

Business white paper

# HP Converged Storage



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Executive summary

Every two years, the data we generate roughly doubles. By 2015, the total worldwide cumulative digital archive capacity is projected to be at 300,000 petabytes.<sup>1</sup> As the amount of information we generate grows, and as our relationship with information grows more complex, the race to innovate new products and services to help us harness information, manage it, and tap into it more easily intensifies. This paper discusses the continuing development of HP’s strategy for delivering Converged Storage that improves the ability of your business to capitalize on information. Building on the foundation provided by fusing industry-standard technologies, federated scale-out software, and converged management, HP is now extending Converged Storage into new solutions and segments with a new initiative that introduces the next evolution of this HP Converged Storage strategy and vision.

The changing role of IT

Every seven to 10 years, technology delivery undergoes a tectonic shift—one that opens up new business and access models. These shifts change the way that technology is consumed and the value that it can bring, and change what is possible by removing inhibitors to innovation. Examples of these shifts are all around us today—mobility, social media, big data, and the advent of cloud computing to name a few. These shifts offer new opportunities for solving our most pressing challenges, including speeding innovation, enhancing agility, and improving financial management. These shifts can unleash the power of IT to not only support but also help shape business.

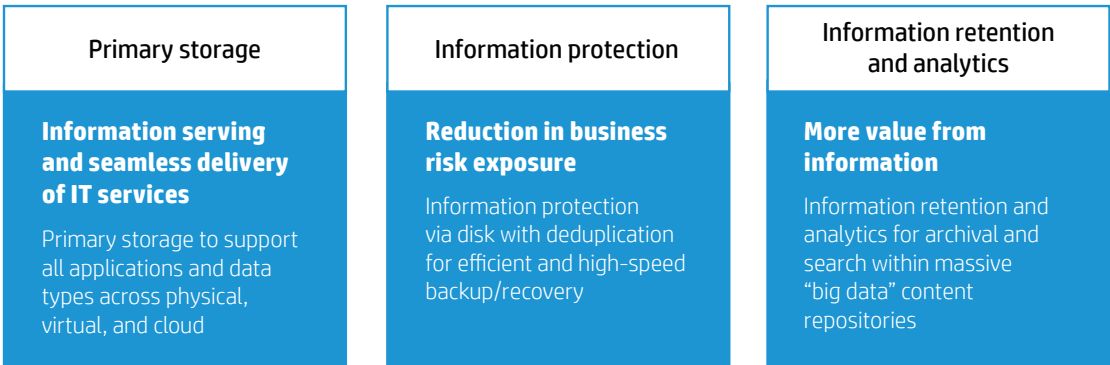
However, these shifts also present challenges. In order to derive the most value out of your IT investment, your business must not only have a strategy in place for coping with the massive data growth that faces today’s IT organizations, but one that allows you to exploit these new technology areas. Within the context of the data center, this means that your data center today needs a lot more from storage than simply serving your data. In fact, your storage requirements are likely to span all three of the following needs (figure 1):

- **Seamless delivery of IT services.**  
Requires the ability to simply and efficiently serve information to support all applications and data types—across physical, virtual, and cloud environments.
- **Reducing business risk exposure.**  
Requires information protection that incorporates efficient deduplication technologies for high-speed backup and recovery.
- **Extracting more value from information.**  
Requires new information retention and analytics capabilities for fast and efficient archiving and searching, particularly within massive “big data” content repositories.

HP is taking agility and efficiency to new levels by addressing all of these needs with storage that can conform to any need at any scale across information serving, protection, retention, and analytics.

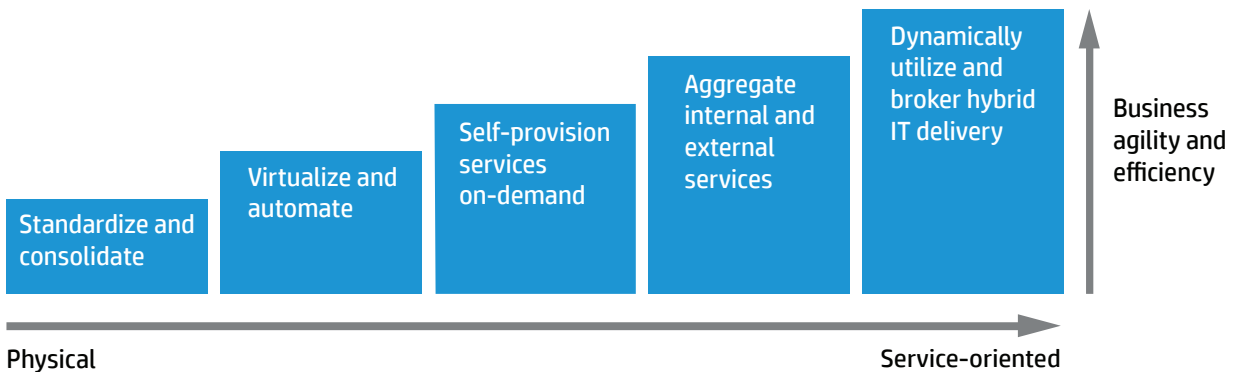
<sup>1</sup> Source: “Digital Archive Market Forecast 2010-2011,” Enterprise Strategy Group, 6 July 2010.

Figure 1  
Today’s data centers need a lot more from storage



**Figure 2**

The progression toward IT as a Service promotes greater agility and efficiency



## Storage silos are not sustainable

While business and storage needs have clearly changed, it's likely that you are relying on legacy storage infrastructure to meet new challenges—and you may not even know it. It's a fact that a majority of the storage systems deployed in data centers today, even those still sold by EMC and NetApp, were originally architected nearly two decades ago.

Back when applications were deployed on physical servers and both performance needs and data growth were predictable, monolithic and dual controller storage architectures were actually designed to function as siloed, walled-off data repositories. These systems are simply not up to the challenges posed by today's unpredictable demands. Outdated technologies, rigid infrastructure, and storage sprawl hamper the ability to capitalize on emerging applications. In the context of today's business, these siloed architectures are not only too inflexible, but they are also both difficult and expensive to plan around, manage, protect, and optimize. Even with new bolt-on features, legacy storage platforms are still costly to maintain, complex to manage, and unresponsive to new business requirements.

Legacy silos have reached a breaking point. In the context of today's business needs, boundaries between traditional classes and categories of storage make information management complex and expensive. Addressing the full breadth of application needs and data types shouldn't require a string of disconnected products.

If your organization is like most, you are contending with a mixture of applications at different stages of maturity. You are also likely to be faced with unstructured data complexity and filer sprawl as you struggle to keep up with unstructured data growth. You probably have multiple storage systems to support Tier 1 applications such as billing and financials as well as general business and productivity applications like Microsoft® Exchange. On top of that, you may even have a few ultra-high performance applications that demand their own low-latency flash storage tier. You might also be using a "cloud tier" for external file sharing or even software-defined storage applications that you've deployed on industry-standard servers.

You probably also rely on a fragmented approach to deduplication, backup, and disaster recovery across all of this information. And, like most organizations, your existing storage is probably massively underutilized.

None of this means you've made bad choices. It's a sign that the storage industry at large hasn't kept up with your needs. As a result, you've been forced to continually make compromises. And now you've come to a point where deploying new storage silos to meet application needs is not the answer. Scale-up and monolithic designs can't meet unpredictable services levels, respond to new application requirements, or help you take advantage of new technology innovations.

## Storage without boundaries

In 2011, HP introduced HP Converged Storage, a set of solutions built on modern storage architectures designed to overcome the limitations of traditional monolithic storage and eliminate storage silos. These solutions were built to address complexity of scale and simplify how storage is delivered, consumed, and managed—enabling you to deploy highly available and scalable storage on the same infrastructure that powers your business applications. This strategy helps organizations like yours meet today's needs while building toward a future in which more and more IT is delivered as a service to promote business agility and efficiency (figure 2).

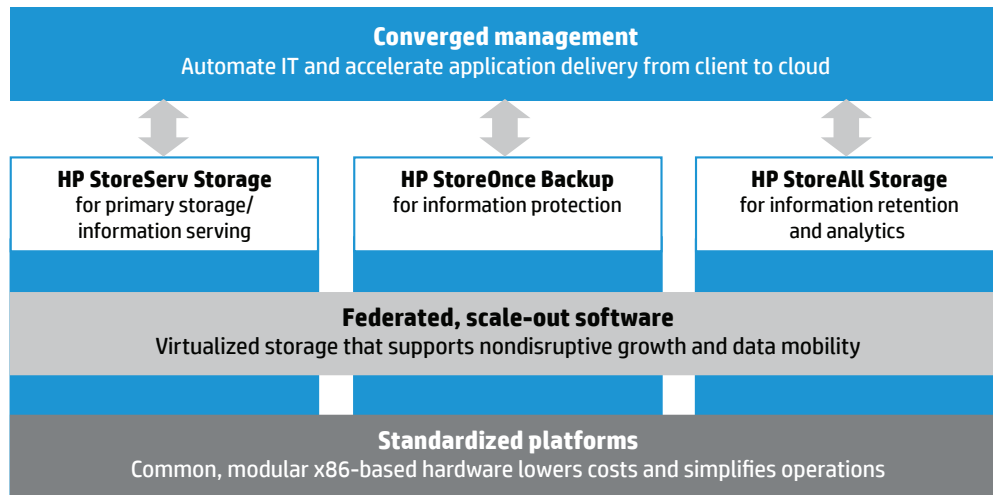
HP Converged Storage provides scale-out block, file, and object data services as well as converged backup, retention, and archiving platforms that are built around a common design center with shared technologies. This innovation helps you respond to unpredictable demands while eliminating the inefficiencies that make today's solutions difficult to scale and costly to manage—made possible through combining the following elements (figure 3):

- **Standardized platforms**

Common, modular x86-based hardware lowers costs and simplifies data center operations by removing the boundaries between servers, storage, and networking. Because they are based on leading server technologies from HP, these platforms inherit the management, performance, and power efficiency benefits of the latest generation of industry-leading HP servers.

**Figure 3**

HP Converged Storage removes boundaries between server, storage, and networking resources



- **Federated, scale-out storage software**

A better way to protect data and scale storage solutions flexibly 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 performance and capacity along with the potential to bring data and applications closer together. Storage federation enables seamless, nondisruptive data mobility between storage systems.

- **Converged management, orchestrated across the stack**

Brings together management of server, storage, and networking to simplify processes, automate IT, and allow new application deployment in minutes—from client to cloud.

By fusing industry-standard technologies, federated scale-out software, and converged management, HP Converged Storage addresses new application requirements and fuels dynamic business models. HP Converged Storage solutions also give you nondisruptive scaling of performance and capacity for any data type, storage workload, or capacity point. They help you overcome virtualization, cloud, and information management (including big data) challenges. Finally, they provide a rich set of data services to enhance availability, performance, and utilization. At the core of this strategy is the use of HP 3PAR StoreServ Storage as an information-serving engine, HP StoreOnce Backup for information protection, HP StoreAll Storage to drive information retention and analytics, and HP StoreVirtual Storage for software-defined storage that can be deployed on standard server building blocks, including those you already own.

## Standardized platform innovation

To provide a hardware foundation for the HP Converged Storage functions of information serving, protection, and retention, HP is standardized across server and storage hardware. By leveraging company-wide innovation to deliver standard platforms that provide the foundation for our server and storage products, HP is not only

able to deliver outstanding storage products, but also unique advantages that no other storage vendor can offer, such as:

- Flexible deployment options including a range of form factors (rack, tower, blade, hybrid) as both physical disk systems and as software-defined storage
- Easier administration through common management interfaces for remote support and service
- Simplified hardware maintenance via common component leverage with servers
- Greater visibility into operational metrics (like power and cooling) with a “sea of sensors” for the data center
- Converged networking to reduce cable sprawl and lower costs
- Enhanced performance through standards-based storage hardware innovation

For information serving and analytics, HP leverages utility storage hardware designed for high performance and multi-tenancy and capacity-oriented hardware for bulk storage applications including information retention and protection.

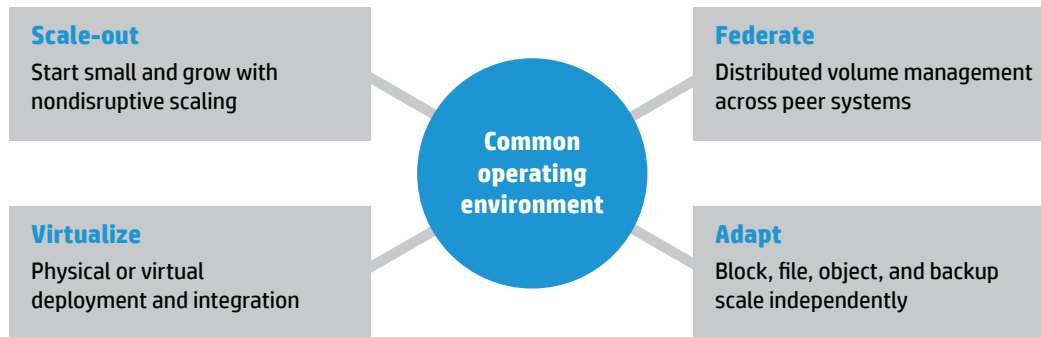
## Federated, scale-out storage software

According to Terri McClure of the Enterprise Strategy Group, within five years, scale-out storage will make up the majority of data storage systems.<sup>2</sup> To address this demand, HP continues to make a significant investment in federated, scale-out software design.

Monolithic storage architectures are built on the premise that you buy a pair of storage controllers with fixed performance capabilities and then scale behind them with additional disk capacity over time. This model demands that you predict your future storage needs up front, which can lead to overpurchasing of storage capacity and processing capability. As you scale beyond a single box, and as

<sup>2</sup> Source: “Scale-out Storage,” Enterprise Strategy Group, 8 June 2011.  
[enterprisestrategygroup.com/2010/06/scale-out-storage/](http://enterprisestrategygroup.com/2010/06/scale-out-storage/)

**Figure 4**  
HP Converged Storage with federated, scale-out software interfaces



you add the need to retain, protect, and extract more value from data, the need to manage multiple software instances for multiple storage tiers leads to management inefficiency. This approach can also lead to data migration headaches. These gotchas are all costly, requiring you to make larger up-front capital expenditures as well as paying higher operational costs over time.

Unified storage architectures, which combine NAS and SAN into a single system, attempt to provide a degree of consolidation to alleviate this situation. However, while they eliminate separate solutions for file and block storage, most still suffer from the core design flaw that comes with dual-controller systems: fixed performance and capacity limits. They also cannot manage complexity at scale, such as the need to instantaneously search billions of files in order to serve analytics or compliance applications.

HP Converged Storage—with its scale-out storage software interfaces (figure 4)—provides a single design center that can scale independently from a virtual machine to a cluster. This provides a single storage environment for management across multiple storage controllers or nodes that are used for information serving as well as backup/protection and retention/analytics. This allows you to buy only what you need, when you need it—thereby preserving capital and easing your ongoing management and migration costs. In addition, this approach enables co-location of multiple storage types and applications on a common infrastructure, so you can meet block, file, and object storage needs at all stages of the data lifecycle.

As an example of this design principle put into practice, HP StoreAll Storage is the world's most scalable storage platform for big data, with support for both file and object storage, up to 16 petabytes of data, and more than a thousand nodes—all under a single namespace managed by a single interface. HP StoreOnce Backup features a scale-out design that eliminates failed backups by removing the opportunity for a single point of failure across nodes, controllers, cache, disks, paths, and power/cooling on HP StoreOnce B6200 Backup Systems.

Building storage federation into HP Converged Storage takes the pain out of data migration and addresses asset utilization at the data center level rather than the system level. 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. HP Peer Motion is an example of storage federation

software that allows you to move data between systems without disrupting information access. It is also the ideal technology complement for virtual and cloud data centers, in which Peer Motion enables fluid and dynamic data movement and workload optimization. Now you can nondisruptively (and, eventually, autonomically) move data from highly utilized to underutilized systems, enabling you to manage asset utilization at the data center level instead of the storage system level.

With its deduplication engine developed by HP Labs, HP StoreOnce Backup offers federated deduplication that can be deployed across the entire storage infrastructure—from virtual machines to enterprise data centers. The use of a common deduplication engine enables the native communication and movement of data across the various systems without “rehydrating” that data. This increases the efficiency of the deduplication process and permits data to be moved from location to location over affordable low-bandwidth links. HP has also moved federated deduplication into software via HP Data Protector software to extend the vision of using a single, consistent deduplication technology throughout the organization.

With primary storage, federation can also be used to extend thin provisioning benefits by increasing utilization beyond system-level thin provisioning. Federation software allows you to buffer across systems, for example, so that growing or runaway volumes can be moved nondisruptively to prevent failures. Together, these capabilities allow you to extend thin provisioning value and asset utilization through efficient pooling of capacity without constraints imposed by thin provisioning capacity limitations on any individual storage system.

By running federated, scale-out storage software on standardized hardware, HP delivers:

- More predictable operational costs
- Nondisruptive scalability 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
  - Federated deduplication

## Management orchestration

Management is your key to driving operational efficiency. HP Converged Storage gives you 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 hardware administration while preserving traditional server and storage administrator roles. Common instrumentation also means that data center operational processes like power and cooling management may be consolidated in the future.

- **Autonomic**

Delivering self-management of built-in data services. Self-management capabilities have been built into all HP Converged Storage products. Automation is a function of enabling the hands-off orchestration of a sequence of events in response to a command. Within our Converged Storage portfolio, HP enables even greater simplicity with management that is *autonomic*, meaning that it requires no user instigation or intervention. Autonomic management introduces self-regulating functions that enable a storage system to monitor itself and trigger intelligent actions to maintain system integrity, performance, and availability as required. Examples include load balancing after the addition or removal of a storage node with HP 3PAR StoreServ and HP StoreAll Storage; the movement of data to the right tier of storage for improved performance and cost savings; data mobility between federated systems; and Autonomic Restart with HP StoreOnce Backup, which adapts to unpredictable failure modes while hiding the intrinsic complexity of that protection from operators and users. Over time, HP plans to grow commonality of management across platforms for these functions, including the aggregation of individual device management into frameworks that are accessible by mobile devices for the notification and remediation of issues from virtually anywhere.

- **Orchestrated**

Featuring vertical integration with HP CloudSystem Matrix software for 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 software 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 Storage makes this possible by delivering tight integration with third-party management software via plug-ins for products like Microsoft Systems Center, VMware vCenter, and Symantec NetBackup. In addition, a common management plug-in provides integration for both servers and storage.

## What's next?

Now we are extending this HP Converged Storage strategy by introducing the evolution toward *polymorphic* designs. These designs represent the development of revolutionary and fundamentally open storage that is capable of conforming to any need at any scale across information serving, protection, retention, and analytics.

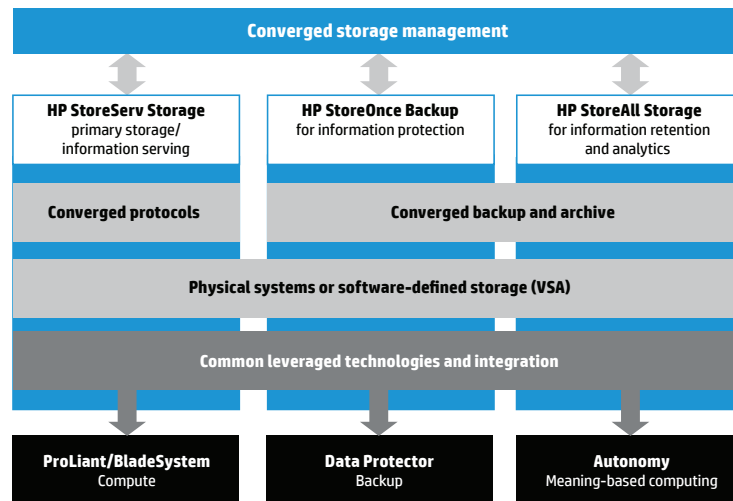
By introducing a single design center for delivering common data services, autonomic management, and integrated orchestration (figure 5), HP is promoting a vision for enabling storage technologies to be shared across solution sets—including information serving, protection, retention, and analytics—to improve asset utilization, lower costs, and speed return on investment.

To achieve this vision, HP is investing in a multi-year, multi-million dollar initiative to:

- **Converge file, block, and object protocols** to enable any data from any platform, thus simplifying application deployment and eliminating application-specific storage silos. For example, HP 3PAR StoreServ Storage supports native block access and file gateways today and is being extended to support file, block, and object storage managed within a single system. With this strategy, HP is committed to delivering total solutions that converge servers, networking, software, and storage, and address the needs of information serving, protection, retention, and analytics—not just SAN and NAS, as is common with unified storage.
- **Move data and applications closer together** to improve performance and simplify data mobility across compute and storage resources. Examples of this include the extension of HP StoreOnce deduplication into application servers and backup applications (such as HP Data Protector software) with the StoreOnce Catalyst API and custom metadata integration between HP StoreAll Express Query and the Autonomy IDOL information management platform.
- **Optimize performance with SSD/NVM technologies** integrated into current products to eliminate additional storage silos, thereby improving utilization and speeding applications. One example of this is the development of collaborative caching between HP 3PAR StoreServ Storage and high-speed flash cache on HP ProLiant servers. HP has also committed to deliver an all SSD, flash-optimized disk array built on the 3PAR StoreServ platform to bring extreme performance and low-latency solutions to this family of federated storage products.
- **Enable data mobility** within systems, between systems, and to the cloud to improve agility and efficiency via load balancing, infrastructure refresh, and cost containment. Examples of this include storage federation between systems as well as “cloud on-ramp” capabilities that enable storage tiering beyond a physical data center.



**Figure 5**  
A single design center for HP Converged Storage



- **Eliminate management silos** with aggregation and orchestration that allows you to shift valuable resources away from operations to focus more on innovation. An example of this is the “mashup” aggregation of individual storage element managers and proactive notification and issue mitigation. This single management interface would extend across primary storage, data protection, and retention/analytics.

What does this mean for you? It means that with HP Converged Storage, you’re one step closer to *effortless simplicity*: one system to deploy, learn, and manage—for snapshots, tiering, replication, and management. It means *seamless efficiency*: deploy one system to serve all workloads; eliminate application-based tiering; shrink your storage footprint. It means *limitless agility*: master the unpredictable with nondisruptive data mobility; deploy new applications more rapidly; respond more quickly to changing business demands. It means a new era, not just for your IT infrastructure, but also your business.

## Support and services for data center transformation

To support HP Converged Storage, HP offers a completely re-architected ecosystem of services, financing, and certification programs that help you transform your storage infrastructure. In conjunction with the HP Converged Storage portfolio, we offer a

comprehensive ecosystem of professional and financial services as well as training and certification programs to help you modernize your storage infrastructure for technology that is relevant today:

- HP Technology Consulting Services can help you drive and deliver business value from IT with the know-how to make technology work for you.
- HP Enterprise Services has adopted HP Converged Storage for clients and includes HP 3PAR StoreServ Storage on its list of managed storage offerings.
- HP Financial Services feature a special utility financing structure that includes lease and flexible payment options.
- HP ExpertOne Certification for storage offers sales and technical professionals access to expertise for turning legacy storage environments into efficient, agile, virtual resource pools based on HP Converged Infrastructure.
- HP Converged Systems integrate hardware, software, and services into turnkey solutions that are ready to hit the ground running.

## For more information

Learn more about storage for the next era of IT, see what industry experts have to say, and get in on the discussion by going to: [hp.com/storage/nextera](http://hp.com/storage/nextera)

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