

Hyperconverged Infrastructure: Planning the Future of Datacenters

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IDC Opinion

As an increasing number of organizations worldwide commence their digital transformation (DX) journeys, it is becoming necessary for organizations to have a clear understanding and control of all their assets, tools, and platforms that can support DX initiatives driven jointly by IT and business units. Focusing on DX initiatives is imperative for organizations that wish to keep pace with accelerated business and customer demands. According to IDC's latest research, annual spending on DX initiatives in the Middle East, Turkey, and Africa (META) region will cross the \$20 billion mark by the end of 2018. This figure is expected to exceed \$40 billion by 2022 as the organizational pursuit of game-changing innovation accelerates.

Datacenter transformation is considered a key enabler of the whole organizational transformation journey, and of most organizational DX initiatives. Transforming datacenter infrastructure and powering it with the latest innovations helps IT teams on many fronts: It increases the efficiency of managing the IT infrastructure, maximizes resource utilization, and provides great flexibility in technology implementation. Consequently, IT infrastructure becomes more capable of supporting accelerated business dynamics, improved business models, and enhanced user experience.

The key innovations in datacenter transformation have included the introduction of converged infrastructure along with hyperconverged infrastructure (HCI). "Organizations around the world are increasing their investments in datacenter technologies that eliminate inefficient silos and support business-centric decisions rather than infrastructure-centric decisions," says Eric Sheppard, research vice president, server and storage infrastructure at IDC. "This is driving increased spending on converged systems that can safely reduce the complexity of datacenter infrastructure and allow IT teams to focus on high-value business projects."

Although both innovations focus on consolidating datacenter processing, storage, and network components into integrated systems, HCI adopts a software-defined approach to consolidation as opposed to the hardware-based approach typical with converged infrastructure. The software-defined approach for HCI is a key reason behind it gaining momentum globally and regionally. According to IDC,

worldwide revenue from hyperconverged systems has been growing steadily from \$3.90 billion in 2017 to a forecast of \$12.41 billion by 2022, representing a compound annual growth rate (CAGR) of 26.0%.

The growth of the HCI market in MEA is driven by multiple factors; first, the speed at which new business models are introduced to local markets to gain competitive advantage and increase market share is putting great pressure on IT to cope with the new demands with IT agility, speed, and efficiency. Second, CIOs are prioritizing infrastructure decisions by the technology's flexibility to change and scale, all with a strong focus on the total cost of ownership (TCO). According to IDC's end-user survey conducted in 2018 among Middle East CIOs, around 32% of total IT budgets for 2018 will be allocated to infrastructure projects. In addition, almost 44% of CIOs have already either implemented HCI in their organizations or plan to implement it in the next 12 months. It is evident that HCI is strongly positioned in the region, as it bundles compute, storage, and networking in one interface to enable faster services adoption, while requiring little IT-department attention to operations, as well as offering a significant cost advantage over traditional servers and storage.

Methodology

This IDC White Paper is based on in-depth customer interviews conducted with enterprises operating in Egypt that have adopted hyperconverged infrastructure. Additionally, it showcases Cisco's opinion of the global hyperconverged infrastructure trends and offerings for the local market. The insights gathered are supplemented by secondary sources such as IDC research.

The Evolution from Traditional to Hyperconverged Datacenter

A decade after the initial rise of the 3rd Platform technologies, organizations are still experiencing the ripple effect of both business and technological transformation at all organizational levels. The digital transformation wave is not anywhere close to subsiding – in fact, it has progressed from the initial introduction of modern technologies such as cloud, mobility, big data and analytics, and social media to the wide adoption of innovation accelerators such as the Internet of Things, robotics, augmented reality and virtual reality (AR/VR), and cognitive artificial intelligence.

During the early days of digital transformation, IT teams were the primary drivers of change within organizations. IT took the lead in educating organizational teams about the benefits of transformation and how transformation can help better utilize resources. This phase was also characterized by increased willingness in IT departments to experiment with the new capabilities that technological advances facilitated. The impact of 3rd platform technologies on the design and operation of IT infrastructure quickly became apparent, as datacenter innovation shifted away from hardware capabilities and toward software defined innovations such as virtualized infrastructure.

Virtualized infrastructure was the standout datacenter innovation in the early phases of digital transformation. Later, CIOs were more concerned with gaining greater control over their virtualized environments, getting more visibility, and standardizing datacenter processes. Convergence was then introduced as an innovation containing server hardware, disk storage systems, networking equipment, and basic element/system management software. Converged infrastructure combined all the essential capabilities for running a datacenter with the benefits of consolidated management tools and getting service from a single vendor, thereby ensuring ease of deployment and troubleshooting. It was remarkable how organizations accelerated their adoption of converged infrastructure to power their mission-critical applications and as a platform to drive operational simplicity.

HCI was the natural evolution of convergence. Hyperconverged systems collapse core storage and compute functionality into a single, highly virtualized solution. A key characteristic of hyperconverged systems that differentiates these solutions from other integrated systems is their scale-out architecture and their ability to provide all compute and storage functions through the same x86-server-based resources.

Benefits of HCI Adoption

HCI adoption plays a fundamental role in driving change within organizations:

- HCI supports better utilization of IT skills and talent by allowing administrators to focus more on enabling business rather than management of IT resources.
- HCI powers business applications with improved performance, agility in adapting to business requirements, process automation, shorter time to provision, and improved service levels.
- HCI provides a better economic model that avoids high upfront and periodic costs, since it allows for incremental growth through its lifetime.
- HCI drives operational efficiency as it accelerates deployment, reduces integration complexity, supports scaling to cloud, improving operational processes such as backup and recovery, and eliminates management of silo IT components.

As HCI technology matures and becomes mainstream globally, customer confidence in it is increasing, as is the range of workloads that customers will consider hosting on HCI. In IDC's 2016 HCI survey of 300 organizations using HCI, more than 30% of respondents used HCI to deploy business, collaborative, and content apps, while more than 20% used it for data analytics, data management, and application testing.

HCI providers have been driving adoption through all customer segments and helping build confidence in the migration of mission-critical applications to HCI. The benefits of HCI adoption are equally significant in both the enterprise and the small and medium-sized business (SMB) spaces: Many SMBs adopt HCI for their entire environment, end to end. This allows them to host every application and IT service on a single, all-inclusive architecture, and eliminates the need for external storage or complex integration activity.

Enterprises also reap the benefits of HCI, as it provides great flexibility in scaling out resources across different workloads without the need to duplicate investments or assets. According to IDC's Worldwide Converged Systems Tracker, the HCI adoption rate in 2017 is at 40% among SMBs and 34% among enterprises.

Customer Story: HCI in Manufacturing

"When choosing an HCI solution to move to, it was important for us not to disrupt any datacenter operations and to select a technology that connects easily to our existing environment and storage."—Ibrahim Eissa, Senior Systems Administrator, Zamil Steel

Zamil Steel Pre-Engineered Buildings' plant is located in Cairo. The IT management staff are responsible for the entire IT infrastructure and services provided to all 400 employees and plant workers in the company's Egypt premises. The applications managed by the team include core mission-critical applications for production, unified communication solutions, file servers, and cloud software-as-a-service (SaaS) applications. In addition, they manage a datacenter hosting servers, storage, and network hardware from various vendors such as IBM, Oracle, 3Com, and Cisco.

Initially, the management direction was to move to HCI, since this offered cost advantages over traditional server upgrades. The team invested time in exploring all the vendor offerings in the market, and their priority was choosing a delivery partner with the right capability and experience to support critical migration activities such as capacity planning and considering fabric interconnects.

Their choice to move forward with the Cisco HyperFlex HCI solution was driven by the ease of migration of existing infrastructure to the HyperFlex platform with no impact on existing infrastructure management processes.

Customer Story: HCI in Education

The British International School in Cairo (BISC) is home to more than 1,000 students spanning school years from junior school up to the sixth form (Y12).

The entire IT operations in BISC are run by very small team. BISC's IT manager, Mr. Hussein Zaher, is responsible for managing all IT infrastructure and applications within BISC.

"The main reason we considered moving to HCI was to make managing the IT infrastructure and solutions easier. HCI saves me time to focus on the business needs rather than managing the IT operations."—Hussein Zamar, IT Manager, BISC

BISC's IT provides many services to students, staff, and parents, including access to education and learning applications, as well as customized applications for information systems, time sheeting, and financial packages. The school plans to provide innovative education solutions such as smart education,

AR, and VR. Its datacenter hosts a diverse set of hardware provided by different vendors such as HP, Cisco, Palo Alto, and Aruba.

BISC's move to HCI was motivated by multiple factors – the primary one was the flexibility and ease of management of HCI. Also, HCI ensures 24x7 access for users and guarantees minimal down time at critical business times such as exam and report periods. HCI enabled IT to create redundancy while providing a single interface for monitoring health, alerts, processing updates, and service consumption. It has also enabled IT to respond to annual business cycles with great flexibility to scale up, increase performance, and reallocate resources to high-traffic functions.

It took BISC one year to evaluate different HCI technologies in the market; it decided to go with Cisco's HyperFlex solution, as it offered great flexibility to support BISC's five-year expansion plan, alongside strong local support. BISC has been successfully using Cisco HyperFlex for over two years.

The Future of HCI

IDC forecasts the continuous growth of the HCI market as use cases expand and it continues to provide great benefits to a wide range of industries. Organizations are seeing HCI as the next-generation infrastructure for upgrading their existing three-tier architectures. Revenue from hyperconverged systems sales has also been growing steadily across the Middle East and Africa (MEA). According to IDC, the hyperconverged systems market in MEA reached \$131.52 million in 2017, which is 29.1% of the total regional converged systems market. The hyperconverged systems market is expected to grow to \$306.38 million by 2022, amounting to 43.2% of the total regional converged systems market. The overall CAGR from 2017 to 2022 is forecast to be 18.4%.

Enterprises are looking to adopt HCI to better utilize all their compute and storage resources for mission critical applications, both in the datacenter and at edge locations. HCI can also serve as a solid platform for the on-premises side of hybrid cloud architectures.

Overview of Cisco's HCI Solution

Cisco has leveraged its leadership in both the network and compute technology spaces to deliver an inclusive HCI system that does not compromise on scalability, flexibility, or performance. Cisco's primary focus with HCI solutions is to help customers save costs, simplify procurement, and reduce the TCO of their operations by adopting a single-vendor strategy for datacenter infrastructure.

Cisco HyperFlex is a comprehensive end-to-end adaptive platform that powers multi-cloud IT with hyperconverged infrastructure. Built on Cisco HX software and engineered on Cisco Unified Computing System (Cisco UCS), Cisco HyperFlex delivers a simplified HCI solution with independent scaling, comprehensive end-to-end automation, support for multiple hypervisors, and flexible cluster scaling. It combines innovative software-defined storage and data services software to ensure rapid, agile, easy,

and efficient deployment. Cisco HyperFlex is designed to support a wide range of applications and workloads in the datacenter and remote locations, virtual and bare-metal resources, and edge-computing and multi-cloud environments.

The primary focus of Cisco HyperFlex is to help organizations achieve business objectives such as:

- **Increasing Agility:** HyperFlex aids this objective by providing an end-to-end solution that supports rapid setup, provisioning, problem resolution, and upgrading. The foundation of HyperFlex is granular building blocks of both compute and storage, which enables faster IT response to growing business demands.
- **Improving Efficiency:** HyperFlex keeps data optimized and aligned with application requirements by enabling remote distributed deployments and upgrades, offering pay-as-you-grow options in small increments, and orchestrating HCI from common platforms.
- **Enhancing Adaptability:** It offers seamless integration with existing datacenter architectures, which makes shifting resources from HCI to traditional infrastructure dynamic and responsive to business demands while protecting existing investments. When customers plan for business applications rollout, HyperFlex offers freedom to run many hypervisors removing any constraints of limited supported options of operating environments.
- **Reducing TCO:** Granular scaling helps reduce the capital costs of infrastructure silos. HyperFlex also offers different models of payment such as subscription-based, pay-as-you-grow, and scale-as-you-go models in selected geographies to enable cloud economics on premises. It lowers operational costs by providing uniform management of computing, networking, and storage.
- **High Performance:** With several storage technologies like Hybrid, All Flash, and all NVME the HyperFlex offers highest levels of performance in terms of latency and IOPs as well as best optimization possible to serve all mission critical applications at scale.
- **Environment Support:** Cisco offers single point of support for Cisco & Non-Cisco components running on top of HyperFlex. Cisco, and its technology partners, use the published CVDs “Cisco Validated Designs” to ensure smooth integration and operation of end-to-end solutions.

The Cisco Hyperflex system is composed of the following multiple solutions:

- **Cisco HyperFlex HX Data Platform:** Cisco UCS provides a single point of connectivity that integrates Cisco HyperFlex HX-Series nodes and a variety of Cisco UCS servers into a single

unified cluster. It offers the flexibility to choose the combination of CPU, flash memory, graphics acceleration, and disk storage resources to deliver an optimal infrastructure for your applications.

- **Cisco HyperFlex HX Data Platform Controller:** Each of the nodes started by the HX Data Platform has a software controller called the Cisco HyperFlex Controller. The controllers control all system SSDs and HDDs to store persistent data into a single distributed, multi-tier, object-based data store presenting a single pool of storage for the cluster so that data availability is not affected if single or multiple components fail.
- **Cisco HyperFlex Edge:** Cisco HyperFlex Edge is designed for remote- and branch-office operations. It offers a lower-cost, small-footprint option, with automated management and the full feature set in Cisco HyperFlex systems. It brings HCI capabilities beyond the datacenter and out to the network Edge.
- **Cisco HyperFlex Management Lifecycle:** Cisco HyperFlex supports cloud-like functions throughout the management lifecycle, including:
 - Planning using web-based tools
 - Deployment using simplified workflows
 - Systems and data management systems such as HyperFlex Connect, Cisco Intersight, Hypervisor management integration for Microsoft and VMware, and container multi-cloud deployment
 - Monitoring using vSphere web client or Cisco HyperFlex HX Connect

Conclusion

While the HCI offerings and ecosystem in the local market continues to grow, it is essential when planning an organizational move to HCI to focus on how adoption can impact datacenter operations in addition to providing value to the organization. When evaluating different HCI technologies, some of the key customer considerations should be:

- **Business Impact:** HCI not only transforms an organization on the technology level, but also on the business level. It is essential to consider the business benefits of moving to HCI with all the flexibility it brings to easily provision services, reduce time to market, and increase availability to customers.
- **Planning Change:** The move to HCI is an important architectural shift from the traditional datacenter. It is critical for organizations to understand and plan for the transformation, considering HCI's capability to integrate with the current datacenter environment and future plans for expansion. Your HCI discovery exercise should include compute, storage, and network considerations so as to avoid any disruptions and bottlenecks within the HCI system itself.

- **Cost Advantage:** It is important to understand the financial impact of moving to HCI. Introducing HCI to the datacenter environment is coupled with changing the opex and capex operational models and reducing secondary sites and disaster recovery costs.
- **Vendor Selection:** Look for HCI solution vendors that own and co-develop all layers of the stack. Storage and network software co-developed with the hardware it resides on delivers the most reliable and consistent user experience right out of the box, with little or no customization or tuning required.
- **Local Support:** Moving beyond the initial rollout of HCI solutions, customers should look for vendors that provide solid local support and have a thorough vision of how HCI can benefit different functions within the organization.

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