Hewlett Packard Enterprise

The benefits of evolving your HPE BladeSystem environment to HPE Synergy composable Infrastructure solution

Contents

Introduction

Today's idea economy calls for businesses to transform ideas into services at a faster pace. It has never been easier, or more crucial, to turn ideas into new products, services, or applications—and quickly drive them to market. HPE Synergy is a single composable infrastructure that can help IT organizations simplify operational complexity in traditional environments and accelerate service velocity. New classes of applications exist in the idea economy which bring ideas to market faster and more efficiently. At the same time, IT environments must sustain traditional business applications that run core business operations. Examples of these traditional applications include large prepackaged databases and enterprise resource planning (ERP) applications. Gartner describes this type of IT environment as "bimodal computing." Companies are expected to adopt a strategy that maintains existing infrastructure for traditional applications, and creates a different infrastructure and tools for the new cloud-native and mobile applications.

HPE Synergy is the ideal architectural and management solution that addresses both traditional business applications and the emerging idea economy applications for current IT environments. HPE Synergy is the first platform built from the ground up for Composable Infrastructure that empowers IT organizations to create and deliver new value instantly and continuously. It uses a single management interface and Unified API to reduce operational complexity for traditional workloads and to increase operational velocity for the new breed of applications and services.

This document describes HPE Synergy management, methods, and why transitioning from your present HPE BladeSystem c-Class environment is beneficial.[1] For detailed information about HPE Synergy physical infrastructure, see the technical white paper, "HPE Synergy: the first composable infrastructure." To read about HPE Synergy architecture and management features in more depth, see the technical white paper, "HPE Synergy Management Infrastructure, Managing Composable Infrastructure."

Customer advantages of HPE Synergy

The HPE Synergy provides powerful incentives to transition from the HPE BladeSystem c-Class portfolio to HPE Synergy:

- One infrastructure—Runs any workload with more fluid pools of compute, storage, and fabric

- Simpler operations—Advanced software-defined intelligence reduces operational complexity

- Superior economics—Lower total cost of ownership through capital expenditure and operating expense savings

- Designed for the future—New infrastructure architecture, delivering benefits now and in the future

One infrastructure

HPE Synergy infrastructure can enable a broader set of applications, at lower cost. This infrastructure includes significant enhancements in raw resources (compute, storage, and fabric), compared to HPE BladeSystem c-Class. These enhancements translate into more horsepower, and more storage for your applications. Table 1 lists some of the benefits that come with one infrastructure.

Table 1. HPE Synergy infrastructure benefits

More powerful compute	Shared direct-attached storage (DAS)	Rack-scale fabric
• Up to 50% more DIMMs per CPU (3X more DIMMs per CPU with EX) • 28-core/205W CPUs	• Shareable drives up to 200 per compute	• Connect up to 3.8X more compute to a single flat fabric • Up to 5X increased bandwidth per compute
• Deliver more application horsepower	• Enable storage-oriented applications such as HPE StoreVirtual, VMware® vSAN, Ceph object storage	• Improve east-west traffic performance • Reduced uplink port cabling
• 29% lower cost per VM for 2P (36% lower cost per VM for 4P)	• Up to 14X greater storage per compute	• $37K Uplink port savings per rack

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[1] The performance and cost metrics comparisons between HPE product lines in this document are based on internal HPE testing and evaluation.

Along with 29% lower cost per VM, a result of the additional memory and improved economics (discussed in the "Superior economics" section), HPE Synergy provides more flexible storage options ranging from stateless[2] (available resources with no storage or controller identity) to configurations with four internal drives.

More powerful compute

HPE Synergy 2- and 4-socket compute module advantages over HPE BladeSystem c-Class servers include:

- Power and cooling support for the full range of current and future Intel® processors to 28 core and 205 watts without any constraints or limitations. HPE BladeSystem c-Class Gen10 servers are limited to 150 watts (or less) CPUs, reducing the maximum core count and overall system performance.

- A DIMM slot increase of 50 percent with comparable servers such as the SY 480 Gen10 and the BL460c Gen10. Additionally, Intel® Xeon® EX processors support three times the number of DIMM slots compared to Intel EP processors on BladeSystem. For example, with the BL460c Gen9 and Gen10 servers you have a 16 DIMM capacity versus the SY 620 Gen9, which has a 48 DIMM capacity. HPE Synergy also offers 4-socket compute modules, allowing for up to 96 DIMM slots in the HPE Synergy SY 680 Gen9 module, three times the capacity of the HPE BladeSystem BL660c Gen9 server.

- Up to 10 interchangeable mezzanine slots in HPE Synergy compute modules with support for dual-port 50 Gb Ethernet adapters (2,000GbE maximum full duplex per compute) versus three (plus two dedicated FlexibleLOM for the onboard network adapter) in HPE BladeSystem c-Class servers (400GbE maximum full duplex per server).

HPE Synergy provides a broad range of compute compared to HPE BladeSystem including 2- and 4-socket Gen10 models supporting a full range of Intel Xeon Scalable family processors to 205 watts and 2- and 4-socket E5, and 2- and 4-socket E7 Gen9 models.

Shared direct-attached storage (DAS)

HPE Synergy storage modules accommodate up to 40 small form factor (SFF) drives, while an HPE c-Class storage blade accommodates 12 drives. The HPE Synergy storage module resources can be specified and assigned to multiple compute modules within the same frame, while HPE c-Class storage blades work only with a directly adjacent server blade. Up to five HPE Synergy D3940 Storage Modules can be deployed within the same frame, allowing HPE Synergy to map up to 200 drives per compute module. The result is affordable storage options with up to six times more storage per HPE Synergy compute.

Internal storage is accessible as direct-attached file, object, or remote block. HPE Synergy is also extendable with direct-attached or fabric-attached HPE 3PAR storage as part of the resource pools. The HPE Synergy storage module supports multi-tiered technology for solid state drive (SSD) and hard disk drive (HDD) storage in both SAS and SATA options to achieve the right cost/performance. Customers can take full advantage of all flash configurations both in DAS (using the non-blocking 12 Gb SAS fabric) and SAN configurations using 3PAR all-flash arrays connected via a variety of Fibre Channel options.

HPE ONEVIEW CUSTOMER STATISTIC

84% of surveyed organizations reduced the number of errors by 11-25% or more due to the automation of templates with HPE OneView.

84%
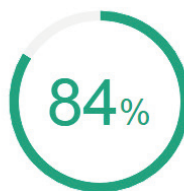
Source: TechValidate survey of 220 users of HPE OneView

Hewlett Packard Enterprise   TechValidate

✔ Validated   Published: Feb. 3, 2017 TVID: FE8-03C-D39

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[2] HPE defines true "stateless" operation as allowing IP addresses to be assigned to software such as operating systems (similar to the way IP addresses are assigned to hardware). This allows environment planning apart from hardware and enables fast implementation when hardware is available.

These flexible storage options achieve the right cost/performance based on a wide variety of workloads. For larger scale enterprise applications looking for Tier-1 service levels, HPE 3PAR StoreServ flash arrays are capable of serving both block and file applications with 99.9999% (6-nines) of availability, and up to 60 PB and 10M IOPS in a single federated storage pool. HPE Synergy Composable Storage's superior, enterprise-grade availability allows IT to quickly and confidently implement infrastructure changes with simplified template-based operations. In many cases change operations such as updating firmware can be implemented while the infrastructure is online, which significantly reduces manual interactions and errors and ensures real-time compliance.

Rack-scale fabric

HPE Synergy Composable Fabric delivers high performance and composability for the delivery of applications and services. It simplifies network connectivity using fabric disaggregation in a cost-effective, highly available and scalable architecture. HPE Synergy Composable Fabric creates a pool of flexible fabric capacity configurable almost instantly to provision infrastructure for a broad range of applications.

HPE Synergy Composable Fabric's enterprise-grade availability allows IT to implement frictionless infrastructure changes with one-tool, one-step template-based operations from the HPE Synergy Composer. HPE Synergy fabric is rack-scale (three frames at 20 Gb, five frames at 10 Gb), while HPE BladeSystem c-Class fabric options are single enclosure only and require more uplinks to the data center network.

HPE Synergy employs a master/satellite composable fabric.[3] The master module contains intelligent networking capabilities that extend connectivity to satellite HPE Interconnect Link Modules in additional frames. This eliminates the need for top of rack (ToR) switches, and reduces both cost and complexity. The reduction in components also simplifies fabric management by reducing management touchpoints, while consuming fewer ports at the data center aggregation layer. HPE Synergy Composable Fabric employs a flat, east/west architecture to maximize data throughput and minimize latency with only a single hop within large domains of virtual machines (VMs) and up to 60 compute modules.

HPE Synergy compute modules offer up to 10 interchangeable mezzanine slots with support for dual-port 50 Gb Ethernet adapters (2,000GbE maximum full duplex per compute) versus three (plus two dedicated FlexibleLOM for the onboard network adapter) in HPE BladeSystem c-Class servers (400GbE maximum full duplex per server). Also, legacy hierarchical architectures use a north/south design that creates oversubscription bottlenecks and adds latency caused by multiple hops, both of which negatively impact performance.

Figure 1 provides additional compute infrastructure comparisons that support the transition from HPE BladeSystem to HPE Synergy.

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[3] For more about the "master/satellite" composable fabric, see the "HPE Synergy: the first composable infrastructure" technical white paper.

HPE BladeSystem

- HPE BladeSystem
  c7000 Enclosure

2P Server Comparison

	BL460c Gen10	SY 480c Gen10
	Compute	
16	DIMMs per module	24
768	DIMMs per rack*	864
2	Interchangeable mezzanine cards**	3
	Storage	
12	Drives per storage module	40
12	Mapped drives per compute	200
	Fabric	
16	Compute per fabric switched pair	60

* Comparisons made at three frames at maximum number of CPUs.
** HPE BladeSystem also has dedicated mezzanine for an onboard FlexLOM adapter.

4P Server Comparison

	BL660c Gen9	SY 660 Gen10
	Compute	
32	DIMMs per module	48
768	DIMMs per rack*	864
5**	Interchangeable mezzanine cards**	10
	Storage	
12	Drives per storage module	40
24	Mapped drives per compute	160
	Fabric	
8	Compute per fabric switched pair	30

* Comparisons made at three frames at maximum number of CPUs.
** HPE BladeSystem also has two dedicated mezzanines for onboard FlexLOM adapters.

HPE Synergy

- HPE Synergy 12000 Frame

- HPE Synergy D3940

- HPE Synergy Composable
  Fabric

Figure 1. HPE BladeSystem and HPE Synergy infrastructure comparisons

Simpler operations

HPE Synergy has several significant management enhancements compared to HPE BladeSystem c-Class infrastructure. HPE Synergy Composer provides automated discovery of physical resources. All HPE Synergy Frames linked in a domain are automatically identified, assigned resources by HPE Composer, and then placed into a monitored state. New resources are self-assimilated into the managed environment. This means that managing all HPE Synergy compute, storage, and fabric resources is greatly simplified (Figure 2).
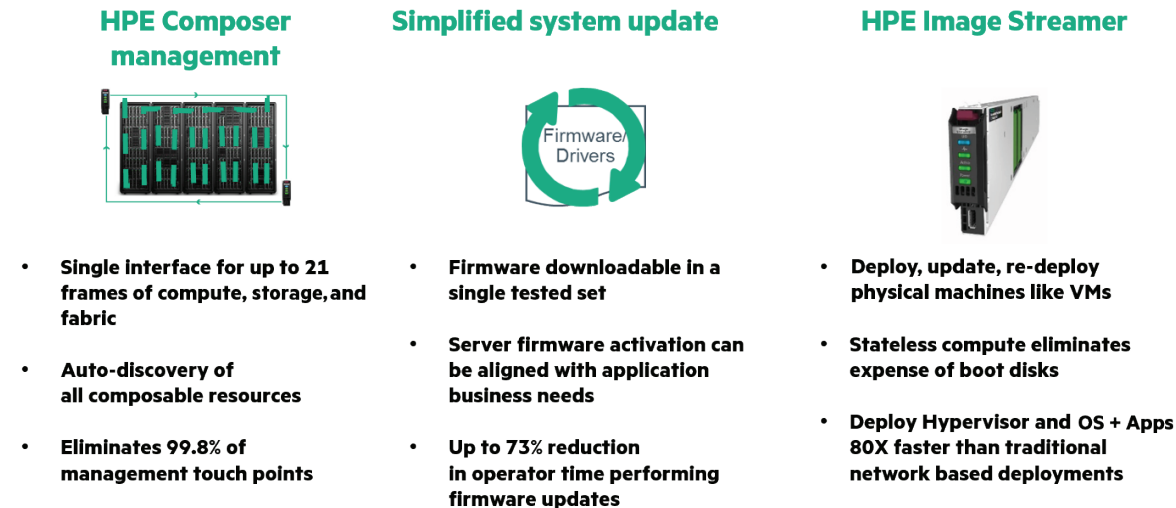
HPE Composer management

- **Single interface for up to 21 frames of compute, storage, and fabric**
- **Auto-discovery of all composable resources**
- **Eliminates 99.8% of management touch points**

Simplified system update

- **Firmware downloadable in a single tested set**
- **Server firmware activation can be aligned with application business needs**
- **Up to 73% reduction in operator time performing firmware updates**

HPE Image Streamer

- **Deploy, update, re-deploy physical machines like VMs**
- **Stateless compute eliminates expense of boot disks**
- **Deploy Hypervisor and OS + Apps 80X faster than traditional network based deployments**

Figure 2. HPE Synergy management enhancements

There is a significant reduction in the time required for complex administration, maintenance, and the expense associated with those tasks. This operational efficiency is a result of HPE Synergy being developed to run at larger scale and positioned for cloud environments.

HPE Synergy Composer management

Each HPE Synergy includes an HPE OneView instance. HPE OneView is ready to run when HPE Synergy boots up. External instances of HPE OneView (such as those in HPE BladeSystem environments) must be configured as the HPE c-Class servers boot up.

The HPE Synergy management ring connects up to 21 frames together enabling the HPE Synergy Composer to automatically discover and inventory all resources in the management ring. HPE c-Class servers require each enclosure to be manually configured before it may be imported into an HPE OneView managed environment.

Embedded HPE OneView makes storage operations easier to manage in HPE Synergy. HPE OneView enables end-to-end management of infrastructure with provisioning automation of HPE 3PAR StoreServ storage volumes, external SAN fabric zoning, and "on the fly" attachment of volumes to server profiles. Automating these features dramatically simplifies end-to-end management.

A single HPE Synergy composer with 21 Frames can manage up to 252 compute and associated fabrics. In contrast, HPE c-Class servers (without HPE OneView implementation) require direct management of all iLOs, Onboard Administrators, and Virtual Connect Managers. This single HPE Synergy composer interface amounts to a 99.8% reduction in embedded management interfaces.

HPE Synergy simplified system update

Managing firmware and driver updates has been a significant and growing challenge in the industry. HPE Synergy has made significant strides in simplifying how firmware and drivers are updated. HPE Synergy update methodology includes:

- MySPP—Allows you to create a custom HPE Synergy SPP with all the latest, tested combination of firmware and drivers.

- Firmware for a Logical Enclosure—Can be updated through a single interaction (3–5 frames, approximately one rack). Firmware is then updated in an orderly manner:

  – First updating the shared management components and fabric modules.

  – And then pushing the firmware and drivers out of band into the iLOs of the compute nodes. Firmware and drivers are then staged on the server.

- Firmware and drivers—Server firmware and drivers can be updated at the discretion of each infrastructure or server administrator. Activation requires a reboot, but this can be aligned to desired windows such as an application maintenance window.

This simplicity allows administrators to quickly perform update operations, and see up to a 73% reduction in system update time, at scale.[4] On HPE BladeSystem c-Class servers, one firmware update can be performed on a single enclosure with up to 16 servers. On HPE Synergy, one firmware update can span up to 5 frames with 60 servers.

HPE Synergy Image Streamer

HPE Synergy Image Streamer is a new innovation not available on HPE BladeSystem c-Class infrastructure that enables stateless computing and very rapid provisioning, updating, and re-provisioning of compute. In effect, physical compute can be treated like VMs. Individual compute nodes are stateless: no internal drives or RAID controllers are required. This results in initial acquisition cost savings and also reduces the number of parts that can fail.

Stateless compute can have new images created in seconds and booted with new personalities in a matter of minutes. This enables a variety of new paradigms such as rapid patching of images, or enabling nodes to change personalities over the course of a day in an HPC environment. In a hybrid environment, you can shift the balance of compute running VMs or containers with ease. The creation of a new bootable image can be 80 times faster due to a 15-second image boot creation time versus 20 minutes without HPE Synergy Image Streamer.

Superior economics

The HPE Synergy architectural and management advantages translate to significantly improved return on capital expenditure. This means you can enable advanced software defined intelligence with more fluid pools of compute, storage, and fabric while lowering the total cost of ownership (TCO). Figure 3 provides a "greenfield" analysis comparing a new HPE Synergy solution to a new HPE BladeSystem solution on a per-compute basis across a number of scale points.

[4] This comparison is based on a HPE BladeSystem environment without HPE OneView, versus HPE Synergy with embedded HPE OneView.
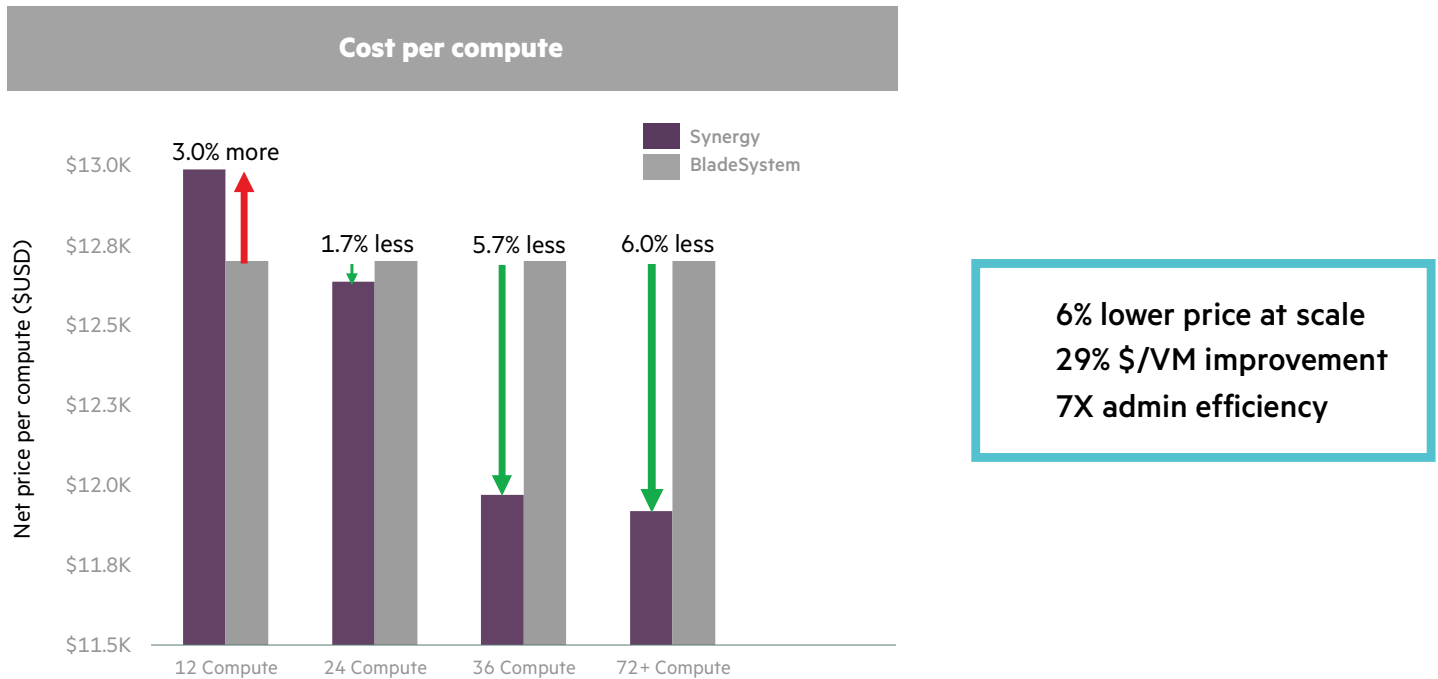
Figure 3. System cost for HPE Synergy versus HPE BladeSystem c-Class on a per compute basis

Figure 3 conclusions are based on configurations with full HPE Synergy Frames (divided by the number of compute modules in those Frames) and compared with the values on a per compute basis. This configuration provides a balanced comparison, given that HPE Synergy Frames and c-Class enclosures support a different number of compute devices.

Pricing was based on the system cost of hardware and software for a typical mid-range configuration.[5]

Figure 4 provides an alternate view highlighting the typical Synergy economic advantages versus BladeSystem at scale. From 1 to 12 compute, Synergy delivers a price advantage, but at 13 compute (where Synergy requires a 2nd frame) the advantage temporarily shifts to c-Class. At 17 compute and onward (the breakeven point), Synergy regains and maintains the advantage at the point where c-Class requires a 2nd enclosure. Figure 4 conclusions are based on the price compare with at the system level with configurations starting with one compute and scaling one compute at a time to 72 compute (six Synergy frames).

The price advantages shown in figures 3 and 4 are primarily due to the:

- HPE Synergy master-satellite fabric architecture at 2+ frames.

- HPE Image Streamer stateless compute functionality at 3+ frames.

Figure 4 provides a "brownfield" analysis highlighting the savings migrating existing HPE BladeSystem systems to a new HPE Synergy solution.

[5] All pricing is net per U.S. pricing in USD with a discount of 35% per Gartner Competitive Profiles.
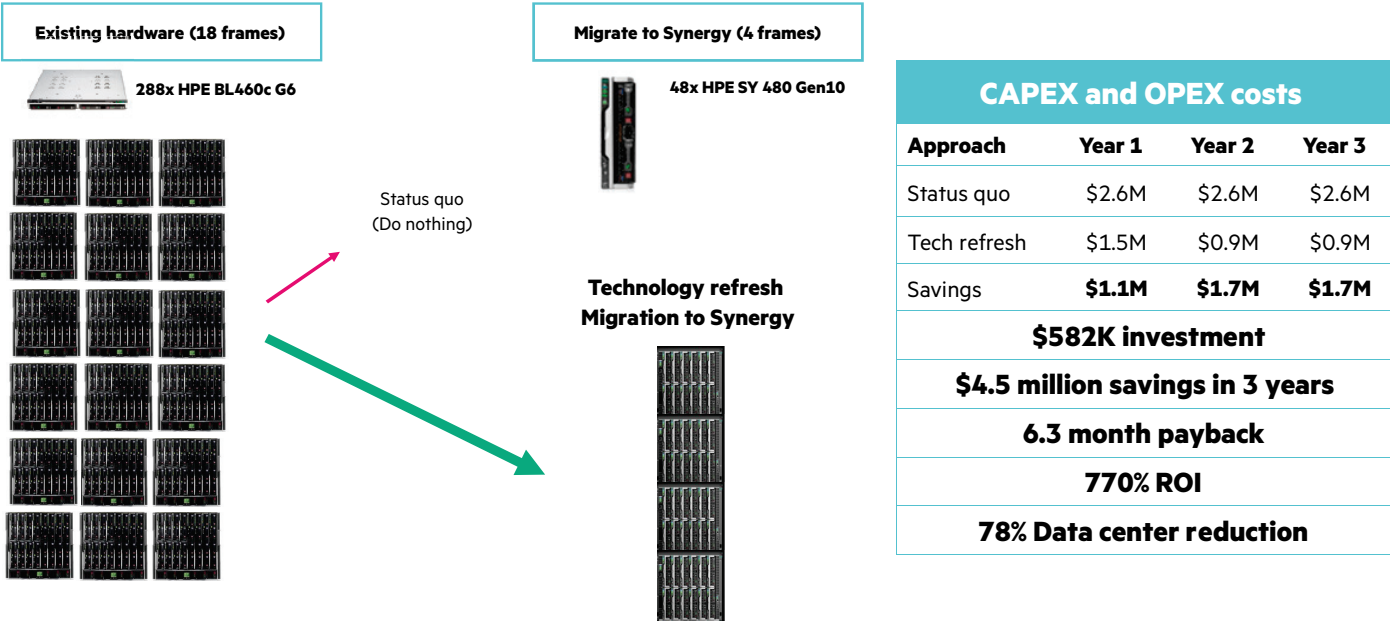
Figure 4. HPE Synergy technology refresh savings (VMware environment)

Figure 4 conclusions are based on the three-year costs to operate, support, and maintain the compute hardware, operating system software, and VMware software of 288 HPE BladeSystem BL460c G6 servers versus a technology refresh consolidation to 48 HPE Synergy 480 Gen10 compute modules. By investing $582K in new HPE Synergy hardware, you realize the benefits of a composable infrastructure while saving $4.5 million over three years with a 6.3 month payback, a 770% return on investment (ROI), and a 78% data center server reduction. All pricing is net per U.S. pricing in USD with a hardware discount of 35% per Gartner Competitive Profiles. See the Appendix for additional assumptions and configuration details.

Whether considering a new project installation or a technology refresh, with HPE Synergy you not only experience the technological advantages of a Composable Infrastructure, but gain very significant economic benefits as well.

Designed for the future

Compute architectures are evolving to memory-driven computing with photonics and non-volatile memory (NVM). HPE Synergy is ready (see Table 2). Just as HPE BladeSystem was designed in 2006 as the defining IT strategy for the next decade, HPE Synergy is designed to lead IT organizations into the next decade of computing. HPE Synergy handles both traditional application environments (such as VMware and MS apps), and new cloud-based and cloud-native applications used in a DevOps environment.

Table 2. HPE Synergy infrastructure ready for the future

More powerful compute	Benefits delivered now	Built-in infrastructure for the future
• 3.75X more bandwidth per bay	• Bandwidth of one HPE Synergy optical connection is greater than total c7000 midplane	• 100 Gb enabled • Photonics and NVM ready: 12.8 Tb/s per compute with Photonics
• 35% more power headroom	• HPE Synergy can grow its processors, c7000 processors are power-limited	• Ready for higher power CPUs, GPUs, DIMMs and NVM
• Extensible management	• HPE Synergy can add new resource types and functions from the same UI and API	• Ready to manage future technologies and accept advanced appliances

More bandwidth

Each half-height bay in the HPE Synergy 12000 Frame can accommodate up to three redundant 100 Gb links for 1200 Gb total (full duplex). This is 3.75X the bandwidth per half-height bay of the HPE BladeSystem c7000 enclosure. HPE Synergy physical infrastructure is photonics-ready, with each HPE Synergy bay ready to support over 10 Tb/s of 12.8 Tb/s of photonic bandwidth. HPE BladeSystem c-Class is not equipped with such a capability.

More power headroom

HPE Synergy allocates more raw power per bay (35 percent more than HPE BladeSystem c-Class) with 12 bays instead of 16 (fewer bays means more power allocation per bay with HPE Synergy).

Intel and other vendors are dramatically increasing power requirements for CPUs and GPUs, which are increasingly popular for virtual desktop infrastructure (VDI) and high performance computing environments which did not exist 10 years ago. HPE Synergy is designed with ample headroom for these new demands.

As storage moves to solid state and NVM, the power density of storage increases, requiring more power. The HPE Synergy infrastructure is positioned to meet this demand.

Extensible management

Computing is evolving towards more abstracted, cloud based computing, and infrastructure management must evolve as well. As NVM becomes a shareable resource, it too needs to be managed. Traditional management approaches would simply create one more management layer, managing yet another resource type. HPE Synergy Composer, powered by OneView with the Unified API is designed to be highly extensible and ready for these futures, without the need to create more management tools.

- HPE Synergy with the Unified API essentially provides Bare Metal as a Service. This integrates seamlessly with various cloud stacks and configuration management tools, making HPE Synergy a fluid cloud underlay for current and future cloud states based on VMs, containers, or other future technologies.
- HPE Synergy's resource manager architecture enables future resource types such as NVM to be added and seamlessly managed; the same as existing resource types.
- Even the Unified API is extensible. It maintains backwards compatibility as it evolves forward in functionality, so existing code can continue to operate.

With all these capabilities built in, HPE Synergy is well positioned as a single platform for current and future needs.

HPE Synergy fits into your BladeSystem environment

HPE Synergy is ready for the future, but it hasn't forgotten the past. It is backward compatible and designed for ease of migration with current HPE BladeSystem c-Class owners in mind (Figure 5).

Figure 5. Forward-looking architecture of HPE Synergy

Same data center footprint

The HPE Synergy frame takes the same 10U of rack space as the HPE BladeSystem c7000[6] and uses the same power feeds as c7000.[7] HPE Synergy cooling is further improved over the c7000, allowing it to fit in the same data center locations and be adequately cooled.

Same and more applications

With a full complement of compute modules, HPE Synergy can power virtually any application. Utilizing maximum CPU and more memory, HPE Synergy can run all the same apps as the c-Class c7000. And with large shared DAS, HPE Synergy can also take on storage oriented applications such as mail, object stores, files servers, software-defined storage (SDS), databases, and more.

You can find out more about the complete HPE Synergy compute module family at hpe.com/us/en/integrated-systems/synergy.html#Portfolio.

Same and simpler management operations

HPE OneView, the same optional management environment available with the HPE BladeSystem, is embedded in HPE Synergy Composer. HPE OneView was designed as a consumer-inspired user interface to be highly intuitive and easy to use. A short learning curve means that administrators can be productive immediately. The HPE OneView Global Dashboard provides a unified view of server health, profiles, and enclosures. This unified view spans multiple virtual and physical appliances across HPE Synergy, c-Class and DL platforms. Managing up to 6,400 nodes today and more in the future, the HPE OneView Global Dashboard also provides centralized management of alerts and core inventory data. HPE Synergy and HPE BladeSystem environments with OneView use the same Unified API, and integrate into the same third party management tools. For more information about HPE OneView, go to hpe.com/info/oneview.

Migration options

For those wanting to migrate to HPE Synergy from environments not currently using HPE OneView, you can use the methods and tools found in the "Transitioning a Virtual Connect configuration to HPE OneView" technical white paper. In many cases, this information allows you to migrate from Virtual Connect Manager to an HPE OneView environment without powering off your servers.

Conclusion

The ability of HPE Synergy to provide fluid pools of resources (compute, storage, and fabric) through one infrastructure, simplify operations, improve economics, and position your IT operation for the future is an architectural leap into the extended capabilities of a composable infrastructure. HPE Synergy brings additional value to IT operations in terms of lowering capital expenditure and operating expenses—and reducing complexity. This HPE implementation of composable infrastructure continues with current and future development in shared non-volatile memory (NVM) and memory driven computing.

HPE is defining a clear path in the transition from HPE BladeSystem c-Class to the HPE Synergy environment. The commonality between these two environments provides a clear migration path giving you the ability to leverage a significant portion of your existing infrastructure. You have the flexibility to completely transition to HPE Synergy, or to migrate over time in a way that makes sense for your IT environment.

Use the following links to find out more about HPE Synergy, composable infrastructure, and how to migrate your HPE c-Class infrastructure.

HPE Synergy

HPE Synergy Reference Architecture

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[6] The HPE Synergy hardware is slightly deeper, and there are some significant considerations in placing a Synergy in a 1 m deep rack.
[7] The HPE c7000 has a 3-phase option not available on Synergy, as it was not widely used. For these customers, they will need to use appropriate 3 phase PDUs to convert to the correct power cords for Synergy.

Appendix: System comparison assumptions and details

This Appendix contains details for the comparisons illustrated in Figures 3 and 4.

HPE BladeSystem versus HPE Synergy system configuration, assumptions, and cost details
Compute

- HPE Synergy: SY 480 Gen10 compute with 2x Intel Xeon 4116 processors, 256 GB memory (16x 16 GB RDIMMs), and 1x 3820c dual-port 20 Gb network adapter.

- HPE BladeSystem c-Class: BL460c Gen10 with 2x Intel Xeon 4116 processors, 256 GB memory (16x 16 GB RDIMMs), and dual-port 20 Gb 650FLB network adapter.

Frame

- Redundant power and fans

Image deployment

- HPE Synergy: Redundant Image Streamer solution with stateless compute for 25–72 compute (3–6 frames) and 2x300 GB SAS HDDs and hardware RAID controller for 1–24 compute (1–2 frames).

- HPE BladeSystem c-Class: 2x300 GB SAS HDDs and hardware RAID controller.

Management

- HPE Synergy: Embedded HPE OneView with iLO Advanced, redundant HPE Composers, and redundant Frame Link Models.

- HPE BladeSystem c-Class: HPE OneView with iLO Advanced per server and redundant Onboard Administrators.

Fabric

- HPE Synergy: Redundant master-satellite architecture with 40 Gb F8 VC Modules each with a 8 Gb FC upgrade license, 20 Gb Interconnect Link Modules, and DAC Interconnect Link Cables.

- HPE BladeSystem c-Class: VC FlexFabric-20/40 F8 modules.

Cost assumptions

- Pricing is net per U.S. list pricing in USD as of July–August 2017 with a discount of 35% per Gartner Competitive Profiles.

HPE BladeSystem versus HPE Synergy system configuration, assumptions, and cost details
Compute

- HPE Synergy: 48x SY 480 Gen10 compute with 2x Intel Xeon 8160 (24-core) processors, 384 GB memory (20x 16 GB RDIMMs), and 1x 2820c dual-port 10 Gb network adapter (48 cores per compute, 2,302 cores total).

- HPE BladeSystem c-Class: 288x BL460c G6 with 2x Intel Xeon X5570 (4-core) processors and on-board dual-port network adapter (8 cores per compute, 2,302 cores total).

Frame

- Redundant power and fans

Image Deployment

- HPE Synergy: Redundant Image Streamer solution with stateless compute.

- HPE BladeSystem c-Class: 2x300 GB SAS HDDs and hardware RAID controller.

Management

- HPE Synergy: Embedded HPE OneView with iLO Advanced, redundant HPE Composers, and redundant Frame Link Models.

- HPE BladeSystem c-Class: HPE OneView with iLO Advanced per server and redundant Onboard Administrators.

Fabric

- HPE Synergy: Redundant master-satellite architecture with 40 Gb F8 VC Modules each with an 8 Gb FC upgrade license, 10 Gb Interconnect Link Modules, and DAC Interconnect Link Cables.

- HPE BladeSystem c-Class: Redundant HPE Virtual Connect FlexFabric 10 Gb/24-Port Modules.

Operating System

- MS Windows Server® 2016 Datacenter.

- VMware vSphere® Enterprise Plus.

HPE Synergy technology refresh savings details

The consolidation ratio of 288 to 48 (i.e., 6:1) per the following:

- Principled Technologies Consolidate and save on virtualization costs paper at principledtechnologies.com/HPE/ProLiant_BL460c_Gen9_hypervisor_support_savings_1116.pdf. The paper identified a 4:1 ratio when migrating from a BL460c G6 2x4-core/96 GB RAM to a c-Class BL460c Gen9 2x16-core/256 RAM.

- BladeSystem BL460c Gen10 2x16-core/256 GB RAM to Synergy 480 Gen10 2x24-core/384 GB RAM consolidation of 1.5:1 per 50% greater DIMM capacity per server.

- Results in a BladeSystem G6 2x4-core/96 GB RAM to Synergy Gen10 2x24-core/384 GB RAM consolidation of 6:1.

Cost assumptions

Hardware pricing:

- New HPE Synergy: HPE Synergy Business Value Calculator v2.1 (preliminary) July 11, 2017 using the default discount of 35%.

- Existing BladeSystem c-Class: Considered as sunk (i.e., $0).

Software license and support pricing (all systems):

- OS license: Redistributable per the software EULA (end-user license agreement) (i.e., zero cost).

- OS support: Operating system support pricing based on the average per core price of HPE SKU U5JM1E at $438.44 list less a 30% discount for 3 years for FC 24x7 MS Windows Server 2016 Datacenter Service.

- VMware: $5,681 less a 30% discount per CPU for 3 years for VMware vSphere Enterprise Plus software + support. Pricing based on the per CPU price of HPE SKU BD515A.

TCO savings

- Per the server consolidation c/o the HPE Synergy Business Value Calculator v2.1 (preliminary) July 11, 2017. The TCO savings include power and cooling, carbon footprint, data center infrastructure, and downtime costs.

Resources

HPE Synergy

HPE Synergy Management Infrastructure, Managing Composable Infrastructure

HPE Synergy: The first platform architected for composability to bridge Traditional and Cloud Native apps

HPE Synergy Composer QuickSpecs

HPE Synergy Image Streamer QuickSpecs

A compelling on-premises alternative to public cloud HPE Synergy for collaboration and database

Five steps to building a Composable Infrastructure with HPE Synergy
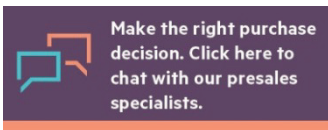
HPE Technology Services for HPE Synergy

SSD Selector Tool

HPE NVMe 2.5" SSDs and Enablement Kits

HPE technology white papers

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