

HPE Synergy: Claiming Composability Isn't Enough to Hide Complex Infrastructure

Solution Brief
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Highlights

Infrastructure on Demand with Cisco Unified Computing System

- Blade, rack, and storage servers are in the same management domain.
- All servers are connected through the same unified fabric.
- Wire once and configure servers and bandwidth through software.
- I/O is configured on demand through Cisco Unified Computing System™ (Cisco UCS®) virtual interface cards (VICs).
- Shared resources are inherently more flexible.

Infrastructure Complexity with HPE Synergy

- HPE Synergy is more complex than the HP c7000 BladeSystem chassis.
- You must guess application resource needs before deployment.
- I/O devices are physically installed and configured in servers.
- The configuration is difficult to change after Synergy is deployed.
- Synergy imposes many rules, limiting configuration.
- The infrastructure has more new chassis-resident devices.
- The management domain is incompatible with HPE's other products.

To stay competitive, you need to reduce the amount of time needed to deploy applications. Can HPE do this while reducing complexity and increasing agility and flexibility?

With the Cisco Unified Computing System™ (Cisco UCS®) platform, you can quickly and easily provision your infrastructure resources: servers, networking, and storage. Cisco UCS provides true infrastructure on demand, with a system that grows gracefully and incrementally so that you can closely align your costs with your infrastructure. Cisco UCS enables application requirements to dictate infrastructure delivery—not the other way around.

As the HP c7000 BladeSystem chassis approached the end of its useful life, HPE had a clean slate to address the many problems of an outdated design. Instead of adopting a new, scalable architecture—like Cisco UCS—the company made only incremental changes. HPE Synergy is now labeled as “composable infrastructure” and marketed as “fluid,” with “software-designed intelligence.” The reality is that Synergy is even more complex than the previous c7000 product and requires customers to purchase more hardware and make even more configuration decisions at the start before deploying it. This approach results in a system that requires you to know ahead of time exactly what resources your applications will need. After the system is deployed, it is difficult to change, scale, or repurpose. It's hard to align costs with benefits when you have to overprovision your supporting infrastructure and adhere to complex configuration guidelines every time you change or expand your environment. Unfortunately for customers, HPE's new infrastructure was dated long before it was released.



Composable Should Not Mean Complex

Composable infrastructure, in theory, gives you the capability to program, reprogram, and scale computing, networking, and storage resources independently. HPE's chassis-centric design remains tied to the traditional concept of in-chassis HPE Virtual Connect switches. In moving to Synergy, the company has added even more hardware and touchpoints to every chassis while reducing the overall number of computing servers.

Complex Chassis, Complex System

You can begin to understand the lack of agility when you consider the chassis, or frame. Each HPE Synergy Frame can contain up to 12 two-socket compute servers, up to 4 new single-socket management servers, and up to 6 switching devices. The reality is that HPE Synergy has more overall hardware devices and more physical touchpoints

than any other x86-architecture blade server product in history. While our philosophy is to reduce physical hardware, reduce infrastructure touchpoints, and eliminate or reduce complex configuration rules, HPE has increased all of these with Synergy.

The Day-0 Guessing Game

With HPE Synergy, all your networking and bandwidth allocation choices are hard-wired decisions that must be made at the time of purchase, before you deploy and run any actual applications. If you guess that your applications will require 20 Gbps of bandwidth, you would purchase and connect Virtual Connect switches and interconnects for every 36 blades. If your applications need to burst to 40 Gbps of bandwidth or more, you are out of luck. If many of your applications require only 10 Gbps, you overbought and overprovisioned the networking fabric. This approach means that you must completely predesign your environment for applications for which

you may or may not know actual bandwidth or scaling requirements.

With Cisco UCS, all network connectivity and bandwidth is shared and available to any application on any server as needed in the domain. We do not subscribe to the "stranded islands" approach. We instead allow applications to determine the computing infrastructure, not the other way around.

Not Unified, Not Agile

After years of justifying in-chassis switching with c7000, HPE has now moved to a master-satellite data fabric configuration for Synergy. Customers must now decide whether to replicate the old c7000 with Virtual Connect switch pairs in every chassis (one switch for every six computing blades) or extend the network to multiple frames through interconnect modules (satellites) and specialized cables. Additionally, the data fabric does not follow the management fabric, which

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forces customers to track where the HPE OneView management appliances, called Synergy OneView Composers, are located. Without unified fabric, Synergy customers must now endure the additional burden of tracking which chassis contain masters and which contain satellites every time they want to scale or repurpose infrastructure. Synergy continues to have no concept of shared resources or unified fabric—just islands of infrastructure cabled together.

Rules, Rules, Rules

HPE rack servers require you to install a separate, virtual version of OneView.

Rack servers cannot be composed by Synergy's hardware version of OneView. If you want to compose a c7000, you will find that it does not talk to the Synergy OneView Composer. If you want to use the Virtual Connect master-satellite configuration, you must buy the correct interconnect modules and special data cables and follow the bandwidth rules closely. The bandwidth rules alone limit your data flexibility and dictate the way that every rack and row is connected and cabled. If you want to use storage blades, you must add SAS switches to the back of the chassis and SAS controllers on each blade in the chassis. Storage nodes serve only the blades in the same chassis. If you want

to use the optional image streamers, you will find that they follow only the Virtual Connect domains (for either three or five chassis) and must be externally cabled directly to the Virtual Connect switches.

More Is Not Better

Figure 1 illustrates a recommended 20-Gbps-per-blade sample configuration with two master Virtual Connect switches and four interconnect modules in each rack of three frames. Customers are forced to predict exactly which I/O switches to install and how to connect them for northbound traffic, and then must carefully cable dozens

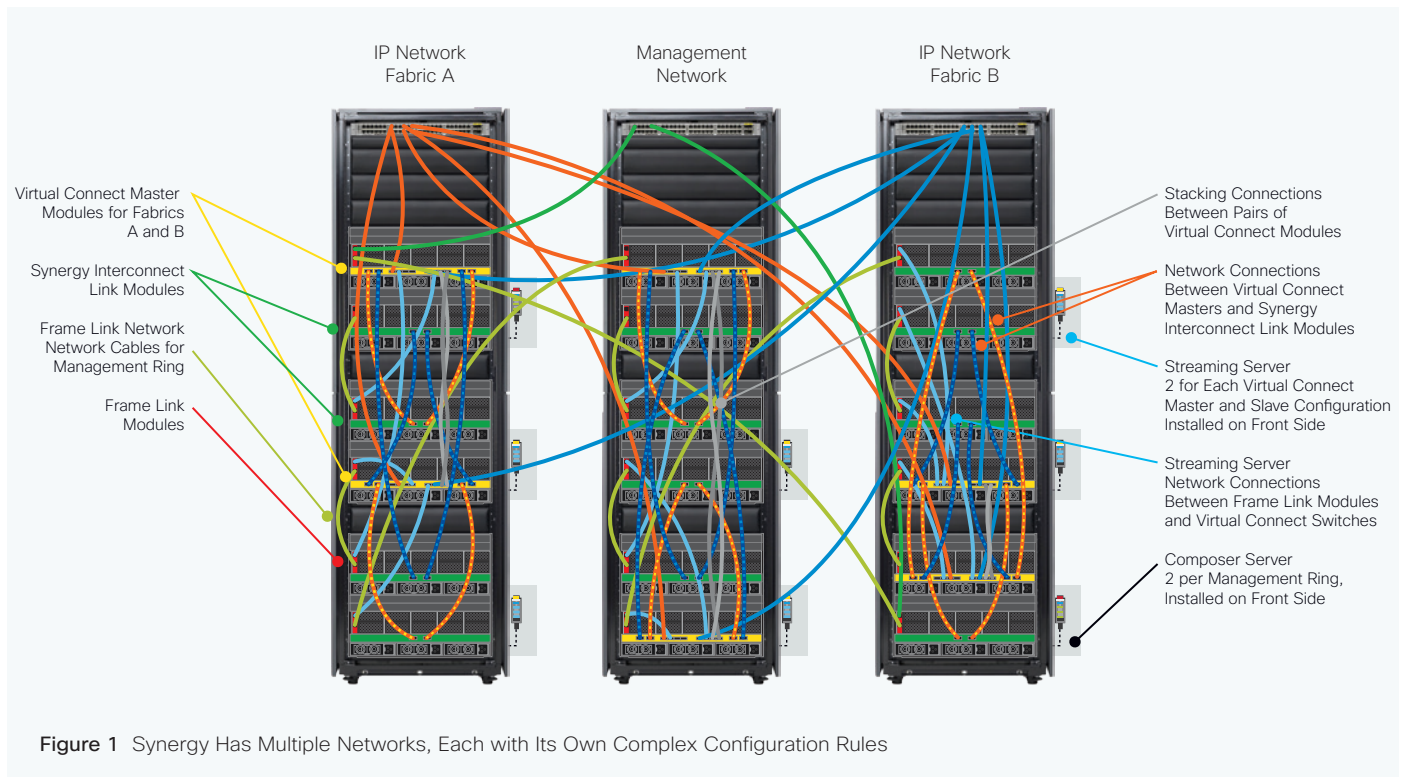


Figure 1 Synergy Has Multiple Networks, Each with Its Own Complex Configuration Rules

of modules between frames in a rigid topology. Customers must know, at the start, which switches to install in every frame and then install matching I/O interfaces in the servers, whether Ethernet, Fibre Channel, SAS, or a combination.

The figure also shows the management fabric, which must be physically cabled together in a clumsy ring topology. If you want to add, reduce, or move any resources, you must break these networks and follow many rules, hoping not to incur downtime. And finally, the illustration shows the optional streaming servers that follow their own configuration rules while adding even more devices and cabling. The infrastructure overhead for Synergy is up to three times more than for Cisco UCS, and a typical row configuration will require more than 50 percent more physical hardware resources than for a comparable Cisco UCS configuration.

Composable in Name Only

Although attempting simplification, HPE created a blade chassis with even more devices to purchase, power, configure, manage, and secure. As you make your day-0 planning decisions, you discover that you have to install, manage, and maintain up to four physical fabrics. Two fabrics are required—management and data—and two are optional—operating system provisioning and in-chassis storage. This system requires organizations to purchase, install, and manage the following components:

HPE Synergy Composer (Required)

- Hardware management appliances (single-socket servers), installed in a dedicated slot running HPE OneView software; two are required for redundancy
- Note: This setup is different from that for OneView Virtual Appliance for ProLiant rack servers and c7000 chassis.

HPE Synergy Frame Link Modules (Required to extend to multiple frames)

- Required to connect OneView Composer masters to other frames in a management ring; if you add or remove frames, you break the management network

I/O modules (Required)

- Familiar Virtual Connect, Fibre Channel, pass-through, and SAS switches
- Hard-wired connections offer no flexibility or shared resources; you must choose wisely on day 0

Synergy Interconnect Link Modules (Required for master-satellite Virtual Connect configuration)

- Required to extend Virtual Connect to any satellite frames using special data cables

HPE Synergy Image Streamer (Optional)

- Dedicated single-socket server appliance for operating system provisioning
- Must be physically cabled to each Virtual Connect switch, so not good at scale

Storage blades (in single chassis only, Optional)

- Works only for server blades in the same chassis
- Requires SAS switches in the back of the frame and SAS controllers on every blade

Day-2 Considerations

How many new physical devices and switches will you have to deploy each time you scale out or repurpose a Synergy system? Scaling is complex and costly because physical limitations likely mean downtime to break into the data fabric to add more frames. Or you can start another new island with new masters and satellites, requiring you to decide which infrastructure to purchase and install all over again.

- What happens as you build out in different locations?
- What if one blade requires more bandwidth than the data fabric you set up?
- What happens if applications demand that you add rack-server configurations?
- What happens when new generations of blades and switches emerge with new rules?

If you start another row or another room or another floor, your Synergy installations will not talk to each other unless you add more software. If you need more bandwidth, you must rip out and replace your switch fabric and incur downtime. If you want to add rack servers, you must start a completely

separate domain with a different OneView installation. If you want to add storage blades, you must incur downtime while you add SAS switches and SAS blade controller cards to each blade. All these rules and restrictions limit your flexibility to move your applications to unused resources and increase the likelihood of configuration mistakes.

Management Domains

Despite marketing a single management tool, HPE created a separate Synergy-specific hardware appliance version of OneView, called the Composer. Even more confusing, HPE extends the management domain to 21 frames through a separate bidirectional Ethernet ring. Each location, or even each row, requires its own OneView appliance masters, which do not follow the Virtual Connect data domain. Furthermore, the Synergy OneView Composer network does not talk to or see any c7000 BladeSystem or Proliant rack servers, because they require a separate virtual OneView appliance. In fact, HPE Synergy domains don't even talk to one another or share any resources.

To manage multiple OneView appliances, HPE has added a third software tool: OneView Global Dashboard. True to its name, the

dashboard simply invokes the disparate child appliances. Unlike Cisco UCS Central Software, the dashboard has no concept of global policies, global access control, or global backup and recovery. In fact, there is no single management tool to manage systems across HPE's product line. OneView cannot manage existing c7000 blade chassis, rack servers, and Synergy domains, or even multiple Synergy domains. With Cisco UCS management, you can manage multiple domains across geographically distinct locations. Cisco UCS Central Software is an extension of Cisco UCS Manager, allowing true global management of multiple generations of Cisco UCS blade and rack servers.

Why Cisco UCS

With Cisco UCS, all the blade and rack servers in the domain share access to a unified fabric with shared resources. We don't make you choose a specific bandwidth for your application workloads. You wire your chassis once and allocate bandwidth to applications through quality-of-service (QoS) controls. You can increase bandwidth or reprogram the QoS controls in real time, without incurring downtime. With Cisco® SingleConnect technology, the management and data domains are the same and don't require separate

and cumbersome cabling. Cisco UCS is the only solution in the industry that supports blade servers, rack servers, and storage servers—with the new Cisco UCS S-Series Storage Servers—all on a common fabric under unified management.

When Marketing Isn't Enough

While we continue to reduce hardware, complexity, and managed touchpoints, HPE has increased these all in Synergy. "Composability" messaging is not enough. You should instead demand an agile fabric without complex configuration limitations. You should demand a fabric that delivers on the original promise of shared resources and allows applications to dictate resource allocation, not the other way around. You should demand an architecture that allows you to repurpose resources without having to retool your entire infrastructure. If you are considering HPE Synergy, you should instead choose Cisco UCS to better match your application needs with your infrastructure.

For More Information

- [Cisco UCS](#)
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