

# HP Converged Infrastructure

Unleash your potential

An HP Converged Infrastructure innovation primer

## A new window of opportunity

Today, your business has a window of opportunity that opens once in an economic cycle—a short pause before the return to growth. Now is the time when leading CIOs are aggressively investing in infrastructure innovation to bring in new customers and tap new markets. However, this strategy is being challenged by the increased sprawl of technology silos that is causing IT infrastructures to be inflexible, unmanageable, inefficient, and more costly.

The good news is that this economic cycle is being matched by an inflection point in IT, where the convergence of new and existing technologies is creating new opportunities. Convergence—the solution to IT resource sprawl—is one of today's mega-trends, and it is a good predictor of tomorrow's business

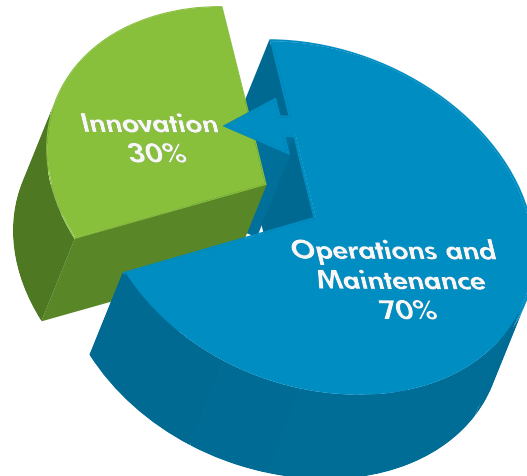
infrastructures. Infrastructure convergence breaks down manual processes and technology silos and brings together all IT resources into adaptive pools of assets that can be shared by many applications and managed as a service.

The optimum Converged Infrastructure matches the supply of IT resources with the demand for business applications. It requires evolving your infrastructure from a product-centric approach to a service-centric management approach to simplify IT and accelerate business results.

HP has the expertise and technology leadership to help you transform your infrastructure—at your pace—by engineering your IT resources to work better together. IT organizations that miss this opportunity by maintaining their current course will regret it. There may not be another opportunity like this for a decade. So let's take a look at how you can evolve your infrastructure by unleashing the potential that is already there.

**Figure 1. A problematic ratio**

IT organizations typically spend up to 70 percent of their budgets on operations and maintenance, leaving just 30 percent for business innovation, such as deployment of new applications and services.



## The state of IT

### IT resources are sprawling.

For years, IT organizations have been adding servers, storage, and networking devices to keep pace with applications and the terabytes of data they generate. Over time, these IT resources became locked up in countless technology silos, each devoted to a particular application or line of business. To ensure service level agreements (SLAs), these silos have created over-provisioning and underutilization, and have become collectively difficult to manage. The result: More budget spent on operations and IT's inability to deploy new services, quickly. Inevitably, the sprawl of underutilized IT resources leads to diminished productivity, lack of space, complex networking, and unnecessary facility costs.

### Server virtualization has IT at an impending breaking point.

To counter sprawl, IT organizations are dramatically expanding server virtualization efforts. IDC reports that 6.3 million virtual machines were deployed in 2008, with the number of virtual servers expected to surpass the number of physical servers in 2010. Server virtualization greatly speeds up server deployment and application growth, but removing these bottlenecks to application deployment leads to acceleration in data growth and network traffic. As a result, storage and networking infrastructures can't keep pace with server virtualization.

Most of today's storage environments have been associated with specific application implementations from their original date of deployment. The deployment method has hardwired storage to servers and trapped capacity throughout the infrastructure.

Typical companies use a multi-tiered infrastructure that relies on centralized (core) switches at the top, aggregation/distribution switches in the middle, and access switches at the bottom (network edge). This infrastructure requires that most data must be sent to the mid- and upper-level switches to reach their destination. These network switches are intelligent—performing decision-making processes—but they are not high performance. Virtualized environments require a higher performance network infrastructure with intelligence moved closer to the edge of the network.

### IT's 70/30 spending ratio is headed in the wrong direction.

A recent InformationWeek survey<sup>1</sup> found that IT organizations are typically spending up to 70 percent of their budgets on operations and maintenance. That leaves just 30 percent for business innovation, such as deployment of new applications and services that can make businesses more competitive. On the business side, executives are looking for improved business outcomes, with application owners needing quicker ROI and higher service levels from IT. But on the IT side, there is tremendous pressure to contain costs and gain more value from existing investments. Too often, IT managers cannot meet the business organization's needs, because they are confined by the sprawl of technology silos.

1. 2009 InformationWeek Analytics survey of InformationWeek 500 executives

# HP Converged Infrastructure—the solution to sprawl

The solution to sprawl is to break down the technology silos and bring all IT resources together into adaptive pools of assets that can be shared by many applications and managed as a service. This solution brings together management tools, policies, and processes so resources can be managed in a holistic, integrated manner. It also brings together power and cooling practices so systems and facilities work synergistically to extend the life of the data center.

A Converged Infrastructure has five overarching requirements. It is virtualized, resilient, orchestrated, optimized, and modular.

## Virtualized

A Converged Infrastructure requires the virtualization of all heterogeneous resources: compute, storage, networking, and I/O. Virtualization separates the applications, data, and network connections from the underlying hardware, thereby making it easier and faster to reallocate resources to match the changing performance, throughput, and capacity needs of individual applications. This end-to-end virtualization improves IT flexibility and response to business requests, ultimately improving business speed and agility. A single operating environment needs to be able to manage VMware®, Microsoft®, Citrix®, and UNIX® virtual machines.

## Resilient

A Converged Infrastructure integrates nonstop technologies and high availability policies. Because diverse applications share virtualized resource pools, a Converged Infrastructure must have an operating environment that automates high-availability policies to meet SLAs. A resilient, Converged Infrastructure provides the right level of availability for each business application.

## Orchestrated

A Converged Infrastructure orchestrates the business request with the applications, data, and infrastructure. It defines the policies and service levels through automated workflows, provisioning, and change management design by IT and the business. Orchestration provides an application-aligned infrastructure that can be scaled up or down based on the needs of each application. Orchestration also provides centralized management of the resource pool, including billing, metering, and chargeback for consumption.

## Optimized

A Converged Infrastructure must optimize itself for any workload—non-stop, desktop, or cloud applications and any operating system—whether it runs on a physical or virtual machine. Based on policies, the infrastructure is able to adapt to a wide variety of demands in the most efficient way possible to meet different requirements for performance, resiliency, and overall efficiency. This means that it does not over-provision (waste resources) or under-provision (hurt business outcomes), but continuously optimizes resource supply with application demand.

## Modular

A Converged Infrastructure is built on modular design principles based on open and interoperable standards. A modular approach allows IT to integrate new technologies with existing investments without having to start over. This approach also gives IT the ability to extend new capabilities and scale capacity over time.

# Benefits of an HP Converged Infrastructure done right

HP is aggressively converging the industry's leading infrastructure portfolio and expertise across IT systems, management tools, and facilities into a simplified architecture and common tool set based on current HP innovations and industry standards. The HP Converged Infrastructure matches the supply of IT resources with the demand for business applications in an optimal way. By transitioning away from a product-centric approach to a shared-service management model, your organization can accelerate standardization, reduce operational costs, and accelerate business results.

# Building a Converged Infrastructure

In order to increase the potential of a Converged Infrastructure, HP is delivering—and investing in—a Converged Infrastructure architectural framework consisting of the four core areas shown in Figure 2.

**Figure 2. HP Converged Infrastructure architecture**

The HP approach to Converged Infrastructure encompasses four key areas: HP Infrastructure Operating Environment, FlexFabric, Virtual Resource Pools, and HP Data Center Smart Grid.

**HP Infrastructure Operating Environment**

Enables shared-service management

**HP FlexFabric**

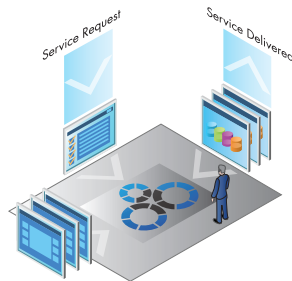
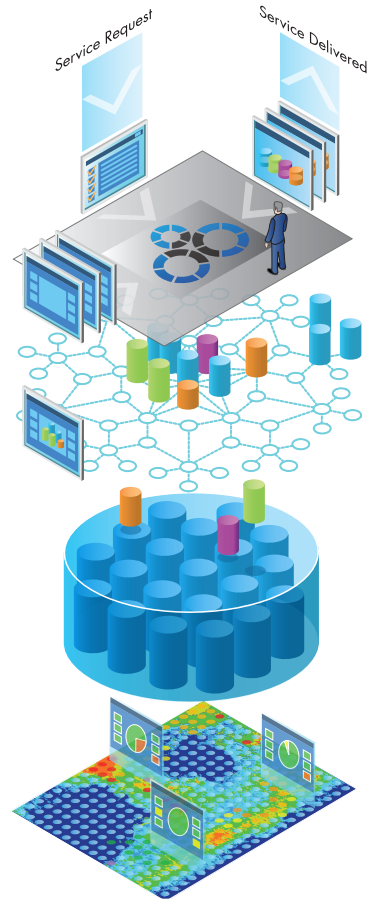
Wire-once, dynamic assembly, always predictable

**HP Virtual Resource Pools**

Adaptive compute, memory, storage and network resources

**HP Data Center Smart Grid**

Intelligent energy management across systems and facilities.



## HP Infrastructure Operating Environment

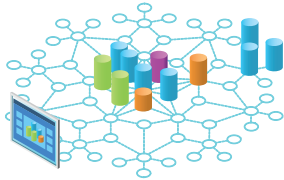
The HP Infrastructure Operating Environment is a shared-services engine that provisions and adapts application environments on the fly. The HP Infrastructure Operating Environment unifies all the tools for infrastructure lifecycle management into one command center, enabling your organization—for the first time—to simultaneously control all elements of an infrastructure needed to deliver a service. It helps you accelerate the delivery of application environments in a predictable and repeatable way that uses IT resources and staff time most efficiently.

This environment is uniquely built from HP's infrastructure, mission-critical, and business service software portfolios to meet the demanding nature of heterogeneous enterprise IT environments across multiple delivery models (e.g., on-site, outsourced and over the cloud).

### Key benefits

The HP Infrastructure Operating Environment transforms application-specific processes and tools into a shared, standardized environment that accelerates time-to-service delivery and optimizes resource utilization for all applications and business services. This environment:

- Delivers new services in minutes instead of months
- Optimizes the infrastructure confidently
- Protects continuity and quality of services



## HP FlexFabric

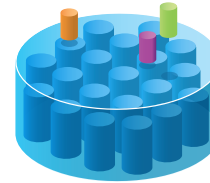
HP FlexFabric is a virtualized, high-performance, low-latency network that consolidates Ethernet and storage networks onto a single fabric to dramatically lower network complexity and cost. HP FlexFabric moves network intelligence away from the core switches and closer to the application, thereby simplifying complex hierarchical network infrastructures. It improves flexibility and resource utilization by connecting physical resources to the network once, and then dynamically remapping connections based on application requirements. This unique, wire-once approach enables your organization to easily flex connections and performance to meet changes in workload demand through a single management console.

For the first time, HP FlexFabric fully virtualizes network connections to allow your business to move applications freely across or between data centers and deliver “network-as-a-service.”

HP will deliver the FlexFabric vision by converging the technology, management tools, and partner ecosystems of the HP ProCurve and Virtual Connect network portfolios into a virtualized fabric for the data center.

### Key benefits

- Dynamically adapts network protocols and scales capacity to match application demand on the fly
- Instantly migrates connections as applications move across different resources
- Provides predictable performance and quality of service governed by security and service-level policies



## HP Virtual Resource Pools

HP Virtual Resource Pools are created from virtualized compute, storage, I/O, and networking systems that can be combined, divided, and repurposed to match any application demand quickly and efficiently. Individual systems can be carved up to increase utilization, or interrelated systems can be aggregated together to present a large pool that can be optimized for a variety of applications.

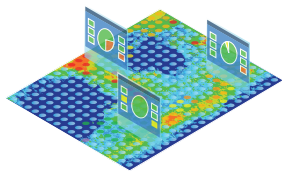
For the first time, your business will be able to support a shared-service model with a common pool of adaptive, virtualized resources based on standards that can be optimized for all types of enterprise, cloud, and high-performance computing (HPC) applications.

This enables your organization to meet the unique, dynamic requirements of a Converged Infrastructure and shared-services model by increasing the scalability, flexibility, and utilization of resources.

Leveraging 25+ years of leadership in adaptive IT systems, HP is accelerating the creation of Virtual Resource Pools by converging the capabilities of blade, mission-critical, and scale-out systems across the ProLiant, Integrity, StorageWorks, and ProCurve portfolios.

### Key benefits

- Increases total utilization by freeing and repurposing trapped capacity to support applications
- Enables resiliency and flexibility to support applications on interrelated resources
- Accelerates standardization to enable higher levels of automation and increase productivity
- Protects investments through simplified integration with existing systems, upgradability, and scalability to meet future demand



## HP Data Center Smart Grid

The HP Data Center Smart Grid creates an intelligent, energy-aware environment across IT and facilities to optimize and adapt energy use, reclaim trapped facility capacity, and reduce energy costs. The HP Data Center Smart Grid collects and communicates thousands of real-time power and cooling measurements across IT systems and facilities to give you insight and control over energy use. This enables more efficient use of existing capacity and capital investments, enabling your organization to support business growth with more applications and services within the same energy footprint.

For the first time, your business can accurately visualize and dynamically control data center energy use and environmental impact across the entire data center to increase power density, efficiency, and capacity use.

Based on HP's unique expertise, which spans system engineering, environmental management, and facility design, the HP Data Center Smart Grid extends Thermal Logic technology from IT systems to environmental monitoring and control across the facility, and eventually to third-party IT and data center systems.

## Key benefits

- Reduces operating costs required to power and cool IT systems
- Improves reliability by optimizing power and cooling efficiency of IT and facilities
- Provides insight and control over energy costs and environmental impact
- Extends the useful lifespan of facilities and other capital investments



## Change the 70/30 spending ratio

Our goal is to help your business devote more of your IT budget to innovation for core business needs and spend less on operations and maintenance.

HP Converged Infrastructure can improve IT productivity and service levels, allowing your administrators to move at the speed of the business. A complex application infrastructure can be up and running in four hours versus several weeks, which is typical today. The HP Converged Infrastructure can improve disaster recovery by 80 percent, and it can fail over in as few as five minutes.

HP Converged Infrastructure can significantly reduce the size of the infrastructure, making it simpler to manage. Networking can be wired once using 75 percent fewer switches and 96 percent fewer cables. The compute infrastructure footprint can be reduced by 70 percent while doubling utilization. This combination of results allows you to triple the capacity of your data center.

This is what we mean by unleashing your potential.

## HP leadership

To build a Converged Infrastructure with the attributes previously described, you need a partner with vast expertise that is guided by the ability to align business applications with IT resources. That describes HP. We are the only company with everything it takes to deliver the full vision of a Converged Infrastructure. We have the intellectual property, open integration, global reach, and expertise to make it happen.

## Intellectual property

To create a Converged Infrastructure, you need a complete, integrated portfolio of servers, storage, networking, management software, and energy optimization—with purposeful IP designed for convergence from the outset. Only HP has the deep-rooted experience, a legacy of proven leadership in all categories that matter, and the investment strategy to bring it forth. Our comprehensive portfolio allows you to integrate and orchestrate your infrastructure—from the desktop to NonStop servers and from your corporate network to the Internet.

## Open integration

HP has a tightly coupled partnering strategy—based on open integration—to deliver a Converged Infrastructure the way you need it. HP has a vast number of partners who leverage our products and services. We have more than 180,000 channel partners worldwide, including major and emerging software and hardware vendors and system integrators. We work closely with these partners to deliver integrated solutions based on open standards. We deliver solutions that work with your existing infrastructure and provide investment protection for the future.

## Expertise

HP expertise has been developed from helping thousands of customers transform to next-generation data center and technology infrastructures through end-to-end strategy, design, architecture, implementation, and management. We have both the proven expertise and in-house resources to deliver your Converged Infrastructure in the best manner to meet your business and IT requirements. Our expertise begins with systems and spans across the entire data center through our acquisition of EDS and EYP Mission Critical Facilities.

With HP Enterprise Services (formerly EDS), we have a strong foundation for delivering outsourced or cloud environments. We manage more than 3 million square feet of data center space for over 1,000 clients. With HP Critical Facility Services (formerly EYP Missions Critical Facilities), we are one of the top companies in the world for planning, designing, and operating the large-scale, mission-critical facilities that can support a Converged Infrastructure. We have designed more than 32 million square feet of data centers.

HP works closely with the leading independent software vendors in the industry to deliver joint solutions for our customers. These offerings demonstrate and document the practical use of HP Converged Infrastructure

technology to deliver an optimized infrastructure for deployment of our partners' software applications. Each offering is tightly integrated and pre-tested, and brings together all the key hardware, software, and services components.

The HP Solutions Infrastructure Practice can help you transform and optimize your complex, multi-vendor technology environments. We employ world-class infrastructure talent who creatively apply HP and partner portfolios.

Using proven HP Services, we can build a Converged Infrastructure on your site; we can deliver it on an outsourcing basis; we can deliver it using cloud technology; or we can deliver a hybrid combination.

## For more information

For additional information, refer to the resources listed below.

Resource description	Web address
HP Converged Infrastructure	<a href="http://www.hp.com/go/ConvergedInfrastructure">www.hp.com/go/ConvergedInfrastructure</a>
HP BladeSystem Matrix	<a href="http://www.hp.com/go/matrix">www.hp.com/go/matrix</a>
HP Solution Demo Portal	<a href="http://www.hp.com/go/solutiondemoportal">www.hp.com/go/solutiondemoportal</a>
To help us improve our documents, please provide feedback at:	<a href="http://www.hp.com/go/ActiveAnswers">www.hp.com/go/ActiveAnswers</a>

To learn more about the HP Converged Infrastructure strategy, portfolio, and architecture, visit: [www.hp.com/go/ConvergedInfrastructure](http://www.hp.com/go/ConvergedInfrastructure)

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## Technology for better business outcomes

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