

White Paper

Dell EMC Hyperconverged VxRack System 1000

Able to Scale on Demand, Simple to Manage, and Fully Integrated

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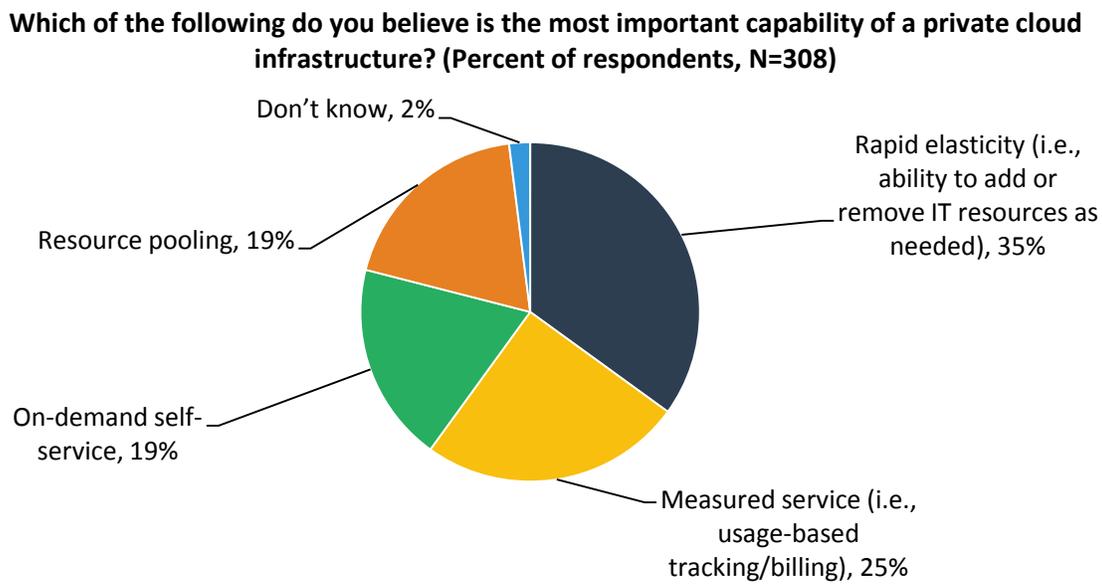
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The Data Center Modernization Movement

Enterprises of all sizes are undergoing massive data center modernization initiatives. They are looking to use technology to cut costs and drive competitive advantage. At the core of many of these transformations is an effort to reengineer IT delivery models to enable cloudlike flexibility of resources, and reduce both capital expenditures and operational overhead. That is giving rise to the private cloud movement. Indeed, private cloud adoption is accelerating and maturing. IT organizations are looking to the private cloud for the elasticity it can provide to add or remove resources as required. In fact, ESG research reveals that more than three-quarters of organizations would classify their private cloud deployment as either an advanced internal cloud or a basic internal cloud. Those organizations that have virtualized at least half of their production applications are more than twice as likely as their more physical infrastructure-dependent counterparts to categorize their environment as a complete IT-as-a-service operating model (ITaaS).¹

IT managers surveyed about their private cloud deployments cite elasticity, providing a measured service, the ability to provide an on-demand/self-service environment, and the ability to pool resources as the most important capabilities of private clouds (see Figure 1). This is *exactly* what hyperconverged systems enable.

Figure 1. Most Important Private Cloud Infrastructure Capabilities



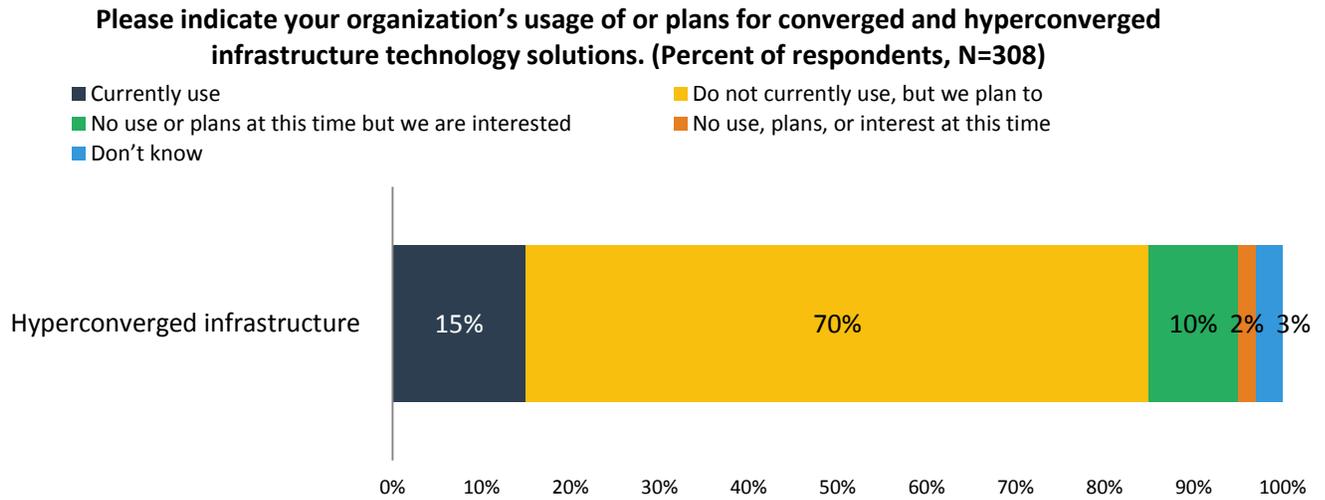
Source: Enterprise Strategy Group, 2016

Building a Private Cloud – Why Hyperconverged Makes Sense

According to ESG research, 85% of IT organizations surveyed have deployed or are planning to deploy a hyperconverged system (see Figure 2), and for good reason.

¹ Source: ESG Research Report, [The Cloud Computing Spectrum, from Private to Hybrid](#), March 2016. All ESG research references and charts in this white paper have been taken from this research report, unless otherwise noted.

Figure 2. Hyperconverged Infrastructure Adoption



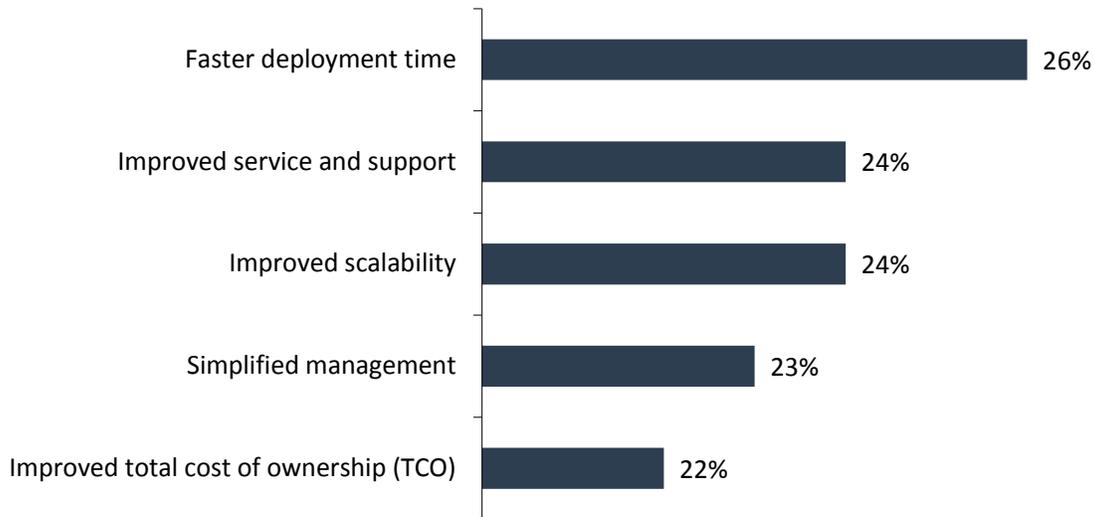
Source: Enterprise Strategy Group, 2016

When it comes down to it, IT organizations can derive numerous benefits from the hyperconvergence movement. When planning to deploy solutions, the most often-cited benefit IT organizations are seeking from hyperconvergence is improved service and support. But there are additional reasons cited by IT organizations for going down the hyperconverged path. IT organizations say they are looking for greater scalability, agility, and the ability to deploy resources faster since a modern data center can’t expect to stay competitive when infrastructure provisioning takes weeks or months.

Hyperconvergence pays off. Though users primarily adopt hyperconvergence for improved service and support, the *benefits that organizations realized post deployment*, as indicated by ESG research, show that more than one in four cite faster deployment as one of the most significant benefits they’ve realized, while nearly one in four cite service and support, and scalability improvements. Furthermore, more than one in five report reduced management overhead and TCO (see Figure 3). So whether it’s the benefit of elasticity through faster deployment, or capital and operational expenditure reduction, hyperconverged systems at the core of data center modernization efforts just make sense.

Figure 3. Top Five Benefits Realized by Deploying a Converged or Hyperconverged Technology Solution

What have been the most significant benefits your organization has realized by deploying a converged or hyperconverged technology solution(s)? (Percent of respondents, N=145, three responses accepted)



Source: Enterprise Strategy Group, 2016

Yet concerns remain. More than one in five respondents in that same survey cite concerns about a lack of flexibility when scaling, while nearly one in five are concerned about cost, noisy neighbor issues, and lack of configuration flexibility. Dell EMC's family of hyperconverged solutions is designed to address these issues.

Dell EMC Converged Platform division provides a range of hyperconverged solutions offering all of the benefits of hyperconvergence while helping reduce costs and enabling deployment flexibility. And because Dell EMC's hyperconverged appliances do not subscribe to the "one-size-fits-all" philosophy, organizations have the flexibility to choose the right solutions based on their own unique needs.

Dell EMC hyperconverged solutions include:

- **VxRail.** Providing organizations across the board with a means of entry into midrange VxRail appliances, the pre-configured and pre-tested VxRail family is optimized for traditional and cloud-native workloads running on VMware integrated server and storage, and Dell EMC software.
- **VxRack System 1000.** This system is optimized for traditional and cloud-native workloads running in mixed environments where customers need hyperconvergence and want to start small, four nodes, and grow to extreme scale (greater than 64 nodes, thousands of VMs) with built-in, rack-scale networking. Organizations can choose from three options:
 - **VxRack System with FLEX.** This rack-scale solution runs Dell EMC ScaleIO behind the scenes, which enables some significant benefits including: massive scalability, multipathing (for extreme performance), and high availability (Dell EMC claims six 9s). It also provides users with a choice of OS/hypervisor, so they can use the best fit depending on workload.
 - **VxRack System with Neutrino.** Using open standards, this native hybrid cloud solution provides organizations with a simplified way to move from developing traditional applications to cloud-native applications—enabling

rapid deployment of an OpenStack or Photon environment, single vendor support, and reduced operational expenses.

- **VxRack System with SDDC (software-defined data center).** This all-inclusive solution combines hardware with integrated, pre-tested VMware software stack, providing a hyperconverged system that streamlines operations, deploys quickly, reduces downtime, and scales easily as demand grows.

Hyperconverged at Scale: VxRack System with FLEX

Designed for deployments with large numbers of virtual machines and users, the VxRack System with FLEX (VxRack FLEX) is an integrated system incorporating a full IT stack comprised of server, networking, storage, virtualization, and management components—pre-configured, pre-loaded, and pre-tested. VxRack FLEX, which runs Dell EMC ScaleIO software-defined storage, offers:

Wide data distribution for high performance. VxRack FLEX widely distributes data across all storage resources in the cluster, thus attaining the benefits of parallel performance as all resources act in concert to meet performance demands. This solves an architectural problem associated with some other IP-based storage systems, which limit data distribution and experience resource bottlenecks. Because of this data distribution, all of the IOPS and bandwidth of the underlying infrastructure are realized with no hot spots, providing linear scaling with minimal overhead.

Increased availability and resiliency. Designed with a self-healing architecture that leverages its parallel architecture and wide data distribution for increased resiliency, VxRack FLEX employs many-to-many rebuilds. This is much different than the serial rebuilds seen with many storage products. When hardware fails, data is automatically rebuilt using all other resources in the cluster. This enables a six 9s availability profile while using x86 industry-standard hardware.

Built-in multipathing. This feature automatically distributes traffic across all available resources. Every server can be a target as well as an initiator. This means that as users add or remove nodes in the cluster, multipathing is dynamically updated on the fly, with no input required by an administrator.

Fully integrated networking. Like other products within the Dell EMC converged and hyperconverged portfolio, VxRack FLEX includes a fully integrated Cisco rack-scale spine-and-leaf network fabric with pre-integrated physical networking. This can provide distinct advantage at scale versus hyperconverged appliances that leave the networking domain outside the system and support boundary, sharing hyperconverged traffic across the communications network switching infrastructure.

Ensure Quality of Service (QoS). Dell EMC ScaleIO provides the ability to set different priorities to different applications, users (multi-tenancy), or data flows, and deliver a certain level of performance to a data flow. This helps to ensure there can be no single point of failure or “noisy neighbors” impacting the services delivered to each and every user/customer.

Support for a variety of workload types. The solution is deployed as a rack-scale, hyperconverged technology along with customer choice of hypervisor and operating system for a variety of use cases, including VMware workloads—all within a single cluster.

Simple management, upgrades, and sustainability. VxRack FLEX includes VCE Vision software to provide the intelligence, automation, and visualization needed to effectively manage next-generation converged and hyperconverged infrastructures.

Attractive entry point that scales with the business. Customers can start with a few nodes and can rapidly scale to hundreds or up to a thousand nodes with VxRack FLEX.

The Dell PowerEdge Advantage

VxRack System with FLEX now offers new PowerEdge-based configurations. These come in two configurations (1U/1N based on PowerEdge R630, and 2U/1N based on PowerEdge R730xd), both offering options for all-flash, storage only, or hybrid.

The clear highlight here is the all-flash nodes, which promise to dramatically improve economics and performance for I/O-intensive workloads:

- **Better flash economics.** Dell PowerEdge servers offer 2.5X more useable all-flash capacity for a similar price when compared to previous node options.
- **Application acceleration.** Full integration with SanDisk DAS Cache accelerates the speed of storage input-output operations and reduces latency, resulting in improved performance of I/O-intensive applications such as Microsoft SQL.

On the compute side, PowerEdge servers enable users to:

- **Maximize operational effectiveness.** This is achieved by delivering optimal performance per resource unit through streamlined management, power savings, and density advantages.
- **Optimize flexibility at any scale.** PowerEdge server platforms and management architectures are designed for consistency across the product line, extensive scalability, and maximum versatility to enable IT departments to be able to adapt on the fly to deliver new applications without interruption due to platform or infrastructure changes.
- **Ensure availability.** The evolution of applications, expectations, and BYOD delivery means that 8 am-5 pm availability is no longer good enough, so PowerEdge server platforms are designed to enable 24x7x365 operations.

Dell EMC owning both the compute and storage portions of the stack is a game-changer for the hyperconverged portfolio. It allows the company to deliver more value choices for customers via investment protection, faster innovation, supply chain advantages, and, ultimately, the cost advantages and savings it can pass on. New Dell PowerEdge-based appliances and nodes can mix and match with existing VxRail and VxRack Systems, providing investment protection for customers.

Dell EMC ScaleIO Performance: More Cost-effective and Less Complex (than External SAN)

VxRack FLEX runs a variety of applications, including tier-1 applications. The software-defined solution uses Dell EMC ScaleIO technology, which leverages host-based internal storage to create scalable, server SAN performance comparable to or better than an external SAN. With software-defined storage, organizations gain greater flexibility, performance, and scalability with simplified management capabilities.

Approved by Oracle and SAP for use with tier-1 applications, Dell EMC ScaleIO ensures there are no noisy neighbors in the system, keeping traffic separate by defining nodes per application. In addition, ScaleIO has the capability to evenly spread workloads, providing quick, easy, linear scalability. ScaleIO also matches nodes to workload requirements, adding flash nodes for compute, dense storage for storage-heavy applications, or hybrid for general purpose workloads.

[Based on ESG Lab testing](#), ScaleIO performance is more cost-effective and less complex than an external SAN, and it is the secret sauce for allowing VxRack FLEX to meet tier-1 performance requirements.²

² Source: ESG Lab Spotlight, [EMC ScaleIO: Proven Performance and Scalability](#), September 2015.

The performance, scalability, flexibility, manageability, and integrated nature of the VxRack System 1000 make it an ideal solution to be used as the basis for a private cloud that supports a multitude of workload types, from tier-1 applications like Oracle RAC to tier-2 and -3 applications like email and cloud-native applications, including OpenStack.

The Bigger Truth

IT is shifting to a services delivery model, forcing a fundamental change in how the underlying infrastructure is deployed, managed, and operated. And this new model is driving the data center modernization movement.

While the bulk of applications are (and will continue to be, for at least the next five years) serviced by traditional three-tier (server, storage, and network) infrastructures, new applications will be deployed on modern converged architectures. Over time, as applications are upgraded or aged out, we'll see three-tier architectures diminish, though nothing ever really dies out when it comes to technology deployed in the data center. Manageability and availability at scale will be the driving factors in determining how to provision infrastructure in support of modernization efforts. That's what convergence is all about.

The performance, scalability, flexibility, and built-in resiliency features of VxRack FLEX take the worry away from supporting most tier-1 applications. Dell EMC has the experience in large-scale enterprise deployments and the global footprint to be a hyperconverged vendor of choice for meeting data center modernization needs.

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