Why Hyper-Converged Infrastructure Makes Sense For VDI Workloads

It's hard to find a single IT organization on the planet that isn't trying to adapt and evolve its infrastructure to address a wide variety of key capabilities, including cost predictability, scalability and visibility. That's why converged and hyper-converged infrastructures are rapidly gaining acceptance for a wide variety of applications and workloads.

Both converged and hyper-converged (HC) solutions offer the benefits of tightly coupled compute, storage and networking within a single package. These solutions are pre-configured and pre-tested for streamlined deployment by eliminating the need to install infrastructure components separately.

Hyper-converged infrastructure, however, goes even further. HC infrastructure appliances (HCIA) comprise server, storage, network connectivity and software into a pre-integrated package. That package typically is designed to act as a unit of scale for a designated workload, determined by the software, such as a virtualization hypervisor. This allows the workload to start out small with one or a few units, but quickly scale out by combining more units to increase capacity and performance of that appliance.

One of the most prevalent workloads using hyper-converged appliances is virtual desktop infrastructure (VDI), a fast-growing solution for many IT organizations regardless of organizational size or industry. In fact, global VDI revenues are expected to grow by more than 32% on a compound annual basis between now and 2019.¹ The main reasons why this dramatic growth is taking place center on such trends as BYOD, the need for heightened security and improved cost efficiency in moving away from physical desktops.

The increased utilization of VDI often creates pressure on traditional infrastructure due to several issues. This is an area where scalability becomes a key requirement for VDI, and where HCIAAs can help address challenges. For instance, infrastructure comprised of discrete components must configure and tune each of those components for the individual workload, such as VDI. In traditional infrastructure design, Logical Unit Numbers and storage volumes need to be mapped to VMs; maintaining that alignment over time amid typical changes in storage requirements is a demanding and complex task. Another challenge is

overprovisioning of storage; IT organizations usually have to buy and deploy sufficient storage to meet what they expect their needs will be 12-18 months out. That is a difficult and often expensive task, and adding more storage to a traditional SAN is not an ideal solution.

With HC appliances, however, IT organizations can just add one or more infrastructure nodes without experiencing unnecessary and disruptive downtime. This allows organizations to easily scale in small increments as necessary, and as conditions and budgets allow.

**Cost predictability** is another important requirement in HC solutions for VDI. While adding VMs certainly saves on capital expenses compared with adding physical machines, the increasing number of virtual desktops can carry additional costs in management, deployment and user onboarding and training. By using HCIs for faster deployment, organizations save money on IT staff time—which obviously multiplies as the number of VMs grows—as well in avoiding costly downtime because HCIs can be added without disrupting operations. Additionally, using a centralized management platform helps reduce OpEx compared to physical client devices, which becomes a big contributor to faster time to value.

**Visibility and ease of deployment/management** also are vital requirements for an HCI optimized for VDI workloads. As virtual desktops proliferate, there is increased pressure on storage and IT administrators to have real-time insight into every aspect of infrastructure activity and behavior. For instance, administrators need a 360-degree view of all resources across different infrastructure clusters, and must be able to simultaneously manage multiple discrete clusters for activities such as configuration, replication, disaster recovery and compression policies.

Another key aspect to visibility is monitoring, assessing and, if necessary, remediating infrastructure health. That visibility should be enabled through a unified management platform for those and other features, including changes in baseline server configurations, discovery, inventory and monitoring of hardware components and service-level performance.

Naturally, that unified management platform must enable visibility through a single pane of glass in order to reduce management demands on administrators—even while they gain and share greater insight into system activity and status.

Of course, there are other challenges to VDI, as well. Utilization spikes such as boot storms can temporarily overwhelm infrastructure that is not optimized to handle VDI’s unique performance characteristics, especially when the number of virtual desktops scales dramatically and predictably. Hyper-converged infrastructure appliances often can help mitigate this impact through a combination of features, such as storage tiering, caching and support for higher performance levels of solid state disks compared with traditional hard drives.

HC infrastructure also addresses VDI challenges in other ways. For instance, customers can start with a pilot program supporting relatively small numbers of users, but can then ramp up dramatically to support many more users. This comes in handy in fast-growing organizations that are adding employees and want to equip them with virtual desktops rather than physical desktops. Not only does this support easier scalability than with other infrastructure designs, but it makes managing VMs easier in a dynamic user environment.

The use of hyper-converged infrastructure is an excellent solution for VDI’s challenges because it allows organizations to dedicate a cost-effective, easily managed and scalable infrastructure appliance to VDI workloads. Hyper-converged
addresses such VDI-centric issues as deployment and provisioning time for new virtual desktops; predictability of costs in growing environments; the ability to expand as workload and business needs evolve; performance challenges created by scenarios such as boot storms; and VDI management through a software-defined architecture.

**What to Look for in a Hyper-Converged Solution for VDI**

When an organization begins evaluating HC options for VDI workloads, there are a number of key features, functions and capabilities that should be on the “must-have” list. Without these, IT departments will be hard pressed to put in place truly scalable, VDI-specific solutions that deliver visibility, scalability and predictable costs as VDI implementation escalates.

- **Application-specific reference architectures.** The reference architecture facilitates application-specific, HC solutions designed to work with a customer’s specific VDI application of choice. General reference architectures certainly help, but they are most useful for “steady states,” without the impact of growth and scale-up requirements.

- **Pre-configured and pre-tested with predictable scale, workloads and cost per seat.** Some solutions that advertise themselves as “converged” actually still require integration at the component level. Look for a complete solution, including pre-installed software.

- **Attention to operating expenses such as management, power, cooling and physical space.** Converged and hyper-converged solutions offer demonstrable advantages over traditional infrastructure in these areas; however, not all HC solutions are purpose-built for the highest possible savings in operating costs.

- **Rapid time to value with prescriptive deployment.** A key part of achieving fast time to value with HC solutions is the ability to deploy those solutions in hours, not in days or even weeks.

**Dell’s Hyper-Converged Portfolio Approach for VDI**

Dell offers two purpose-built HC solutions for VDI workloads: Dell Engineered Solutions for VMware EVO:RAIL Horizon Edition and the Dell XC Web-Scale Appliance powered by Nutanix. Dell made a strategic decision to create multiple solutions to provide customers with greater choice in selecting the best HC solution for VDI workloads to meet their individual needs. The solution for EVO:RAIL is typically aimed at smaller deployments with several hundred users, while the XC Appliance powered by Nutanix is generally deployed in larger VDI projects.

EVO:RAIL is VMware’s software bundle featuring vSphere and Virtual SAN that is integrated with HC solutions from leading vendors such as Dell. Designed specifically for VMware environments, Dell’s EVO:RAIL implementation is a plug-and-play solution based on Dell’s 4-node servers.

For organizations looking to quickly and cost efficiently deploy virtual desktops in VMware environments, Dell Engineered Solutions for VMware EVO:RAIL Horizon Edition enables new VMs to be spun up in mere minutes, compared with the more typical days or weeks usually required to install, assemble and integrate discrete components.

The Dell XC Web-Scale HC Appliance leverages Dell’s x86 hardware platform and Nutanix’s web-scale software for VDI requirements. The XC Series appliances are based on HC infrastructure using software-defined architecture to distribute data, metadata and operations across the entire HC server cluster.
The Nutanix distributed file system runs in a controller VM on each node, aggregating direct-attached storage resources across all nodes. The Nutanix software is a key enabler of the XC Series web-scale, hyper-converged appliances’ use as integrated, highly scalable compute and storage solutions for virtualized workloads.

They offer rapid time to value for dynamic environments like desktop virtualization, test and development, private cloud and server virtualization. Available in 1U and 2U form factors, XC Series appliances come with the option of three Nutanix software editions—Starter, Pro or Ultimate—that support different levels of deployment. The modular nature of the XC Series means enterprises can start with a small deployment and scale up to a large cluster as needed.

Dell XC appliances offer alternative ratios of processor, memory and hard disk drive/solid state disk configurations. These appliances can be mixed and matched to independently scale compute and storage in a cluster. Each one is designed for specific virtualized workloads, and a sizing tool is available to help identify a solution that closely matches the customers’ workload and overall IT requirements.

**Conclusion**

As virtualization in general, and VDI in particular, becomes increasingly commonplace in the enterprise, IT organizations need new solutions architectures to optimize VDI workload scalability, visibility and cost predictability. Converged infrastructure is a big step forward in data center infrastructure design because of its ability to offer pre-configured, pre-tuned and pre-certified bundles of hardware and software in a single package. Hyper-converged infrastructure, however, takes it even further.

HC solutions are optimized through the addition of dedicated software for individual workloads, such as VDI. As a result, HC solutions—based on software-defined architecture—support demanding VDI requirements by offering essential scalability, improved visibility and cost predictability as VMs proliferate throughout the organization.

Dell, which has established itself as a leader in the converged infrastructure space with a broad portfolio, offers customers a pair of VDI-optimized hyper-converged solutions. Dell’s HC solutions combine the company’s long history of market leadership in compute, storage and networking with a sophisticated take on software-defined architecture to optimize VDI workload performance and cost efficiency. The company is also working with industry leaders such as VMware and Nutanix to offer customers a broad portfolio of SDS solutions. Dell’s ecosystem of strategic partnerships is an invaluable asset for organizations looking to take advantage of best-in-breed solutions, while at the same time mitigating implementation and operational risk.