

HPE BRIDGES TRADITIONAL AND NEW WITH COMPOSABLE INFRASTRUCTURE

NEW CATEGORY OF INFRASTRUCTURE PROMISES TO DRIVE EFFICIENCY FOR TRADITIONAL WORKLOADS AND OPERATIONAL VELOCITY FOR NEXT-GENERATION APPLICATIONS

EXECUTIVE SUMMARY

IT is undergoing a significant transformation as businesses look to streamline costs and roll out a new class of cloud-based applications driven by a changing digital economy. The IT infrastructure as we know it today is not well equipped to improve on the cost structure for traditional workloads nor handle the velocity demands of a new generation of workloads where IT is a focal point for competitive differentiation. As one approach to address these changing demands of IT, vendors are bringing to market new solutions under a new category called “**composable infrastructure**”.

At a very high level, composable infrastructure is designed to treat hardware like software, allowing IT to manage “infrastructure as code”. Infrastructure defined by software has the potential for significant efficiency benefits. Composability empowers IT to allocate the optimal set of resources (compute, storage, networking) for each application. Vendors promoting composable infrastructure solutions claim this approach will help IT lower total infrastructure costs, provide flexibility as resource needs change, and accelerate time-to-market for customer-facing service applications.

The composable infrastructure market is new, with a few leading vendors promoting solutions. IT organizations should prioritize applications that could benefit from a self-service, flexible approach to application provisioning as the first to move to composable infrastructure, including a mix of both traditional and new applications in their deployment plans. Hewlett Packard Enterprise (HPE) has made a significant investment in composable infrastructure with a multi-phased plan to enable the ecosystem and its customers to transition to composable infrastructure solutions. HPE Synergy is expected to be the first platform in the market that is purpose-built for composability when shipments begin in 2Q 2016. IT organizations looking to evaluate composable infrastructure for their environments should add HPE to their short list of vendors for consideration.

IT SUPPORT FOR TWO INFRASTRUCTURE MODELS IS UNSUSTAINABLE

Technology has become a key driver in today's economy for turning ideas into new market opportunities. To keep pace with the changing needs of the business, IT organizations face more pressure than ever before both to ensure the business runs efficiently **and** to help line of business (LOB) leaders achieve their goals of delivering new products and services quickly.

In the past, IT's primary function was to support traditional applications designed to help automate existing business processes and lower operating costs. IT organizations historically used a siloed approach to deploy traditional applications with a range of administrative domains, Application Programming Interfaces (APIs), complex processes, and an endless number of workload-specific hardware platforms. Decades of siloed IT management resulted in a proliferation of costly over-provisioned infrastructure.

In addition to continued support for traditional applications, today's digital economy puts IT at the forefront to help businesses differentiate through cloud-native applications that provide opportunities for new products, services, and business models. LOB owners are demanding that their IT departments leverage an infrastructure deployment approach focused on quick time-to-value with flexibility to adapt to or even get ahead of rapidly changing business environments. To help address the need for faster application delivery, DevOps software development models focused on continuous delivery have emerged to produce applications and services rapidly.

IT finds itself under pressure to lower operating costs in the traditional environment while simultaneously increasing operational velocity in the new application environment. Ideally, they want to find a common infrastructure that allows them to optimize service delivery for both worlds. To do that, this new infrastructure must be able to change personalities to meet the reliability, cost, and security requirements of traditional workloads **and** also the agility, flexibility, and fluidity requirements of applications driven by today's digital economy.

COMPOSABLE INFRASTRUCTURE: DESIGNED FOR THE CHANGING IT LANDSCAPE

As one approach to address this major shift in application requirements, industry-leading enterprise hardware vendors are bringing to market a new category of solutions called composable infrastructure. Moor Insights & Strategy (MI&S) defines composable

infrastructure as **fluid pools of resources that can be configured dynamically through software with an application of policy tuned to optimize application performance, then provisioned through a common API to drive the most efficient use of infrastructure.**

At a high level, composable infrastructure flips the hierarchical relationship between hardware and software. Composable infrastructure allows IT to deploy and manage their hardware infrastructure resources using software commands (*i.e.*, infrastructure as code), instead of force-fitting all of their applications onto static, siloed hardware. Infrastructure defined by software has the potential for enormous efficiency benefits. Composability empowers IT to allocate the right set of resources (compute, storage, networking) needed to optimize each application's performance.

Although implementations vary by vendor, composable infrastructure solutions require a number of common elements.

1. Composability requires **disaggregated programmable infrastructure** (compute, storage, networking fabric) that can be allocated and managed as individual resources.
2. An infrastructure operator must be able to **compose** the right components from the available resource pools to match the needs of each application.
3. Resource discovery and policy implementation require a **comprehensive management framework**. This framework must include a single (most optimally open) API with broad support for third party management tools.
4. The solution must allow for an **application-centric** approach to resource allocation to match the right set of hardware for each workload.

Table 1 provides an overview of the potential benefits of composable infrastructure for traditional workloads such as collaboration, data processing and analytics, supply chain, and web infrastructure, **and** new application environments like big data, software-defined storage, and cloud-based services.

TABLE 1: POTENTIAL BENEFITS OF COMPOSABLE INFRASTRUCTURE

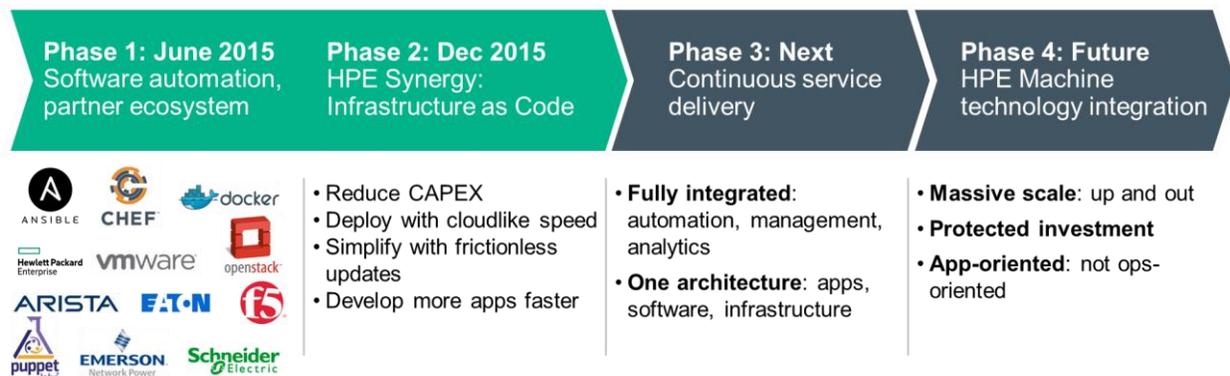
Application Type	Key Requirements	Potential Benefits of Composable Infrastructure
Traditional Applications	<ul style="list-style-type: none"> • Cost • Reliability • Security 	<ul style="list-style-type: none"> • Reduced over-provisioning (CapEx) <ul style="list-style-type: none"> ○ Intelligent resource allocation • Reduced operational costs (OpEx) <ul style="list-style-type: none"> ○ Common infrastructure, management, & APIs
New Applications	<ul style="list-style-type: none"> • Agility • Flexibility 	<ul style="list-style-type: none"> • Faster application delivery <ul style="list-style-type: none"> ○ Infrastructure as code ○ Single API • Flexible deployment options <ul style="list-style-type: none"> ○ Private cloud ○ Hybrid cloud • Flexible resource allocation for all apps & service levels <ul style="list-style-type: none"> ○ Separation of resources allows for provisioning only the resources that are required

The composable infrastructure market is new with a range of vendor solutions and approaches emerging. MI&S expects enterprise IT organizations will increasingly adopt composable infrastructure over the next three to five years. Enterprise datacenters will likely prioritize applications that could benefit from a self-service, flexible approach to application provisioning as the first to move to composable infrastructure, including a mix of both traditional and new applications in their deployment plans.

HPE'S COMMITMENT TO COMPOSABLE INFRASTRUCTURE

HPE recognized the enormous potential for enterprise IT customers to adopt composable infrastructure and, over the last several years, has developed a comprehensive market-enablement strategy and roadmap to help lead its customers through this transition. In June 2015, HPE publicly announced their long-term commitment with a four-phased master plan called Project Synergy. Figure 1 provides an overview of the phases of HPE's Project Synergy.

FIGURE 1: HPE PROJECT SYNERGY OVERVIEW (SOURCE: HPE)



When HPE announced Project Synergy in June 2015, they also publicly kicked off Phase 1 of their plan by announcing a number of supporting partners and initiatives designed to further the ecosystem. In December 2015, HPE announced Phase 2 of their plan with the launch of their first-generation composable infrastructure system, aptly branded HPE Synergy. HPE Synergy will begin shipping for production in 2Q 2016.

HPE positions their composable infrastructure products in the near-term as a good fit for enterprise customers and service providers with mixed workloads (physical, virtual, and containers), DevOps environments, and large scale enterprise-wide private or hybrid clouds. HPE expects a growing number of customers to transition to composable infrastructure over time, as IT organizations migrate more broadly to DevOps application development models and hybrid cloud environments.

MULTIPLE PATHS TO COMPOSABLE INFRASTRUCTURE

HPE has been planning the company's datacenter infrastructure roadmap for a number of years to help to deliver multiple paths for customers looking to transition to composable infrastructure. In 2013, the company laid the groundwork for systems management of composable infrastructure with the launch of the HPE OneView Management platform, which allows customers to manage their server, storage, and networking resources under the same umbrella. HPE OneView serves as the single interface point to compose all of the physical and virtual resources for HPE Synergy and other supported products. Customers who use HPE OneView to manage their HPE Blade Systems, HPE Proliant servers, and HPE 3PAR storage systems can begin to experience the benefits of composability with their existing infrastructure before making the transition to HPE Synergy.

Many IT organizations that use converged or hyper-converged platforms are also a good target for a transition to composable infrastructure. These customers are already familiar with the benefits of a single platform with server, storage, and network resources—and the efficiencies from an application-centric approach to resource deployment. Organizations that decide to take the next step to composable infrastructure from a converged or hyper-converged platform could experience additional benefits by pooling these resources and dynamically provisioning / re-provisioning their infrastructure as workload needs evolve.

Another potential path to composable infrastructure includes organizations that have moved to the public cloud to improve efficiencies and save money. For example, IT organizations using DevOps environments have recognized the benefits of deploying the specific resources needed to optimize application performance, and they have the tools in place to deploy and manage their applications efficiently. As the market evolves, these organizations may consider using composable infrastructure in a hybrid cloud model—potentially saving costs and gaining flexibility to deploy each application in a way that makes the most sense for the business.

Because composability is a new concept for most enterprise IT organizations, and each organization is starting from a different place, it will be critical for HPE to leverage its global services organization and channel partners to provide expertise and guidance that customers can use to determine their best path to composable infrastructure.

HPE SYNERGY: PURPOSE-BUILT FOR COMPOSABILITY

HPE Synergy is the first major bet from HPE in the composable infrastructure space and will likely be the first platform in the market that was purpose-built for composability when it begins shipping in 2Q 2016.

FLUID RESOURCE POOLS

The HPE Synergy platform provides the fluid pools of resources required to implement a composable infrastructure environment. By allocating the right resources for each application, IT could eliminate over-provisioning capacity, significantly lowering CapEx and increase operational velocity.

HPE Synergy includes server compute, storage, and networking (fabric) resources all in one frame. Figure 2 provides an overview of the key elements of HPE Synergy.

FIGURE 2: HPE SYNERGY PRODUCT OVERVIEW (SOURCE: HPE)



The HPE Synergy composable frame is the base infrastructure that pools compute, storage, fabric, cooling, power, scalable links, and embedded management. Inside the frame, IT operators can configure flexible, composable compute capacity for physical, virtual, or container based workloads. Internal composable storage can present itself as direct-attached or remote block, file, or object. Customers can extend HPE Synergy with 3PAR storage as part of the resource pools. The composable fabric can help eliminate the need for costly standalone top-of-rack switches by using an intelligent master / satellite architecture. Fabric bandwidth is dynamically adjustable and configurable for multiple protocols.

SOFTWARE-DEFINED INTELLIGENCE

HPE claims that Synergy will allow easier systems management and application deployment than traditional infrastructure by using **software-defined intelligence**. Historically, change operations required coordination across multiple teams, multiple tools, and complex interdependent processes often taking weeks to complete. HPE Synergy leverages HPE OneView as the unified management interface for all Synergy resources, potentially allowing an IT administrator to discover, search, inventory, configure, provision, update, and diagnose in a fraction of the time compared to traditional siloed management approaches. HPE Synergy also uses one firmware / driver set for all resources, which could result in easier systems maintenance and the potential for less downtime. In addition, HPE Synergy leverages application specific

templates for composability, which allows infrastructure to be deployed and updated consistently. The same hardware can be configured and reconfigured via a library of templates allowing for on-demand composability and helping to ensure infrastructure optimization for each application's performance needs.

UNIFIED API

HPE recognizes the importance of the ecosystem, which is why Phase 1 of Project Synergy focused on software ecosystem enablement. HPE has built a unified API for HPE Synergy that allows IT organizations to leverage standard management frameworks such as Microsoft SystemsCenter and VMWare vCenter, among others. HPE Synergy's tight integration with leading management tools means IT can now automate their operational processes and design their workflow around enterprise needs using the same tools and frameworks they are already using today.

The unified API also supports open source automation and DevOps tools—such as Chef, Docker, OpenStack, and Puppet—allowing developers to use same tools as they use for the public cloud to build, test, and deploy applications. In addition, the unified API aggregates physical resources in the same way as virtual and public cloud resources, so developers can code **without needing a detailed understanding of the underlying physical elements**. HPE claims that developers will be able to provision new boot images in a matter of seconds using the HPE Synergy Image Streamer appliance.

CALL TO ACTION

MI&S believes the market for composable infrastructure is still new with a range of vendor solutions and approaches emerging. Enterprise datacenters and cloud providers will likely prioritize those applications that could benefit from a self-service, flexible approach to application provisioning as the first to move to composable infrastructure, including a mix of both traditional and new applications in their deployment plans.

As IT organizations become familiar with composable infrastructure over the next few years, market demand is likely to increase to include a wider range of workloads and use cases. IT organizations running next-generation applications with dynamic resource needs that are core to their business success—such as big data, software-defined storage, and cloud-based services—should consider evaluating composable infrastructure solutions as a potential fit for their environments. In addition, traditional workloads—such as collaboration, data processing and analytics, supply chain, and

web infrastructure—could benefit from composable infrastructure via improved costs due to smarter allocation of resources and unified management. In the near term, MI&S recommends that IT organizations begin evaluating vendor product roadmaps and consider proof of concept deployments for target applications. Over the next 12 to 24 months, the market is expected to ramp with additional new products, tighter integrations across vendors, and usability enhancements to make deploying and managing composable infrastructure easier for mainstream IT organizations to adopt more widely.

HPE has a broad datacenter infrastructure portfolio, with HPE Synergy emerging as the first big bet in the company's composable infrastructure strategy. HPE has world-class services and support organizations to help enterprise IT customers make the transition to composable infrastructure, and HPE has a long-term investment strategy to bring composable capabilities to more products in its portfolio over time. In addition, HPE claims that HPE Synergy will support the use of third party storage and networking platforms, and MI&S expects HPE to continue to develop tighter integration with third party platforms. HPE also plans to take composability to more sophisticated levels in the future with the HPE Machine architecture. IT organizations looking to evaluate composable infrastructure for their environments should add HPE to their short list of vendors for consideration.

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