



Smart Data Center Strategies in a Multicloud World

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Table of Contents

Introduction	3
It's all about workloads	4
How converged and hyperconverged infrastructure made it all possible	5
What the new data center looks and feels like	6
How Cisco's innovation and leadership has driven innovation over the past decade	7
Conclusion	9

Introduction

Enterprise computing is in the throes of dramatic change, driven simultaneously by the availability of more agile and flexible infrastructure options and important new applications and workloads. This paper looks at how changing business demands have reshaped—and will continue to reshape—the role and format of compute infrastructure.

The traditional, headquarters-based data center isn't dead—but it now looks and acts a lot different than it did just a few years ago. And what we've traditionally called the enterprise data center is going to continue to change in dramatic ways in the very near future.

There are two major reasons why: dramatic upheaval in how organizations use digital technologies for a wide range of applications and use cases, and exciting changes in the form and function of compute infrastructure itself. These and other developments aren't just step-change improvements over legacy data center technology and workloads. They are fundamental, even radical disruptions in the role of technology to drive continuous business improvement.

As the very nature of the data center expands, morphs and transitions, IT decision-makers have found themselves under pressure in two fundamentally different, yet intertwined ways: They must reduce costs and improve operating efficiency on one hand but build an intuitive, adaptive infrastructure that promotes innovation and business differentiation on the other hand.

Of course, none of this is happening overnight. In fact, it's been at least 10 years in the making. Technical and business leaders have increasingly collaborated on strategies and tactics to use technology in more innovative ways, which has often revolved around the ability to develop and deliver new applications and workloads. At the heart of this trend has been the reimaging and re-engineering of the data center from hulking, expensive, component-based systems to sleek, agile, cost-efficient converged infrastructure. At the same time, this transition also is based upon a simple, yet critical concept: Applications are the business.

Applications can provide a competitive edge and be the key interface to customers. Applications are also hyper-diverse and hyper-distributed, with many parsed into virtual machines and microservices, and deployed across hybrid, multicloud, and edge environments.

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In this new application-driven world, where change is the only constant, the compute infrastructure needs to be a living, breathing thing, drawing in data to drive automated decisions so that IT infrastructure can be more application-aware and adapt resources to the needs of the applications. Computing must also take place where data is being collected, analyzed and shared.

And that's happening... everywhere.

It's all about workloads

New workloads, powered and transformed by technologies such as artificial intelligence (AI), machine learning and agile development, have burst onto the scene, changing not only how data is created but also how organizations use data for a wide range of business goals. And even more fundamental and important

to this onslaught of new workloads is the reality that cloud computing has changed everything. Cloud is no longer an efficiency play but now a source of innovation that drives differentiation, enhanced customer experience and enterprise-wide digital transformation.

The primacy of cloud computing brought with it the need for a new application architecture, one based on microservices, containers and cloud-native applications instead of monolithic, shrink-wrapped applications. The latest, cloud-based architectures must support an array of processes and approaches for digital transformation, such as hybrid IT, multicloud architecture, DevOps, DevSecOps and agile development.

The result of this application architecture shift has been the rapid development and deployment of transformative workloads, such as customer self-service, pervasive mobility, analytics and business intelligence, data protection and business continuity, the Internet of Things, edge computing and more.



These workloads are shaped by several fundamental requirements, including distributed data and applications, cloud-native development and management, security integrated from the onset of the development process and the need for legacy and new workloads to be managed from the same console.

This also has ushered in an important shift in the role of the IT professional, from technical architect and help desk coordinator to IT services broker, where developers and data scientists are IT's new customers.

How converged and hyperconverged infrastructure made it all possible

The move to the cloud—and, increasingly, a hybrid cloud and multicloud model—means that the very nature of the data center has been turned on its head. As the application has become king, enterprise computing has moved from singular, component-based “data centers” to “centers of data,” where all compute, storage, networking and management functions take place throughout the distributed enterprise.

Clearly, a new approach to IT infrastructure was needed to help organizations rearchitect how, where and when the data that fuels applications is created, captured, managed and shared. Instead of an infrastructure model based on distinct compute, storage and networking components, infrastructure became tightly integrated in an evolution from unified to converged to hyperconverged.

Today, converged infrastructure (CI) and, increasingly, hyperconverged infrastructure (HCI) represent a more efficient model that blurs the lines between component functions such as storage and computing. Technical advances such as flash storage, persistent memory, NVMe, and GPU and FPGA accelerators have made it possible and advantageous to integrate the hardware stack into a more efficient, reliable and easily managed framework.

The move to a more streamlined infrastructure model began more than a decade ago, implemented initially through reference architectures and first-generation integrated systems. As technology advanced—driven largely by the desire to create a sleeker infrastructure designed specifically for the reality of cloud-based and multicloud workloads—the move to CI and HCI changed the rules of the game for IT professionals and line-of-business executives looking to use the cloud not only for efficiency but also unprecedented innovation.

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And it wasn't just the hardware stack that was revolutionized. The software stack needed a new model, because the software elements on top of the physical infrastructure had become more complex to deploy and manage, especially in a hybrid IT environment, where "work" moved from on premises to the cloud and often back again.

The evolution from bare metal to hypervisor to containers and microservices has both driven the need for a new hardware model and enabled that model to operate with maximum efficiency and agility in new computing circles—remote offices, on the road and at the edge.

The new software stack also has been critical to the widespread acceptance and adoption of DevOps (and its necessary follow-on model, DevSecOps), enabling applications to operate in a more agile, serverless setting.

What the new data center looks and feels like

In many ways, today's CI/HCI model has led to a more egalitarian and user-centric flavor of information technology and data. Because the new infrastructure stack offers the same out-of-the-box experience consumers have long enjoyed with PCs, smartphones and applications, it has allowed many business users to take charge of their own data and application needs, rather than waiting for the burdensome application development backlog to clear up.

Additionally, new CI/HCI systems have dramatically changed the economics of computing, reducing not only Capex costs but also the often-hidden Opex costs for things like physical space, power and cooling. They have also substantially boosted the productivity of business users, while freeing up IT professionals from mundane, keep-the-lights-on functions like patches and updates to collaborate more closely with business users.

In more and more instances, traditional data center glass houses have given way to small, distributed computing facilities distributed throughout the extended enterprise. And, since CI/HCI systems were designed for a cloud-centric IT model, those systems are more tightly integrated with each other and with cloud computing services via a cloud-based management platform.

This has been a prime catalyst for the continued evolution of computing from unified to intuitive, where systems are imbued with intelligence to spot challenges, remediate problems, identify efficiencies and harvest telemetry from the hundreds, thousands or even millions of connected points in the digital enterprise.

How Cisco's innovation and leadership has driven innovation over the past decade

Unsurprisingly, Cisco has been on the forefront of this evolution for more than a decade. Building upon its decades of expertise and leadership in computer networking, storage and security, Cisco was able to spot the trends identified throughout this paper to see why and how IT functions would need to be collapsed into a more efficient hardware stack and a more easily managed, yet more powerful, software stack.

In fact, Cisco's initial offering in this space recognized the importance of unifying both hardware and software components into a tightly integrated offering: Unified Computing System (UCS). A key breakthrough that helped to fuel IT adoption of unified infrastructure was Cisco's decision to move systems management out of individual hardware components and centralize it in the fabric. This unified not only the hardware infrastructure but also application programming interfaces for easier, faster programmability. The result: easier connectivity, reduced complexity, and faster and easier deployment.

Now, Cisco has spearheaded the move from unified computing to intuitive computing, by harnessing the power of cloud computing, AI, machine learning and analytics to support new, transformative workloads that must provide both scale and velocity in today's rapidly moving business environment.



Cisco Intersight moves the centralized management and policy control engine of UCS to the cloud, creating the first cloud-based IT operations and management platform. Powered by AI and machine learning, Intersight enables IT teams to use automation and “digital intuition” to react more quickly to business needs, allowing them to focus on supporting business decision-makers and new workloads rather than on tactical tasks.

In Cisco’s vision for intuitive computing, cloud and AI help organizations connect everything, including both legacy workloads and new, cloud-borne workloads. By using multiple, distributed and interconnected CI/HCI modules throughout the enterprise, organizations can connect literally everything. More important, this allows organization to harvest unprecedented amounts of data telemetry to turn massive data sets into actionable insights.

One of the key elements of Cisco’s CI/HCI focus is its commitment to automation in a number of different modes, including:

- Intent-based networking, which helps organizations deliver services faster and with increased reliability, while improving uptime, in alignment with business goal across all computing facilities.
- Workflow automation and workload optimization, where Cisco collaborates its widespread business partner ecosystem to deliver hardware, software and services to automate workflows and optimize infrastructure to meet the needs of the applications.
- Automated, programmable data center switching, using open APIs for storage, networking and compute for greater efficiency and more intuitive operations.

Today, Cisco offers a comprehensive range of CI/HCI solutions across a span of use cases and functionality models, enabling small and large organizations alike to streamline their delivery of IT services, become more agile in spotting and leveraging new business opportunities, and provide a more consistent, positive experience for all users both inside and outside the organization.

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Conclusion

CI and HCI are no longer “hot new things.” They are now established—and often preferred—platform architectures for today’s concepts such as data center modernization and transformation, virtualization, hybrid cloud and software-defined infrastructure.

As organizations accelerate and broaden their adoption of CI and HCI, they are increasingly looking to partner with an established, credible, well-resourced and reliable market leader—one that can provide the vital combination of product vision, global support and technology innovation necessary to ensure that IT keeps up with the rapidly changing demands of the business.

For more than a decade, Cisco has helped organizations navigate the often-turbulent waters of transformation from monolithic, siloed data centers to a more integrated model that reduces risk and simplifies deployment and management. Cisco’s combination of hardware and software expertise, along with its technology partner ecosystem, global service and support organization, and widely acknowledged reliability makes it an ideal partner for businesses looking to overhaul their infrastructure to support digital transformation.

For more information about Cisco’s lineup of converged and hyperconverged infrastructure solutions, please visit cisco.com/go/emear/ucs.

