

# TRANSFORM

*your business by rethinking  
your storage.*

HP Converged Storage: a vision for the next  
era of computing based on modern scale-out  
storage architecture

Business white paper



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## Executive summary

Our world is changing, and Information Technology is becoming more and more integral to how we think, feel, and connect. In 2005, we generated 150 exabytes of digital information. In 2010, this volume was expected to grow more than eightfold to 1200 exabytes.<sup>1</sup> We rely on technology to help us process and manage this data, serving it up in consumable chunks. By 2015, the total worldwide cumulative digital archive capacity is projected to be at 300,000 petabytes.<sup>2</sup> That's a lot of chunks.

As the amount of information we generate grows, and the relationship between people and information grows more complex, enterprises are racing to innovate new products and services to help us harness information, manage it, and tap into it more easily. These new innovations would allow us to connect more simply and effectively, when and how we would like. This paper discusses these dynamics and explains how to leverage technology to better capitalize on information.

## The Instant-On Enterprise and the changing the role of IT

Fundamental shifts in technologies related to mobile, cloud, and ubiquitous computing will continue to influence the role that IT plays in the enterprise and in our lives. Each new era of computing brings new ways to deliver services to enterprises, their customers, and their citizens. For example, the coming decade could see as many as two trillion devices being connected to the internet. Add this to the approximately 5 billion people who will also be connected to the internet, and it's clear that new industries will continue to emerge to meet the need for real-time, immediate services. Everyone wants to be a part of this innovation. The race is on.

In this emerging ecosystem, the Instant-On Enterprise is one with the power to leverage technology to capitalize on information rather than simply adapting to these changes.

Unfortunately, the ability to capitalize on the changing role of IT is complicated due to the fact that a majority of the infrastructure deployed today was designed for the information needs of 20 years ago—when workloads were predictable, data was structured, access needs were limited, and growth was manageable. Since then, while the world has changed, the storage that holds its information has not. At the heart of legacy IT infrastructure are monolithic storage architectures purposely designed to function as siloed, walled off data repositories. As a result, over time they have created their own sprawl. They are inflexible and both difficult and expensive to plan, manage, protect, and optimize.

Outdated technologies, rigid infrastructure, and storage sprawl hamper the ability of enterprises and mid-sized companies to capitalize on emerging applications. Even with new bolt-on features, legacy storage platforms are costly to maintain, complex to manage, and unresponsive to new business requirements.

To be Instant-On, the enterprise must remain focused on innovation, not maintenance. The Instant-On Enterprise must be agile—responding rapidly to changing business and client needs. It must be efficient—achieving better return on investment (ROI), lower costs, and better operational efficiency than its competitors. It must effectively manage risks posed by security threats, regulations, and the unknown.

## From convergence to cloud, one step at a time

The HP approach is in step with the differing needs of today's organizations while helping them build modern storage architectures. Within any IT organization, there are many applications at different stages of maturity. For example, organizations that are just starting to virtualize need to focus on standardization and consolidation to lay the groundwork for delivering IT as a Service (ITaaS) via public or private cloud.

HP Converged Infrastructure provides a standardized, modular architecture for IT that enables you to respond to new customer requirements in the era of the cloud. Converged Infrastructure breaks down rigid IT silos and transforms them into flexible, shared pools of resources with a common management platform. This foundation helps enterprises virtualize infrastructure components to increase utilization and flexibility. This helps to make them resilient enough to support mission-critical applications and enhance business continuity. The end result is open and standards-based orchestration across the data center and the data lifecycle to increase agility—built in a modular way to help scale for future growth.

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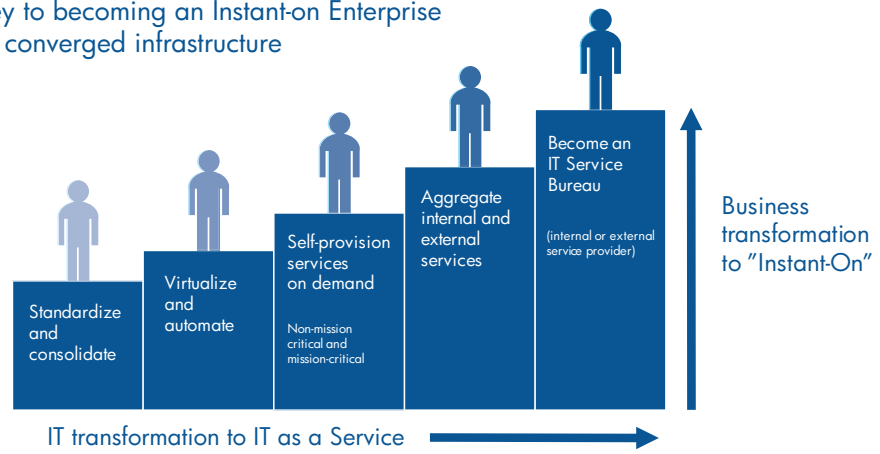
<sup>1</sup> Source: "The data deluge," *The Economist*, 25 February, 2010.

<sup>2</sup> Source: "Digital Archive Market Forecast 2010-2011," Enterprise Strategy Group, 6 July 2010.

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**Figure 1:** Becoming an Instant-On Enterprise

The journey to becoming an Instant-on Enterprise requires a converged infrastructure



By building solutions on modular building blocks, HP stands alone in its ability to offer organizations a common IT foundation to support a range of needs—from Converged Infrastructure to virtualized environments to fully automated private clouds. HP offers a range of solutions that simplify solution adoption. Whatever route an organization takes, it achieves the same overarching benefits.

## Removing traditional storage boundaries

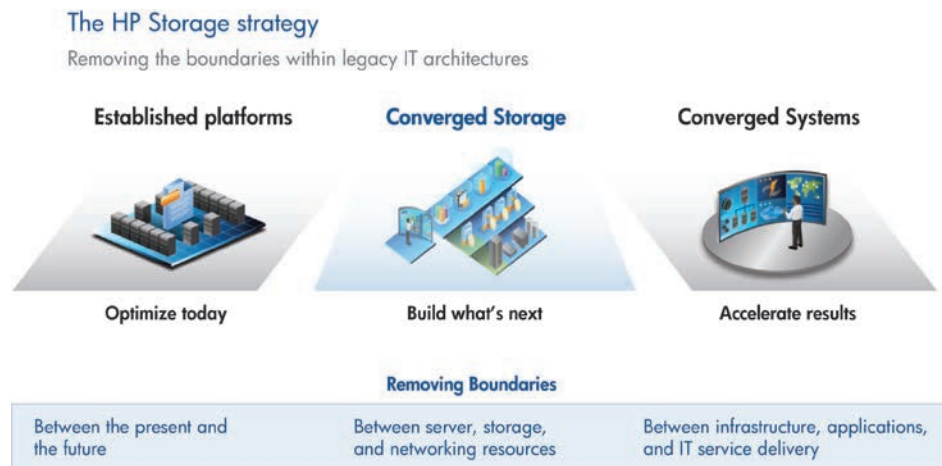
To fuel the journey to the Instant-On Enterprise, HP is bringing together the assets of the entire organization to change the way that our clients build, manage, and migrate technology over time—based on a converged infrastructure foundation.

Fundamental to this transformation is a storage strategy that removes the boundaries within traditional, siloed storage environments. This strategy introduces new efficiencies, building a storage architecture for the era of convergence and offering solutions that simplify deployment and integration.

HP Converged Storage is at the center of this strategy, but the larger storage vision presented by HP brings together multiple elements that help customers to optimize their current environments, build what's next, and accelerate deployment of new applications:

- **Established platforms:** To help bridge the gap between where customers are today and where they want to be in the future, HP is bringing to market new hardware, software, and services designed to improve efficiency and agility of existing storage architectures.
- **Converged Storage:** To enable customers to meet the challenge of explosive data growth while maintaining operational efficiency and simplicity, HP is delivering a next-generation Converged Storage architecture that removes the boundaries between server, storage, and networking resources. HP Converged Storage products are built on modular, standardized platforms, scale-out software, and converged management. They are designed for virtualized and cloud environments.
- **Converged Systems:** To facilitate application integration, virtualized infrastructure, and cloud services, HP is leveraging its investments in server, storage, networking, management, and security to deliver Converged Systems. These solutions range from pre-packaged, turnkey environments, to comprehensive, extensible, global-scale solutions that can even be delivered in turnkey portable data centers or PODs.

**Figure 2:** The HP Storage strategy is to help customers remove the boundaries presented by traditional IT architectures.



# Enhancing established storage environments

With the move to the cloud and “everything as a service” remaining a long-term evolution, transforming operational efficiency and optimizing today’s traditional applications are things that HP can help enterprises do immediately.

Traditional enterprise applications still account for over 70 percent of operational expenses for most businesses.<sup>3</sup> Worldwide email traffic is projected to jump to 507 billion messages per day in 2013—double the 2009 level of 247 billion messages. Over the course of the year, more than 185 trillion email messages will be sent.<sup>4</sup> IT departments are working to improve investments in those traditional deployments while at the same time leveraging both internal and external IT investments, or “hybrid IT”.

To help customers make traditional environments more efficient and agile, HP is investing in the following areas:

- **Platform modernization** such as the recent introduction of the fifth-generation Enterprise Virtual Array (EVA) provide platform upgrades while enabling data centers to maintain existing processes
- **Software innovation** that allows clients to take advantage of advanced data services such as tiering, virtualization, performance management, thin provisioning, and virtualization integration
- **Integrated management** to provide new levels of control, anytime remote access, and integration with third-party management infrastructure
- **Services** to help customers understand their existing environments, assess where they want to go, and help them modernize their IT infrastructures accordingly.

## Modern, scale-out storage architecture

The HP Converged Storage vision focuses on the development of products based on a new architectural blueprint that simplifies how storage is designed, delivered, consumed, and managed—enabling clients to deploy highly available and scalable storage on the same infrastructure that powers their business applications. By fusing scale-out storage software with HP hardware and management software innovation, HP Converged Storage addresses new application requirements and fuels dynamic business models.

This vision presents a new way to build storage infrastructure that addresses complexity of scale. Storage silos are not sustainable. HP Converged Storage is working to remove the bottlenecks and complexities that plague traditional monolithic storage architectures. By providing scale-out SAN, NAS, backup, and deduplication built from a common modular architecture, HP Converged Storage is enabling easier integration with existing storage and networking architectures while eliminating the inefficiencies that make today’s solutions difficult to scale and costly to manage.

HP Converged Storage is ideal for applications such as virtualization, cloud computing, data protection and archiving, and Microsoft® deployments.

### Bridging the gap between rigid storage silos and converged storage architectures

The HP P6000 Enterprise Virtual Array (EVA) has long been an industry leader in simplicity and, as the original virtual storage solution with almost 100,000 units deployed, was ahead of its time in terms of storage efficiency. Innovations to the fifth-generation of the EVA platform continue to bridge the gap between rigid storage silos and converged storage architectures by continuing to deliver enhanced performance, scalability, connectivity, and availability while also delivering new features for both energy and resource efficiency. In addition, the array-based virtualization capabilities of the P6000 EVAs make them the easiest-to-manage mid-range Fibre Channel SANs available today.

Industry-standard hardware and capacity enhancing capabilities enable the new P6000 EVAs to operate at new levels of efficiency and scale. New, modern hardware like low-power, small form-factor (SFF) SAS drives, Fibre Channel over Ethernet (FCoE), and iSCSI as well as advanced data services like thin provisioning and dynamic LUN migration provide new energy and resource efficiencies. Thin provisioning improves capacity utilization by up to 50 percent over and above high utilization that EVA customers already achieve through array-level virtualization.<sup>5</sup> New P6000 EVA systems can scale to 480 TB using large form-factor drives, or use smaller form-factor drives that reduce energy usage by 40 percent<sup>6</sup> and enable 100 percent<sup>7</sup> more enterprise capacity to be deployed in the same rack space versus previous generations of EVA.

<sup>3</sup> Source: “InformationWeek survey 500 executives,” InformationWeek Analytics, 2009.

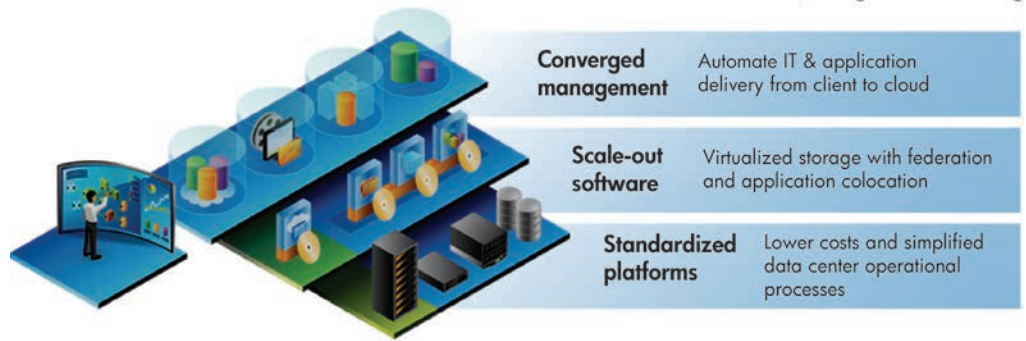
<sup>4</sup> Source: “Email Storage Market,” Radicati Group, 2009-2013.

<sup>5</sup> Source: “Thin provisioning on the HP P6000 EVA,” HP, June 2011.

<sup>6</sup> Source: “Energy efficient P6000 EVA Family,” HP, June 2011.

<sup>7</sup> The new EVAs support small form factor drives while the previous EVA did not. This allows more than twice the number of drives (and therefore capacity) in the same footprint.

**Figure 3:** Removing boundaries between server, storage, and networking resources



Only HP provides innovative solution in all these three areas.

The three foundational elements of HP Converged Storage are:

- **Standardized platforms** built on common, modular hardware and offering common operational processes for data center infrastructure. Common, modular platforms remove the boundaries between server, storage, and networking. Since they are based on leading server technologies from HP, these platforms inherit the management, performance, and power efficiency benefits of HP servers.
- **Scale-out storage software** that delivers a better way to protect data and scale storage solutions over time. Each converged storage platform is built on clustered software architecture and provides a rich set of data services to enable independent scaling of SAN, NAS, and backup resources, along with the potential to bring data and applications closer together.
- **Converged management** that brings together management of server, storage, and networking to simplify processes, automate IT, and allow new application deployment in minutes—from client to cloud.

HP Converged Storage provides non-disruptive scaling of performance and capacity for any data type, storage workload, or capacity point. It is designed to overcome virtualization, cloud, and information management challenges by removing the boundaries between server, storage, networking, and supporting resources. It provides a rich set of data services to enhance availability, performance, and utilization.

## Converged virtual and converged utility storage

To address diverse customer use cases, HP is applying the principles of Converged Storage to two design centers: converged virtual storage and converged utility storage.

**Converged virtual storage** is storage collocated with applications for simplicity and efficiency. Built on the HP ProLiant Server platform, converged virtual storage is designed to help customers save by consolidating onto a common infrastructure to reduce hardware, networking, management, power, and cooling.

- Reduces data center footprint and delivers improved performance and security as a result of co-location within a single HP BladeSystem Chassis, which provides a low latency connection between server and storage resources
- Lowers operational costs through common processes across consolidated server and storage resources
- Simplifies data center operations with HP iLO (Integrated Lights-Out) embedded server management technology
- Reduces energy consumption and cooling requirements for both server and storage resources through built-in sensors and dynamic power management

**Figure 4:** HP Converged Storage platforms

## Modern scale-out architecture designed for virtualization and the cloud



**Converged utility storage** takes advantage of specialized architectures to deliver unique capabilities such as multitenancy, autonomic management, and autonomic storage tiering within a massively scalable, high-performance storage system. These are tier 1 storage platforms built on a clustered architecture designed for large-scale implementations.

- Multitenancy enables the creation of Virtual Private Arrays (VPAs) with advanced workload segregation for massive consolidation capabilities without sacrificing performance
- Autonomic management and storage tiering capabilities balance cost and performance while dramatically reducing administration time.
- Integration with HP Data Center Orchestration Software and HP CloudSystem provides a simplified path to the cloud.
- Storage born for the cloud—designed to boost efficiency in public and private cloud employments.

## Standardized platform innovation

As part of the HP Converged Infrastructure strategy, HP is standardizing its server and storage hardware, leveraging HP-wide innovation to deliver standard platforms that provide the foundation for its server and storage products. In addition to enabling HP to deliver the outstanding storage products to customers, this approach provides the following advantages across server and storage infrastructure:

- Flexible deployment options with a range of form factors (rack, tower, blade, hybrid)
- Easier administration through common management interfaces for remote support and service

- Simplified hardware maintenance via common component leverage with servers
- More visibility to operational metrics (like power and cooling) with a “sea of sensors” for the data center
- Converged networking to reducing cable sprawl and lower costs
- Enhanced performance through storage hardware innovation built on standards (for example, the HP 3PAR Mesh-Active architecture and purpose-built 3PAR ASIC)

## Software innovation—making convergence a reality

According to Terri McClure of the Enterprise Strategy Group, within five years’ time, scale-out storage will make up the majority of data storage systems.<sup>8</sup> To address this demand, HP continues to make a significant investment in scale-out software design as part of the HP Converged Storage strategy.

Monolithic storage architectures are built on the premise that customers buy a storage controller and then scale behind it by additional disk capacity over time. However, this model demands upfront prediction of future storage needs that can lead to over-purchasing of storage capacity and processing capability. As an organization scales beyond a single box, management inefficiency results from the need to manage multiple software instances. This approach can also lead to data migration headaches. These demands are costly, requiring a larger upfront capital expenditure as well as higher operational costs over time.

<sup>8</sup> Source: “Scale-out Storage,” Enterprise Strategy Group, 8 June 2011. <http://www.enterprisestrategygroup.com/2010/06/scale-out-storage/>

<sup>9</sup> Earlier generations of D2D (before June 2010) only support NAS (CIFS) and virtual tape library (VTL) targets.

### Next-gen data protection and deduplication

As part of the HP Converged Storage strategy, HP is transforming data protection with HP StoreOnce, next-generation deduplication systems. HP StoreOnce allows for better management, higher performance, and more efficient data protection while providing IT administrators with a cost-effective way to control unrelenting data growth while maintaining business continuity.

HP StoreOnce is central to the data protection strategy put forth by HP, providing a common deduplication engine that permits movement of deduplicated data across the enterprise. A simple graphical user interface and iLO2 and HP Systems Insight Manager integration offer simplified management and a consistent management interface with industry-standard servers and storage, respectively.

As the HP strategy for data protection and disaster recovery, StoreOnce technology performs the following functions for both data centers and remote offices:

- Removes duplicate data at the block level, permitting more backups to be retained on less storage
- Enables network-efficient replication for cost-effective transmission of data off-site for disaster recovery purposes
- Integrates with ease into the current IT environment by offering the flexibility of both virtual tape library and NAS targets on a single device
- Addresses common customer pain points, including backup windows, recovery objectives, disaster recovery, and remote office data protection

Today all HP StoreOnce Backup Systems feature HP Labs deduplication software for efficient backup and recovery for data centers and remote offices. Using HP StoreOnce, IT or storage administrators can automate and consolidate the backup of multiple servers onto a single, rack-mountable device while improving reliability by reducing errors caused by media handling. HP StoreOnce Backup Systems integrate seamlessly into existing IT environments and offer the flexibility of both NAS (Common Internet File System and Network File System) and Virtual Tape Library (VTL) iSCSI targets.<sup>9</sup>

Due to its modular design, future HP StoreOnce solutions can be extended across a number of different environments and deployments. One of these is as a StoreOnce virtual machine appliance providing flexibility to address environments too small for a dedicated appliance. Another is StoreOnce integrated with HP Data Protector Software, both as a software deduplication target store and as an option to employ deduplication on the client, reducing data sent over the network to the source.

The design of HP StoreOnce enables it to maintain compatibility between these various implementations. This allows customers to mix-and-match StoreOnce solutions, whether hardware versus software, target versus client-side, or remote office versus data center implementation. The end result enables a major step towards simplified information management and flexible data movement across the enterprise.

Unified storage architectures (which combine NAS and SAN into a single system) attempt to provide a degree of consolidation to alleviate this situation. However, they suffer from providing very limited clustering capabilities, limiting the ability to scale performance and capacity together. In addition, unified storage tends to be good for either block-level data or for NAS, but not for both.

HP Converged Storage—with its scale-out storage software interfaces—provides an architecture that can scale independently (from a virtual machine to a cluster) and provides a single storage environment for management across multiple storage controllers or nodes. This helps organizations buy only what they need, when they need it—thereby preserving capital and easing ongoing management and migration costs. In addition, this approach enables co-location of multiple storage types and applications on a common infrastructure.

The development of scale-out interfaces by HP provide a consistent operating environment and data access across file, block, and backup storage to enable performance and capacity to be scaled independently and non-disruptively. By running scale-out storage software on standardized hardware, HP can deliver:

- More predictable operational costs
- Nondisruptive scale with granular workload optimization
- Flexibility to run storage on physical or virtual nodes
- Enhanced data services for file, block, and backup storage, such as:
  - Block storage federation
  - Single, large-scale namespace for file workloads
  - A flexible deduplication architecture

HP believes that clients are best served by a total solution that converges servers, networking, software, and storage rather than just SAN and NAS storage, as is the case with unified storage. HP already offers scale-out DAS, NAS, and SAN with unified management capabilities and unified hardware as part of an overall convergence strategy that runs from the storage infrastructure all the way up to applications.

## Storage federation—data migration made simple

Defined as distributed volume management across self-governing, homogeneous peer systems using native, peer-to-peer communication, in essence, storage federation is no more than the ability to simply, dynamically, and non-disruptively move data and workloads between storage systems.

HP has already introduced storage federation into its Converged Storage portfolio via Peer Motion technology, supported on HP LeftHand P4000 and HP 3PAR Utility Storage. Peer Motion software helps solve two major challenges that today's data centers face: data migration and workload optimization—without adding in layers that complicate the design and future operations of its solutions. With HP Converged Storage, federation is built in, not bolted on.

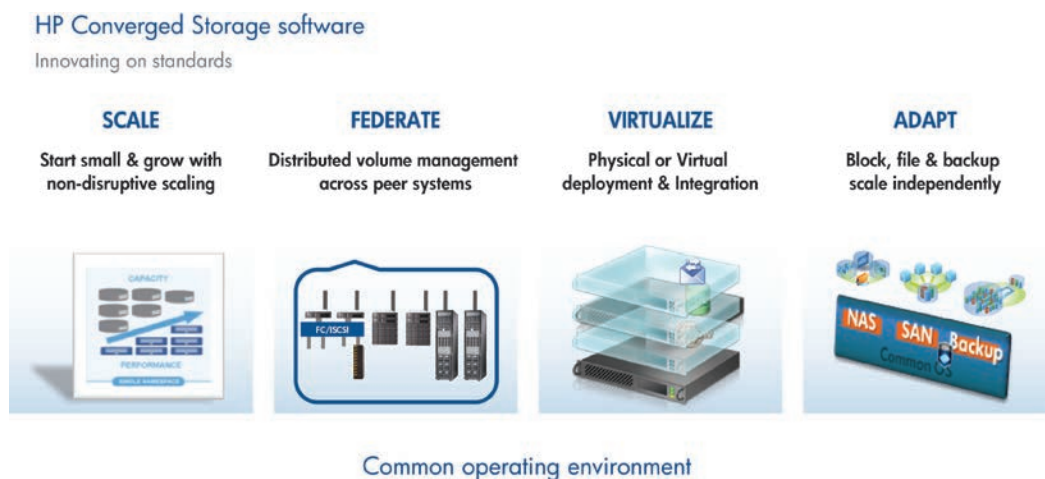
One of the top IT challenges in any new storage purchase or consolidation project is data migration—how to get legacy data from the old infrastructure to the new. With Peer Motion, data can be migrated over from existing HP 3PAR or HP LeftHand systems to a new heterogeneous system without disrupting information access. Peer Motion is also the ideal complement for virtual and cloud data centers, where it enables fluid and dynamic data movement and workload optimization.

With Peer Motion and future enhancements to the storage federation in HP products, customers may be able to non-disruptively and even autonomically move data from highly utilized to underutilized systems—an innovation that can enable utilization to be managed at the data center level rather than that of the individual storage array.

With storage federation, organizations can:

- Respond to unpredictable application storage resource needs by shifting workloads to the appropriate resources at any given time
- Create and maintain persistent storage pools where infrastructure lifecycle changes are non-disruptive, using federated asset management to keep running during upgrades and refreshes
- Extend thin provisioning value and fully utilize arrays for efficient pooling of capacity without being constrained by thin provisioning capacities on an individual array

Figure 5: HP Converged Storage scale-out software—innovating on standards





## Management convergence via orchestration of resources

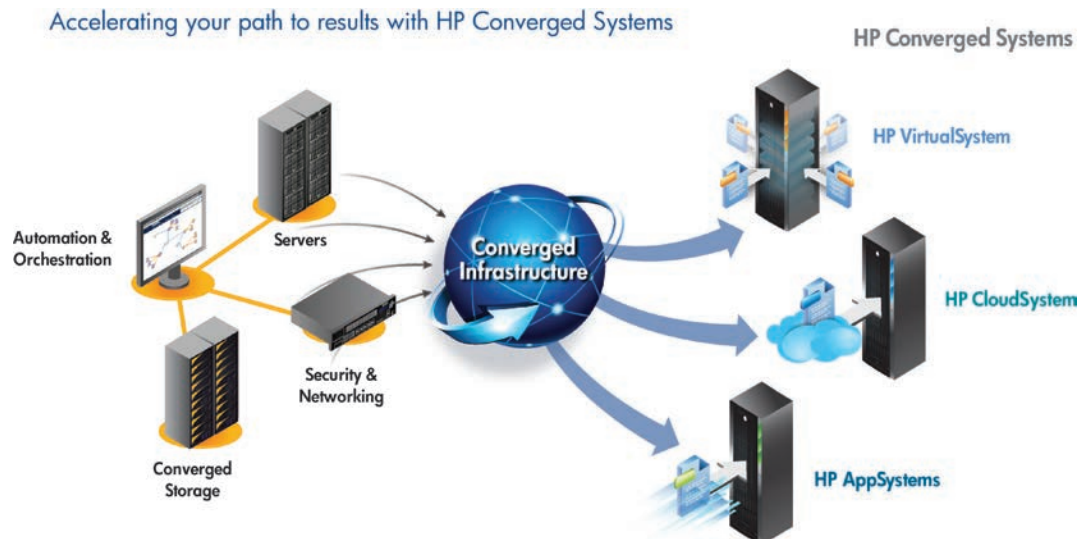
Management is the key to driving operational efficiency. HP Converged Storage enables new levels of management efficiency and automation by converging management of hardware, software, and services as well as plugging in to both HP and third-party management applications. With HP Converged Storage, management is:

- **Integrated**—merging the management of server, storage, and network hardware. Platforms are standardized between servers and storage hardware instrumentation and remote and fault management processes are common. For Converged Storage solutions leveraging the HP BladeSystem architecture, management of networking elements is also simplified. This helps lower the cost of administration for the hardware while preserving traditional roles of the server and storage administrator. Common instrumentation also means that data center operational processes like power and cooling management may be able to be consolidated in the future.
- **Autonomic**—delivering self-management of built-in data services. HP has built self-management capabilities into all Converged Storage products in varying degrees. Automation is a function of enabling the hands-off orchestration of a sequence of events in response to a command. With Converged Storage, HP enables even greater simplicity with autonomic management. Autonomic functions require no user instigation or intervention. They are self-regulating functions in which the storage system monitors itself and then triggers intelligent actions to maintain system

integrity, performance, and availability. Examples are: load balancing after the addition or removal of a storage node and the movement of data to the right tier of storage for improved performance and cost. Over time, the management across platforms for these functions could become more common.

- **Orchestrated**—featuring vertical integration with HP Cloud and data center management. Service-oriented infrastructure provisioning enables new cloud applications to be deployed in minutes. Vertically integrated management removes the boundary between storage and IT service delivery. Tight integration with HP CloudSystem Matrix—made possible by the HP Storage Provisioning Manager for HP Matrix Operating Environment—automates management and provisioning of HP Converged Storage within cloud services deployments. Orchestration of ITaaS speeds deployment and increases control.
- **Open**—compatible with partner software via standards-based development and the availability of plug-ins. Customers frequently request a single pane of glass for management. However, they often want that single pane of glass to be a product they already use. HP Converged Infrastructure makes this possible by delivering tight integration with third-party management software via plug-ins for products like Microsoft® Systems Center and VMware vCenter. In addition, a common management plug-in provides integration for both servers and storage.

Figure 6: Using HP Converged Storage to build new solutions



# HP Converged Systems— accelerating your path to results

HP Converged Storage provides proven standalone storage capabilities, but also acts as the storage foundation for HP Converged Systems. Unlike other approaches that attempt to solve integration and augmentation demands of one type of application environment (for example, virtualization or data warehousing), only HP addresses the complete continuum of application delivery needs across virtual, cloud, and dedicated environments.

HP Converged Systems represents the first portfolio to address the three ways that IT organizations deploy applications today in a common way and with investment protection. It is the industry's first portfolio of preintegrated, pretested, and preimproved infrastructure solutions for applications running in both dedicated and hybrid virtual and cloud environments. These solutions are designed to deliver the fastest time to application value—and time to business success—by simplifying the deployment and enhancement of application environments. HP Converged Systems integrate hardware, software, and services into turnkey solutions that are ready to hit the ground running.

The HP Converged System portfolio includes HP VirtualSystem, HP CloudSystem, and HP AppSystems—all of which are designed for fast, improved application delivery in virtualized, cloud, and dedicated environments.

- **HP VirtualSystem** delivers an enhanced virtual server or virtual client environment. It is designed to take the complexity out of achieving the best performance for virtual workloads, reduce costs and complexity as the environment grows, and to simplify management on an ongoing basis. VirtualSystem also shares the same core hardware architecture as HP CloudSystem, so when customers are ready to expand to a fully automated private or hybrid cloud environment, it's a simple upgrade of the management stack. No changes to the physical architecture are necessary.
- **HP CloudSystem** is all about speeding application delivery through complete automation capability across infrastructure and applications. HP CloudSystem has experienced strong market interest since its launch, ramping quickly with strong interest from both enterprise and service provider customers. This integrated solution uniquely enables organizations to build, automate, and orchestrate services across private clouds, public clouds, and traditional IT environments—without having to know whether those services come from on-premises resources or the public cloud.

In the near future, the cloud will become the ultimate destination for most IT departments. HP CloudSystem delivers the fundamental capabilities required to deliver infrastructure and applications in minutes with a single view of all services across private, public, and hybrid cloud and built-in security, lifecycle management, and heterogeneous support.

- **HP AppSystems** are focused on greater performance, uptime, and SLAs for business-critical applications such as business intelligence, analytics, and collaboration environments. HP AppSystems are dedicated and designed to deliver the best performance for one application or application suite. HP currently offers AppSystems only for a focused group of applications. The uniqueness of AppSystem is that this portfolio is modular to enable each aspect of the business intelligence or collaboration environment to perform a high level.

Benefits of HP Converged System turnkey solutions include:

- Accelerating enterprise agility and innovation through simplifying and expediting the delivery of new applications and services that bring new capabilities
- Realizing faster time to application value and ROI by bringing new applications and services online much faster and with less risk
- Enhancing application service levels and IT systematically and efficiently through a predictable, modular solution built on common architectural, management, and security elements

## Support and services for data center transformation

In addition to Converged Storage systems, HP now offers a completely rearchitected ecosystem of services, financing, and certification programs to help customers transform their storage infrastructure. In conjunction with the HP Converged Storage portfolio, HP offers a comprehensive ecosystem of professional and financial services as well as training and certification programs to help clients modernize their storage infrastructure for technology that is relevant today:

- **HP Technology Consulting Services** help clients optimize traditional infrastructure, protect data, and accelerate the benefits of service-centric IT.
- **HP Enterprise Services** has adopted HP Converged Storage for its clients and added HP 3PAR Utility Storage to its list of managed storage offerings.
- **HP Financial Services** features a special utility financing structure that includes lease and flexible payment options.
- **HP ExpertONE Certification** for storage offer sales and technical professionals access to expertise for turning legacy storage environments into efficient, agile, virtual resource pools based on HP Converged Infrastructure.

## Converged Storage—fueling convergence and the Instant-On Enterprise

The cloud leadership garnered by HP is the result of a long, deliberate journey. While others have been talking about the promises of the cloud, HP has been executing on the vision. While others have been borrowing technologies from various vendors, HP has been integrating its own intellectual property into comprehensive cloud solutions to deliver storage without boundaries.

The value proposition offered by HP encompasses unique HP innovation, partnerships with leading companies in the cloud and application space, a vast partner ecosystem, and end-to-end solution offerings. HP offers the products, solutions, and the ecosystem to make customers and the cloud industry thrive. Scores of customers across web, search, services, and social media have implemented production clouds based on HP Converged Infrastructure. HP currently powers eight of the world's ten most visited websites, three of the most popular social media properties in the US, and four out of the world's five largest search engines.<sup>10</sup> HP also provides storage to seven out of the world's ten largest cloud service providers.<sup>11</sup>

HP Converged Storage simplifies operations with common platform management, remote support, and intelligent power control linked to applications. By fusing scale-out software with converged hardware and integrated management, HP Converged Storage solutions accelerate the ability of clients to capitalize on emerging applications and business models. This approach enhances enterprise agility by addressing the gaps in legacy architectures and delivering automation, flexibility, increased performance, and enhanced insight.

The HP Converged Storage strategy positions us as the technology provider best able to build, deliver, and support infrastructure for virtual and cloud computing. This strategy offers:

- Modern, scale-out storage architectures built for today's IT challenges
- The industry's most complete virtualized storage portfolio aimed at the changes occurring in IT
- A broad storage offering that ranges primary and secondary SAN, entry-level to high-end NAS, and data deduplication for backup and archive
- Global reach, global services, and global support available in 127 countries—offering a breadth of ways to buy and an unmatched global services and support organization

HP Storage gives clients the ability to build data centers that are not only equipped to handle today's challenges, but which provide a foundation for the transformation to becoming an Instant-On Enterprise.

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<sup>10</sup> Source: "[Top sites](#)," Alexa.com, October 2010. According to Alexa.com, October 2010.

<sup>11</sup> Source: "Winter 2010 Managed Hosting Report," Tier1 Research, 2010. HP 3PAR Utility Storage is deployed at 7 out of the top ten global managed service providers.

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To kick-start a technological evolution, break free from the boundaries of traditional storage environments, and embrace converged storage technology that is relevant today, visit [www.hp.com/go/storage](http://www.hp.com/go/storage).



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