How to Get Future Ready Infrastructure for Hybrid Cloud and Modern Applications

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Nearly all enterprises are rapidly moving to modernize all aspects of their IT framework: Infrastructure, applications, processes, resource rationalization, data centers and the essential role that IT plays in organizational success all are undergoing massive changes, upgrades and updates.

But no enterprise wants to endure the economic and operational impact of perpetual change in order to achieve a truly modern IT platform and architecture. Senior IT and business executives are deeply committed to using IT in new, innovative and game-changing ways, and that can't be done effectively or efficiently without a plan to future-proof the enterprise's IT infrastructure. Initiatives such as digital transformation, machine learning, virtualization, cloud computing, big data analytics, edge computing and connected devices are just hopes and dreams without a future-proofing strategy.

There are several reasons for this. First, few organizations want—or can afford—to devote more Capex every time a new technology refresh cycle comes around for servers, storage or networking. Second, organizations want to deploy their talented people on transformational applications that have tangible economic value, not just supporting functions that merely keep the lights on such as patching software, ensuring proper infrastructure configuration and manually tuning servers and storage for optimal performance. And third, IT now is widely acknowledged as a strategic asset for competitive advantage, an enriched customer experience and enhanced employee productivity—but that can't be done without a consistent, unified, agile framework that doesn't have to be overhauled frequently.

Fortunately, most senior executives have begun recognizing that requirement, and many are embracing the notion of a future-proofed infrastructure, because they know that strategic programs such as hybrid cloud and modern applications demand it. The right future-proofing strategy breaks down IT silos, improves IT responsiveness to business needs, stretches valuable Capex and Opex dollars, facilitates new initiatives and embeds higher and deeper levels of intelligence into all decision-making. That's where capabilities delivered by hybrid cloud and modern applications, in particular, become invaluable.

But, although many enterprises now grasp the need for a future-proofed infrastructure for hybrid cloud and modern applications, not everyone yet understands how to get that done. This guide not only looks at the rapidly changing issues that are making infrastructure modernization challenging, but also examines some practical things senior decision-makers can and should do today and in the near future in order to make it happen—in particular, hyper-converged infrastructure (HCI).
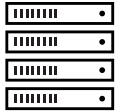
Storage, in particular, was seen as a component that needed to be refreshed even more frequently as data volumes exploded and the need for higher-performance and lower-latency storage became more prominent.

Hybrid cloud and modern applications require a foundational strategy to future-proof infrastructure for long-term business impact

Not that long ago, IT professionals and infrastructure managers built their operational strategies, budgeting and resource deployment around the notion that hardware infrastructure—servers, storage and networks—had to be refreshed regularly, usually on a 3-to-5-year cycle. That was done for a variety of reasons, particularly to align with organizations' capital expense depreciation guidelines, but also to take advantage of the rapid rate of improvement of hardware price/performance.

Storage, in particular, was seen as a component that needed to be refreshed even more frequently as data volumes exploded and the need for higher-performance and lower-latency storage became more prominent. "Storage should be a just-in-time affair, driven by storage consumption rates and DASD performance," wrote Computer Economics, a research organization that studies the economics of IT hardware and software. "IT organizations cannot afford to be caught flat-footed if a sudden change is needed."[1]

But in today's rapidly moving business cycles, where technology often is a critical driving factor in organizational success, IT professionals and infrastructure managers have sought to move away from frequent, and often dramatic, forklift upgrades of servers, storage and networking hardware. This has become particularly important as they have embraced plans for hybrid cloud and modern applications, which are inevitably at the heart of their digital transformation and IT modernization efforts. These will include:

• Managing increased infrastructure diversification (physical and virtual, on premises and cloud, 3-tiered and HCI) in a way that reduces complexity, improves responsiveness and enhances scalability.

• Driving for flexibility to move workloads to the right environment if and when ready, rather than as an expensive, time-consuming and resource-draining forklift overhaul.

• Moving away from an IT personnel model with lots of component specialists (i.e., experts in servers, storage or networking), in favor of a more integrated infrastructure approach that better leverages IT talent.

• Developing, deploying and managing mission-critical applications where and when it makes the most sense to do so.

• Getting the most bang for the buck in Capex and Opex spending.

• Breaking down IT and operational silos.

• Ensuring robust security and data protection.

• Aligning with enterprise compliance and governance requirements.

For more and more enterprise IT buyers, the desire to ensure a more future-proofed infrastructure strategy to support hybrid cloud and application modernization has led to broad adoption of HCI.

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1 "*Optimizing the Hardware Refresh Cycle*," Computer Economics.
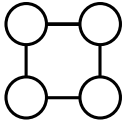
As organizations embark on this future-proofing paradigm, it is important to understand a few key reasons why legacy infrastructure constructs no longer apply.
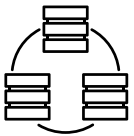
A future-proofed infrastructure gives enterprises access to the infrastructure resources they need, when they need them.

"How-to" guide to future-proofing infrastructure for hybrid cloud and modern applications

Enterprises are looking for practical advice to ensure smart decisions on infrastructure choices that drive them toward a hybrid cloud IT service delivery model and support modern applications—in effect, a how-to guide for future-proofed infrastructure.

As organizations embark on this future-proofing paradigm, it is important to understand a few key reasons why legacy infrastructure constructs no longer apply. For instance, application modernization has been made more challenging by a few fundamental developments, such as the need to embrace multiple operating models, development teams and user constituencies. The increasing importance of DevOps (and its extension, DevSecOps) is a direct result of the need to reduce complexity and speed development and deployment. Also, few organizations today remain exclusively rooted in either all-on-premises or all-cloud infrastructure; in fact, the vast majority of enterprises deploy and operate some manner of hybrid cloud. The need to support co-dependent, collaborative efforts among on-premises and cloud solutions means that hybrid cloud becomes more important than ever—but also is more challenging in bridging the inconsistencies between legacy hardware and infrastructure-as-a-service.

As a result, IT decision-makers should consider a thoughtful, strategic approach to infrastructure future-proofing that centers on three major recommendations:

• Build infrastructure that bridges developer-IT silos

• Ensure full-stack agility and security

• Embrace cloud

A sound plan that addresses each of three steps will not only help organizations embrace hybrid cloud and modern applications today and over the next few years, but it also will lay the groundwork for a long-term strategy that promotes flexibility, cost efficiency and scalability even under rapidly changing business scenarios.

Step 1: Build infrastructure that bridges developer-IT silos

One of the goals of a future-proofed infrastructure strategy is to smoothly manage both virtual machines and containers on a single, scalable, easily managed platform. Rather than rewriting entire applications and then using containers to break those applications into microservices, enterprises need an approach that is less expensive, less time-consuming and less IT-dependent. Consolidating VMs and containers into a single application supports a more logical and less resource-intensive way to modernize applications without the need to containerize and re-architect all legacy apps.

Doing that demands a tightly integrated infrastructure stack to manage VMs and containers, providing application-level visibility regardless of the application's deployment locale. At the same time, that infrastructure platform must deliver enterprise-level availability and resiliency while also easing the systems management demands that are beginning to choke already-stretched IT administrators.

Finally, a future-proofed infrastructure must support developers' need for improved productivity and faster time to value through self-service application programming interfaces (APIs) that they are familiar with. Without a modernized infrastructure, enterprises will have to either hire software engineers with experience in highly customized tools, or retrain existing personnel and commit to steep learning curves and slower time to market.

A future-proofed infrastructure gives enterprises access to the infrastructure resources they need, when they need them. Instead of submitting tickets to infrastructure managers asking for space on disk arrays, additional memory or more network bandwidth, developers can better serve the ever-evolving needs of their business stakeholders with a
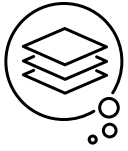
A truly future-proofed infrastructure stack needs to support security for every layer of the stack, especially those often associated with modern architectures such as VMs, containers and microservices.

self-service model supporting API access to Kubernetes clusters, VMs, persistent volumes for stateful apps, and more.

For some time, enterprises have embraced HCI as a more appropriate alternative to traditional 3-tier infrastructure (separate storage, compute and networking) for a variety of reasons. HCI is widely perceived as faster to deploy, simpler to manage, easier to scale and less costly, from an Opex perspective, than legacy 3-tiered infrastructure. HCI solutions—especially those engineered for fast-moving hybrid cloud and modern application requirements—deliver a flexible, powerful platform that serves the needs of developers and IT organizations well out into the future.

Step 2: Ensure full-stack agility and security

One of the core reasons enterprises have accelerated their move to the cloud is the need to become more nimble in developing and delivering IT services designed to move the business forward. Increasingly, that means building upon infrastructure platforms that promote integration of the traditional 3-tier infrastructure component model, along with an automated management platform that leverages industry-leading, market-proven virtualization tools.

In order to support functionality like containers, VMs and more, IT departments need infrastructure that promotes agility for dynamic, easy and cost-efficient scaling. This is particularly true in both hybrid cloud environments. For instance, many organizations have applications in both the cloud and on-premises, and those applications often need to talk with each other. Also, some application components may be in the cloud in order to best leverage public cloud tools, while other components may be on-premises. Disaster recovery is, by its very nature, a hybrid cloud requirement with data in multiple clouds as well as on premises.

Security also is a critical element of a future-proofed infrastructure for hybrid clouds and modern applications. Not only do those clouds and applications support mission-critical data, they also house highly sensitive data such as personally identifiable information and other data that must be protected for compliance, governance and e-discovery requirements.

A truly future-proofed infrastructure stack needs to support security for every layer of the stack, especially those often associated with modern architectures such as VMs, containers and microservices. These include encryption for both data at rest and data in motion, micro segmentation, ingress controllers, automated policy management, real-time audit trails, identity management, privilege management, role-based access control and more. A future-proofed architecture also should support a container registry with integrated vulnerability scanning, image signing and auditing for improved security and data protection.

This is another area where HCI solutions are uniquely aligned with evolving needs for a full-stack, highly secure model. HCI systems' tight integration not only of hardware components but also of virtualization layer and management framework promotes agility, flexibility and a more robust security profile in the face of dramatic increases in the need for data protection, business continuity, compliance mandates, data governance and e-discovery.

Step 3: Embrace cloud

Finally, enterprises should commit to making cloud a fundamental, strategic part of their service development, deployment and delivery process—probably to the point of adopting a cloud-first service delivery paradigm. Although there is little doubt that enterprises are making cloud an increasingly important part of their IT strategy, a number of factors are converging to push IT organizations to make cloud even more integral not only to their technology plans, but also to their business operations.

Cloud's broad adoption patterns is a direct result of organizations' desire to speed up deployment of modern applications and for the integrated infrastructure necessary to improve management, scalability and security.
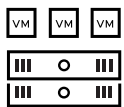
The highly strategic nature of infrastructure decisions means that proven market leaders like VMware continue to play an increasingly valuable and integral role in helping organizations support their modern applications and hybrid cloud strategies.

Cloud's broad adoption patterns are a direct result of organizations' desire to speed up deployment of modern applications and for the integrated infrastructure necessary to improve management, scalability and security. With both hybrid cloud and multi-cloud environments becoming more common, organizations need to put the right infrastructure in place to optimize workloads across heterogeneous clouds—public clouds such as AWS, Azure, Google Cloud and more, as well as private clouds often built for on-premises deployment.

Only through a flexible, automated and highly scalable future-proofed infrastructure can organizations give their developers—both experienced programmers and "citizen developers" comfortable with self-service API models—the ability to use whatever cloud platform they prefer.

Doing so requires consistent, integrated and highly automated infrastructure that is designed with a cloud-first model in mind. This future-proofed infrastructure gives organizations the ability to deploy modern applications in whatever environment makes the most sense—and to eventually migrate those applications to other platforms when desired.

How VMware solutions promote future-proofed infrastructure

When IT and infrastructure decision-makers evaluate their options for a future-proofed infrastructure that works for hybrid cloud environments and modern applications, it is extremely important to have multiple infrastructure options from a reliable, proven and innovative technology partner.

VMware not only is the long-established market leader in virtualized storage, compute and networking, it also offers a number of HCI options to meet the diverse needs of enterprises. This HCI portfolio was developed using a philosophy that reflects the reality of today's—and tomorrow's—IT requirements: **Application needs drive cloud strategy, and cloud strategy drives platform decisions.**

As organizations make strategic decisions on how to optimize, manage and support their growing portfolio of both traditional and modern applications, they must consider critical factors such as application functionality requirements, the ability to manage and ensure application availability and performance (at scale), how to maximize the application's long-term value and whether to refactor, rebuild or fully rewrite applications for the cloud.

At the same time, cloud decisions have a big influence on the underlying infrastructure decisions, because they shape issues such as Capex spending, IT staff deployment, security and data protection strategies and more.

The highly strategic nature of infrastructure decisions means that proven market leaders like VMware continue to play an increasingly valuable and integral role in helping organizations support their modern applications and hybrid cloud strategies. That's why VMware offers organizations VMware vSAN™ and VMware Cloud Foundation™ (VCF).

One of the most significant aspects of this multi-solutions HCI approach is VMware's ability to provide the right level and depth of HCI capability for different customers' needs. For instance, VCF can be seen as a "full-stack" HCI solution, designed for end-to-end HCI deployment for the ultimate software-defined data center solution. VCF is an ideal hybrid cloud platform, offering maximum flexibility and choice for organizations that need consistent infrastructure throughout the enterprise, and to act as a common platform across private cloud, public cloud, and the edge environments.

VCF extends the capabilities and functionality of the vSphere hypervisor platform with integrated software-defined storage, networking and security. It also integrates cloud management to create a hybrid cloud platform that can be deployed in both public and private environments without application refactoring.

By comparison, organizations looking to move into HCI either for the first time or for very focused, purpose-built solutions may want to consider a "core HCI" solution such as vSAN.

Gartner recognized hyper-converged infrastructure as the critical foundation for a hybrid cloud architecture, as HCI has expanded beyond compute and storage to include the complete set of software-defined services for compute, storage, networking, security and cloud management.

VCF delivers an integrated infrastructure stack that enables interoperability among software components, a standardized architecture based on VMware Validated Design and automated infrastructure deployment for fast, easy and replicable deployments that reduce risk and operational costs. Additionally, VCF enables self-service deployment for enhanced IT governance, improved lifecycle management and faster infrastructure configuration and application service delivery.

VCF also delivers:

• Automated and integrated lifecycle management.

• Simplified workload domains and accelerated workload deployment, including modern applications built on Kubernetes.

• Support for the growing trend toward hybrid and multi-cloud environments, where the software-defined infrastructure utilized in private cloud deployments of VMware Cloud Foundation™ also unpins VMware-based public clouds.

By comparison, organizations looking to move into HCI either for the first time or for very focused, purpose-built solutions may want to consider a "core HCI" solution such as vSAN. Core HCI often is an excellent jumping-off point for smaller organizations that may have less experience with HCI. Adopting vSAN has proven to be an effective steppingstone for organizations that ultimately aspire to full-stack HCI solutions such as VCF.

Regardless of enterprise size, vSAN, combined with the industry standard vSphere virtualization management layer, is ideal for organizations seeking a highly agile HCI system that converges compute and storage in an on-premises solution and scales as needed.

Additionally, vSAN's *Cloud Native Storage feature* makes it easy for developers to automatically deploy persistent block- and file-based volumes through Kubernetes API, while providing administrators with visibility into container volumes. And, just like VCF, vSAN offers organizations the benefit of an easily managed, highly scalable and secure solution that grows with the organization over time and as demand increases, resulting in higher long-term economic and operational value.

Also, vSAN is an excellent fit for scenarios with stateful applications, which need data to be easily migrated among environments, or where administrators need familiar tools and processes in order to manage a multi-cloud environment. vSAN offers extensive native services with such leading cloud platforms as Amazon Web Services, Microsoft Azure and IBM Cloud, allowing them to leverage the same tools and processes as users' private clouds. This makes it far easier to migrate data between on-premises environments and public clouds, or to further scale to public clouds as the application scope dictates.

Conclusion

Organizations looking to become more agile, nimble and opportunistic in exploiting new business opportunities need an infrastructure strategy that gets away from frequent, expensive and resource-consuming component upgrades. Instead, HCI has rapidly become the infrastructure model of choice for enterprises looking to fully leverage hybrid cloud, modernized applications and other business-transformative initiatives.

VMware has expanded its market leadership foundation in virtualization software platforms for a wide range of infrastructure with a family of HCI solutions that align well with the movement toward future-proofed infrastructure.

Visit our website to learn more about how VMware solutions enable a future-proof infrastructure with *data center modernization* and app modernization.

Or, you can request a free *HCI assessment*.