In today’s data center, major breakthroughs in software-defined technology have emerged with the promise of making organizations more versatile and agile. Hyper-converged infrastructures (HCI) bring together the layers of compute, storage and networking into a scalable building block for the software-defined data center (SDDC). However, if not configured properly, these deployments can suffer from network-induced performance problems. Up to one in four deployments are inefficiently connected into the data center network, reducing the benefits that HCI can provide. To live up to the promises of a modern SDDC, it is critical to have a flexible, high performance, highly scalable foundation for both storage and networking. Dell EMC has addressed this issue, mapping a networking design to software-defined storage utilizing Dell EMC Networking and the Dell EMC Ready Node for ScaleIO® to help IT organizations build their own HCI.

Key benefits of Ready Node for ScaleIO:

Ready Node for ScaleIO combines the proven foundation of reliability and manageability delivered by Dell PowerEdge Servers with the massive performance, elasticity and scalability of Dell EMC ScaleIO software. ScaleIO is a key component of Ready Node for ScaleIO and the SDDC. Built with enterprise-grade resiliency, it provides scale-out, software-defined storage for block-based storage needs. ScaleIO abstracts, pools and automates storage resources across a multitude of servers, automatically rebalancing data as nodes are added or removed. IT organizations can allocate as little or as much performance and capacity, as needed, to individual applications and add or remove nodes in small or large increments, from 3 – 1000+ nodes. In turn, performance scales linearly as nodes are added.

The Dell PowerEdge servers have been tuned and optimized to run ScaleIO, enabling IT organizations to deploy a one-layer co-resident or two-layer storage-only solution that is fully supported, configured, tested and validated to provide the best performance possible. The different server node configurations are designed to be optimized for capacity or performance, including All-Flash and Hybrid options with enhanced caching capabilities. Ready Node for ScaleIO is also hypervisor and OS agnostic and supports VMware vSphere, Windows Server 2012 and Hyper-V, Linux and OpenStack deployments. This provides IT organizations the flexibility to select the solution that best meets their business objectives, while greatly simplifying the process of procuring and deploying a software-defined storage architecture.

Dell EMC Networking infrastructure with Ready Node for ScaleIO

Dell EMC Open Networking disaggregates networking technologies into modular building blocks, bringing customers both flexibility and innovation. Dell EMC simplifies the overall network and opens the architecture to allow customer choice across the entire networking infrastructure — building highly reliable, flexible and customer-centric solutions. Dell EMC offers customers an open, programmable network infrastructure that ensures optimum performance and availability within the data center.

Key benefits of this joint solution include:

- Open approach – delivers customers a broad choice of best-of-breed networking platforms, operating system and management tools to fit specific business and operational needs.
- Scalable and flexible – builds networking fabrics to support the flexibility and scalability requirements of Ready Node for ScaleIO deployments.
- High performance – decreases the number of required switch ports and cabling, consolidating traffic on 10-100GbE low latency switching.
Building Fabrics for HCI and SDDC

A common design choice in networking uses a mix of Ethernet-based layer 2 protocols and technologies. Network topologies typically look like a tree, with redundant uplinks and three levels of hierarchy commonly named the Core, Aggregation and Access layers. To accommodate bandwidth demands, each succeeding level has higher port density and bandwidth capacity. Normally, only the upper layers of the network (the core or aggregation layers) use IP routing.

Spine and leaf topologies

Network designs that leverage IP routing down to the access layer of the network have been gaining popularity in the data center. The main benefit of these topologies, commonly called spine and leaf, is improved network stability and scalability resulting from limiting layer 2 broadcast domains. Moving the routing down to the access layer creates an effective spine and leaf topology. Dell EMC Virtual-Link Trunking (VLT) connects the two leaf switches, enabling an active/active redundant load-balancing connection.

One of the benefits of ScaleIO’s IP-based storage in a spine and leaf infrastructure is its reachability. Any device in the data center can reach the solution using layer 3 routing. This allows ScaleIO to reach hundreds of compute/storage nodes with nearly seamless scale-out for growth. Connecting directly to leaf switches decreases latency and complexity while increasing reliability. This direct connection also simplifies troubleshooting problems by enabling efficient identification of problems down to the node and specifically spotting switch failure, allowing efficient substitution of a spare switch from a common pool.

Dell EMC high performance switching

In addition, introduction of high performance switches at both the leaf and spine decreases the number of required switch ports and cabling, consolidating traffic on higher-speed ports. Dell EMC Networking offers a range of 10-100GbE, low latency switches that simplify the network fabric, ideal for a ScaleIO deployment. Through these high performance switches, networking costs and cabling complexity can be dramatically reduced for even the most demanding workloads.

Summary

Modern Data Centers are already delivering tremendous advantages for organizations, providing key benefits of an SDDC by improving time to deployment while offering significant TCO incentives. As a leading solution for the modern data center, Ready Node for ScaleIO provides the technology for strong performance through flexible, scalable and efficient resource management. For flexibility of HCI and storage-only deployment models in an SDDC, Dell EMC delivers a network fabric deployment optimized to derive the maximum benefits of a modern data center.

Learn more at Dell.com/ScaleIO