

# THE DELL EMC NETWORKING STRATEGY

ONE COMPANY, MULTIPLE WORKLOAD-ALIGNED CONNECTIVITY CHOICES FOR STORAGE

## EXECUTIVE SUMMARY

Dell EMC holds a substantial portion of the enterprise IT market. The combined entity has a commanding lead in enterprise storage as well as a top spot in server shipments. To bridge these two islands of technology, the company offers many connectivity options for the wide range of workloads where Dell EMC provides solutions. Dell EMC delivers its own branded high-speed Ethernet products as well as a range of fabric connectivity products including third-party Ethernet, fibre channel, InfiniBand, and OmniPath to connect compute to storage.

With a growing market emphasis on scale-out deployments, private clouds, and changing workloads, Dell EMC needs a host of connectivity choices to ensure the right connection for these critical infrastructures. Digital transformation is giving businesses an opportunity to redefine how systems communicate to drive more agility. Just as the market is changing with digital transformation, Dell EMC is doing the same. Dell EMC is aligning its networking strategy around helping businesses drive their real growth as they work to achieve greater agility and flexibility in this transitioning market.

## TODAY'S CUSTOMER NEEDS

As companies work to reinvent their businesses, many are moving through a digital transformation, where changing needs are creating demand for a new set of products and architectures that leverage information for faster / better decision making. Dell EMC acknowledges that this new reality needs a different strategy, as it will be impossible to solve the needs of tomorrow with the products of the past. Architecturally, businesses are trying to scale-out with new types of workloads that change how applications and servers communicate, while not losing connectivity to the existing data stores and systems of record that continue drive their business. As they decide how best to handle this transition, management and efficiency are paramount.

Just ten years ago businesses grappled with managing three different networks: voice (analog, POTS), compute (Ethernet), and storage (fibre channel). Voice eventually became VoIP, condensing down into the IP layer and using the same protocols and tools as the data layer, even if being run on separate networks. Now, as companies look to change their storage networks to take advantage of cloud technologies in a digital

transformation, they can again simplify by moving the data transport to IP for some types of storage traffic. Even if these services are being run on separately (partitioned) hardware, many of the same IP skills and management toolsets can be used to keep all three services running smoothly.

As storage requirements have changed, we are seeing an increased reliance on IP networking technologies for connectivity. In the past, low latency technologies like fibre channel and InfiniBand were more commonly deployed for storage due to their higher throughput. Because these interconnects required separate networks that had to be built and managed, they had higher total solution costs and required different skill sets, which were negatives for the new workloads that need rapid scaling.

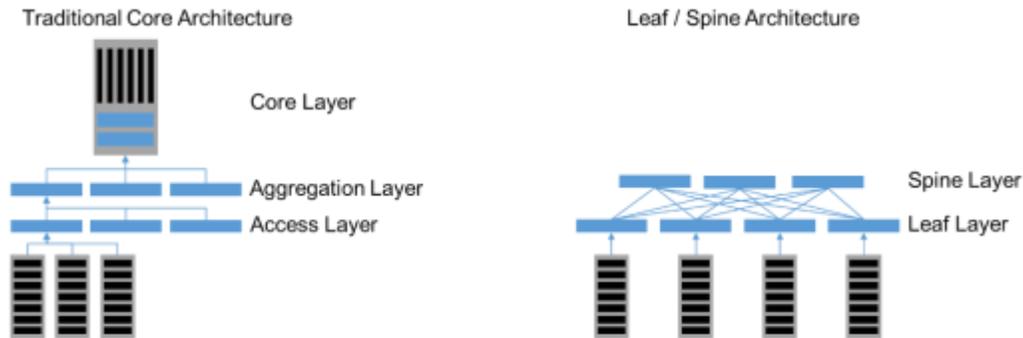
But as applications have changed through the rise of cloud technology and big data analytics, more object-based storage needs have surfaced, primarily being connected via high speed Ethernet. Companies look to Ethernet connectivity for these next-generation storage strategies and cloud-native applications because of its new higher speeds, pervasiveness, cost-effective deployment, and flexible tools.

To drive better agility, businesses are also turning to hyperconverged systems: platforms that combine modular compute, storage, and networking. Unlike blades (which were converged but established fixed ratios of these elements), hyperconverged systems can scale those elements more independently, with better granularity, to match workloads. Hyperconverged storage is integrated into the systems, and Ethernet is the external connectivity choice. Because many of the workloads share storage in a distributed manner, leaf / spine networking is a more consistent architectural choice for managing storage traffic and providing agility in a hyperconverged world.

Ethernet is both more cost effective and easier to deploy with existing administrative resources. Where cost pressures drive businesses to seek alternatives to traditional IT infrastructure, Ethernet brings a value equation to storage that complements fabrics like fibre channel and InfiniBand. Dual 10Gb/s NICs are embedded in most production servers available today, and 25Gb/s technology will deliver even higher performance for future servers. These high-speed Ethernet connections are already deployed and generally not saturated, making Ethernet a perfect conduit for new cloud-based storage options. Multi-rate Ethernet switches are pervasive in the top of rack (ToR), enabling investment protection for businesses that need to support multiple combinations of server traffic from 1Gb/s through 100Gb/s. Once inside the ToR switch, Ethernet traffic is aggregated upwards at 40Gb/s or 100Gb/s as it moves back to the core. But the

explosion of Ethernet-based storage is creating significant strain on legacy north-south architectures, forcing a change to east-west to drive better efficiency.

FIGURE 1: LEAF / SPINE ARCHITECTURE IS FLATTER, MORE SCALABLE



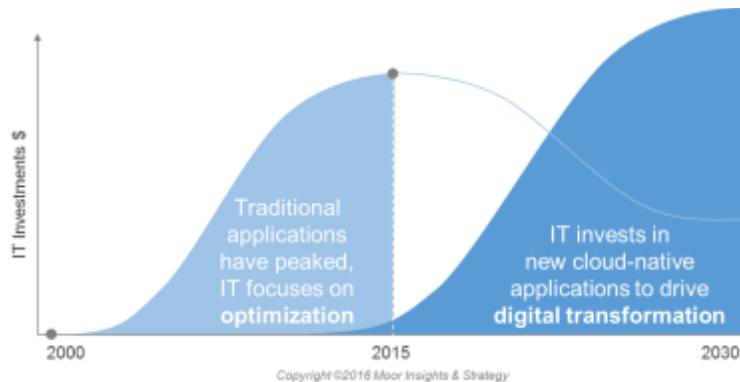
(Source: Moor Insights & Strategy)

Hierarchical networking strategies were adequate for years, as the relatively lighter traffic patterns worked well in a north-south model. But changes in applications, with more machine-to-machine communication and increasing data feed integration, now present IT with a new model for traffic that has significantly more east-west communication. As distributed storage and new data protection schemes have evolved, the shift towards east-west traffic is becoming more pronounced.

Changing traffic patterns are leading businesses to adopt leaf / spine networking to compartmentalize some of the traffic domains and bring more scale-out flexibility to their networks. The shift to leaf / spine networking is opportune as open networking—[which changes many of enterprise networking's traditional, hard-coded paradigms](#)—is coming into favor. Open networking breaks the traditional “black box” of vertically integrated networking, giving businesses more choice in both how and what they deploy.

Investment is shifting away from traditional platforms that have run their course and toward cloud enabled platforms that will enable digital transformation. Cloud storage and object storage are changing the focus, as IT moves from a hardware-defined strategy to a software-defined strategy. This change more closely aligns with Ethernet, which is the preferred connectivity layer for the cloud already. Because object storage replicates each piece of data at least three times on multiple servers for redundancy and availability, this protection scheme favors Ethernet and leaf / spine architectures; technologies that favor north-south patterns will generate traffic bottlenecks. Software-defined storage (SDS) puts more stresses on the network, as the network is no longer just a pipe for moving data; it now has a fundamental role creating this data as well.

FIGURE 2: INVESTMENT INFLECTION FROM TRADITIONAL TO CLOUD



(Source: Moor Insights & Strategy)

Most experts believe that both enterprise SDS (in private clouds) and hyperscale SDS (in public clouds) will grow as traditional enterprise storage is complemented, not necessarily replaced, by these new technologies. Cloud is being driven by the need for agility, and IP-based connectivity makes storage more agile and easier to deploy and manage compared to traditional fabric-connected solutions. With converged or hyperconverged platforms becoming more prevalent, vendor responsiveness becomes critical, as there is now “one throat to choke” across compute, storage, and networking.

## DELL EMC ADDRESSES THE FUTURE OF IT

The enterprise strength of Dell EMC across servers and storage represents a significant upside for businesses that are tackling the challenges of transforming their IT to be more responsive. Dell EMC’s own fast transition and integration reflects the very agility that businesses are seeking. Just weeks after the merger became official, new integrated engineered systems featuring both Dell EMC servers and storage were already available for purchase. While this combined entity was a \$74B company with one of the broadest portfolios in the market, it could still be agile...exactly what companies crave for their own enterprises.

Because of the small overlap in Dell’s server and EMC’s storage customer bases, the combined entity enables the opportunity to bring Dell EMC Networking to a new class of companies, just as it enables storage from Dell EMC to be brought to an equally different pool of opportunity. As the company looks at its combined portfolio, it will have a chance to optimize solutions with better integration over time as it aligns architectures to customer demands, just as it has done with servers and storage.

With consistent leadership and strategy, Dell EMC has committed to continuing its work in the high-performance networking space. The need for scale-out fabrics and multi-rate networking continues to drive opportunity for Dell EMC. With Ethernet rising as a connectivity choice for storage, it makes sense for the largest storage company in the world to control its destiny by bringing businesses a complete end-to-end solution. With the Dell EMC storage strategy becoming increasingly software-defined, Moor Insights & Strategy (MI&S) believes that integrating the Ethernet networking component into their solutions makes sense, especially with open networking tying in to SDN so tightly.

## DELL EMC NETWORKING FOR AGILE COMPANIES

Traditional enterprises are slow to change their networking standards because of the complexity that these environments have built up over the years. Dell EMC Networking products have made inroads in the networking market fueled primarily in the SMB (midmarket) segment, with companies who are moving towards open networking / SDN as well as with service providers. The primary driver for these varied customers is the need to change and adapt in a competitive market.

With Dell EMC, MI&S sees those customer segments that were most attracted to the previous Dell Networking value proposition are continuing to gravitate to the branded offerings, because they continue to match the changing business needs for that customer set. Dell EMC's commitment to flexible multi-rate network switching continues to be a differentiator, providing investment protection as these innovative customers move through different Ethernet speed options.

Dell EMC will continue to work with its cadre of open networking partners, giving IT a choice in how they deploy. Options from Big Switch Networks, Cumulus Networks, IP Infusion, Pica8, and Pluribus Networks can be integrated easily onto Dell EMC Networking products. Dell's open model also provides flexibility for adding additional partners in the future as customer requirements or demands expand. The work that Dell had done on its own network operating system (NOS), OS10, will continue with a defined feature roadmap for future releases.

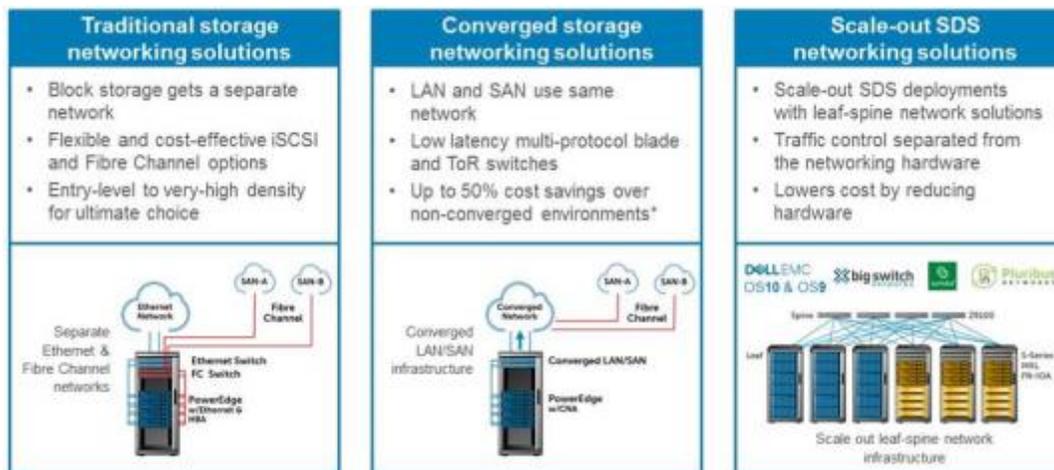
The contributions that Dell has made to the open source communities (most prominently the recent [move of OS10 base components as the foundation for the OpenCompute SONIC project](#)) will continue. The Dell EMC OS10 Open Edition enables IP, fabric, security, and management tools to be integrated on top of Dell EMC switches using the OS10 Premium Edition or open source tools like Quaga or SnapRoute. Dell EMC has

also contributed to the Linux Foundation, making OS10 the [base foundation](#) for the OpenSwitch NOS as well.

Dell was an early supporter of leaf / spine topologies, with much leaf / spine experience to offer, as new storage solutions drive networks in that direction and applications like data replication tax the network. As storage becomes more distributed, architectures fueled by Ethernet increasingly make more sense.

Dell EMC Networking support will now extend to legacy EMC storage products, giving IT a one-stop shop for support and integration. This support includes not only the core storage portfolio built upon array-based technology, but also the software-defined storage solutions such as ScaleIO. ScaleIO can take the direct-attached storage on servers and turn it into easily scalable, shared block storage, making it a compelling choice for hyperconverged infrastructures.

**FIGURE 3: DELL EMC NETWORKING CONNECTIVITY OPTIONS**



(Source: Dell EMC)

## DELL EMC ENGINEERED SYSTEMS

A benefit of the Dell and EMC merger was bringing Dell products into a new set of businesses where Dell previously did not have a footprint. EMC has a presence in many of the largest enterprises, and while Dell might have been selling into those accounts, it did not hold the same level of influence with those key decision makers that EMC held.

Dell and EMC have had a long-running relationship dating back to the 1990s. The fact that Dell PowerEdge servers were integrated into the VxRack and VxRail products so quickly after the merger is a testament to the high degree of previous engagement. As

one of the top server vendors in the world, it is safe to assume that many legacy EMC storage systems are also connected to Dell servers, creating a more supportable environment overall.

In contrast to the open networking environments where Dell EMC Networking plays, heritage EMC products that include engineered systems (VxRack, VxRail) and OEM integrated systems (Vblock) will continue to leverage their legacy network switching elements to maintain consistency with previously deployed infrastructure. It is likely that variants of these engineered solutions will emerge with an open networking option to maximize customer choice and capability in the future.

As many of the Dell EMC solutions demand specific quality-of-service levels and low latency, MI&S expects to see fibre channel and other fabric choices as a connectivity option over Ethernet. But for new scale-out, object-based, and SDS environments, Dell EMC will see Ethernet as the primary connectivity between servers and storage, especially in the hyperconverged areas where ScaleIO plays well.

## THE OUTLOOK FOR NETWORKING'S FUTURE

As we look at what the future brings for networking, much of the change will be driven by one key business requirement: the need for greater agility and responsiveness. Several new technology directions (all focused on feeding that business requirement) are emerging around mobility, IoT, social media, and cloud technologies. These applications will generate massive amounts of data that must be analyzed to glean the insights that enable businesses to move quickly. Because of these new workloads, businesses will need to develop a concerted view of how architectures are built.

To support this agility, IT is quickly dividing between two realms: on-premise and off-premise. On-premise can be a mix of legacy applications, virtualized environments, and private cloud. Off-premise deployments are public cloud (SaaS), hosted private cloud (IaaS, PaaS), or even some co-located servers. The complexity of this hybrid IT environment is driving complications in connectivity, whether it is a public / private cloud that access resources from another domain or it is a multi-cloud environment. These options are driving businesses to reconsider how they deploy and access storage. A large percentage of cloud storage will be deployed as object storage, either internally or through a hosted provider, and that storage will favor a leaf / spine architecture.

While Ethernet networking will play an important role in future storage connectivity, it is more likely to be an additive component in addressing storage than a disruptive component that pushes traditional fabrics out of the market. InfiniBand and fibre channel

will continue to provide connectivity to highly critical storage in environments like high performance computing (HPC) or transaction processing, where low latency and high throughput are required. Direct attach storage will remain primarily where servers are dealing with small amounts of storage or more isolated locations (like branch offices).

For the market that demands greater agility, Ethernet is the preferred choice, because most of these solutions are connecting into some type of cloud-based services that are also IP-driven. Additionally, applications like mobility and IoT are driving more machine-to-machine traffic that favors a flatter network structure and can be more easily deployed through Ethernet with a leaf / spine architecture.

Hybrid cloud is allowing businesses to change how they operate with a trend often referred to as “[digital transformation](#)”, which enables businesses to align themselves around data and knowledge—all of which must be stored somewhere. In this world, businesses are moving beyond simply virtualizing infrastructure; they are building elastic, scalable environments that can move as quickly as the market changes. With a high concentration of cloud technologies, along with big data analytics, businesses are finding that the high performance and malleability of Ethernet make it the right choice.

#### FIGURE 4: TRANSITIONING TO A DIGITAL TRANSFORMATION



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*(Source: Moor Insights & Strategy)*

Not all workloads of the future, however, will be “cloudified”, leaving many in virtualized clusters running legacy VMware, Xen, or Hyper-V environments. For these solutions, fibre channel will remain a preferred interconnect for the largest storage pools, with Ethernet being used in medium to smaller pools. Most important to these deployments will be a consistent connectivity option that helps reduce operational costs.

For service providers that may need to deliver a wide range of products to their end customers, Dell EMC Networking products will make the most sense for the object-

based storage services and cloud services that they will be hosting. However, some of the larger hosted applications, like Oracle or SAP as well as specific hosted services like Exchange, will continue to require traditional Dell EMC storage products because of the application profiles.

The key to an effective storage plan is the ability to manage all elements across a wide range of deployments, using common consoles and tools. As the Dell EMC integration continues, their shared goal is to integrate their consoles and tools to deliver a more consistent and efficient management plane across the servers, the storage, and the connectivity methods.

## CALL TO ACTION

Dell EMC is focusing on delivering a consistent set of networking choices to the market, matching its offerings to the various application needs. Simultaneously, it is trying to prevent disruption for current Dell and EMC customer relationships as it works through its own business integration.

For SMBs, service providers, and agile businesses who have moved to open networking, SDN, and network virtualization, the Dell EMC Networking product line has compelling choices with strong value to fill these needs.

For customers who had been purchasing EMC engineered systems like the VxRail, VxRack, or Vblock, Dell EMC will continue to maintain the consistency of the legacy networking components to help ensure a consistent, supportable, and scalable virtual deployment.

The combination of Dell and EMC is occurring while many businesses are also investigating digital transformation. There is an opportunity for many businesses to take a deep look at how their networking and storage strategies are changing. Against that backdrop, the combination of Dell's longstanding value proposition with EMC's data storage and protection strategies can deliver a valuable solution for the storage needs of a digital transformation. Fabric-based networks are still a requirement for modern storage infrastructure, because they can scale-out to assist in the capturing and analyzing of data coming in from next generation workloads.

Digital transformation imposes new business requirements, and it requires storage and networking to change. New Dell EMC solutions are designed to help businesses take that next step. MI&S recommends that businesses look seriously at both the networking and storage solutions in the combined Dell EMC portfolio.

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