



A compelling on-premises alternative to public cloud

The benefits of a composable infrastructure

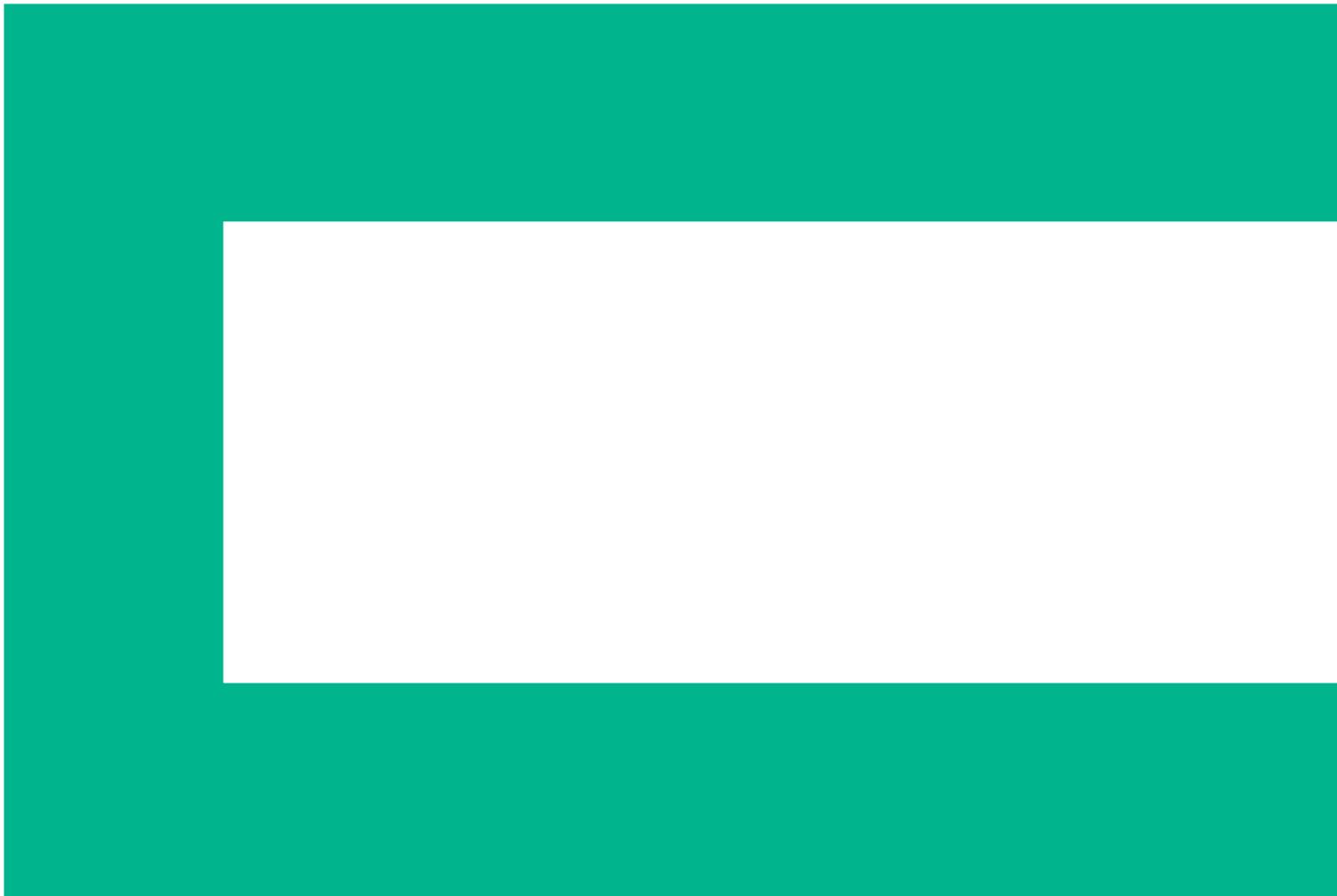




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In today's hyper-competitive business environment, it is easier than ever to disrupt industries and markets with new innovations. Cloud and mobile computing, combined with the rise of social media, have given business unprecedented opportunities to reach new customers with innovative products and services. This is called the Idea Economy, and it allows businesses to impact their industries quickly with new ideas while often leaving more established competitors scrambling to keep up.

Success in the Idea Economy requires turning ideas into value faster than the competition. This puts tremendous pressure on IT leaders who are pulled in two different and conflicting directions. Part of their job is keeping the business running—the traditional IT role that requires managing applications like ERP, collaboration tools, databases, etc. The objective is high availability while minimizing cost and risk. In traditional IT, as long as applications are running, nothing breaks, and IT hits its budget numbers, things are going well.

But in this era of industry disruption, business is looking for more from IT. Lines of business put tremendous pressure on IT leadership to enable a whole new style of applications and services—things like mobile apps, social, cloud, and the Internet of Things (IoT)—that are location-aware and that drive real-time personalized customer experiences and revenue opportunities. Managing both traditional IT functions and new revenue- and profit-driven IT services successfully is key to sustainability in this new economy.



Two styles of IT

The challenge today is that these two different IT environments require different infrastructure approaches. The traditional approach requires that traditional applications run in a stable, steady-state environment. Applications run in complex silos that tend to be optimized for their specific application. Silos are often over-provisioned, and stranded resources are common. To maintain reliability and stability, changes are limited, infrequent, and usually involve long review, procurement, and deployment cycles. These changes often take weeks or months to deploy.

Conversely, the Idea Economy requires a dynamic environment, where change is constant and decisions can be acted upon in hours or days. Lines-of-business look for the ability to deploy new apps and upgrade user experiences on the fly. To meet this demand, DevOps teams need the ability to deploy new infrastructure instantly. The problem for IT is that they can't deliver this experience from traditional infrastructure.

In this new environment, with its new requirements, IT is at risk of losing credibility with the business because it can't move fast enough to meet business needs. IT leaders find that when they can't deliver that dynamic IT experience in the enterprise data center, lines of business often go around them and purchase the capacity, flexibility, and agility they need from the public cloud. This creates a new set of issues, with the CIO potentially losing control of the IT budget and unable to guarantee that the company's data is secure and protected.

Available alternatives

Most enterprises are heavily invested in the traditional IT models, which work for keeping the business running but do not provide the agility and speed needed to support the Idea Economy.

One alternative is a cloud approach, using internal resources to support traditional applications with external public cloud resources to support new style applications. The "cloud giants" provide an attractive alternative, with low start-up costs and the ability to spin resources up and down on demand. But many enterprises have experienced sticker shock at the costs of processing and storing large volumes of data in the cloud.

In addition, most enterprises have at least some sensitive applications or data that they don't want to put in the public cloud. As mobile and cloud-native applications evolve from being "systems of engagement," driving initial customer engagement, to "systems of record," accessing and storing more and more sensitive business and customer data, this need for a more secure alternative to the public cloud will only grow.

This can lead IT to adoption of a bimodal approach, operating one infrastructure designed for reliability and stability to support mature applications and a second infrastructure designed for agility and speed to support mobile and cloud-native applications. Some analysts suggest bimodal is the future of IT, but this approach adds complexity and cost, and is inconsistent with another directive that most IT leaders face: the need to simplify operations and reduce the overall cost of IT.

IT would like to deliver cloud-style flexibility in the enterprise data center but is constrained by the need to reduce operational complexity and cost. What's needed is a new architecture that supports both IT models—an architecture that provides the reliability of stable traditional environments, the DevOps capability of defining infrastructure as code, and the flexibility of cloud—all delivered from a single on-premises infrastructure.

A new architecture: Composable Infrastructure

An infrastructure that works for both of these models needs the capabilities of the traditional space where it's reliable and stable, but it also needs to provide the flexible and dynamic experience of the public cloud. To address these competing needs, a new architectural vision is evolving that delivers a Composable Infrastructure.

Composable Infrastructure gives IT the ability to instantly provision the infrastructure needed for each workload. Physical and virtual resources can be provisioned to applications instantly, regardless of the style of application or the type or amount of resource. Composable Infrastructure has the unique ability to run without being limited to one computing paradigm because it can run virtual machines, bare-metal deployment, containers, and cloud-native applications.

Composability isn't just the latest incremental improvement in server design or software controls. It's a whole new take on infrastructure, a new architecture for the data center designed from the ground up to deliver a new experience to the business. Composable Infrastructure is hardware and software integrated, providing a single infrastructure that reduces operational complexity for traditional workloads and increases flexibility and speed for new applications and services.

Three attributes of Composable Infrastructure

For an infrastructure to be composable, it must have:

- **Fluid resource pools**—fluid pools of disaggregated compute, storage, and fabric resources, which is boot-up ready for any physical or virtual workload and are composed instantly to support the needs of specific applications and services
- **Software-defined intelligence**—template-driven workload automation to implement changes quickly and programmatically for frictionless operations
- **A unified API**—an open application program interface (API) that provides a single line of code to abstract every element of infrastructure, delivering true infrastructure as code

It's the combination of these three attributes working together that defines composability. Anything less may provide some composable features, but will not provide the full benefits of a single Composable Infrastructure.

Think of a Composable Infrastructure as a set of flexible building blocks that can be dynamically and automatically assembled and re-assembled to meet changing workload needs. A recent paper from Frost & Sullivan described it this way: "It's as if a child's set of Lego bricks came with the ability to replicate blocks as needed—and programmed-in instructions to configure themselves into a Ninja temple today and a working race car tomorrow."¹

Compute resources are composable at the physical, virtual, or container level. Composable data services can be defined at the block, file, or object level based on application requirements. Using simple software commands and repeatable templates, resources are provisioned together with their state (BIOS settings, firmware, drivers, protocols, etc.) and the operating system image to create logical infrastructures at near-instant speeds. IT can now use a single line of code to access the compute capacity, memory, and storage necessary for a specific application. Hardware can flex to run virtually on any workload, and when the workload is finished, resources are returned to the resource pool.

¹ "How the Right Infrastructure Can Prepare Your Data Center for Business Disruptors," Frost & Sullivan, 2015



A Composable Infrastructure and DevOps

Composable Infrastructure is uniquely suited to achieve the DevOps vision of continuous delivery. In a composable environment, developers can leverage workload-specific provisioning templates and a unified API to instantly provision resources programmatically from the available pool without needing a detailed understanding of the underlying physical elements. Developers can deploy applications across bare metal, virtual machines, and containers, all from within their application code. This infrastructure-as-code capability allows DevOps teams to:

- **Shorten and simplify development cycles**—enhance collaboration between development and operations with a programmable infrastructure
- **Accelerate and automate builds and integration**—stand up an in-house, bare-metal cloud infrastructure using templates via a unified API
- **Accelerate and automate testing**—a unified API simplifies the deployment of multiple testing environments, enabling an iterative development process

Business benefits of composability

Composable Infrastructure empowers IT leaders to deliver services faster, more effectively, and at a lower cost by eliminating the need for two separate infrastructure environments to support traditional applications and the new breed of applications. With composability, IT can now:

- **Run anything**—optimize any application and store all data on a single infrastructure with fluid pools of physical and virtual compute, storage, and fabric
- **Move faster**—accelerate application and service delivery through a single interface that precisely composes logical infrastructures at near-instant speeds
- **Work efficiently**—reduce operational effort and cost through internal, software-defined intelligence with template-driven, frictionless operations
- **Unlock value**—increase productivity and control across the data center by integrating and automating infrastructure operations and applications through a unified API

For the CIO looking for a more effective way to run traditional applications, Composable Infrastructure will simplify day-to-day operations by removing complexity from deploying bare-metal and virtualized resources through the use of repeatable templates. Overprovisioning and captive resources can be eliminated through the availability of resources on demand. Composable Infrastructure provides a way to future-proof your infrastructure investments, preparing you to compete in the Idea Economy.

For the CIO that needs to provide Web-scale/cloud-like functionality on-premises, Composable Infrastructure can provide the ability to support bimodal operations without the need for dual infrastructures. This provides enterprise IT the best alternative to continue to deliver reliable and stable support for traditional applications while giving DevOps the infrastructure for continuous delivery.

For the CIO that has seen lines of business utilize external IT services such as public cloud, Composable Infrastructure provides the tools to re-establish the leadership role of IT in meeting business needs, providing a superior alternative while gaining credibility with the business by providing a secure and reliable in-house alternative for new, innovative applications and services.

HPE Synergy

HPE Synergy, the first platform built from the ground up for Composable Infrastructure, provides a single infrastructure that reduces operational complexity for traditional workloads and increases operational velocity for the new breed of applications and services. Through a single interface, HPE Synergy composes physical and virtual compute, storage, and fabric pools into any configuration for any application. As an extendable platform, it easily enables a broad range of applications and operational models from virtualization to hybrid cloud, and is well suited for the DevOps approach to continuous integration and continuous delivery.

The fully programmable interface of HPE Synergy is fully compatible with and integrates into dozens of other popular management tools such as Microsoft® Systems Center, Red Hat®, and VMware® vCenter among others, allowing you to continue to use your favorite tools to manage virtualized resources. HPE OneView is also future-proofed through integration into open source automation and DevOps tools such as Chef, Docker, and OpenStack®, enabling a true infrastructure-as-code environment.

Next steps

Composable Infrastructure empowers IT to fulfill the traditional role of IT more efficiently: running the business while at the same time enabling new mobile and cloud-native applications and services that drive customer experience and create new revenue opportunities. Composable Infrastructure allows IT to align operational processes around a single data center architecture.

Composability relies on three elements: fluid pools of resources, software-defined intelligence, and a unified API that abstracts every element of infrastructure. The combination of these three elements, working together, allows IT to deliver a new IT experience from a single Composable Infrastructure.

CIOs can run their data centers more effectively and efficiently. Operations teams can more easily automate and accelerate internal processes. Developers can more quickly access infrastructure resources to speed the application development process. Ideas coming from the lines of business can realize faster time-to-value, allowing the business to deliver better experiences for customers while staying ahead of the competition.

Hewlett Packard Enterprise provides a variety of tools and services to get you started on your journey towards a Composable Infrastructure. With global, enterprise-grade technical expertise, Hewlett Packard Enterprise can help you design the right solution, integrate your solution into your existing environment, proactively support your environment, further automate your infrastructure, and help you flexibly manage your capacity and pay only for what you use to make the most of your technology investment.

Your journey to composable infrastructure is unique, and Hewlett Packard Enterprise can help you to evolve your organization's culture, people, processes, and technology to reach the desired destination. No matter where you are on the path, we are there to help you reach your desired outcome and drive business growth and innovation.

Learn more at
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