

White Paper

Dell EMC XC Family: Hardware that Matters to the Digitally Transformed Business

Extending the Value of Hyperconverged Infrastructures with an Ecosystem of Solutions, Services, and Support.

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Executive Summary

A common misconception about hyperconverged infrastructure (HCI) is that because data services are software-defined, the hardware doesn't matter. It's easy to see why people think that—the software driving HCI solutions such as the Dell EMC XC Family (in this case, Nutanix software) is exceptional. It efficiently manages data and communications across a cluster of nodes and storage tiers, keeping applications up and running, delivering optimal performance and availability. Software-defined infrastructure is changing the way data services are delivered, making companies more efficient and agile, and reducing costs.

But the software—no matter how powerful—cannot do anything alone. It depends on a hardware foundation that impacts the efficacy of your infrastructure. Sure, you can save money by using commodity x86 hardware—but that will also define the manageability, reliability, performance, and support of your HCI deployment. What about lifecycle management to ensure data is not only protected, but also quickly recoverable at all times? How about application-specific guidance—reference architectures and best practices—to ensure optimal infrastructure efficiency? The relationship between the software and hardware vendor must be strong in order to properly meet customer needs.

Hardware abstraction is a given with HCI, but what does that mean? It simply means that data tasks are managed through software and can therefore be completed on different hardware platforms. It does *not* mean that hardware doesn't matter; on the contrary, the hardware and software are interdependent. To get the best results, the entire stack should be validated to handle the varying demands of different enterprise applications. While commodity hardware can get you some of the benefits of HCI, a purpose-built hardware foundation can get you more.

Dell EMC intellectual property makes the difference in the XC Family. It uses PowerEdge hardware powered by Intel Xeon Scalable processors, designed specifically for HCI, pre-integrated with Nutanix software, and with purpose-built configurations tailored to HCI workloads. Leveraging the vast experience and expertise of Dell EMC storage engineers, the XC Family is a product line that delivers a highly reliable foundation and provides a complete offering to the modern business. This not only includes hardware and software co-configured and co-engineered with Nutanix, but also an extensive ecosystem of supporting solutions, improved manageability, flexible licensing, application-specific references architectures with best practice guidance, and timely support.

What Drives Customers to HCI?

Organizations are attracted to HCI primarily for its simplicity—it is easy to deploy and ongoingly manage, providing a fast onramp for virtualization in a single footprint that through central control reduces management effort and cost, as do software-defined data services. IT no longer has to manage LUNs and RAID groups on external storage connected via SAN; they may opt instead for the internal storage of HCI that can include enterprise-class storage features. HCI provides a common platform for multiple virtualized applications, instead of requiring a different server for each workload, and is easy to upgrade and to scale. This, in turn, allows organizations to shift focus away from the management complexities of a siloed infrastructure to the more important aspects of the infrastructure that drive revenue—the applications.

ESG research with midmarket and enterprise organizations supports the notion that efficiency and cost are key drivers of HCI. The percentage of respondents deploying HCI has more than doubled since 2015, from 15% to 39%, with an additional 18% expressing imminent interest in the technology. Additionally, as organizations look to prioritize data center modernization to help them digitally transform, 44% view HCI as the best vehicle for them to become more “cloud-like,” to deliver IT as a service and reap the cost, efficiency, and agility benefits. When asked about their reasons for deploying it, ESG research respondents selected numerous factors, including:¹

¹ Source: ESG Master Survey Results, [Converged and Hyperconverged Infrastructure Trends](#), October 2017.

- Scalability.
- TCO.
- Ease and speed of deployment.
- Simplified systems and storage management.
- Agility of VM provisioning.
- Reduced operational expenses.

What to Look for in HCI Solutions

Not all HCI solutions are alike. Below are some of the features you should be aware of when selecting an HCI solution.

- **Ease of deployment and management.** HCI is a node-based architecture, with nodes working together in a cluster. It should be fast and easy to deploy with minimal configuration—being a turnkey system is a key feature. Managing compute, storage, and networking from a central location saves time and money, and software-based upgrades are easy.
- **Scalability.** Scaling is as simple as adding nodes to the cluster; both hardware and software contribute to keeping management simple as you scale.
- **Lifecycle management.** How easy is it to upgrade hardware and software components? An integrated, purpose-built appliance is a holistic HCI solution that is easier to deploy, operate, and upgrade than hardware and software that are used together but remain distinct throughout the lifecycle.
- **Serviceability.** Component failures do happen. Drives fail, especially as you scale from dozens to thousands of drives. Because most HCI clusters support many applications, virtual desktops, and production workloads, it is essential that IT be able to troubleshoot and fix problems easily, without disruption.
- **Performance.** HCI storage is local, eliminating the delays that happen with external RAID storage. Performance must meet expectations for multiple simultaneous workloads and VMs. Be sure you get the performance you need.
- **Reliability.** You're running numerous applications and VMs, so always-on data services are essential.
- **TCO.** The biggest savings with HCI are in OpEx because you don't need separate administrators for server, storage, networking, and virtualization. Any automation in your HCI solution will increase those savings. In addition, hardware that does the job efficiently is easier to manage and service, fails less, delivers the right performance for any workload, and will deliver a lower TCO.
- **Flexibility.** Workload requirements differ—some may need more compute, some may need more storage. Having capacity and performance configuration options in your HCI nodes allows you to cost-effectively optimize your environment.
- **Density and power/cooling.** Some organizations need a small footprint due to space restrictions, and HCI is a great solution for that. The ability to pack as much performance and capacity as you need into a small footprint and ensure power efficiency can provide market advantage.

Realities of Hardware and Hyperconverged

Commodity x86 servers are built for general purpose computing—not to handle the demands and stresses of a mix of business-critical applications with different SLAs while ensuring high levels of performance, availability, and security. “Commodity” means there are options from various manufacturers, along with lower acquisition costs due to economies of scale from mass production. They can have an important place in the data center. But they were not designed for the levels of performance and reliability an HCI platform should deliver. For example, if your applications needed enterprise storage capabilities such as high performance and reliability before HCI, why should you give those up to get HCI? If you’re consolidating applications onto a single platform, make that platform a robust, purpose-built workhorse, not a generic workbench.

Hardware needs to be designed and configured with software nuances and limitations in mind to understand what’s going on across all the interconnected components at a system and hardware level. Getting it right can improve the reliability and manageability of the system. A hardware and software solution that is validated and hardened into a complete ecosystem can do that. Running multiple virtualized applications creates an “I/O blender” effect, with different I/O types all wanting resources at the same time. This can overwhelm a virtualized controller, causing performance degradation, unless the platform is built for that specific purpose. Also, HCI clusters depend on inter-node communication to handle routine maintenance tasks such as resource pooling, data tiering, data protection, capacity optimization, etc. These require the software to consume resources; in case of hardware failure, fewer resources are available, resulting in not only application performance problems, but also problems across the entire cluster. With proven hardware, collaboration between the hardware and software vendors, and expansive support, disruption will be minimized, and operational efficiency will be maximized.

Proving the Point with the Dell EMC XC Family

There are numerous HCI solutions on the market, some bundled with hardware, some software only. The Dell EMC XC Family are purpose-built HCI appliances that prove why hardware matters. Dell EMC and Nutanix have shared their knowledge to create a fully integrated, hardware/software ecosystem designed to deliver the linear and predictable scalability of capacity and performance required to support the flexibility needs of a dynamic IT environment.

XC Overview

The XC Family is built on Dell’s flagship PowerEdge platform, an x86 machine that has been a stalwart in data center computing throughout 14 generations. And with over 150 design features that were integrated into the XC Family with hyperconverged workloads in mind, numerous optimizations are gained. It is equipped with high performance Intel Xeon Scalable processors, high performance flash, and high-speed Ethernet. Delivered in 1U, 2U, and 3U appliances, the XC Series supports virtualized environments that leverage Microsoft Hyper-V, VMware ESXi, and Nutanix AHV hypervisors.

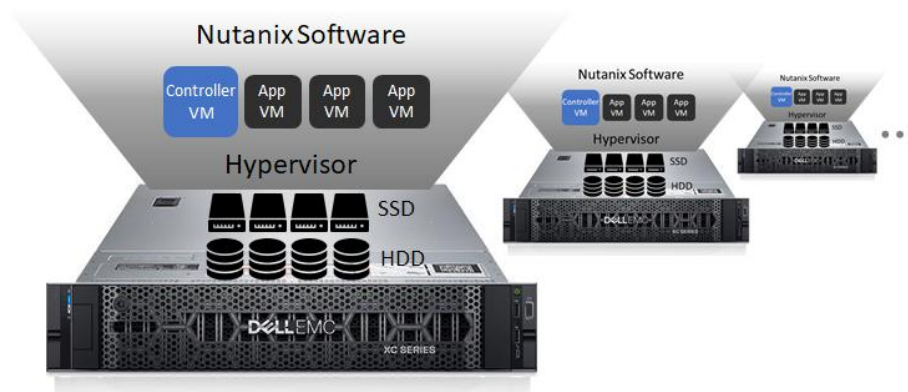
With XC Core—which uses the same hardware foundation as the XC Series—organizations gain flexibility in how they can license Nutanix software and leverage support. While XC Series enables organizations to go right to Dell EMC for complete hardware and software support, XC Core provides customers with flexibility in how they acquire the Nutanix software license. While leveraging the XC Series appliance is generally the preferred approach based on its turnkey capabilities, XC Core gives customers the sometimes-required portability of licenses, enabling them to continue to leverage the benefits of the Dell EMC XC platform with a separation of management, maintenance, and software and hardware support.

XC Series appliances are fast and easy to deploy, with node-based linear scalability that ensures predictable performance as you scale and pay-as-you-grow expansion. Compute, storage, and virtualization resources are seamlessly intertwined with software-defined data services. Data, metadata, and operations are distributed across the cluster, delivering high availability and data protection. Data locality is delivered by placing frequently used data on the same node as the VM for optimal performance. Features include replication, capacity-saving deduplication and compression, and “one-click”

upgrades and node additions. The Nutanix Acropolis operating system runs in a controller VM on each node to combine SSD, HDD, and optional SED capacity into pools. And Nutanix Prism provides GUI-based, centralized cluster management, with REST APIs enabling third-party management integration.

Figure 1. Dell EMC XC Family Hyperconverged Infrastructure

- PowerEdge platform
- Licensing flexibility
- Engineering expertise
- Components selected for HCI
- Integrated, validated ecosystem
- Workload-based configurations
- PowerTools-enabled workflow automation
- Continued innovation
- Dell EMC ProSupport



Source: Enterprise Strategy Group

XC Family Differentiators

What makes the XC Family different? First, it is a fully integrated, pre-tested, hardware/software ecosystem. The hypervisor and Nutanix software are factory-installed before shipping, saving IT administrator's time and cost. The components and versions are already compatible, built into a validated stack—so there are no surprises that delay deployment, speeding time to value.

The ability to choose the hypervisor enables the XC Family to support a variety of applications and use cases. Even more important, the XC Series offers flexible configurations designed for optimal support of workloads ranging from virtual desktop infrastructure to enterprise business applications. Dell EMC offers various configuration options designed using application-based sizing tools to define the optimal configuration, including CPU, memory, hybrid or all-flash drives, and networking, validated end-to-end. These configurations help optimize resources and cost; for example, Exchange and SharePoint applications are often better served by 3.5" high-capacity drives, while VDI and server virtualization often benefit from higher compute density and need less storage capacity. The ability to match your workloads with specific components makes the XC Family a tailored HCI solution instead of a generic one.

PowerEdge Platform, Engineering Expertise

Dell EMC's expertise and experience building software-defined appliances sets the XC Family apart from competitors' solutions. The multigenerational PowerEdge platform is an industry standard for data centers. It was designed and configured by a team of experts from Dell EMC with hundreds of years of combined storage experience that has developed numerous software-defined storage appliances, and in cooperation with Nutanix, the XC Family brings together expert knowledge on both the hardware and software stack. This is a vastly different approach from grabbing commodity hardware off the shelf and installing HCI software on it. Why? Because these engineers understand that a storage failure in HCI can be more disruptive than in a compute server. Understanding the functions that the appliance must reliably execute enabled these engineers to design-in the required efficiency, reliability, and performance to meet the consistently high demands of end-users.

This engineering expertise results in other important current features and future enhancements. Without going into too much technical detail, here are a few examples:

- XC Family software components are pre-deployed, pre-configured (such as BIOS and iDRAC settings), and pre-integrated before being shipped. This enables customers to easily and quickly deploy their XC series and provides them with peace of mind knowing that their hypervisor of choice is ready to go, and more importantly pre-tuned for optimal performance with Nutanix software. This includes first-time boot scripts directly integrated into Nutanix's deployment tools to enable a fully automated deployment experience.
- The integrated Dell Remote Access Controller (iDRAC) provides out-of-band management for improved productivity. It enables automation of provisioning, deployment, servicing, user customization, and updating, as well as remote monitoring and control for troubleshooting and maintenance. In addition, iDRAC is proactively supported by monitoring, alerting, and automatically creating a support case, reducing downtime and speeding time to resolution.
- Organizations also benefit from the software components that enable Rapid Appliance Self Recovery (RASR). RASR is a bootable tool that allows for restoration to factory-shipped settings. Further, the tool can restore the system to any released software stack currently in development. Customers find this feature especially valuable when transitioning from a POC to production.
- The XC Family supports the Nutanix Life Cycle Management (LCM) framework. This enables XC firmware and software upgrades to take place through the one-click update functionality directly in Prism.
- Dell EMC can orchestrate common workflows across a single cluster or across multiple XC Series clusters.
- When selecting the PowerEdge components for this appliance, Dell EMC followed specific performance and reliability criteria focused on HCI versus general purpose computing needs. For example, when selecting SSDs for general purpose computing, average performance is important, but for HCI, the key is consistent performance. Because workloads are spread across multiple drives and nodes, the slowest drive will dictate workload performance; therefore, consistent performance is more important than average overall performance. Similarly, Dell EMC runs the drives cooler in HCI, more like traditional external arrays than internal server disk, for improved reliability.

Dell EMC PowerTools SDK: Making the XC Family Simpler

PowerTools Software Development Kit (SDK) is an internally-used software built from Dell EMC engineering and contains intellectual property that automates appliance workflows. It abstracts host management tools while maintaining a consistent interface across server generations and hypervisors. With software-defined storage, it is important that the software understand what's going on in the hardware, and PowerTools SDK enables that, keeping the stack optimized and validated and the ecosystem running smoothly. The combination of PowerTools SDK and the PowerEdge design and configurations sets the XC Family apart from other Nutanix software-based offerings.

The workflows that it automates are essential to some of the ease-of-use benefits in the XC Family, even those that appear to come from Nutanix. Thanks to PowerTools enabling the ability to easily load software in the factory before shipping, the Dell EMC XC Family can be deployed in just 30 minutes; in addition, scripts automate the actual onsite deployment process.

These controls can also be run at the customer site to recover a certain software version. PowerTools SDK works with the



Nutanix Life Cycle Management (LCM) Utility to enable one-click firmware upgrades for the XC Family. The ability to consistently monitor hardware across server generations is available because the XC Family makes API calls directly to the hardware or iDRAC. For compliance, PowerTools SDK enables locking of the firmware, operating system, running applications, and VMs to validated levels (through Dell EMC OpenManage Essentials and Nutanix Prism) and will provide alerts when any component no longer meets the validated parameters. In essence, PowerTools SDK provides customers the ability to deploy HCI faster, spend less time managing it, and restore functionality quickly.

Solution-aware Support

Dell EMC provides full 24/7 support including access to hardware, software, hypervisor, and operating system experts, with assistance from Nutanix or other third-party vendors as needed; the global support organization covers 124 countries and 55 languages with over 1,000 parts depots throughout the world.

In addition, the Dell EMC XC Family (XC Core included) provides SupportAssist, a proactive and predictive support technology that works in combination with Dell EMC iDRAC. A component failure will trigger numerous processes: automatic alerts to the customer and Dell EMC; creation of a support case; secure transfer of system state details to Dell EMC; and contact to the customer with a resolution. For customers with ProSupport Plus, Dell EMC can analyze trends, predict certain failures, and proactively resolve them before the failure occurs. This solution-aware support service is managed by a dedicated technical account manager and ensures that problems are reported and resolved quickly, enabling organizations to maintain high availability for the workloads running on HCI clusters.

The Bigger Truth

When it comes to HCI, it is easy to think that “hardware abstraction” makes the underlying hardware irrelevant. Simply put: It doesn’t. And while the hardware in your HCI solution will help define the ease, speed, and reliability of deployments, management, problem identification and resolution, and performance, there is so much more to think about when selecting the right HCI solution. How is the lifecycle of data managed? What level of service and support can be expected from the vendor? Are best practices available based on the mission-critical applications I plan to deploy? Answers to these questions can all be tied back to a return on investment, from the time you install through the lifecycle of your deployment.

The foundation of your hyperconverged infrastructure—the hardware, ecosystem, data lifecycle management, support, and vendor relationship—really does matter. Management is easier with software-defined data services that are abstracted from the hardware—but that doesn’t mean any server will create the same foundation as a purpose-built appliance like the XC Family. In fact, some organizations want to use servers they already have and just download HCI software, only to find that their leftover hardware cannot support HCI for their workloads.

Dell EMC and Nutanix work closely together on the XC Family to deliver what customers need: simplicity, automation, reliability, flexibility, and performance for mission-critical virtualized applications and workloads. These are all greatly enhanced by the design and configuration expertise and global service and support from highly experienced Dell EMC engineers.

Hardware abstraction? Yes, but it matters what you abstract *from*. With the Dell EMC XC Family, it’s more like hardware advantage.

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