



CREATING THE DATA CENTER OF THE
FUTURE WITH HYPERCONVERGED
INFRASTRUCTURE

F R O S T  S U L L I V A N

An Executive Brief Sponsored by
Hewlett Packard Enterprise

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December 2016

INTRODUCTION

Most IT professionals today recognize that enterprise IT will be hybrid in the future. To provide the optimal foundation for each workload being deployed, the hybrid IT environment will include cloud-based infrastructures—from multiple providers—co-existing alongside infrastructure within the enterprise data center or a hosted environment.

Regardless of infrastructure model, the IT organization will expect cloud-like benefits; for example, pay-as-you-go capacity, the ability to scale as needed, and self-service capabilities. While such benefits are inherent in the hosted cloud, they are new to the on-premises data center. To meet enterprise expectations, IT vendors are introducing solutions that tightly integrate compute, storage, networking, and services, often on purpose-built hardware. These “hyperconverged” solutions also typically overlay management and orchestration platforms that help to integrate various infrastructures, and create a seamless hybrid experience.

But not all hyperconverged solutions yield the same results. The right hyperconverged infrastructure can meet your IT needs both today and well into the future. In this paper, we will talk about where your data center needs to be in the next five years to meet changing business demands, and how the roles of IT professionals will evolve. We will also review “hyperconvergence” models, and how they can best meet your IT needs both today and in the future, as well as the benefits you can expect along the way. Finally, we discuss what to look for in the right hyperconverged provider, who will position your IT department for success.

IT OF THE FUTURE

Changing business needs are making hybrid IT the way of the future. Differing workloads with different configurations and security requirements make it unwise to use just one environment to support your business’s IT needs. As the business environment continues to evolve, and providers’ offerings change to better accommodate hybrid environments, what will the IT roles and data center of the future look like?

Roles and Processes

You can expect that the roles of IT professionals will change moving forward.

- **Specialists vs. Generalists:** No longer will there be a separate specialist for every system and hardware type within the data center. IT will hire generalists who can respond to big-picture business needs across a range of applications and infrastructure components. This shift enables greater flexibility in IT resource deployment. It also means that IT leaders do not need to invest in continual training on systems, nor do they need to be concerned about knowledge “walking out the door”—especially for less common or legacy systems.
- **IT as a Service Broker:** IT organizations will no longer serve as asset managers and gatekeepers. Instead, the organization will respond to business needs by deploying resources, as needed, from a variety of options, including hosted and SaaS applications, managed services, cloud and DIY. This means that IT organizations will need to hire or develop skills in areas such as customer service and communications, so they are better able to understand business needs. New processes will also be required; IT will be more accountable for delivering resources that meet needs for time-to-market, end-to-end application performance, security, and more.

- **Developers' Roles:** Developers will play a larger role in IT infrastructure deployment. Greater adoption of development processes such as DevOps, and development tools such as Platform as a Service will enable developers to define an application's needs for physical infrastructure directly within the code, thus minimizing the need for specialized operations teams. Application software will use API calls to compose the infrastructure that the application requires for optimal function. In addition, easy-to-deploy APIs will connect microservices and applications from multiple sources and infrastructures. The use of flexible, API-enabled management software enables IT generalists to more easily manage a wide variety of components within the data center.

Data Center Infrastructure

In the future, your data center environment will be:

- **Connected**, with central management across a variety of infrastructures—premises-based and cloud—regardless of operating systems or virtualization platforms (including virtual machines and containers).
- **Integrated**, with every application able to share data with other workloads; and multiple services—such as security and analytics—able to operate across multiple applications.
- **Scalable**, with pools of resources created from a variety of infrastructure resources, enabling fast, automated increases and decreases in capacity.
- **Software-Defined**, such that resources are created and defined using software, rather than being configured through firmware on each individual server. This increases flexibility, decreases time to deploy, and optimizes each individual server's capacity.

Supporting tomorrow's hybrid, composable, high-performing environment requires an infrastructure that tightly integrates purpose-built hardware with compute, storage, networking, and services. By defining infrastructure components using software, the environment can be changed; and different elements, like compute and storage, can be put together in a way that best meets the needs of the workload being deployed.

WHY HARDWARE MATTERS IN A SOFTWARE-DEFINED WORLD

As noted, the data center of the future must be software-defined, in order to gain the flexibility and self-service environment that lines of business appreciate in the cloud. It must also allow IT to maintain strong control over security and compliance of data and workloads in the environment. Defining resources like compute, storage, and networking through software, rather than directly in the hardware, enables far greater flexibility than is available in traditional hardware. But that's not to say that hardware is unimportant. On the contrary, your hardware choice can have a significant impact on application performance, as well as on data center operations. This is true even in a software-defined environment: the underlying physical hardware must supply sufficient processor and storage capacity, must support efficient communications across resources, and must enable speedy transaction processing. Intersection points between physical or logical components all represent potential bottlenecks or points of delay or failure.

While some applications can run on commodity servers without noticeably impacting business operations, that is not true for high performance or latency-sensitive workloads. For performance-sensitive workloads, the optimal choice is specially configured, hyperconverged systems that are workload-optimized. Such a system is optimally engineered so the software and hardware are created and configured to work together, minimizing friction at key integration points.

Also important is the hardware pre-configuration for specific workloads. With purpose-built hyperconverged solutions, the infrastructure system is optimally engineered for the workload before it leaves the factory, thus ensuring efficient performance without requiring custom integration or tuning by your own technicians. And by defining the optimal mix of compute versus storage, using software rather than physical components, the configuration can be changed in the future as your business needs change. This allows the enterprise to change the infrastructure, balancing compute versus storage based on the needs of the application.

Providers offering these hyperconverged solutions pre-integrate services like compute, storage, and networking, as well as security and analytics, to ensure that these services work well together without workload-impacting challenges or disruptions.

Rarely is software running on commodity servers able to reproduce the same performance results as a hyperconverged system.

Which Hyperconvergence Deployment Model is Right for You?

Providers are approaching hyperconvergence in different ways. There are three primary ways for you to create a hyperconverged infrastructure in your data center.

- **Build your own:** Some software vendors are offering software platforms that can be deployed by the enterprise on virtually any commodity hardware; and, using robust automation and orchestration software platforms, can define the necessary compute, networking, or storage infrastructure to support enterprise applications.
- **Pre-built on Commodity Hardware:** Some IT vendors focus on the middleware platform and software stack, deploying them on commodity hardware that is not configured to support specific workloads or applications. While the software may be integrated with the hardware, the hardware itself is not tuned for workload performance.
- **Pre-built on Purpose-built Hardware:** Other vendors begin with performance-tuned hardware, and integrate the middleware platforms and software directly, enabling greater application performance than is typically available on infrastructures in which service components are not designed to work together and are integrated manually.

Though some providers tout a software-only or commodity hardware approach as the best economic option, after considering the cost of performance problems or workload failures on business productivity, it becomes clear that purpose-built hardware remains a key factor in the right hyperconverged solution.

HYPERCONVERGENCE BENEFITS

Hyperconverged infrastructures that include high-performance hardware and robust management and orchestration software answer the challenges that IT pros will need to face. And you don't have to wait for the future to deploy hyperconvergence—it's available today, and can meet your needs both today and into the future.

Specifically, hyperconverged infrastructures offer business features that deliver important benefits, including:

- **Hybrid Environment Support** – Hyperconverged infrastructures aggregate a variety of infrastructure sources under central management, enabling the enterprise to choose the right infrastructure with the right configuration for the workload being deployed. This offers the enterprise faster time to market for critical applications and services.

- **Robust Automation and Orchestration Platform** – Tomorrow’s data center requires that rote management tasks be automated, allowing technical employee resources to be reallocated to more critical and higher-value functions. Hyperconverged infrastructures rely on a strong orchestration platform that leverages universal APIs to automate as much as possible, and simplify remaining operations tasks across all components. Data center automation eases the management burden and enables the enterprise to focus on innovation and productivity.
- **Fully Integrated Stack** – Deploying infrastructure into a hybrid environment generally requires custom integration using a variety of APIs—either those available from the provider, or ones written by the business specific to their needs. Cobbling together services can be difficult; and services not meant to work together may impact overall performance. Hyperconverged infrastructures don’t have this issue, as the hardware, hypervisor, and management plane for the infrastructure are designed and pre-integrated to work together using a unified API set, ensuring that your solution works properly out of the box.
- **Availability of Purpose-built Hardware** – A turnkey solution that offers high-quality, purpose-built hardware, pre-configured for the workload, ensures superior application performance with minimal custom deployment effort, and greater productivity throughout your organization.
- **Integrated Storage** – Storage that resides on the same hardware as the compute layer allows for easy scalability of storage space as the application’s data needs change. It also increases data portability and mobility by allowing you to move and store data across different systems, with no separate storage appliance required.
- **Integrated Analytics** – If data is king, then analytics is queen. Without the ability to analyze and make use of available data, it just takes up room on a storage disk. By pre-integrating analytics services into the management layer, hyperconverged solutions enable infrastructure optimization that reduces overprovisioning and unnecessary costs; and allows predictive capacity planning that helps you plan for the “what if” scenarios within your environment.

WHAT SHOULD YOU LOOK FOR IN THE RIGHT ENTERPRISE-GRADE HYPERCONVERGED PROVIDER?

Just as no two hyperconverged solutions are the same, neither are any two providers. Providers differ in how they approach hyperconvergence, as well as their specific platforms and offers. So, what should you be looking for as you choose a hyperconverged provider? We’ve made it easy to evaluate providers and offers by suggesting five criteria that providers should meet. These include:

- **Market-Proven Hardware** – The right hyperconverged solution must start with high-quality, enterprise-grade hardware that is known for success within the enterprise. Using commodity hardware may suffice for non-critical workloads; but when you trust your critical workloads to commodity hardware, you introduce risk into your IT department. Look instead for a provider with market-leading servers that are made to scale easily and that are purpose-built for the workload you intend to run.
- **Integrated Layers/Components** – As you shift from a traditional, hardware and software-based IT environment towards a software-defined data center, integration of the compute, storage, networking

functions and management platform will enhance performance by allowing data to be easily shared among components when needed. Do-it-yourself solutions that are not designed and pre-configured to work together may impact performance, especially when working with mission-critical, enterprise grade applications. They also require high degrees of expertise, and can remove your team's focus from innovation and service development.

Look for a provider that can not only offer all components within the data center, but can also optimize, test, and tune your infrastructure at every point of integration to ensure a successful enterprise experience for the application.

- **Ease of Deployment and Scaling** – Most customers move to the cloud in order to gain the responsiveness that comes with being able to add or change infrastructure configurations quickly and easily. For workloads that must remain in a private environment, hyperconverged infrastructure from the right provider can offer the same ease in deploying and scaling that cloud providers can. Look for a hyperconverged solution with a robust platform that provides auto-scaling and simple deployment.
- **Simple, Intuitive Management Portal** – Providers that have created simple yet robust management functionality can typically offer enterprises the ability to respond to business needs faster. Streamlined management portals:
 - enable the fast creation of virtual machines or containers
 - offer easy management views that simplify lifecycle management of all resources in the infrastructure
 - prevent overprovisioning and sprawl

Simplified management portals often also enable the business to reduce the staff required for routine management tasks, instead redeploying those workers to higher value activities. Look for a provider that offers a complete orchestration and management portal: one that can pool resources, and manage components from several infrastructures; which offers policy-based automation of many data center functions, and includes robust reporting capabilities.

- **Availability of Professional Services** – Access to technical experts is a major benefit as you build your data center of the future. A provider's professional services department has the ability to help you plan every aspect of your data center transformation, from choosing the right foundation, and integrating it with current infrastructure, to planning the migration of your data and applications. Look for a provider that has expertise and a proven track record in a broad range of enterprise IT solutions, including cloud and data center services, hardware and software.

Not every provider will be equally equipped to provide every need on this checklist, but there are those that can. By seeking out providers that offer a complete hyperconverged solution—from hardware to management to professional services—you will significantly increase your department's opportunity for success in your hyperconverged deployment.

THE LAST WORD

As business requirements mount, IT must continue to evolve its infrastructure to meet business goals and drive productivity. To meet these needs, data centers of the future will be fully software-defined, allowing for cloud-like benefits with the security and control of an on-premises data center. Hyperconverged infrastructures are well-placed to offer the benefits required by enterprise IT.

Though providers offer many paths to a hyperconverged environment, infrastructures that are fully integrated and tuned to the workloads being deployed are the best way to assure optimal performance. Hyperconverged systems that include high-performance, finely tuned hardware with software-defined compute, storage, and networking components, and an orchestration and management platform that enables all resources to be pooled and managed centrally, will be best able to deliver success to the enterprise IT department.

To survive in the future, your business will need to respond to customer demands with even greater speed and agility, which requires an even more flexible IT infrastructure. But there's no need to wait. Help your business prepare for the future, with the right hyperconverged infrastructure solution.

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