White Paper

Dell EMC XC Series Advancements and Vision for Customers in the Hyperconverged Era

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EXECUTIVE SUMMARY

IT organizations continue to adopt hyperconverged infrastructure (HCI) at a phenomenal rate to improve IT staff productivity, operational efficiency, and infrastructure agility. Dell EMC has a portfolio of HCI offerings to address a range of customer environments from small to large organizations and for workloads running on a broad range of hypervisors. With the Dell EMC XC Series, Dell EMC continues to expand the XC Series ecosystem to empower IT organizations with infrastructure optimized for virtualized applications. The XC Series is a proven turnkey HCI appliance powered by Nutanix software for a choice of hypervisor environments. The XC Series continues to be enhanced, based on customer demand, to meet an evolving ecosystem of integrations, hypervisor choices, data protection needs, customer packaging, and pricing. This IDC white paper provides an overview of when IT organizations should consider the XC Series for their HCI needs.

THE RISE OF HYPERCONVERGED INFRASTRUCTURE

Today's enterprise leaders and organizations demand less complexity and more agility from their infrastructure. HCI solutions deliver simplicity with a plug-and-play setup and the ability to deploy workloads faster than SAN architectures, which rely on disaggregated server, storage, and networking resources. In addition to reducing complexity, HCI solutions offer the benefits of hardware consolidation, simplified administration, reduction in operating costs, faster time to market, and the ability to dynamically scale out infrastructure. According to the IDC study *Hyperconverged Infrastructure Adoption, Use Cases, and Market Growth,* over 40% of HCI users cited challenges with IT productivity, operational efficiency, and cost reduction as the leading HCI investment drivers. With these benefits in mind, organizations are procuring or expanding their use of HCI. Further, HCI is increasingly being used by firms of all sizes as the same study revealed that 34% of HCI users were organizations with 500–999 employees, 42% worked for organizations with 1,000–4,999 employees, and 24% worked for organizations with over 5,000 employees worldwide.

As is often the case with new infrastructure strategies, early use cases and workloads for HCI included test/development and virtual desktop infrastructure (VDI) environments. However, IDC research consistently validates that organizations are now placing tier 1 and tier 2 production workloads on HCI. Further, organizations that have realized business and operational benefits of smaller HCI application-specific clusters are expanding these environments and using the HCI cluster for mixed workload consolidation. Today, the majority of HCI deployments are running a variety of workloads as well as VDI. Further, 34% of firms are running business applications on HCI. Consistent with this finding, the same IDC study identified that 75% of HCI deployments are replacing existing SAN and NAS
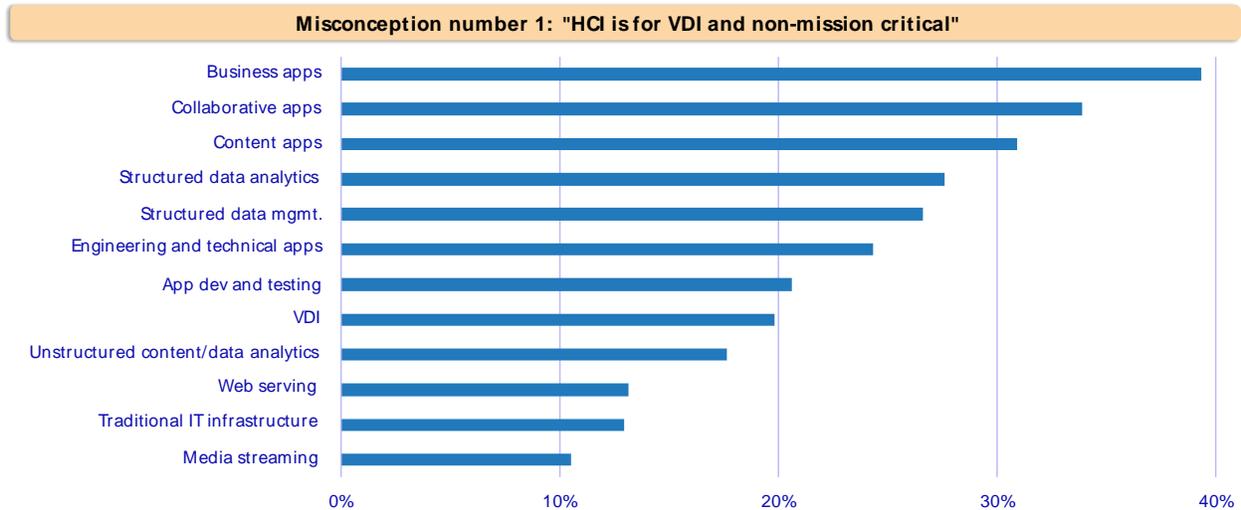
infrastructures, which were supporting mixed workloads, and 90% of HCI deployments are running in datacenters today, while 10% are operating in remote/branch locations.

Figure 1 shows the most commonly deployed on hyperconverged systems.

FIGURE 1

Overcoming Common HCI Misconceptions: Workloads

Q.   Which workloads are deployed on your hyperconverged systems?

Source: IDC's HCI Survey, 2016

HCI offerings bring together compute and storage services in a single virtualized solution. The solution is made up of a series of nodes, which are aggregated as an abstracted pool of virtualized memory, storage, and compute resources. This infrastructure pool is then leveraged by hypervisors, virtual machines, and applications for compute and storage services. HCI solutions can be procured in a number of ways today (e.g., from a complete appliance or a rack-scale system or as a software-led solution). While a software-led approach can bring choice in server deployment, many organizations select a more turnkey appliance purchase and deployment strategy. The delivery of an appliance typically offers faster time to deployment and reduced overhead, with preproduction and interoperability testing done at the vendor's factory.

FUTURE EVOLUTION OF HYPERCONVERGED INFRASTRUCTURE

The acceptance and growing use of HCI signal the satisfaction users have with HCI solutions. However, the consideration and use of HCI are not without challenges. Like the growth trajectory for hypervisors in 2005, the spending on HCI solutions is seeing double-digit growth. In CY 2Q17, spending on HCI grew 48.5% year over year on a worldwide basis. In short, organizations that are not using HCI are becoming the exception. It is important for IT organizations to consider the best-fit use of HCI and for HCI suppliers to continue to advance the solution's capabilities to address and overcome existing challenges. The future evolution and opportunity for HCI stem from the following:

- **Integration of HCI into existing environments.** HCI promises many operational and business benefits. However, to take advantage of these outcomes, organizations must integrate HCI systems with existing tools, systems, and processes. This integration spans existing security domains, networks, event management, security monitoring, orchestration, and data protection schemas. HCI solutions must not only interoperate within these environments but also provide APIs to send and receive correlated events. In the sphere of data protection, operational recovery, and disaster recovery (DR), users often seek to protect existing investments in centralized data protection processes. Operators have learned and come to trust existing tools, and thus HCI solutions need to integrate into these tools and processes.

- **Use of HCI in edge computing and IoT use cases.** While 10% of HCI solutions are deployed in remote locations today, this percentage is expected to increase to 14% over the next 12 months as more companies place computing resources closer to customers and data at the edge of the enterprise. This future edge opportunity could be based on virtualized, bare metal, or containerized applications running on HCI solutions at the edge, which are married to and communicating with larger, more robust HCI solutions in the datacenter.

- **Hybrid cloud with multicloud options.** The majority of cloud users today are multicloud. According to IDC's *CloudView Survey*, 79.7% of large organizations (with 1,000 or more employees) already have a hybrid cloud strategy in place. Further, 51.4% of organizations are using both public cloud and private cloud infrastructure, and an additional 29.2% of organizations expect to do so in the next year. Public cloud infrastructure as a service (IaaS) brings agility and the benefit of a range of services from compute and I/O services to analytics, database, and IoT services. This ecosystem of services is increasingly becoming the largest motivation in the adoption of IaaS. However, on-premise and private cloud infrastructures are not going away. This speaks to the imperative for bridging private and public cloud environments while mitigating vendor lock-in and single supplier risk. HCI solutions must fit into both hybrid and multicloud environments.

- **HCI solutions based on Microsoft Hyper-V and other hypervisors.** Today, VMware enjoys a large percentage of the hypervisor market. However, a growing percentage of customers are evaluating Hyper-V or other hypervisors such as KVM or Xen as an augmentative approach to reduce cost, mitigate lock-in, or integrate into current or future environments. Some HCI solutions are tied closely to and rely on a specific hypervisor, which may be fine in some cases. However, for organizations that have not standardized on VMware, a consideration of which hypervisors are supported by a HCI solution is important.

- **Cloud-native applications designed for cloud computing.** With the move to cloud computing, new application architectures, often referred to as cloud-native applications, have been developed. Cloud-native applications tend to have a set of characteristics that include application-level resiliency and scale-out application architectures, which make use of microservices, containers, and open source components. These applications are designed to run on cloud infrastructure that is dynamic, redundant, horizontally scalable, and highly automated, and a team of consolidated developers and operators, also known as DevOps, shares the continuous build and delivery of the application. Rather than use UIs or CLIs to provision, extend, and deprovision infrastructure resources or patch, update, and control changes, DevOps teams make extensive use of infrastructure APIs and deployment and orchestration tools and templates such as Chef and Puppet. HCI solutions must be designed to fit into these cloud-native environments and meet the changing needs of the infrastructure.

DELL EMC HYPERCONVERGED INFRASTRUCTURE PORTFOLIO

Customers want choice, and Dell EMC's hyperconverged infrastructure portfolio provides this. Further, not every customer environment has the same requirements. The Dell EMC portfolio includes both appliance and rack-scale offerings and is differentiated in offering both fully integrated VMware-based solutions and turnkey outcomes with both bare metal and multiple hypervisor options. Appliances accelerate the transformation of both the compute layer and the storage layer for customers' datacenters by delivering turnkey outcomes on all-flash, software-defined, and scale-out architectures.

This strategy of offering customers choice and broad portfolio of HCI offerings has positioned Dell EMC well to capitalize on the fast-growing HCI market. The Dell EMC HCI portfolio gives the company the leading market share position, as noted in IDC's Worldwide Quarterly Converged Systems Tracker, CY 2Q17. As mentioned previously, CY 2Q17 spending on HCI grew 48.5% year over year on a worldwide basis. In comparison, Dell EMC's growth in the same category was 149.1% year over year during the same period.

Details of Dell EMC hyperconverged solutions include:

- **XC Series** is the HCI appliance for when hypervisor choice is a requirement across industry-leading hypervisors including Microsoft Hyper-V. XC Series is based on Nutanix software but includes joint engineering, with Dell EMC delivering a validated ecosystem of solutions and offerings.
- **VxRail** is the industry's only HCI appliance powered by VMware vSAN and jointly engineered with VMware. It is Dell EMC's recommended approach for customers that have standardized on VMware.
- **VxRack SDDC** is a rack-scale private cloud that includes compute, storage, and networking for vSphere environments.
- **VxRack FLEX** is a rack-scale private cloud that includes compute, storage, and networking for vSphere, bare metal, and/or multihypervisor environments.

DELL EMC XC SERIES HYPERCONVERGED INFRASTRUCTURE

The Dell EMC XC Series is a HCI appliance built using Dell EMC PowerEdge servers optimized for use with the Nutanix software. With support for Hyper-V, ESXi, and Nutanix AHV (a KVM-based hypervisor), the Nutanix software provides the hypervisor flexibility that customers demand. Dell EMC has innovated on top of the Nutanix software, providing the XC Series a rich ecosystem of integrations for data protection, application development, and infrastructure as a service. The XC Series is a result of four years of collaboration between Dell EMC and Nutanix, and the solution has matured and evolved based on working with customers to capture their requirements.

When Dell EMC launched the XC Series in 2014, it started with a single model, but as the concept of HCI gained acceptance in the market and the workloads that HCI was being used for also grew, the need for specialized nodes became apparent and the XC Series expanded to seven models to address the widely growing HCI market. Now the XC Series is on its 3rd-generation server platform with the Dell EMC PowerEdge, which is on its 14th generation (14G). The XC Series has proven itself with over 15,000 nodes deployed across more than 45 countries and 1,700+ customers and continues to evolve into an ever more complete and robust enterprise solution.

Dell EMC was early to identify some of the challenges of HCI. According to IDC research, 28% of HCI users indicated that the top challenge to HCI adoption stems from difficulty integrating HCI with current systems and management tools. The capabilities of the XC Series have expanded beyond the core hyperconverged infrastructure to provide IT organizations with a more complete on-premise infrastructure, including cloud and application development integration, and Dell EMC data protection capabilities, including Data Domain and Avamar. Dell EMC is also doing joint development work with Microsoft to seamlessly integrate the XC Series with Microsoft Azure.

Figure 2 shows the XC Series with an optimized ecosystem.

FIGURE 2

XC Series with an Optimized Ecosystem
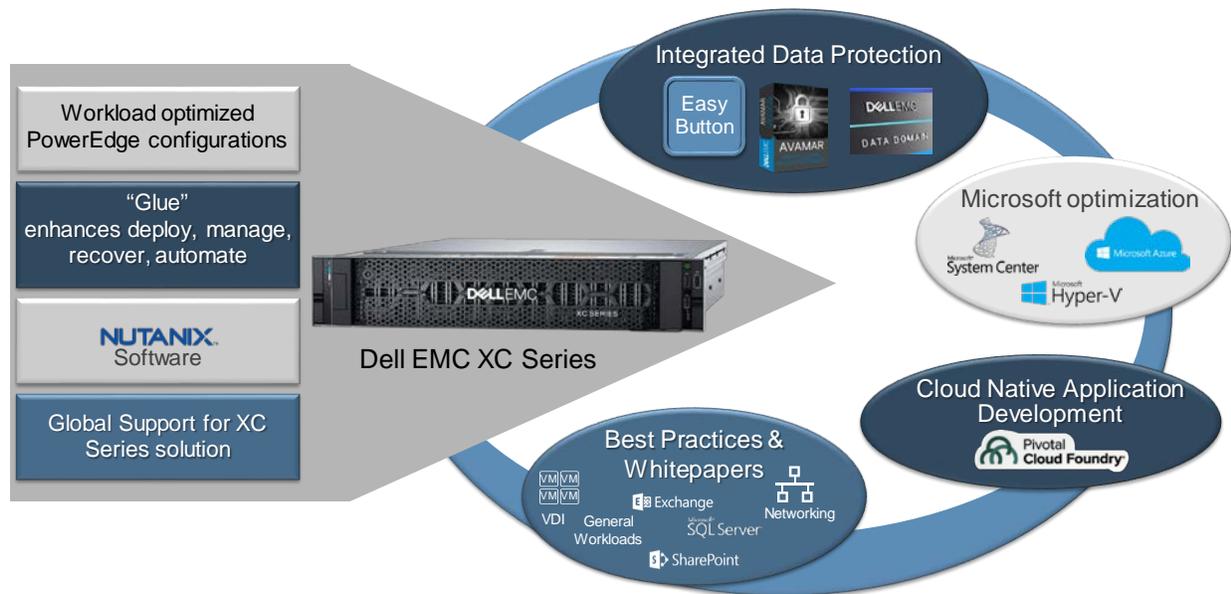
Source: Dell EMC, 2017

Additional details include:

- **Hardware platform update to PowerEdge 14G servers.** Dell EMC's PowerEdge 14G servers were designed to an exhaustive set of requirements, including the unique requirements of HCI workloads. Over 150 design features were integrated for HCI optimizations. Examples include processor, memory, and drive selection; power and thermal optimizations; deployment automation; boot and recovery subsystems; and integrated systems management. XC Series HCI appliances, which are built on the 14G foundation, leverage these same features to offer customers a powerful, scalable, and highly automated solution to run any virtualized workload. Notable advancements in the newest XC Series appliances include higher-performance Intel Xeon Scalable processors, faster and higher bandwidth memory, NVMe drives and flash configurations, 50% more GPUs per node, and 25GbE networking.

Incorporating these features and a choice of industry-leading hypervisors, the new XC Series 14G appliance is an ideal virtualization solution for enterprise applications, high-performance database workloads, graphics-intensive VDI, and large-scale hybrid and private cloud projects.

- **XC Series with integrated data protection.** With the XC Series ecosystem expansion, Dell EMC is redefining the user experience for customers utilizing data protection solutions in conjunction with HCI clusters. This multilevel integration supports the entire solution throughout its life cycle, streamlining all stages from initial procurement through support. As XC Series is deployed as a single solution, users can monitor and manage the Avamar VE data protection software running on the XC Series cluster and the Data Domain backup target utilizing Dell EMC's exclusive XC Series Data Protection Management Console. Included at no extra charge, this unique console is launched directly from the Nutanix Prism management interface in a single click. XC Series users can now utilize the same data protection solutions trusted by 90% of the Fortune 500 companies worldwide in an easy-to-use turnkey solution that is sized to fit their environments and put into production in a single deployment.

- **XC Series with networking.** The XC Series brings together compute and storage resources in one appliance and can leverage customers' existing network infrastructure. With an ongoing focus on time to value, various initiatives are taken to develop better integration of datacenter networking and management operations with XC Series. The first step was to build reference architectures, deployment guides, and solution briefs with recommended network switches, which will help customers in optimized deployment and management. Going a step further, a network validation tool is available today to validate the network infrastructure and provide recommended switch configuration for the XC430 Xpress.

- **XC Series with Pivotal Cloud Foundry (PCF) for cloud-native applications.** PCF is a commercial distribution of the open source, multicloud application platform-as-a-service (PaaS) software, which is governed by the Cloud Foundry Foundation. XC Series exceeds all minimum infrastructure requirements for PCF on vSphere for small to large PCF deployments. Using XC Series as the platform simplifies and accelerates the time to value, enabling quick scale up to support larger PCF deployments. XC Series and PCF are designed for maximum availability. They offer zero-downtime upgrades to both the platform and the applications. PCF offers a cloud computing environment for application-developed services, all hosted on a scalable XC Series. Dell EMC provides a reference architecture guide to develop and deploy this solution. The guide also describes how to scale the XC Series appliances as well as the Cloud Foundry PaaS. The architecture is tested and designed for fast deployment, ease of scale, and simple operation of PCF infrastructure.

- **Dell EMC XC Xpress.** The XC Xpress solution is designed for midmarket IT organizations that make extensive use of Microsoft applications and often Hyper-V today. The solution designed for these environments is a fully configured three-node cluster, with a starting price as low as $25,000. The features of Nutanix software have also been optimized for this solution to provide robust, enterprise-grade features such as remote replication, intelligent and adaptive deduplication, and compression. To further meet customer demand while reducing cost, XC Xpress is customer installable, putting control for deployment timing in the customer's hands. XC Xpress offers the flexibility, ease, and cost effectiveness of the public cloud but with the added control of an on-premise solution.

- **XC Series for customers with Windows Hyper-V.** XC Series for customers with Windows Hyper-V is increasingly popular as customers build on their Microsoft administrative knowledge and tools while introducing the XC Series appliances into their environments. SCOM integration with XC Series enables visualizing health, performance, and dependencies for the entire application stack. Nutanix 5.5 version of the software will support Windows Server 2016, and in keeping with the overall strategy of simplicity, it includes the unique

capability to upgrade Microsoft Hyper-V 2012 R2 environments to Hyper-V 2016 using a one-click upgrade without application downtime.

- **XC Series and Microsoft Azure cloud.** Hybrid solutions built using XC Series have the flexibility and control of an on-premise solution while delivering cost savings over other cloud alternatives, combined with the flexibility and agility of Azure public cloud. The XC Series Azure Log Analytics Solution simplifies this hybrid cloud environment. It enables the integration of
XC Series into customers' OMS-based datacenter automation tools, enabling insights such as trend analysis and behavioral anomaly detection. Further, Dell EMC has been approved by Microsoft to deliver Azure through the Dell EMC cloud solution provider (CSP) program to offer solutions both direct and indirect worldwide, facilitating purchasing and ongoing support for these environments.

  XC Xpress comes standard with the Azure Backup Service, a cloud-based service designed to protect customers' onsite data in the Microsoft Azure cloud. White-glove onboarding orchestrated by Dell EMC allows users to affordably back up their critical data to Azure. Consumption-based pricing billed through Dell EMC ensures that users pay for only what they use.

- **Dell EMC XC Series support offerings.** Through trusted ProSupport and ProDeploy offerings, Dell EMC supports the full life-cycle experience for customers. The solutions are delivered as a turnkey experience ready to be deployed by ProDeploy teams for onsite implementation, including planning, installation, and configuration. ProSupport teams for XC Series are specially trained to address the needs of HCI customers. Proactive tools are available, and the teams are always accessible 24 x 7 x 365 via phone, email, chat, and social media across 167 countries and 55 languages and over 1,000 parts distribution centers.

CHALLENGES AND OPPORTUNITIES

The HCI market is one of the fastest-growing infrastructure markets today. IDC's Worldwide Quarterly Converged Systems Tracker cited year-over-year growth of 130% for HCI solutions for the 2Q17 period. To put this in perspective, we note that the entire IT industry grew at a mere 2.4% during the same period. However, as with any technology, there are customer requirements that must be addressed. Among HCI users and evaluators, the leading HCI challenge was difficulty integrating HCI with current infrastructure and management tools. Dell EMC XC Series provides integration with multiple hypervisors as well as data protection and management offerings. The second most cited challenge was cost or doubts about projected ROI. Dell EMC provides economically attractive options such as the XC Xpress offering as well as ROI insights to project capital and operating cost savings. IDC research reveals that 44% of HCI users see an average of 19% improvement in staff productivity, while 37% of HCI users see a 17% improvement in storage utilization, and 35% of HCI users see 20% reduced cost in data facilities, power, and cooling.

Figure 3 shows that HCI is the fastest-growing portion of the converged market.

FIGURE 3

HCI Is the Fastest-Growing Portion of the Converged Market
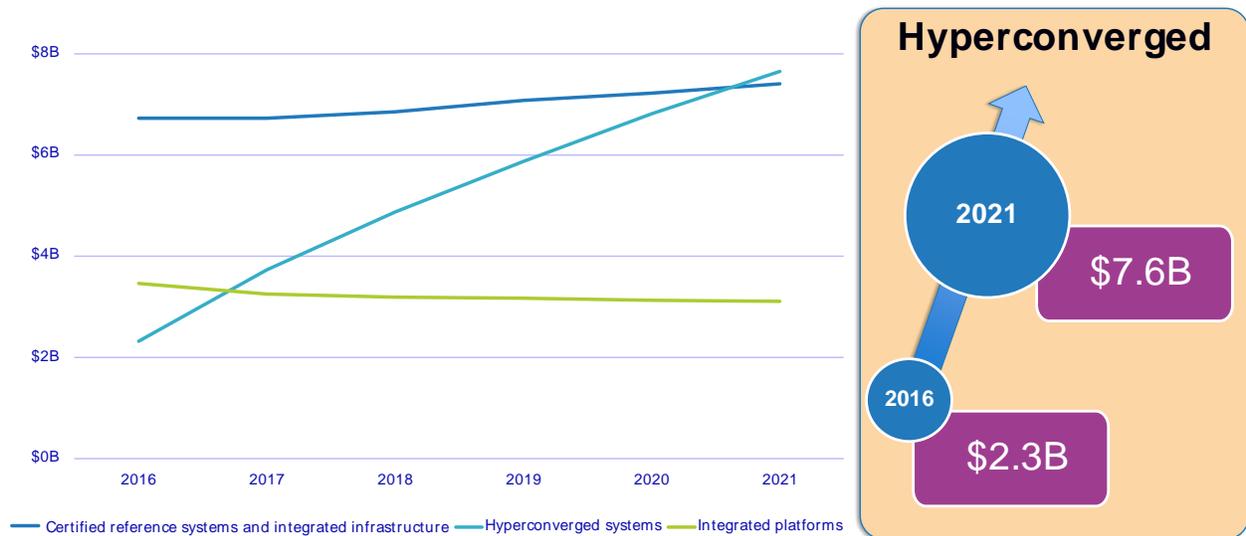
Source: IDC's Worldwide Quarterly Converged Systems Tracker, 1Q17

In contrast to these concerns, the HCI market continues to see strong adoption among existing and new customers. Consistent with this customer demand, the XC Series started with a single model, but as the concept of HCI gained acceptance in the market and the workloads that HCI was being used for also grew, Dell EMC created a full portfolio of workload-optimized appliances. Now, the XC Series capabilities go beyond hyperconverged infrastructure to provide IT organizations with a complete on-premise infrastructure, with seamless cloud integration and data protection capabilities. With the XC Series, Dell EMC is working with not only Nutanix but also Microsoft to integrate the XC Series with Azure as well as Dell EMC's own solution stack to provide backup/DR and data protection capabilities.

SUMMARY

Over the past several years, HCI solutions have proven themselves for higher-priority workloads and use cases. While early adoption of HCI was for dedicated workload deployments such as VDI, the largest enterprises in the world are now using HCI for mixed workload consolidation of general-purpose workloads. In response to this, Dell EMC is aggressively maturing the technology as it architects the underlying Dell EMC PowerEdge servers for HCI/SDS use cases for a variety of workloads, including traditional business applications, test/dev environments, IaaS/PaaS, and big data and analytics. Further, Dell EMC is embracing the broader developer ecosystem through its integration with Pivotal Cloud Foundry and its support for HCI-based data protection with Avamar and Data Domain.

In CY 2Q17, Dell EMC posted the number 1 leadership position in both the converged systems market and the HCI market. To meet changing customer demands, the company continues to invest in an ecosystem of capabilities. These investments span ongoing software enhancements, PowerEdge technology refresh cycles, and integration within the customer's current solution. Driven by customer need, Dell EMC is also moving into new opportunities such as expanding support for data protection,

cloud integration, additional hypervisors, and development work with Pivotal Cloud Foundry. Dell EMC XC Series is a proven, reliable turnkey HCI appliance for a choice of hypervisor environments, and Dell EMC continues to evolve its ecosystem of integrations in the XC Series portfolio to satisfy customer needs in the hyperconverged era.

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