

Is Your IT Infrastructure Ready for Digital Transformation?

Hyper-converged solutions from Nutanix, powered by Intel® technologies, help modernize your data center to ensure that it is ready to support your company's future success.

NUTANIX™



Executive Summary

Traditional data-center architecture can make every step of the infrastructure lifecycle complex and time-consuming. This can make it difficult for CIOs to guarantee the service-level agreements (SLAs), compliance, and security that their organizations require. These challenges are doubly frustrating because CIOs see the agility and predictability that public-cloud services offer. Organizations can now address these challenges and lay a foundation for a pay-as-you-grow data center by using hyper-converged solutions such as Nutanix Enterprise Cloud Platform* with Intel® technologies.

How Traditional Infrastructure Blocks Agility

Success in a competitive enterprise marketplace is increasingly dependent on IT agility. For example, organizations that can deploy new applications and services quickly, or scale to meet changing conditions, often have a competitive advantage over others that cannot. Consider big-data analytics, for example. Organizations that are agile enough to deploy analytics applications on demand can make better business decisions than those that cannot quickly make use of big data. However, this agility is difficult to achieve with traditional infrastructure because the infrastructure was not designed with flexibility in mind. Rather, the role of IT from its earliest days has been to run and maintain core internal business applications. With the arrival of x86 architecture and virtualization, IT has experienced increasing pressure to streamline, reduce costs, provide choice, and improve responsiveness. This era has seen the rise of client-server architectures and storage area networks (SANs) in the data center to service applications.

As a result of this evolution, which has kept storage, compute, and networking separate, many organizations' data centers have been designed for efficiency and risk protection, but not agility. In these data centers, applications are well protected, but the process of adding new infrastructure to scale or roll out new applications can be time consuming and painful. Furthermore, the separation of compute resources and actual storage media can incur additional latencies, leading to longer application wait times and frustrated users. Every element of lifecycle management is complex, slow, and costly. For example, many organizations overprovision storage to mitigate the risk of unknown future needs; but in doing so, storage utilization suffers.

Additionally, it can take days or weeks to deploy a traditional infrastructure stack. You have to install solutions from multiple vendors, make sure that all of these components work together based on their interoperability matrices, configure the network correctly, and so on.

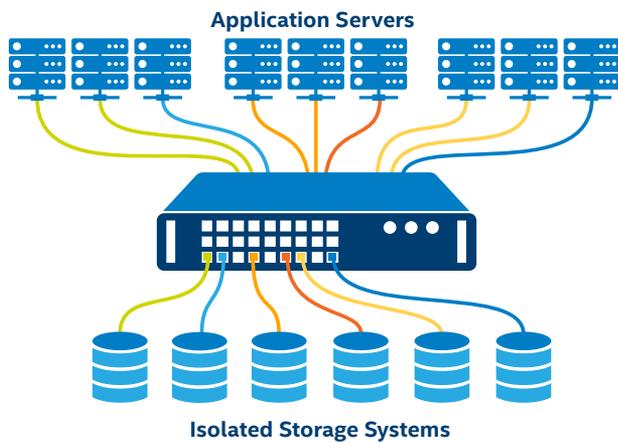


Figure 1. Complexity in traditional infrastructure undermines efficiency and agility

Is Traditional Scale-Up Storage Architecture Able to Address Complexity?

Traditional storage and storage networks can be painful to scale. While it is easy to add capacity in the form of more drives or shelves (scale up), doing so does not increase the performance of storage controllers, which have limited or no ability to scale out. As more drives are added, controllers can become saturated and create input/output (I/O) bottlenecks. Storage administrators sometimes look to flash storage to reduce the bottleneck. However, flash-based SANs come at a cost premium and often don't address power and space constraints. In addition, optimal performance and drive density cannot be achieved if appropriate flash-storage management technologies are not used alongside the new drives. Furthermore, merely a few flash Peripheral Component Interconnect Express* (PCIe*) drives in use could saturate legacy storage controllers, which were designed for hard-disk drives (HDDs). Then, once storage is optimized and storage I/O latency decreases, network latency will exceed I/O latency even though bandwidth is increasing—leading to yet more architectural considerations. All this complexity means that IT teams spend a lot of time standing up and managing their infrastructure stacks rather than focusing on things that actually drive business value.

Is Your Infrastructure Agile Enough to Compete in the Cloud-Powered Future?

In contrast to the inflexible traditional data-center SAN, the cloud has set new, high standards and expectations for flexible, scalable IT. This is the era of cloud agility and web-scale infrastructure created by companies like Amazon, Facebook, and Google. As a result, the pace of business has increased and the patience of customers has shortened. IT is no longer charged with merely maintaining core business applications; rather, it must implement new applications and infrastructure that provide digital services to drive more revenue-generating opportunities for the business. Customers and internal users now expect efficient, on-demand services while IT wants to rapidly and easily provision new infrastructure and quickly roll out new applications. To achieve these goals, organizations are moving more and more workloads to public and private cloud infrastructures; businesses that do not modernize their data centers could be left behind.

The Answer to Complexity: Transformative, Web-scale Architecture

Modern data centers are already moving toward a disruptive architecture: hyper-converged infrastructure with emerging solid-state-drive (SSD) technology. Hyper-convergence is a software-centric approach that brings compute, storage, and networking together in a highly scalable form factor. It simplifies virtualization and resource pooling, moving the data center away from a dependence on more drives and racks to a flexible pay-as-you-grow model.

HYPER-CONVERGED

Compute and storage work together on a common network

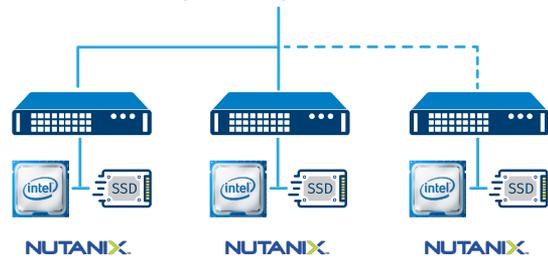


Figure 2. Hyper-converged architecture combines compute, storage, networking, and virtualization software in a form factor that is easy to scale

This new, hyper-converged architecture takes advantage of flash storage to move data closer to the processor, which reduces latency and improves efficiency. Flash-storage costs are dropping, and capacities are increasing, which is driving wider adoption of SSDs. Furthermore, select SSDs deliver more I/O operations per second (IOPS) per dollar and save more space in GB per square inch than 2.5-inch HDDs, delivering disruptive value to the data center.

Modernize Your Data Center with Nutanix Solutions

To meet the needs of both IT control and cloud-like agility, CIOs now have an option from Nutanix. The solution is built with Intel® Xeon® processors, new Intel® SSD hardware, and Nutanix enterprise-cloud software, and it is designed with web-scale agility in mind. The joint solution lets organizations build on-premises enterprise clouds that are as scalable and agile as public-cloud services.

Nutanix Enterprise Compute Platform is a 100-percent software-driven infrastructure solution that natively converges flash storage, compute, networking, and virtualization into a turnkey appliance that can be deployed to run any application out of the box in minutes. Data-center capacity can be easily expanded one node at a time with no disruption, delivering linear and predictable scalability with pay-as-you-grow flexibility. The solution helps eliminate complexity and allows IT to drive better business outcomes.

The Nutanix platform accelerates application performance, in part, by keeping compute and storage close together using data locality—a feature that enables virtual machines to access data on the local node without having to traverse the network—to minimize network latencies. As additional nodes are added, data locality enables performance at scale.

Solution Brief | Is Your IT Infrastructure Ready for Digital Transformation?

The platform runs any workload at any scale and brings together web-scale engineering with consumer-grade management to make infrastructure invisible and elevate IT teams so that they can focus on what matters most to the business.

Business Benefits of Nutanix Solutions

Nutanix solutions can reduce the total cost of ownership (TCO) for an infrastructure by up to 58 percent over five years, and with as much as 510-percent five-year return on investment (ROI) with a payback period of 7.5 months through:¹

- Cost-effective and incrementally scalable infrastructure
- Simplified infrastructure deployment, management, and troubleshooting
- Highly resilient infrastructure that supports the business with minimal downtime

Powered by Intel® SSDs

Nutanix Enterprise Compute Platform features the Intel SSD Data Center Family for PCIe. Because these enterprise-grade drives connect to the CPU through the PCIe interface, they can deliver up to six times the performance of Serial Attached SCSI (SAS)/Serial ATA (SATA) SSDs with reduced latency and improved CPU utilization.^{2,3} They are designed for scalability, quality of service, and low latency. The performance of a single drive from the Intel SSD Data Center Family for PCIe, specifically the Intel SSD DC P3700 Series, can replace the performance of multiple SATA SSDs.⁴ This performance makes the Intel SSD Data Center Family for PCIe an ideal solution for the most demanding data-center workloads.



The Intel SSD Data Center Family for PCIe is based on Non-Volatile Memory Express* (NVMe*), a standard that brings PCIe drives into the mainstream with industry-standard software and drivers. Compared to SATA drives, PCIe drives based on the NVMe standard can provide:⁵

- Low latency
- Improved CPU utilization
- Scalability
- Increased bandwidth
- Direct attachment to CPU, which can eliminate costs and overhead associated with the host bus adapter (HBA)

In the Nutanix Enterprise Compute Platform, Intel SSDs with NVMe are paired with the Intel Xeon processor E5 v4 family, which is optimized for cloud orchestration and built to enable an adaptable, intelligent infrastructure.

The Future Data Center Is Available Today

The next evolution of the data center is already here—the transformative web-scale architecture made possible by hyper-converged infrastructure solutions, such as Nutanix Enterprise Compute Platform, powered by the Intel Xeon processor E5 v4 family and Intel SSD Data Center Family. Hyper-converged architecture vastly simplifies traditional IT infrastructure and has a profound impact on all aspects of enterprise applications and DevOps, delivering a new era of unprecedented performance.

Learn More

To learn more, visit nutanix.com/flash for more information and to schedule a demo.

For more information about Intel® SSDs, NVMe*, and the Intel SSD Data Center Family, visit:

intel.com/ssd

intel.com/ssd/nvme

intel.com/ssd/datacenter

¹ 58-percent reduction in TCO, 510-percent five-year ROI, and 7.5 month payback based on IDC. "Quantifying the Business Value of Nutanix Solutions." August 2015. <http://go.nutanix.com/nutanix-pricing-vs-traditional-infrastructure-tco-roi-report.html>. This is a study of the Nutanix solutions used by 13 organizations (10 using Nutanix XCP® solutions and 3 using Dell XC Web-scale appliances*) and how those solutions impacted those organizations' operations, businesses, and costs.

² The Intel® SSD Data Center Family for PCIe* is capable of reading data up to 2.8 GB/s and 460K IOPS and writing up to 2.0 GB/s and 175K IOPS. Source: Intel. "Consistently Amazing: Make the Switch to Faster Data." 2015. [intel.com/content/www/us/en/solid-state-drives/intel-ssd-dc-family-for-pcie-brief.html](https://www.intel.com/content/www/us/en/solid-state-drives/intel-ssd-dc-family-for-pcie-brief.html).

³ Configuration: Performance claims obtained from data sheet: Intel® SSD DC P3700 Series (2 TB), Intel SSD DC S3700 Series, Intel® Core™ processor i7-3770K CPU at 3.50 GHz, 8 GB of system memory, Windows Server 2012*, and Iometer*. Random performance is collected with four workers, each with 32 QD configuration for latency: Intel® Server Board S2600CP, two Intel® Xeon® processor E5-2690 v2, 64 GB DDR3, Intel SSD DC P3700 Series (400 GB), LSI 9207-8i*, and Intel SSD DC S3700 Series.

⁴ Intel. "Intel Solid State Drive Data Center Family for PCIe*." <https://www-ssl.intel.com/content/www/us/en/solid-state-drives/intel-ssd-dc-family-for-pcie.html>. Configurations: Performance claims obtained from data sheet, sequential read/write at 128K block size for NVMe* and SATA, 64K for SAS. Intel® SSD DC P3700 Series, 2 TB, SAS Ultrastar® SSD1600MM, Intel SSD DC S3700 Series, SATA, 6 Gbps. Intel® Core™ i7-3770K processor, 3.50 GHz, 8 GB of system memory, Windows Server 2012*, Iometer*. Random performance is collected with four workers each with 32 QD.

⁵ NVMe Express, Inc. [nvmexpress.org/wp-content/uploads/NVMe_Overview.pdf](https://www.nvmexpress.org/wp-content/uploads/NVMe_Overview.pdf).

Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit intel.com/benchmarks.

Cost reduction scenarios described are intended as examples of how a given Intel- based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

Intel does not control or audit third-party benchmark data or the web sites referenced in this document. You should visit the referenced web site and confirm whether referenced data are accurate.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com.

Intel disclaims all express and implied warranties, including without limitation, the implied warranties of merchantability, fitness for a particular purpose, and non-infringement, as well as any warranty arising from course of performance, course of dealing, or usage in trade.

Intel, the Intel logo, Intel Core, Intel Inside, and Xeon are trademarks of Intel Corporation in the U.S. and/or other countries.

*Other names and brands may be claimed as the property of others.