PROWESS

Finding the Path to a True Hybrid Multicloud

Can HPE® ProLiant® DX appliances with Nutanix® software and Intel® technologies simplify the journey to a manageable hybrid multicloud?

Executive Summary

Two trends in data center modernization are accelerating, and they are closely connected. One is the rapid move to a hybrid multicloud operating model. The other is the rapid adoption of hyperconverged infrastructure (HCI), where servers, storage, and virtualization software components are all pre-integrated in a single solution.

These two trends are connected in a couple of ways: first, the adoption of a hybrid-cloud delivery model can be a major driver in an organization's decision to update legacy infrastructure to HCI; and second, in a larger sense, both trends are part of a greater movement to make everything in IT more cloud-like.

For companies considering their data center modernization options, it only makes sense to evaluate any HCI solution in terms of its ability to facilitate and support a hybrid multicloud environment. This environment needs both an on-premises private cloud component and the ability to connect to multiple public clouds. Our purpose is to assist in the evaluation of an HCI solution designed for just such an environment.

This paper evaluates the capabilities of one HCI solution that aims to deliver the hybrid multicloud experience that companies are looking for. Nutanix is a leading provider of HCI software solutions. Nutanix has partnered with HPE to offer an HCI appliance solution with Nutanix® Cloud Platform™ software preinstalled on HPE® ProLiant® DX servers with the latest Intel® technologies. Is this a solution that can really ease the journey to modernization and a hybrid multicloud?

The Hybrid Multicloud and HCI Landscape

The move to hybrid multicloud is becoming ubiquitous. In one survey, 92 percent of global cloud decision makers said their organizations had a multicloud strategy (see Figure 1).[1] In another survey, more than three quarters (77 percent) of IT professionals indicated that their organizations had deployed at least one application using multiple locations and a hybrid-cloud delivery model, and nearly half (46 percent) said that they had deployed multiple applications that way.[2]

Highlights

- The demand for hybrid multicloud solutions is a factor driving growth in the adoption of hyperconverged infrastructure (HCI).

- Nutanix offers its HCI software pre-installed on HPE® server hardware.

- Customers have the choice of a traditional purchase or a pay-per-use consumption model.

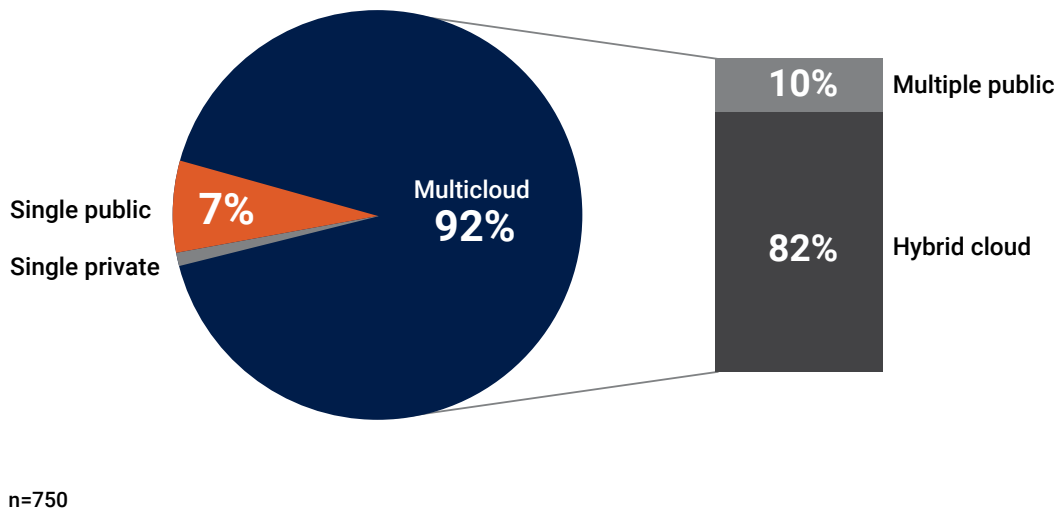## Enterprise Cloud Strategy

Percent of enterprise respondents[1]

n=750

Figure 1. Hybrid multicloud strategy is becoming ubiquitous[1]

The adoption of hybrid-cloud models is a major driver for infrastructure modernization: forty percent of those surveyed by ESG cited improved hybrid-cloud management as one of the biggest drivers for their organizations' adoption of HCI technology.[3] Other big drivers of HCI adoption include improved scalability, IT staff productivity, total cost of ownership (TCO), and IT automation and integration.

> "The real issue is that IT is spending too much time managing individual infrastructure components. But there is a solution. If the need for IT to deal with these low-value tasks could be eliminated, this overworked group would have time to focus on aiding line-of-business teams to receive the maximum value from their application environments."
>
> — ESG[3]

Legacy infrastructure has become burdensome to IT departments. Expensive to purchase, complex to manage, and difficult to protect, legacy systems often require the support of multiple teams of specialists just to run smoothly and stay free from attacks. HCI is seen as a way to reduce or eliminate this IT burden, and it is part of a larger desire to make everything in IT more cloud-like. This goal of a data center with cloud-like capabilities is seen in the investment priorities that companies identify for the next 12–18 months, which include increasing the use of on-premises hyperscale solutions, deploying HCI, using containers and other modern application elements to make apps more portable across multiple clouds, and implementing a software-defined data center strategy (see Figure 2).[3]

In which of the following areas of data center modernization will your organization make the most significant investments over the next 12–18 months?
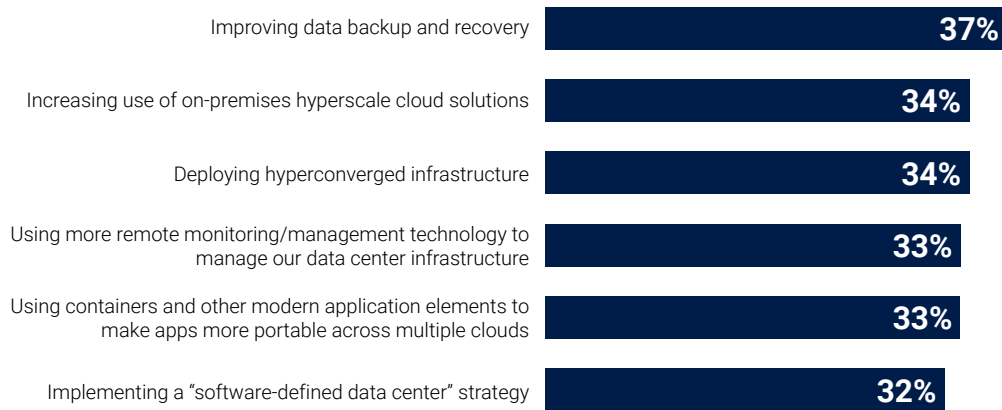(Percent of respondents, N=664, five responses accepted)

Improving data backup and recovery	37%
Increasing use of on-premises hyperscale cloud solutions	34%
Deploying hyperconverged infrastructure	34%
Using more remote monitoring/management technology to manage our data center infrastructure	33%
Using containers and other modern application elements to make apps more portable across multiple clouds	33%
Implementing a "software-defined data center" strategy	32%

Figure 2. Investment priorities for 2022–2023[3]

How Nutanix Addresses the Challenges of Hybrid Multicloud

How does Nutanix, a recognized leader in providing HCI software solutions, address customer challenges in implementing and managing a hybrid multicloud?[4] Nutanix Cloud Platform is its central product offering in the area. This product aims to address challenges that include modernizing legacy applications and infrastructure to support a private cloud, enabling workload and application mobility between private and public clouds, and efficiently managing resources and applications across both private and public clouds through a single pane of glass.

A hybrid multicloud model is about using both public and private cloud resources to run an organization's workloads and applications in a "cloud-smart" way. Some applications run better or cost less running on premises, while others are better suited to a public cloud, and a hybrid multicloud with workload mobility enables companies to move applications to where they fit best. Having a private cloud is a prerequisite. But not every organization already has a private cloud, and those that do might wish for easier manageability, better scalability, and more visibility into costs and controls than their existing private clouds can offer.

Implementing the right kind of private cloud can be expensive and time consuming because of legacy infrastructure, the need to refactor or re-platform applications, and the shortage of specialists to do this kind of work. Legacy infrastructure is complex to manage and not easily adapted to the containerized, virtualized, and service-oriented cloud operations that a private cloud entails. And companies might not want to spend the time and money necessary to refactor or re-platform their legacy applications—a major hurdle often needed before starting cloud migration— especially given the concern expressed by 86 percent of IT decision makers that cloud projects would likely be delayed within the year due to a shortage of talent.[5]

Connecting a private cloud to public clouds and managing multiple clouds can also be challenging. Companies do not want to get locked into a single public cloud provider, but each provider has its own proprietary systems for visibility, metering, and analytics, and the systems do not interoperate. This makes it difficult to get an accurate sense of how much data and other resources are regularly consumed by individuals or departments across the enterprise, especially when many organizations report that different business units are using different cloud vendors.[6] It's no wonder IT professionals report that their organizations waste about 30 percent of their cloud spending, even while expecting to increase that spend by 39 percent in the following 12 months.[1]

Nutanix Cloud Platform is an HCI software stack designed to overcome these obstacles to achieving a scalable, manageable, and cost-effective private cloud solution. Nutanix offers a software-defined hybrid multicloud platform and a single console that spans private and public clouds to manage traditional and modern applications. Implementing a private cloud with a Nutanix HCI solution promises to simplify the modernization process considerably. With Nutanix Cloud Clusters, companies can quickly and easily connect their on-premises private clouds to their public clouds—sometimes even taking less than an hour, according to Nutanix.[7] And they can migrate applications—without refactoring—across private clouds and supported public clouds without any lock-in. Nutanix Cloud Platform provides a complete hybrid-cloud software infrastructure, including multicloud management, unified storage, database services, and desktop services, all in one unified package.

Nutanix software benefits can be pursued via multiple hardware approaches. Customers can purchase Nutanix HCI software and install it themselves on a Nutanix-certified third-party hardware platform. Another option customers might prefer is to choose a turnkey solution that includes the software preinstalled on qualified and optimized hardware, as described in the next section.

An Appliance Solution: HPE ProLiant DX Platform

The HPE ProLiant DX series includes a broad portfolio of server hardware configurations, all qualified and supported by Nutanix and preinstalled with Nutanix Cloud Platform software to support hybrid multicloud infrastructure and a wide range of workloads.
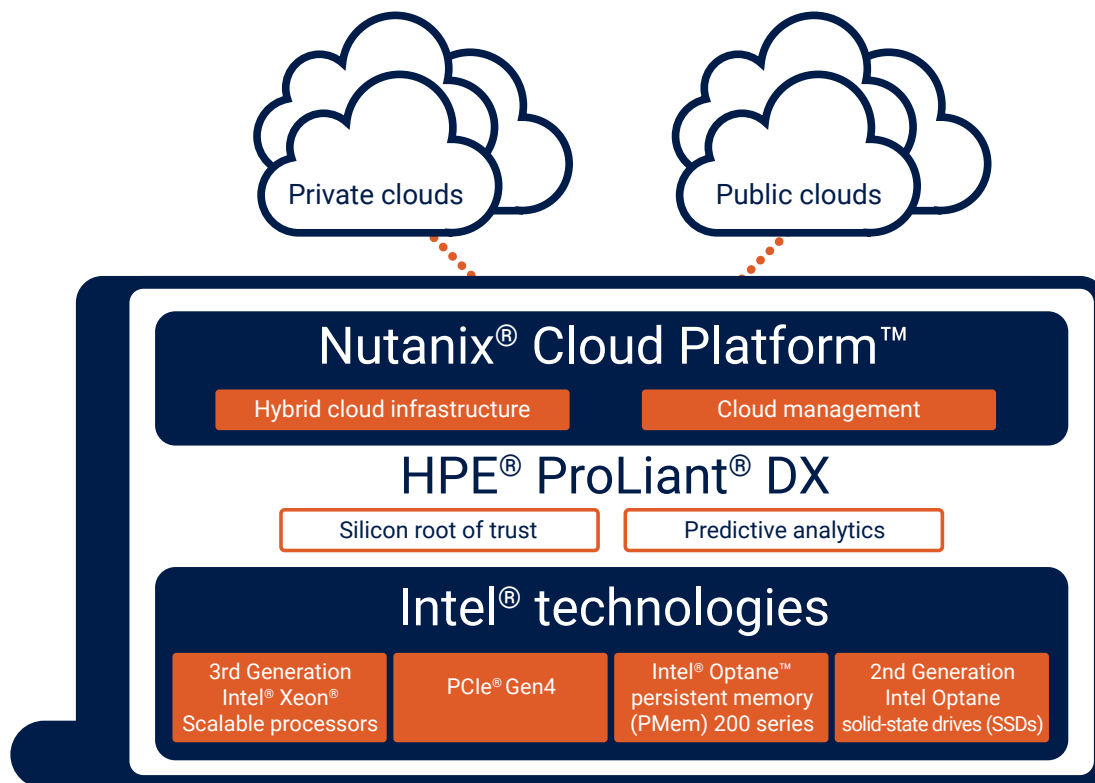

Figure 3. HPE® ProLiant® DX includes Nutanix® software and the latest Intel® technologies

The HPE ProLiant DX Gen10 Plus line of appliances encompasses a variety of form factors and configurations, including 4-socket, storage-dense, and blade options. Of particular interest here are the Gen10 Plus appliances, which feature the latest 3rd Generation Intel® Xeon® Scalable processors, including:

- The 1U model HPE ProLiant DX360 Gen10 Plus

- The 2U model HPE ProLiant DX380 Gen10 Plus

The HPE ProLiant DX360 Gen10 Plus server is a rack-optimized dense solution that is ideal for private-cloud and hybrid-multicloud infrastructure. Both incorporate key technologies from HPE and Intel, fully optimized and integrated with Nutanix Cloud Platform software to deliver simplicity and high performance on a secure and reliable platform.

Leading HPE Technologies

HPE ProLiant DX servers bring some key HPE technologies that help provide a secure, manageable, and high-performing foundation for this HCI solution.

HPE® Silicon Root of Trust

Security is always top of mind for IT when making infrastructure decisions. The threats that keep IT leaders awake today are attacks occurring increasingly lower in the stack. Today's servers can run more than a million lines of firmware code before launching the operating system. This firmware attack surface is becoming a more frequent target for attacks because the firmware code operates in a privileged position. If compromised, a breached system can go for months without being detected, even while damage is being done.[8] Third-party penetration testing of HPE firmware confirms the impressive strength of its defense, which is founded on HPE's silicon root of trust.[9]

The key to the silicon root of trust is that all firmware is scanned and monitored through a series of integrity checks that initiate from a silicon fingerprint. When the server is manufactured, a digital fingerprint is created. Only HPE manufactures its own custom application-specific integrated circuit (ASIC), the HPE® Integrated Lights Out (iLO) 5 chipset, with the fingerprint burned into the silicon right in the fabrication facility. Every time the system boots up, that digital fingerprint is compared to the firmware, and if they don't match, the system is smart enough to know that the firmware has been corrupted. The server won't boot. In addition, the system can regularly check the firmware to make sure no one has tampered with it, and it can even recover to a known-good state. Any new firmware updates are also verified by iLO before being flashed on to the hardware.

Once authenticated, the chain of trust is then passed upward to the Unified Extensible Firmware Interface (UEFI)/BIOS, the operating system bootloader, and the hypervisor.

HPE® InfoSight® for Servers

HPE® InfoSight® brings artificial intelligence (AI) and predictive analytics to protect the server from system failure and security risks. Data is collected from millions of sensors on hundreds of thousands of servers across the globe. This global data is then analyzed to predict and prevent problems locally before business operations can be disrupted.

The InfoSight for Servers wellness dashboard proactively monitors and identifies infrastructure issues, and it provides email notification for performance issues, predictive failures, parts failures, security events, and software issues, including the firmware and drivers, in addition to the operating system. Support cases can be created within InfoSight to provide support teams with access to all the HPE® Active Health System (AHS) files collected from the servers to expedite support resolution, at no cost to the customer.

Included Intel Technologies

The HPE ProLiant DX Gen10 Plus models are built on the latest Intel technologies, including 3rd Generation Intel Xeon Scalable processors, Intel® Optane™ persistent memory (PMem) 200 series, and Intel Optane solid-state drives (SSDs).

3rd Generation Intel® Xeon® Scalable Processors

HPE ProLiant DX servers are available with a wide range of 3rd Generation Intel Xeon Scalable processors in the Silver, Gold, and Platinum series. These processors deliver significant performance improvements over the previous generation, thanks to:

- Up to 40 cores

- More memory and input/output (I/O) bandwidth

- Intel® Deep Learning Boost (Intel® DL Boost) for built-in AI acceleration

- Support for PCIe® 4.0

- Intel® Volume Management Device (Intel® VMD) for enterprise-grade management of NVM Express® (NVMe®) SSDs

PCIe® 4.0 on Motherboard

PCIe is a widely adopted interface, and version 3.0 has been the standard in recent years. 3rd Generation Intel Xeon Scalable processors now provide fourth-generation PCIe interface slots, which support double the data-transfer rate. This doubles the PCIe subsystem speed, meaning that it doubles the NVMe subsystem speed for NVMe drives that are able to take advantage of it. As processors become capable of processing more data in more cores at higher speeds, the ability of SSD drives to transfer data to and from the processor fast enough can become a bottleneck. The PCIe 4.0 interface on the HPE ProLiant DX motherboard helps ensure that the fastest possible data-transfer rates are available.

Intel® Optane™ Persistent Memory (PMem) 200 Series

Intel Optane PMem makes a higher capacity of memory available at a lower price than traditional dynamic random-access memory (DRAM). Larger memory capacity lets companies process increasingly large datasets in memory to deliver business insights faster, to support more virtual desktop infrastructure (VDI) users in a cluster, or to consolidate more workloads onto Nutanix HCI clusters. 3rd Generation Intel Xeon Scalable processors with Intel Optane PMem 200 series can deliver up to 6 TB of total memory per socket and, on average, 32 percent higher memory bandwidth than the previous generation.[10] With Intel Optane PMem, companies can fulfill their large memory-capacity needs with a high-performance, lower cost alternative to DRAM, which can help improve their overall return on investment (ROI).

Intel Optane SSDs

The Intel Optane SSD DC P4800X is available with HPE ProLiant DX servers. Companies can deploy Intel Optane SSDs as cache or tiered storage to consolidate HCI appliance nodes, increase NAND disk endurance by handling write-intensive operations, and accelerate access to metadata, indexes, or temporary storage of hot data.

Add Cloud Economics: HPE® GreenLake® with Nutanix

The option to purchase IT infrastructure on an operating expense (OpEx) model rather than a capital expenditure (CapEx) model is increasingly attractive to companies. According to ESG research, 48 percent of IT and business professionals say they believe their organizations would prefer to purchase on-premises data center infrastructure through a consumption-based model.[11] HPE has a well-established program that lets companies do just that when purchasing an HPE ProLiant DX solution, called HPE® GreenLake®. GreenLake offers on-demand capacity, combining the agility and economics of the public cloud with the security and performance of on-premises IT.

Now, the partnership between HPE and Nutanix means that this as-a-service consumption model is available not only for HPE ProLiant DX server hardware, but also for the Nutanix Cloud Platform software components preinstalled on it. Components can include Nutanix® Database Service, Unified Storage, and end-user computing (EUC), each configured to be metered and charged monthly. This means the entire hardware-plus-software turnkey solution can be delivered to a data center (or a colocation or edge location) ready to use with no charge up-front, just a monthly bill based on actual consumption.

HPE also offers a managed-services option, where companies can outsource operations to HPE staff. Companies can choose not to devote their own IT staff to doing installations, upgrades, patching, and other maintenance, freeing up resources to focus more on deploying new applications and services and pursuing other strategic business initiatives.

HPE GreenLake with Nutanix software offers private-cloud infrastructure that is engineered to deliver highly scalable, available, and efficient cloud services. It is designed to be simple with one-click deployment, update, and disaster recovery (DR) for easy lifecycle management. It is intelligent, with built-in AI and adaptive machine learning (ML) that automatically adjusts resources to optimize performance and utilization. And it is resilient, eliminating data loss or downtime and keeping data safe with built-in security, data protection, backup, and DR.

A Promising Path to Hybrid Multicloud

Hybrid multicloud strategies are ubiquitous among IT decision makers, but the path to a successful hybrid multicloud infrastructure is full of obstacles including legacy hardware, legacy applications, and the difficulty and costs of managing different clouds with different toolsets. HCI is seen by many as key to overcoming some of these obstacles. Prowess analyzed a turnkey HCI appliance solution and found it promising as a simpler and more manageable route to acquiring the kind of scalable private cloud and hybrid multicloud environment that companies are seeking.

This solution stands on three solid legs, which are three industry stalwarts. First, Nutanix is a leader in HCI, simplifying the implementation of successful private clouds and unifying the management of applications and resources across multiple private and public clouds. Second, HPE is a leader in both hardware and business model innovation, building secure and reliable HPE ProLiant DX servers preinstalled with the Nutanix software. Finally, both are optimized for the latest Intel technologies to instill confidence in high performance and efficiency for handling compute- and storage-intensive data center workloads. This solution can be purchased up front or as-a-service through HPE GreenLake with Nutanix, bringing the cloud experience to both the economics and the technology of a modern hybrid multicloud infrastructure.

If you're looking to modernize your data center infrastructure with an HCI solution designed to support a true hybrid multicloud environment, our research indicates the HPE ProLiant DX solution with Nutanix Cloud Platform might be a good fit for you.

For more information about the Nutanix and HPE solution and the Intel technologies it includes, visit:

- **www.nutanix.com/hpe**

- **www.nutanix.com/intel**

[1] Flexera. "Cloud Computing Trends: 2021 State of the Cloud Report." March 2021.
www.flexera.com/blog/cloud/cloud-computing-trends-2021-state-of-the-cloud-report/.

[2] ESG. "ESG Master Survey Results, Hyperconverged Infrastructure 2.0." October 2021.
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[3] ESG. "Modernizing IT with Nutanix Enterprise Cloud and HPE GreenLake." October 2021. **www.nutanix.com/go/hpe-greenlake-with-nutanix**.

[4] Gartner. Gartner Magic Quadrant® for Hyperconverged Infrastructure Software. November 2021.
www.nutanix.com/go/gartner-2021-magic-quadrant-for-hyperconverged-infrastructure-software-vid1.

[5] Logicworks. "Challenges in Cloud Transformation: Survey Report 2020." 2020. **https://go.logicworks.com/2020-cloud-transformation-challenges**.

[6] 30 percent of organizations with more than 1,000 employees say they have different business units using different cloud vendors. Source: 451 Research.
"Public cloud lock-in concerns incongruent with successes seen in multicloud deployments." January 2020.

[7] Nutanix. "Build Your Hybrid Cloud with Nutanix & AWS." **www.nutanix.com/products/clusters/free-trial**.

[8] According to a FireEye survey, the median dwell time before an intrusion was detected between October 1, 2018, and September 30, 2019, was 56 days, which represents an improvement over previous years. Source: FireEye Mandiant Services. "M-Trends 2020 Special Report." 2020.
https://content.fireeye.com/m-trends/rpt-m-trends-2020.

[9] "World's most secure" claim based on InfusionPoints penetration testing of a range of servers from a range of manufacturers in 2017. Source: HPE.
"HPE unveils the world's most secure industry standard servers." June 2017. **www.hpe.com/us/en/newsroom/press-release/2017/06/hpe-unveils-the-worlds-most-secure-industry-standard-servers.html**. For more details on the InfusionPoints testing, see: InfusionPoints. "InfusionPoints' work featured at HPE Discover Europe." December 2017. **https://infusionpoints.com/insights/news/infusionpoints-work-featured-hpe-discover-europe**.

[10] Source: Claim 1 at Intel. "Intel® Optane™ Persistent Memory 200 Series – Performance Index."
https://edc.intel.com/content/www/us/en/products/performance/benchmarks/memory-and-storage/.

[11] ESG. "ESG Research Report: 2021 Technology Spending Intentions Survey." January 2021.
https://research.esg-global.com/reportaction/2021techspendingintentionsreport/Marketing.