

# The Transformational Power of Hyper-Converged Infrastructure

How This New Approach to Architecture Is  
Changing the Future of the Data Center

vmware®





In 2011, Marc Andreessen famously declared that

## **“software is eating the world,”**

which was derided by some as an exaggeration. Several years later, Andreessen’s prediction has proven to be prescient. The hardware-based economy has undergone a massive shift to a software-based economy, in which products and services are now delivered in software.

The data center has not escaped this sea change. Infrastructure-centric thinking has evolved to workload-centric thinking, and IT is under pressure to adapt fast. Amid changing market demands and the emergent application explosion, roles and day-to-day workflows have changed dramatically. IT teams are scrambling to support the new ways applications are developed, deployed, and managed.

As we look to the future, it seems certain that technology will continue to evolve. But with so much to manage, how can IT meet business expectations and remain agile?

## A NEW APPROACH TO DATA CENTER ARCHITECTURE

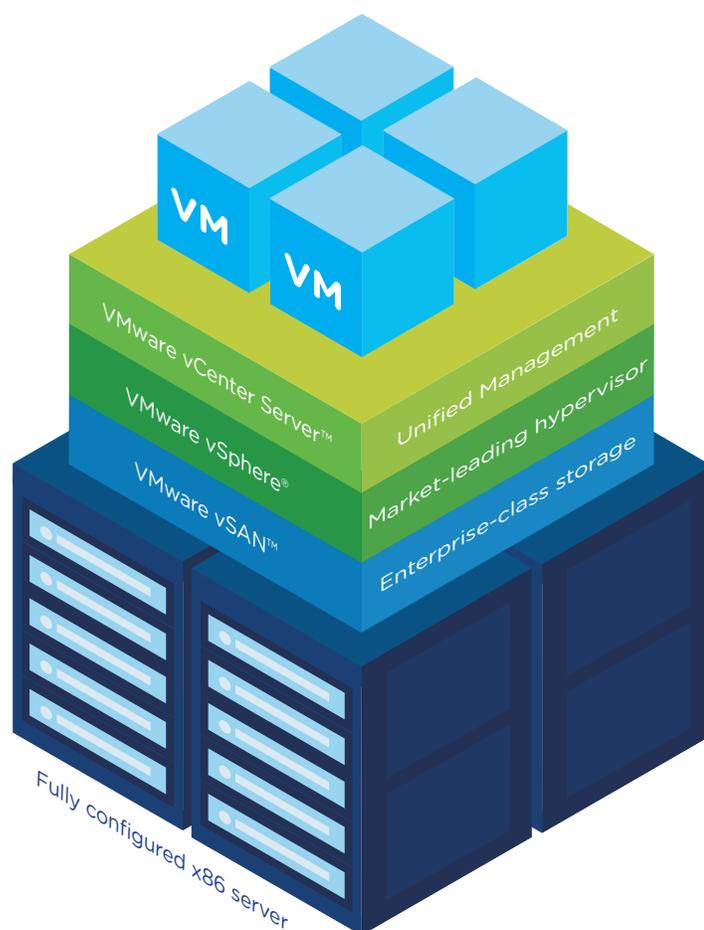
In the hardware-centric data center, silos separate compute, management, and storage; these separate functions require a complex series of requests and permissions to get things done. Today, that complexity is a barrier to agility, which is why many IT organizations are looking for simpler, streamlined solutions that enable faster response times and speed service delivery.

Hyper-converged infrastructure (HCI) has emerged as a flexible, efficient way to bring key IT functions together, breaking down silos, and delivering higher performance at a lower cost. It offers a transformative yet simple approach to data center architecture, making it possible to eliminate challenges with legacy systems and to achieve higher performance and faster response times.

So how does HCI fit into the bigger picture in IT, and how does it align with technologies on the near horizon? Let's take a look.

## WHAT IS HYPER-CONVERGED INFRASTRUCTURE (HCI)?

Hyper-converged infrastructure (HCI) allows the convergence of compute, management, and storage onto industry-standard x86 servers, enabling a building-block approach with scale-out capabilities. In VMware-powered HCI, all key data center functions run as software on the hypervisor in a tightly integrated software layer.



## IT IS UNDERGOING TRANSFORMATION

## ON MULTIPLE LEVELS

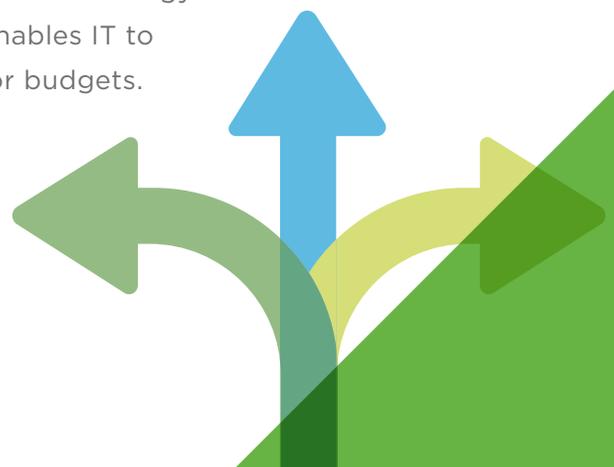
### **INTELLIGENCE IS SHIFTING FROM HARDWARE TO SOFTWARE**

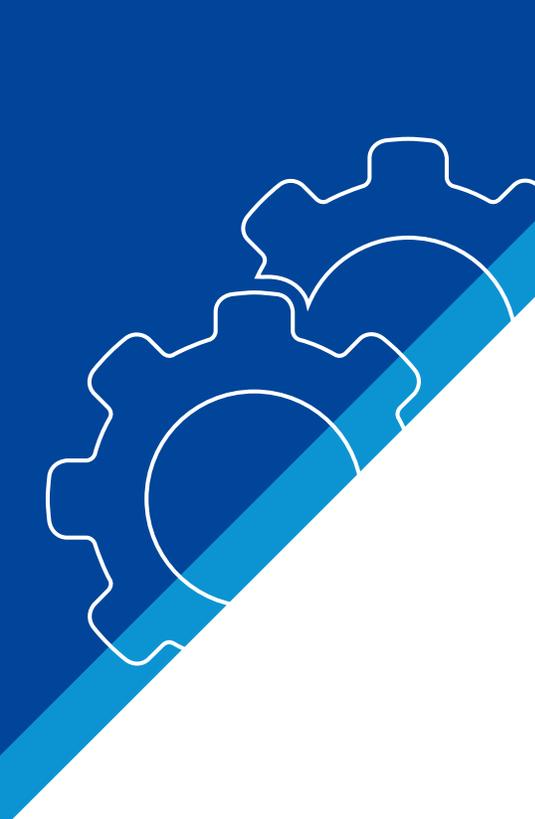
Compute was the first area of the data center to undergo virtualization. By decoupling CPU and memory from physical hardware, virtualized applications could draw on a pool of resources whenever they needed them, resulting in tremendous gains in performance and availability. Virtualization is now changing storage and management, where the same principles apply, as key functions move out of hardware and into software.

Hyper-converged infrastructure is the next logical progression, bringing all of these functions together in a single, integrated stack.

### **FLUCTUATING USER DEMANDS REQUIRE A FLEXIBLE STORAGE PLATFORM**

Data volumes are growing faster than ever before, making it increasingly difficult for IT to predict what kind of storage capacity is needed, and when. The right HCI solution solves this problem, with a software architecture that can combine different types of storage devices to deliver the most cost-effective capacity and performance options for a wide range of workloads. As technology continues to evolve and storage needs shift, HCI enables IT to adapt quickly, without undue stress on resources or budgets.





*“vSAN is so simplified that we do not need to hire an IT professional who is an expert in storage, because I can manage all the data.”*

Rami Baiyou, IT manager, Libya Post

### **A NEW INFRASTRUCTURE MANAGEMENT PARADIGM REQUIRES NEW TOOLS**

The exhaustive manual effort required by hardware-centric infrastructure makes it nearly impossible to meet business needs. From Day 0 (installation and configuration) through Day 2 and onward (end-to-end-monitoring, troubleshooting, and guidance), automation has become a necessity for its ability to reduce tedious, repetitive, and error-prone tasks. VMware-powered HCI enables this with policy-based management that automates provisioning on Day 0 and eliminates manual tasks from Day 2 and beyond.

### **CHANGES IN RESOURCES CONSUMPTION SHIFT DATA CENTER ADMINISTRATION**

In a traditional data center, each siloed area—compute, management, and storage—requires experts with diverse tools, operational procedures, and expertise. By bringing these areas together, HCI breaks these barriers, providing a unified set of tools and a single operational experience. As a result of this evolution, data center administrators in the future will no longer be absorbed in hardware equipment, but will rather be focused on setting up policies and procedures.

The VMware HCI platform contains software that can perform health checks and monitor the entire IT infrastructure. It can check for hardware compatibility, monitor storage utilization, and even offer performance diagnostics.

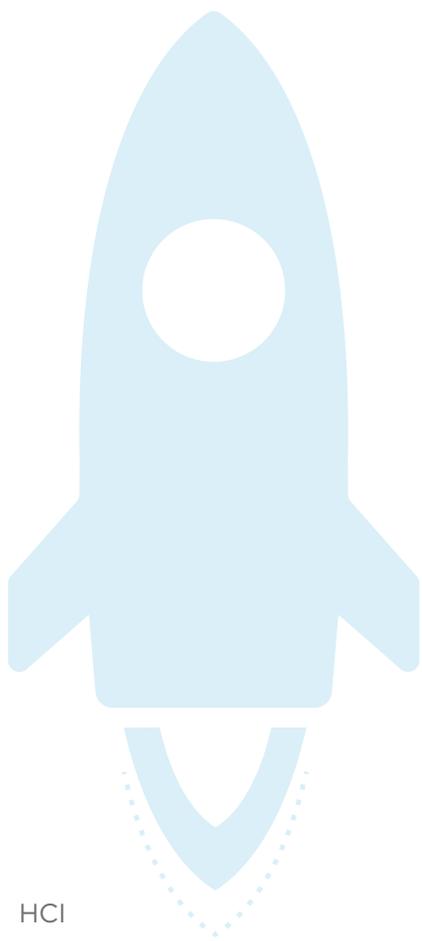
<sup>1</sup> <https://www.micron.com>

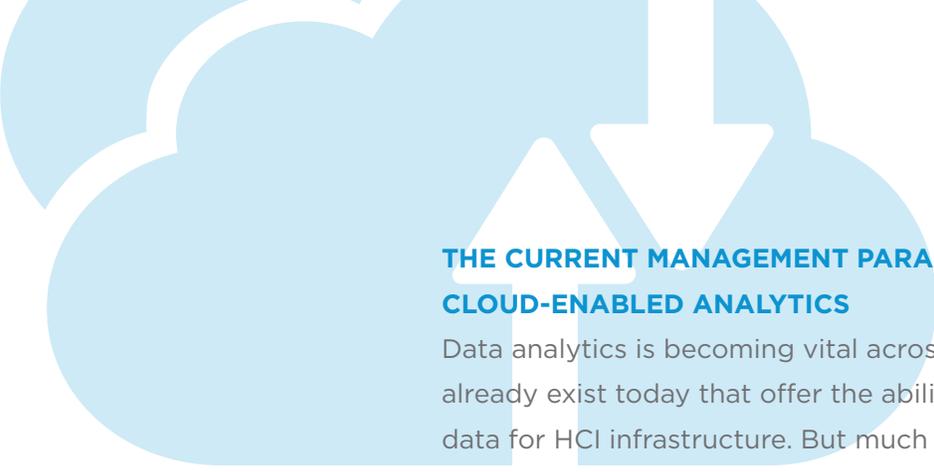
## MORE TRANSFORMATION LIES AHEAD

### NEW STORAGE AND NETWORKING TECHNOLOGIES WILL CONTINUE TO EMERGE

Storage is changing fast, aided by new commodity components with unprecedented capabilities. Among these is 3D XPoint, a non-volatile memory (NVRAM) technology that promises 1,000 times the performance of today's SSDs with 100 times better endurance.<sup>1</sup>

As new options hit the market, it's imperative to choose an HCI solution that will accommodate the next generation of devices and reap all the associated rewards. The right HCI solution will have some form of multi-tier architecture to combine the performance and endurance benefits of NVRAM with the low-cost capacity of traditional Flash or even HDD.





## **THE CURRENT MANAGEMENT PARADIGM WILL EXPAND INTO CLOUD-ENABLED ANALYTICS**

Data analytics is becoming vital across all aspects of IT. Solutions already exist today that offer the ability to aggregate and analyze data for HCI infrastructure. But much of that analysis is still raw and rudimentary.

Ideally, IT will want these powerful tools and analytics algorithms in the form of Software-as-a-Service (SaaS). The right solution will be able to gather data from thousands of sites, run analytics, provide proactive support, and even offer recommendations on hardware, software, and configuration options. At some point in the future, new features will be delivered without the need to install new software or update existing products.

## **HCI WILL BECOME THE INFRASTRUCTURE MODEL FOR NEW USE CASES**

Use cases like DevOps and cloud-native apps are becoming increasingly critical to IT. HCI is an ideal match for these, as it provides the ability to use CLI tools, APIs, and scripts to deal with any storage management need, from infrastructure sizing, configuration, and monitoring all the way to storage policy-based consumption, workload monitoring, and analysis. The right HCI solution enables this through a distributed and scalable platform architecture that eliminates central control points or bottlenecks.

Another key trend is the growth of containers, which are used to deliver applications and cloud services quickly and easily. According to Forrester: “The growth of containers and Hyper-converged solutions with containers is emerging and in 2016 will become commonplace. This combination will yield the most flexible application packaging yet. Hyper-converged infrastructure will be the foundation because it provides great flexibility with underlying resources in the pool for cloud services.”<sup>2</sup>

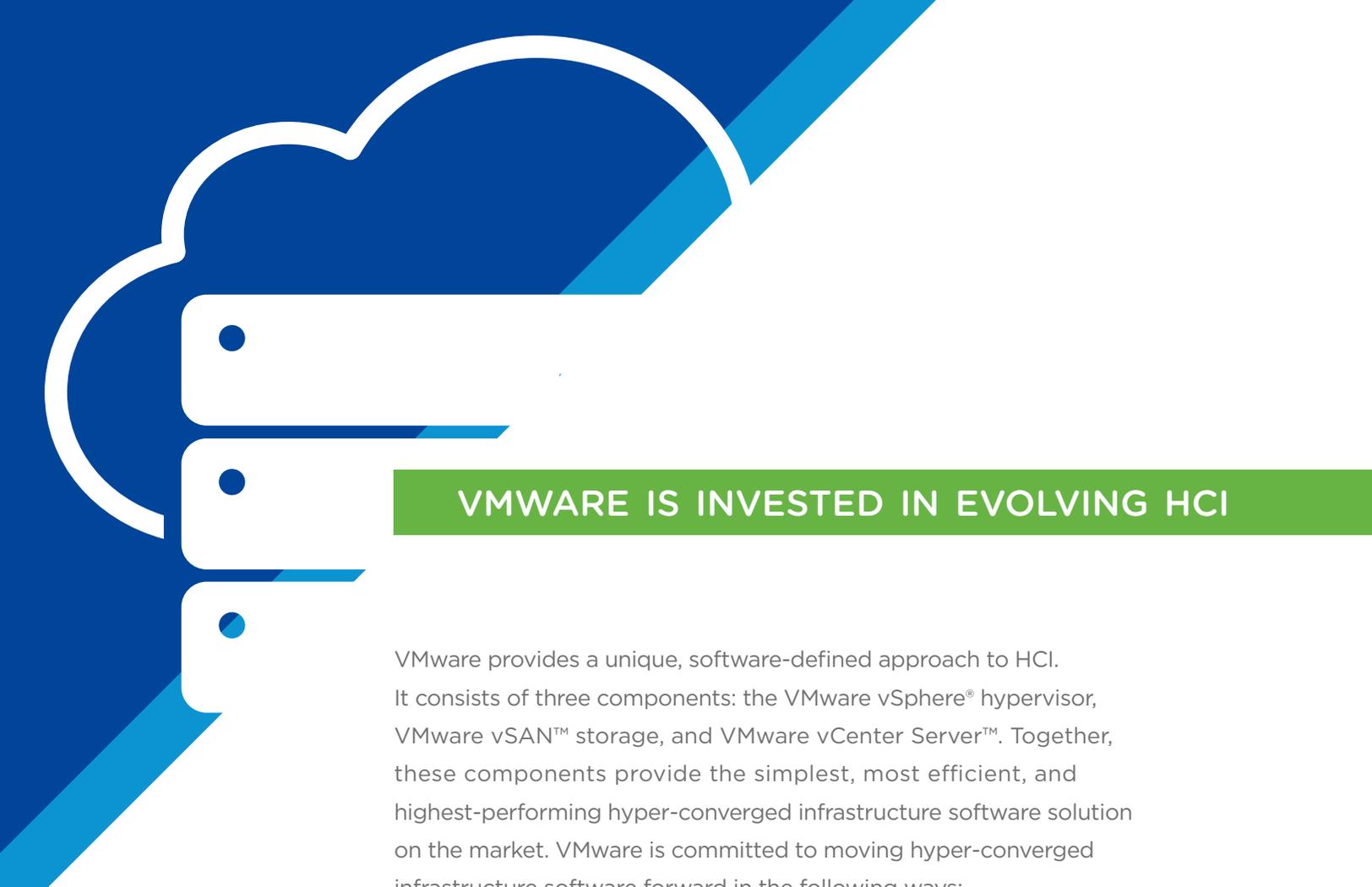
<sup>2</sup> 2016—Hyperconverged Solutions With Containers To Become The “Norm”!—Robert Stroud, Principal Analyst, Forrester



## **THE MOVE TOWARD CLOUD-BASED IT SERVICES AND THE HYBRID CLOUD WILL CONTINUE**

As the pace of business continues to get faster, greater agility and scalability will continue to be top-of-mind for IT organizations. To meet this need, most companies are adopting a hybrid cloud strategy that combines resources from public cloud with on-premises, company-owned data center infrastructure.

It's not an either-or decision; savvy organizations will choose hyper-convergence plus cloud. Turnkey solutions for the Software-Defined Data Center (SDDC) are available today based on a modular and elastic hyper-converged architecture, which leverage technologies for compute, storage, network virtualization, and cloud management. They also provide unique system management capabilities to deliver a simplified operational experience. A good solution will offer data management services that span the data center and the public cloud.



## VMWARE IS INVESTED IN EVOLVING HCI

VMware provides a unique, software-defined approach to HCI. It consists of three components: the VMware vSphere® hypervisor, VMware vSAN™ storage, and VMware vCenter Server™. Together, these components provide the simplest, most efficient, and highest-performing hyper-converged infrastructure software solution on the market. VMware is committed to moving hyper-converged infrastructure software forward in the following ways:

### **CONSTANTLY EVOLVES TO SUPPORT NEW-GENERATION DEVICES**

VMware vSAN has a multi-tiered storage architecture at its core, using 2 tiers of storage to deliver the most cost-efficient performance possible.

### **OFFERS ADVANCED ANALYTICS AND AUTOMATION**

VMware vSAN offers a scalable, distributed management architecture that performs a number of data-crunching tasks and helps customers analyze their infrastructure. It even provides the option to collect basic telemetry data to help spot trends and potential issues, delivering proactive alerts before problems arise.

*“VMware is very aggressive about improving their products and adding new features; we just want to keep pace with our own environment and take advantage of as many of these capabilities as possible.”*

Caleb Holstrom, Network Administrator, Agropur Ingredients

### **DELIVERS A FUTURE-READY IT INFRASTRUCTURE**

VMware vSAN fully exposes all its operational features, both infrastructure management and storage consumption, through APIs. With future support for the Photon Controller, VMware is able to optimize its new infrastructure stack for cloud-native applications.

### **PROVIDES A PATH TOWARD A COMPLETE SDDC AND THE HYBRID CLOUD**

Expanding an HCI solution is easy with additional VMware software, such as VMware NSX® for network virtualization, VMware vRealize® Operations™ for intelligent operations management from applications to infrastructure, and VMware Horizon® for desktop virtualization. The same data management services can be used across physical, virtual, and cloud environments.

ACHIEVE MORE WITH A SOLUTION

FROM TWO MARKET LEADERS

Radically simplify your data center and deliver low-cost and high-performance Hyper-Converged Infrastructure powered by VMware® and Intel® Xeon® processor-based servers, with Intel® Solid State Drives Data Center Family, and Intel® Ethernet Converged Network Adapters. The natively integrated software combines vSAN, vSphere, and vCenter with the broadest and deepest set of HCI deployment choices on industry-standard Intel Architectures.

## Find Out More

Learn more about HCI Powered by VMware vSAN



Try vSAN in our Hands-on Labs



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