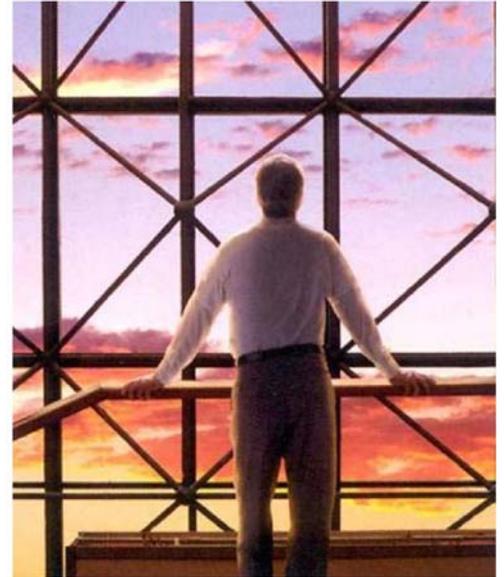# HP StorageWorks Grid

Putting information to work

The new dimension

Digital information is growing at almost implausible rates as each one of us leaves an ever-increasing digital footprint every day of our lives. Businesses capture massive volumes of data that must be protected and made readily accessible to users, customers, and suppliers. Just keeping up with these demands can be a challenge for many organizations.

But there is a new dimension emerging—the requirement to **put information to work real-time** in the face of **unpredictable change.** Change is no longer just a constant; it is a volatile, irregular phenomenon that strikes seemingly at random. A global corporation can make over 500,000 changes a week to its information technology (IT) in response to business decisions, and that is not counting major actions such as mergers and acquisitions.

Businesses must adapt to this new dimension to survive. You need an **adaptive enterprise,** where business and IT are synchronized to capitalize on change—one where you can be successful at the tricky balancing act of maximizing return while minimizing risk and increasing agility while improving performance. The HP Adaptive Enterprise enables you to embrace change as an opportunity, rather than a burden.

Information must become an asset to a business, not simply a cost. An adaptive enterprise requires storage resources that can be dynamically deployed simply by pushing a button and reallocated to deliver different services when needed, reliably, time after time, with your resources growing to fit business needs—scaling up and out at the same time with ease, speed, and economy. The emerging new dimension requires that information be delivered as a real-time service to an adaptive enterprise.

HP StorageWorks Grid—The next key step

HP is introducing new innovative storage technologies that will form the **HP StorageWorks Grid**—a revolutionary thought on an evolutionary path toward the HP Adaptive Enterprise.

HP pioneered the shift in the late 1990s from direct attach storage to network storage and forever changed the economics and effectiveness of IT. This shift transformed storage from a peripheral device to a shared IT resource and brought new levels of efficiency, scalability, and availability. HP pioneered storage area networks (SANs) as the basis for consolidating storage for heterogeneous servers. Over time, this vision has expanded to include comprehensive management that leveraged broad storage virtualization capabilities and the unification of network attached storage (NAS) and SAN networks. More recently, HP StorageWorks SANs continue to evolve with new tiered storage disk media (Serial ATA [SATA] and Fibre ATA [FATA] disk drives), increasingly simplified management, greater scalability, broader availability options, and advanced managed capabilities including Information Lifecycle Management (ILM). However, all of these are only part of the story.

As today's market leader in network storage, HP is once again leading the next big shift in the industry with the HP StorageWorks Grid. This architecture will radically change the way storage is developed, deployed, and managed. It will drive the shift from managing IT resources to leveraging real-time information services. HP is now extending the foundation of network storage with the HP StorageWorks Grid (see Figure 1). The HP StorageWorks Grid is a new technology paradigm that pushes the boundaries of scalability and efficiency to new levels.

The HP StorageWorks Grid is a collaborative infrastructure of standard, modular building blocks called "smart cells," which provides real-time provisioning, deployment, and redeployment of new and existing information services. Each "cell" can be allocated specific traits that enable it to provide specialized capabilities or information services, such as policy and reporting, block or file serving, archiving and retrieval, or auditing and antivirus services, among others. The conglomeration of smart cells will be managed as a single, highly available system that can scale massively and dynamically. Possibly the most significant feature of smart cells is their ability to be changed to deliver different types of services as the business needs dictate. These highly adaptive features will make the HP StorageWorks Grid a key component of the HP Adaptive Enterprise.

Figure 1. HP StorageWorks Grid—The enabler of new information services for an adaptive enterprise
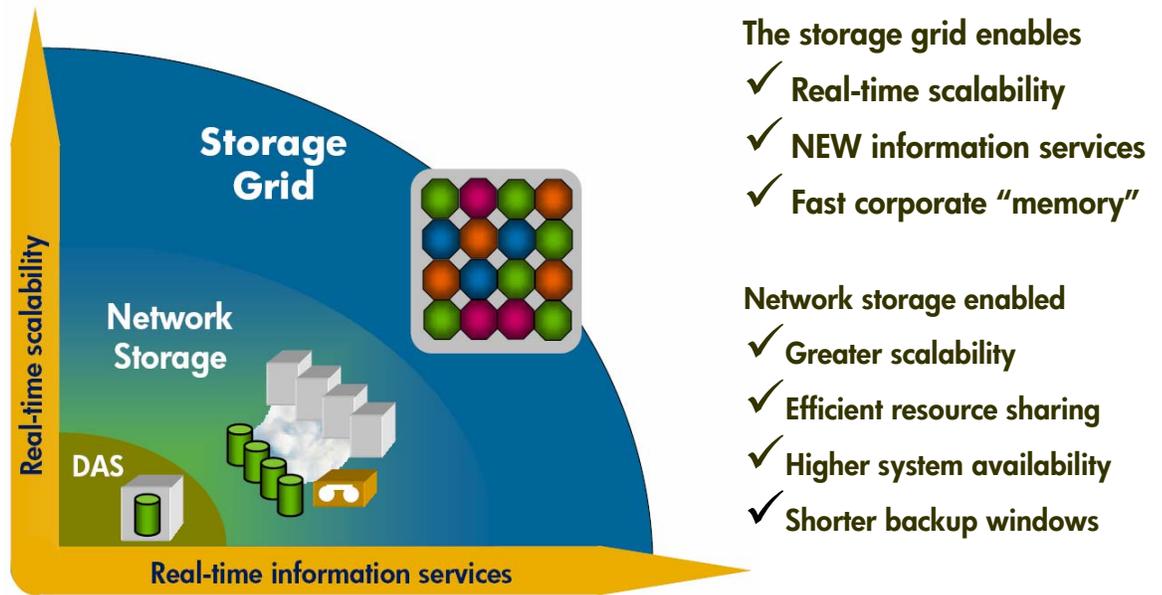
HP StorageWorks Grid—Benefits across the enterprise

Driving this shift towards the HP StorageWorks Grid are the more demanding needs of today's customers—for example, health care providers who must cost effectively store and manage billions of digital client records and images; manufacturers who must adapt their ERP systems in real-time to the unpredictable demands of their downstream distribution channels; and financial services firms that must be able to search and find that one e-mail in a billion on a moment's notice.

The HP StorageWorks Grid is a highly efficient, cost-effective mechanism to deliver storage. It provides a unified environment, consisting of one or more storage fabrics, that meets all needs, including block and file serving, backup, and document archiving. The HP StorageWorks Grid is designed to scale from small to very large—to scale up and scale out. The storage environment is designed as a complete system that contains all necessary components—while still accommodating third-party storage components. This design frees the customer of many of today's IT chores.

The HP StorageWorks Grid will deliver substantial benefits across the enterprise. The HP StorageWorks Grid will provide a business:

• **Growth without limits**—Eliminate real and artificial barriers to change so you can grow your IT on a real-time basis according to business needs.

- **Change without chaos**—Drive change to quickly adapt to business fluctuations and exploit new opportunities. Focus on your business rather than on managing your IT.
- **Simplicity without compromise**—Radically change the cost structure and manageability of IT without compromising your customers, your budget, your people, or your business.

Figure 2. HP StorageWorks Grid—Putting information to work
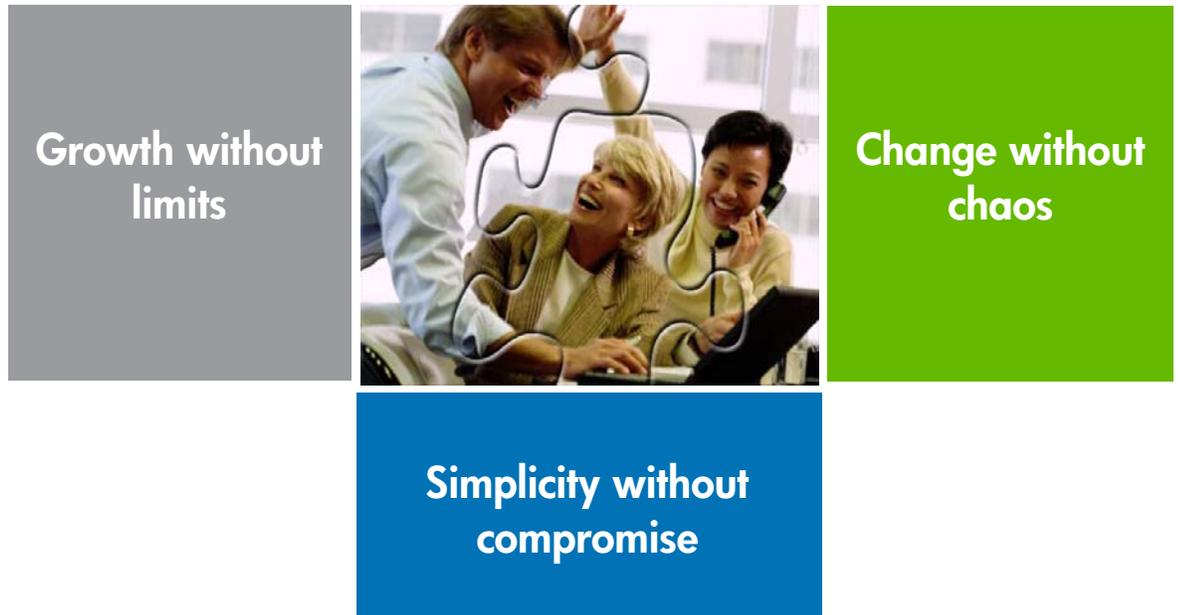
Growth without limits

HP strives to help you manage storage acquisition, deployment, and operation costs. To that end, HP StorageWorks has historically provided a "grow as you need to" scalable approach. With traditional arrays, you are afforded capacity scalability as the number of disks increases with business need. However, the drawback to this approach across the industry has always been over-acquisition of storage and limited ability to scale storage processing capacity along with storage capacity.

Figure 3. Cost of growth: traditional array compared to the HP StorageWorks Grid
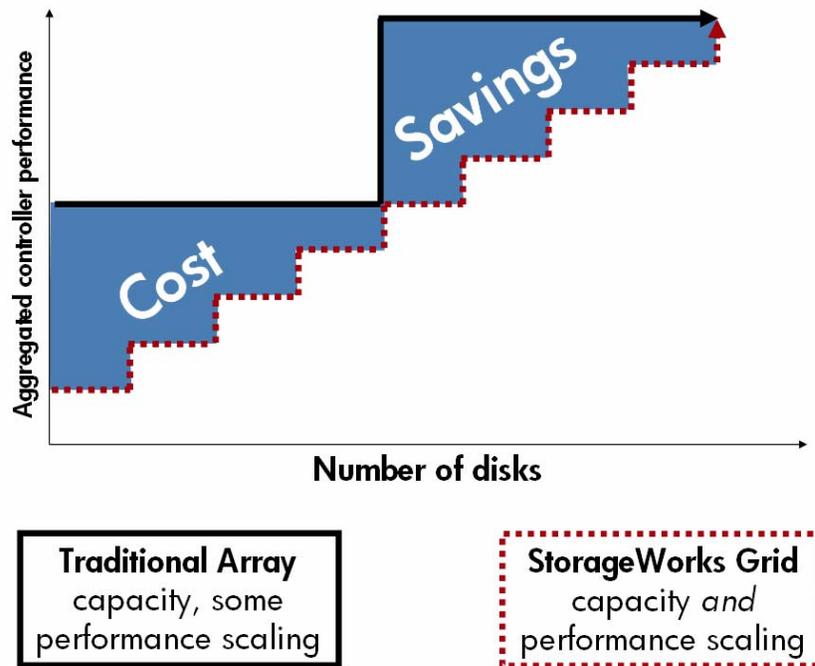
As can be seen in Figure 3, the inefficiency of this historical approach to scaling can result in a significant cost because you often purchased processing and capacity resources well before needed. By contrast, with the HP StorageWorks Grid approach, smart cells containing both processing and capacity resources allow for a much more granular scaling process. The result is cost savings and efficiency as a business grows.

With an eye toward containing cost, the HP StorageWorks Grid is based on high-volume, commodity hardware that is integrated by HP in inventive ways. In addition, data will be packed more efficiently than with traditional storage systems—with the potential to significantly lower the cost of storage by significantly increasing the "information packing density" in the storage ecosystem.

Although HP intends to offer very complete features and capabilities in the HP StorageWorks Grid, it is understandable that businesses prefer the flexibility to choose components from multiple vendors. Therefore, the HP StorageWorks Grid is standards-based and designed to incorporate existing HP StorageWorks storage systems and accommodate multivendor storage offerings.

To protect existing investments, the HP StorageWorks Grid will be compatible with existing network storage installations. Ultimately, this will be achieved in two ways. Initially, a new HP StorageWorks Grid can be deployed alongside an existing SAN and bridged through a common switch port. Later, for greater integration, a special smart cell, which will function like an array controller aggregator and network adapter, will be provided.

CIOs, and administrators as well, will appreciate the ability of the HP StorageWorks Grid to meet service level agreements (SLAs) at the right cost point. The result is much more efficient utilization of all storage assets and better matching of storage cost with application needs.

In summary, the HP StorageWorks Grid provides growth without limits through:

- Simple growth—The HP StorageWorks Grid is architected as a single system based on a common hardware platform. Its capabilities can be easily expanded as needed, without concern for individual component compatibility. In addition, firmware and other upgrades can be rolled back easily if needed. This is a significant departure from the traditional approach of having a range of common platforms sized to do a variety of tasks.
- Pay-as-you-grow scalability—The HP StorageWorks Grid can be expanded as needed, and new technologies are easily incorporated as they become available.
- Investment protection—The HP StorageWorks Grid can exploit existing HP StorageWorks investments and can be added to existing environments as desired.
- Standardization—The HP approach is strongly standards-based to reduce overall cost. The philosophy of HP is to work closely with other vendors when possible.
- SLAs at the right cost point—The HP StorageWorks Grid is highly available yet focused on controlling costs.

Change without chaos

In the HP StorageWorks Grid, business users will experience greater business agility than they ever imagined. The HP StorageWorks Grid is architected for change and will adapt to real-time business needs. By transforming the way information is not only accessed but used, the HP StorageWorks Grid will enable businesses to improve business processes, accelerate time to market, and drive change for competitive advantage.

The HP StorageWorks Grid will provide a dynamically changeable platform in which smart cells can be quickly redeployed. With standard hardware and numerous software downloadable traits, common smart cells can be specialized for differing tasks to meet business need. For example, if a business is launching a new application that required greater IT resources for file serving, excess block serving smart cells could be quickly repurposed with file capabilities.

Today, many users wrestle with two key issues: finding their documents or other data and retrieving them. Information retrieval begins with reliably gaining access to the media on which the information resides—the media must be available when needed, and the user must be authorized to access it. The data must also be available in its intended form, protected against infection by viruses and other corrupting mechanisms. When the ability to access the information is assured, the ability to find it comes into play. Thus, powerful search and retrieval mechanisms are needed. The HP StorageWorks Grid delivers this simple searching.

Real-time information sharing across networks and with third parties, such as customers, suppliers, or subsidiaries, is made simpler. Today's emerging document management services will be augmented with advanced capabilities. Information searching and retrieval will be made easier than ever before.

Documents that require immutability are made tamper-proof, and all others can leverage notification features that let users know when documents are added, deleted, or modified. Other capabilities will include automatic document classification and validation, retention management by way of

policy-driven retention periods being attached to documents, and time travel, whereby users can roll back a document to any point in its history.

Finally, legal compliance is increasingly a consideration for many businesses. The evolving HP storage environment has content management features that allow information to be managed throughout its life cycle—including retention management that provides for safe archival storage of information that must be retained and secure purging of information that requires deletion. The system can also ensure content immutability for retained items.

The HP StorageWorks Grid incorporates powerful content management features that deliver fast, simple information retrieval. The system includes a resilient rollback mechanism that effectively provides versioning for user documents.

In summary, the HP StorageWorks Grid provides change without chaos through:

- Rapid redeployment of storage resources to meet business need
- Content management features that ensure easy, reliable, rapid access to information
- Vastly simplified recovery of previous versions of documents—a capability that is almost nonexistent with conventional storage systems
- Significantly reduced risk of data corruption from virus and other attacks
- Higher service levels that translate into better and more reliable response times, higher productivity, and lower frustration levels
- Simplified compliance with regulatory requirements—a flexible architecture able to meet current and future regulations

Simplicity without compromise

IT administrators will enjoy a new level of simplicity with the removal of operational tasks and fewer logical devices to manage. The HP StorageWorks Grid is designed from the ground up to perform intelligent, automatic self-configuration under policies set by the administrator. Numerous manual processes will be eliminated, and time can be spent on more value-added tasks. The service level needs of applications are met through the combination of policy management and sophisticated algorithms that automatically determine the optimal placement of data (both on media and geographically) and ensure a path between the applications and their data.

Deployment of new capacity and services is made simpler because the HP StorageWorks Grid is constructed from standard "building blocks" that can be dynamically and flexibly scaled to a massive degree. These standard building blocks will drastically flatten the steep learning curves typically encountered when deploying a new system.

Today, system administrators wrestle with many dimensions of complexity. They must deal with numerous objects—disk arrays, tape libraries, switches, servers, applications, users, and data containers (logical disks used by applications, file systems, tape cartridges, optical disks, and other objects). Because the HP StorageWorks Grid is designed as a single system with only a single system image to manage, this administrative morass is eliminated. The single system image also provides for non-disruptive growth and other upgrades.

Because of its high level of automation and fundamentally simplified architecture, the HP StorageWorks Grid removes many operational tasks that traditionally have been performed manually. For example, the system can be implemented with higher levels of automation, established by administrators, which include self-configuration and automatic storage provisioning to applications and users on-demand. Data resilience and data placement are

automatic. These and other capabilities result in significantly less manual administrative effort while delivering higher reliability. Because the system attends to mundane tasks automatically, administrators can focus on application requirements, which integrate IT much more closely with the business and applications powering it than is possible today.

Finally, the HP StorageWorks Grid offers dynamic scalability for non-disruptive growth and upgrades where the system automatically reconfigures itself in response to the addition or removal of bricks. However small or large the system is in terms of the number of smart cells, a single system image enables you to manage just one resource, not thousands. Also, heterogeneous support is inherent to the system, including support for legacy devices.

In summary, the HP StorageWorks Grid provides simplicity without compromise through:

- Simplicity—Easy initial deployment, easy growth, and high levels of autonomic management exist within the storage ecosystem.
- Vastly simplified management—Each HP StorageWorks Grid is a single entity that is highly automated and self-managing. Resilience is built-in; the system is self-configuring and self-provisioning.
- Significantly higher availability and more consistent data delivery—The HP StorageWorks Grid features automatic data resilience, and data is transparently migrated among storage devices to comply with application SLAs.
- Simple growth—The HP StorageWorks Grid is architected as a single system based on a common hardware platform. Its capabilities can be easily expanded as needed, without concern for individual component compatibility. In addition, firmware and other upgrades can be rolled back easily if needed. This is a significant departure from the traditional approach of having a range of common platforms sized to do a variety of tasks.

Making the HP StorageWorks Grid real

Today, HP is delivering elements of the HP StorageWorks Grid and will evolve its capabilities over time. In May 2004, HP announced the first instantiation of smart cell technology with the HP StorageWorks Reference Information Storage System (RISS). RISS comprises a grid of smart cells loaded with index, search, retrieval, and other services used for ILM for the archiving and retrieval of e-mail and office documents. RISS will find that one e-mail out of a billion, and it offers many of the common attributes of the HP StorageWorks Grid—indexing and searching, standard building blocks, single system image, and pay-as-you-grow scalability.

The HP StorageWorks Scalable File Share (SFS) delivers new scalable file services utilizing a smart cell architecture and a massive single file system image. Through implementing the HP StorageWorks Grid architecture, SFS can provide a high performance file system leveraging common storage hardware technology.

And most recently, the new HP StorageWorks XP12000 Disk Array is delivering massive scalability across external devices and the ability to manage all the devices as a single system image—two key attributes of the HP StorageWorks Grid.

Only HP has the vision, capability, and technologies—both those being delivered today and those currently in the labs—to get you simply and easily to the HP Adaptive Enterprise.

The HP StorageWorks Grid, built from high-tech smart cell technology, will enable real-time information usage and adaptability to change. By evolving from your existing infrastructure, the HP StorageWorks Grid delivers lower cost as you to leverage past and present network storage investments. And the best customer experience is gained by the unprecedented administrative simplicity enabled by an adaptive enterprise.

For more information

- Visit http://www.hp.com/storage/storagegrid.
- Access HP StorageWorks product information at http://www.hp.com/go/StorageWorks.
- Access the HP StorageWorks Grid technical white paper at http://www.hp.com/storage/storagegrid.
- You can also e-mail your comments and questions to storagegrid@hp.com.

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