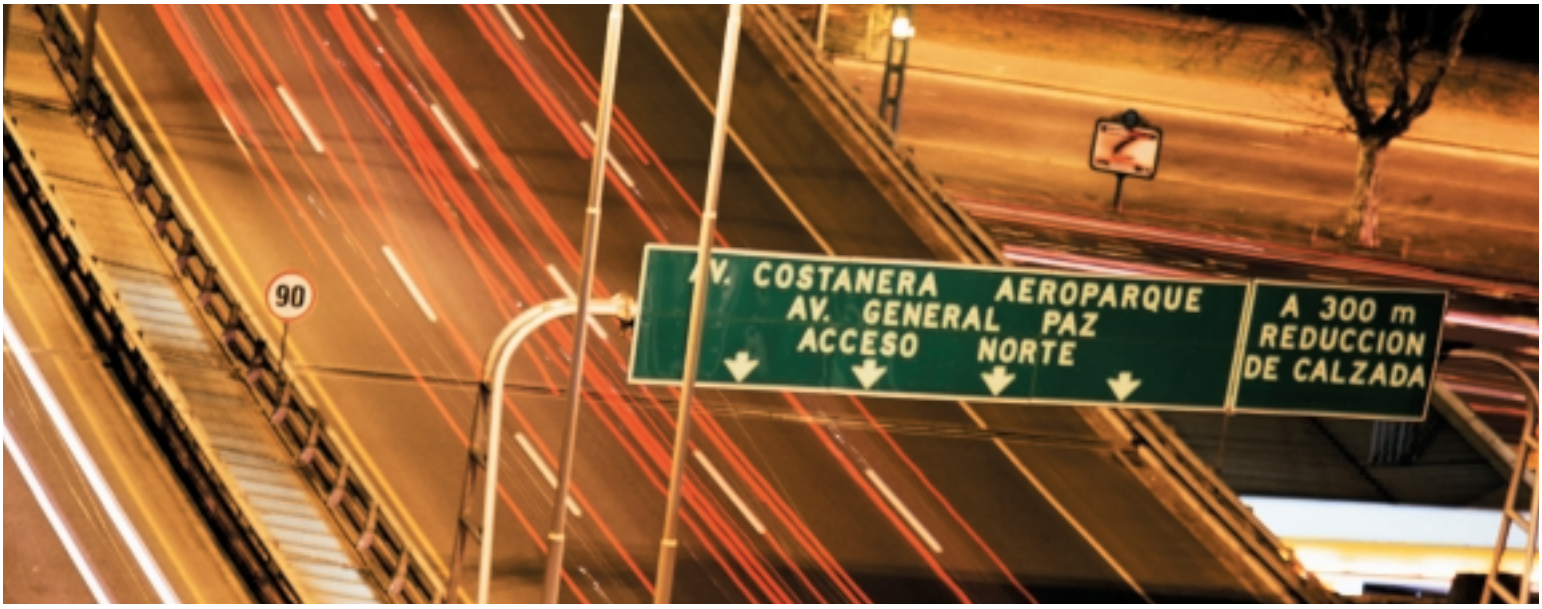
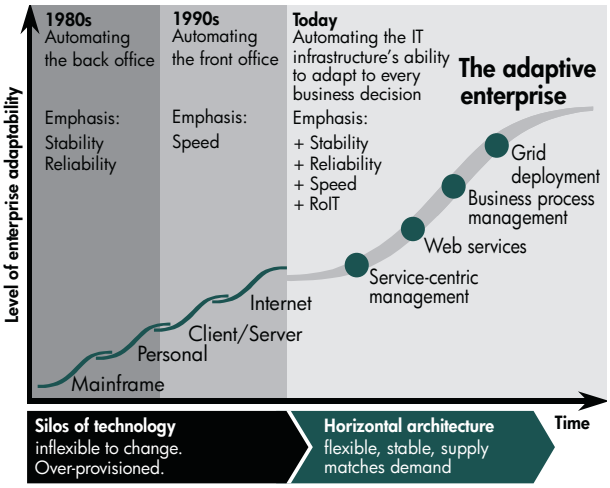
HP StorageWorks Modular Smart Array Family

Simple, reliable and cost-effective storage solutions

invent



The role of IT in building an adaptive enterprise



In the quest to automate the back office, the emphasis in the 1980s was to ensure IT offered rock-solid stability and reliability. In the 1990s, the emphasis turned to speed, as companies began automating the front office—all the way out to partners and customers. Today, companies must create an adaptive enterprise, one that is both stable/reliable and fast/flexible, while also providing a superior return on IT investment.

Proven innovation—HP's adaptive enterprise vision

In today's interconnected world, technology is a powerful asset that allows you to increase productivity, efficiency, availability, and performance. Ultimately, technology is the entrance to new markets and higher revenue. HP offers you proven innovation to help your business thrive. We deliver more: simple, reliable technology that adapts to your changing business environment while protecting your IT investments. And, in our pursuit of excellence, we offer the HP adaptive enterprise vision—an integrated approach to designing, implementing, measuring, monitoring and operating IT with 100 percent quality and reliability for a superior return on your IT investment.

Optimizing storage for an adaptive IT infrastructure

HP recognizes storage is at the foundation of an adaptive IT infrastructure, a safeguard for business information. To achieve the full impact of storage on your business you must optimize its attributes. Enter the HP StorageWorks Modular Smart Array (MSA) family, a product family leveraging our award-winning Smart Array technology. Built on industry standards to ensure compatibility, ease-of-use, and affordability this advanced family of products and services allows you to deploy reliable solutions today, while enabling future growth and change. The MSA family is comprised of five products, the Modular Smart Array 1500 controller shelf (MSA1500), the Modular Smart Array 1000 (MSA1000), the Modular Smart Array 500 (MSA500 G2), the Modular Smart Array 30 (MSA30), and the Modular Smart Array 20 (MSA20). Enhancing the MSA family are the HP ProLiant packaged clusters with Modular Smart Array. These products bring powerful, high-end storage capabilities and benefits to the mainstream, while maintaining the simplicity and affordability of traditional direct attach storage (DAS).

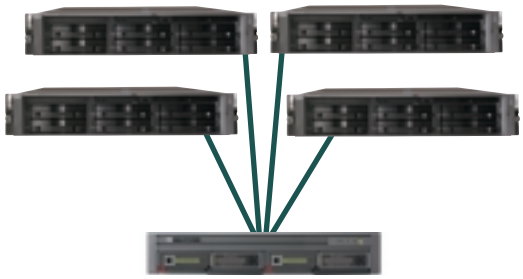
HP StorageWorks Modular Smart Array sample configurations

MSA20 connected to HP ProLiant DL380 server via SCSI

MSA30 connected to HP ProLiant DL380 server via SCSI

MSA500 G2 connected to two HP ProLiant DL380 servers via SCSI with multi-path I/O option

MSA1000 connected to four HP ProLiant DL380 servers via a Fibre Channel switch with Selective Storage Presentation



MSA1500 connected to four HP ProLiant DL380 servers via Fibre Channel SAN attached 2U controller shelf with Selective Storage Presentation

HP StorageWorks MSA products are optimized for HP ProLiant servers, combining the performance and simplicity of Smart Array with the scalability and efficiency of a network. The MSA500 G2 and MSA1000 are available in prepackaged cluster kits that include HP ProLiant DL380 servers, providing maximum integration and simplified deployment. They are also available as part of HP ProLiant family clusters.

HP StorageWorks Modular Smart Array products: simple, reliable and cost-effective

HP knows you must adapt quickly to growth and accomplish IT change seamlessly using simple, reliable, and cost-effective technologies. Customers benefit when applications, servers, storage, software, and services combine to meet IT's need for simplicity, superior reliability, and lowest cost to purchase and own. HP's broad range of product and solution offerings reflect our ability to meet stringent IT requirements, and make companies more efficient, profitable, and competitive. The HP StorageWorks MSA family adapts to changing environments improving the way you do business. This progressive approach streamlines operational expenses through reduced management costs, improved storage efficiency and reduced deployment times. Based on industry-leading Smart Array technology, the MSA family allows you to "hot add" drives, servers and disk enclosures, enabling significant operational savings over traditional DAS, while maintaining the affordability and simplicity of Smart Array. The MSA family leads the industry with capability for seamless migration with DAS to SAN (DtS), allowing storage scalability and adaptability to your ever growing storage requirements. HP now provides comprehensive, affordable packages for the MSA family reducing ordering complexity by providing everything needed to deploy MSA storage in one simple package. HP partners with you to provide the services and support you need to succeed.

HP Smart Office initiative: focus on business

HP's Smart Office initiative allows SMBs to get more. An important component of Smart Office includes the availability of industry leading services designed specifically to meet the SMBs' unique IT needs, lessen computing complexity, and keep business running smoothly. And, HP is continually expanding our portfolio to enable SMB customers to get more from technology, whether they need to expand, optimize, or simply achieve better results.

With Smart Array architecture you get seamless scalability so you can expand servers/storage as needed to accommodate business needs. The simple modular design of Modular Smart Array lets you effortlessly upgrade from MSA500 G2 to a flexible, 6 TB FC SAN with minimal investment and disruption to your business. The MSA product family is a superb fit for HP ProLiant servers and is ideal for smaller deployments, including smaller data centers and remote offices. This family takes your mind off technology, so you can focus on business. And, with our new solution bundle offerings, we make storage easier—easier to deploy, operate and own, and all at affordable prices.

Choose the HP StorageWorks Modular Smart Array that's right for your business needs

Choose MSA technology when data availability is critical to business viability, performance is continually reduced due to capacity shortfalls, and when you need a cost-effective solution to manage key infrastructure components without adding staff or training. The scalable design of this family offers DtS technology, a quick and easy way to convert external storage while leveraging existing infrastructure. It creates high availability, high performance, easy to deploy solutions that don't require highly skilled storage professionals or expensive specialize training. Instead of making a large up-front investment, you buy what you need when you need it as your storage needs evolve.

Now you can tighten control of your increasingly complex storage environment with enterprise features at entry-level affordability. Each solution is designed to maximize transfer rates, reduce management costs, and drive a rapid return on investment while offering the lowest acquisition prices in the industry and the best price performance.

HP StorageWorks MSA20

Low total cost of ownership

The modular, scalable design of the MSA20 provides an extremely flexible platform. You can buy what you need today and purchase additional capacity as your data storage needs grow, instead of making a large up-front investment. Additional drives and enclosures can be easily added as your needs dictate.

Tiered storage

- Lower storage management cost
- Allows more effective utilization of mission critical storage
- Attaches to a MSA1500

Universal Serial ATA (SATA) hard drive

- Investment in disk drives is protected and cost is minimized
- Common universal drive form factor between your server and storage
- Reduces overall reduction in storage management and business costs

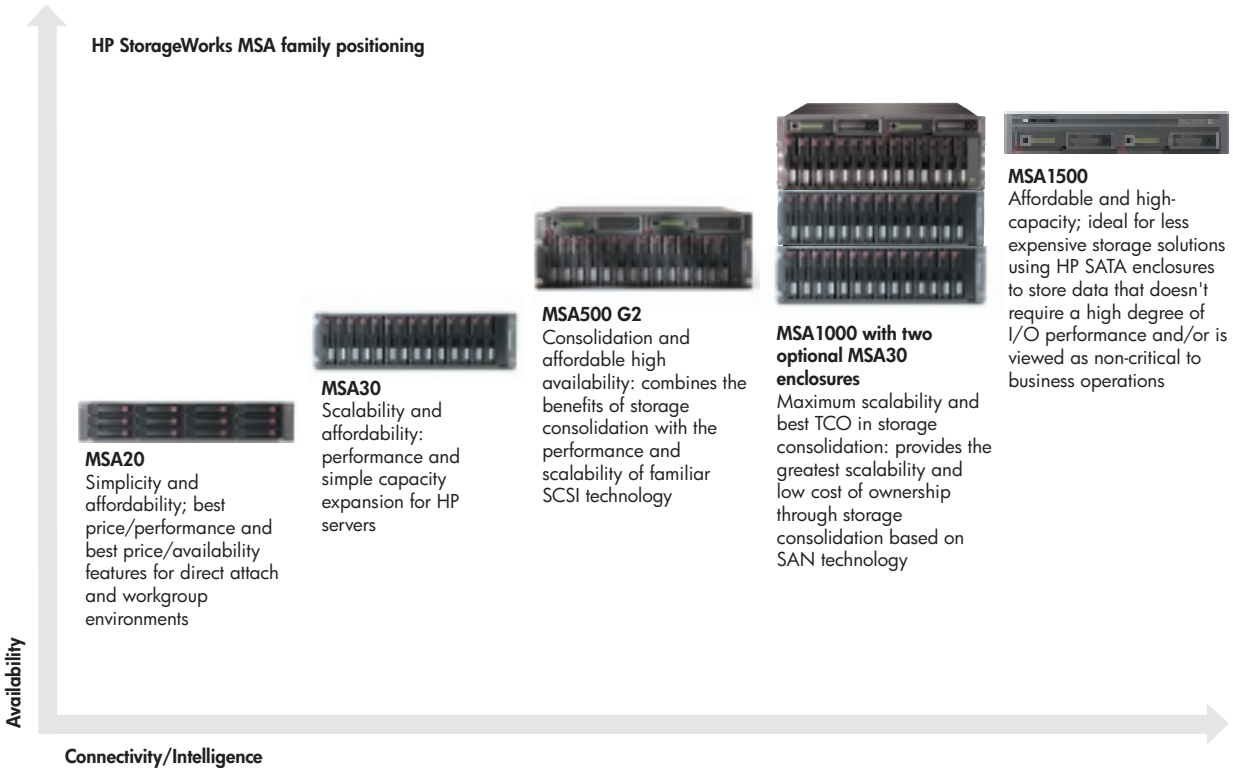
Next-generation technology and investment protection

- Integrates seamlessly into your current U320 host-based environment
- Takes advantage of leveraging your existing technology investments
- Serial-ATA disk technology offers flexible deployment

Trusted reliability

- MSA20 is built on industry-leading Smart Array technology
- Count on 128 MB of battery-backed write cache with 72 hours of battery life
- System supports RAID 0, RAID 1, RAID 5 and Advanced Data Guarding (ADG)

Choosing the right MSA product for your needs



HP StorageWorks MSA30

Scalability and affordability

The MSA30 is for customers who need additional capacities and high performance IO. An external storage enclosure that attaches to Smart Array controllers, it provides scalability and performance in your storage domain. The MSA30 also deploys as the storage expansion shelf for the MSA1000 and MSA1500.

Simple deployment

- Common configuration and management as internal storage
- Familiar SCSI connectivity
- Expansion enclosure for MSA1000 and MSA1500

Lowest price point

- The MSA30 and hard drives are the only requirement on servers with an existing Smart Array Controller and an external port to achieve a DAS solution

Capacity expansion

- With a 3U rackmount form factor and 10K Universal hard drives customers achieve maximum storage capacity per U

High performance IO

- Provides the necessary expansion of additional disk drives to support high performance applications such as database management
- Low latency direct attached solution with maximum Ultra320 SCSI performance

Reliable

- Increased uptime with redundancy of volatile components, power supplies, fans, and RAID protected disk drives

Investment protection

- Using the MSA30 as a storage expansion shelf, you can easily migrate your hardware and data from a direct attached environment to an entry-level SAN behind the MSA1000 or the MSA1500

HP StorageWorks MSA500 G2

Consolidation and affordable high availability

The MSA500 G2 is a 2 TB shared storage system that is perfect for a 2, 3 or 4-node shared storage system. Providing high performance and data availability at a SCSI price, it offers superior data protection and increased uptime.

Designed for affordable availability and data protection

- Hardware redundancy* with dual controllers, power supplies, cooling, and split disk backplane
- Multi-path functionality for dual connectivity paths and load balancing
- Optional HP OpenView Storage Mirroring software is ideal for remote replication

Simplified clustering for HP ProLiant servers

- Supporting 2 to 4-node cluster configurations** for HP ProLiant servers
- Clustering certification for Microsoft® Windows®, Linux, and Novell NetWare operating systems
- Easy to manage storage system utilizes familiar HP ProLiant storage configuration and system management tools

Reliable, low cost storage configurations

- Built upon familiar SCSI technology—no network infrastructure required
- Common array configuration interface with all Smart Array and Modular Smart Array products
- 3-year warranty with 24-hour response standard

Adaptive storage for changing environments

- Support up to 2 TB of storage and 4 HP ProLiant servers
- Simple conversion to MSA1000 and scale out host support and capacity expansion
- Utilizes HP Universal SCSI disk technology

Optimized for performance

- Increased workload performance 2X over MSA500 first generation
- Rapid drive rebuild technology—decreasing drive rebuilds to 1/5 the time
- End-to-end Ultra320 SCSI technology

* Redundant controller and 4-port module with multi-path software optional

** See compatibility information at: www.hp.com/go/msa for a complete list of supported operating systems

HP StorageWorks MSA1000

Maximum scalability and best TCO in storage consolidation

The MSA1000 is an entry-level SAN product. With Fibre Channel (FC) connection, it enables storage consolidation, 'LAN-free' backup/restore, and multiple node clustering, including remote clusters. This affordable, scalable, high performance storage solution reduces the complexity and expense of SAN deployments.

Instead of making a large up-front investment, you buy what you need when you need it as your storage needs evolve.

Improved data protection

- Redundant components throughout assure high uptime access to your data
- Faster backup and restore
- Optional redundant data paths between servers and storage
- Host based remote replication with HP OpenView Storage Mirroring software provides affordable disaster tolerance

Simplified management

- HP Systems Insight Manager and HP OpenView software tools provide powerful but easy to use configuration and local or remote monitoring
- Enhanced storage consolidation via Fibre Channel SAN Selective Storage Presentation
- High performance 2 Gb Fibre Channel interface
- Consolidation offers highly efficient management from a central location

Dynamic growth

- Easy to expand with up to 42 drives and 6 TB of capacity
- Simple to add individual or clustered servers, even to remote locations

Investment protection

- An investment that lets you reduce ongoing and long-term operating costs
- MSA family DtS migration generates a high ROI through an easy, no-risk conversion, using existing tools (Array Configuration Utility and HP Systems Insight Manager).

HP StorageWorks MSA1500

Highest scalability and versatility

The HP StorageWorks MSA1500 is a Fibre Channel SAN attached 2U controller shelf that connects to Serial ATA (SATA) or SCSI disk enclosures. This combination provides customers with a low cost, high capacity storage solution.

High performance

- Up-to-eight attached SATA enclosures provide up to 24 TB (96 - 250 GB SATA disk drives) of raw capacity; also features the ability to attach up-to-four SCSI enclosures for a raw capacity of 8.1 TB (using 56 - 146 GB SCSI disks)

Lowest cost of ownership

- Tiered storage capabilities match up data with appropriate levels of performance, availability and cost of data storage

Easy servicability

- Hot-plug expansion and replacement of hard drives, redundant controllers, for simple, fast installation and maintenance
- Fans and power supplies are also hot-plug replaceable

Hardware foundation for storage solutions

- Compatibility with leading ISV software vendors for Backup and Restore, Medical Imaging, Write Once Read Many (WORM) for disk, Clustering and Archiving
- Designed and implemented for investment protection with your current SAN infrastructure

MSA technical specifications	MSA20	MSA30	MSA500 G2	MSA1000	MSA1500
	MSA20	**MSA30**	**MSA500 G2**	**MSA1000**	**MSA1500**
Capacity	Scales from up to 3TB (12 HP SATA 1.5 Gb/s 250 GB)	Supports up to 8 TB in 4 shelves using the Smart Array 6404 in a 12U rack space for maximum capacity footprint	14 universal SCSI drive bays come standard; when using 146 GB Universal disk drives up to 2 TB of storage is available with 146 GB disk drives; DAS to SAN (DtS) technology allows in-place upgrade to MSA1000	Scales up to 6 TB with 42 Universal disk drives adding up to two MSA30 enclosures	When using up-to-eight attached SATA enclosures provides up to 24 TB (96 - 250 GB SATA disk drives) of raw capacity
Servers supported	HP ProLiant servers	HP ProLiant servers, HP AlphaServer platforms, HP Integrity servers and PA-RISC servers	HP ProLiant servers	HP ProLiant servers, HP AlphaServer platforms and HP Integrity servers	HP ProLiant servers, most multi-vendor industry standard 32-bit Intel-based (x86) servers, and most 64-bit Integrity servers
Max server connections	1	2	4; with single host connections 2; with redundant host connections	20; with single or redundant host connections	20; with single or redundant host connections
OS support	Microsoft Windows 2003, 2000; Novell NetWare 5.1, 6.5; Red Hat Enterprise Linux 2.1; Red Hat Linux	Microsoft Windows Server 2003, 2000; Windows NT; Linux; NetWare; HP Tru64; OpenVMS; HP-UX	Windows Server 2003, 2000; Windows NT; Linux; NetWare	Windows Server 2003, 2000; Windows NT; Linux; HP-UX; NetWare; Tru64; OpenVMS	Microsoft Windows Server 2003, 2000 and Advanced Server; Red Hat Linux; SuSE Linux SLES 8
Host interface	Ultra320 SCSI	Ultra320 SCSI	Ultra160, Ultra 320 SCSI	2 Gb Fibre Channel	Ultra 2, Ultra 3, 2 Gb Fibre Channel
Array controller	Attaches to Smart Array controllers in HP ProLiant servers	Attaches to Smart Array controllers in HP ProLiant or Integrity servers	Single or redundant	Single or redundant	Redundant
RAID Levels	0, 1+0, 5, ADG	0, 1+0, 5, ADG	0, 1+0, 5, ADG	0, 1+0, 5, ADG	0, 1+0, 5, ADG
DAS to SAN (DtS) ready	No	Yes	Yes	Yes	Yes
Drive carrier	Universal Serial 1"	Universal 1"	Universal 1"	Universal 1"	Universal 1" and Universal Serial 1"
Drive count per shelf	12	14	14	14	12 SATA, 14 SCSI
Expansion	No	No	No	Yes, 42 drives	Yes, 96 drives with SATA, 56 drives with SCSI
Upgradeability	Online capacity expansion allows for adding storage to an operational Modular Smart Array 20	With MSA30 I/O upgrade module kits, upgrading HP StorageWorks 4300/4200 enclosures to U320 speeds is quick and easy. The MSA30 can also be deployed with the MSA1000 for capacity expansion	Online capacity expansion up to 2 TB. It converts to the MSA1000 in a snap for additional scalability and capacity, and increased availability in a SAN	Utilizes HP Universal disk drives and HP's DtS technology to allow for fast upgrades from MSA500 G2. For additional capacity it scales up to two additional MSA30 enclosures	Scalable to 8 SATA enclosures for 24 TB or 4 SCSI enclosures for 8 TB of storage capacity with 4-dual channel SCSI I/O cards

Delivering industry-leading technology

The HP StorageWorks Modular Smart Array family delivers industry-leading technology to meet today and tomorrow's growing storage needs. These storage solutions offer investment protection with the best price performance features available for direct attach environments, clusters, and entry-level SAN environments. It is a dynamic storage family designed to maximize transfer rates, reduce management cost, and drive a rapid return on investment. And with the MSA500 G2, MSA1000 and MSA1500, you have options for redundant data paths to protect against data path failure. These storage solutions offer:

- **Reliable and innovative Smart Array technology:** For 12 years customers have relied on its high availability and performance features in addition to its configuration flexibility, all with low initial investment requirements
- **Quick response to change:** Industry-standards ensure compatibility, ease-of-use, lower cost, and the highest level of integration available in the industry on an HP server
- **Simplified management through intuitive software:** System level monitoring software with HP Insight Manager, consistent configuration utilities that speed time to production, common tools across family minimizes re-training
- **Reduced complexity with common components:** Universal disk drives enable flexibility in investment protection by allowing customers to move existing disk drives from servers to the MSA30, MSA500 G2, MSA1000 or the MSA1500
- **Highly available data protection:** Features redundant controllers, redundant paths, redundant power supplies and fans, Advanced Data Guarding (ADG), and pre-failure warranty on the disk drives
- **Improved operational efficiency through storage consolidation:** Bridges the gap between traditional DAS and networked storage environments and lets you extend your investment in HP Smart Array storage and HP ProLiant servers without costly fork-lift upgrades; the sharing of storage between multiple servers increases scalability, reduces management costs and improves overall storage utilization

MSA packaged kits

MSA20 Starter Kit
- MSA20
- Dual hot-pluggable fans/power supplies
- 2 power cables, 1 Ultra320 SCSI host adapter
- 1 SCSI cable

MSA500 G2
- MSA500 G2
- HBAs and cables for 2 servers
- Cluster cabling and documentation

MSA1000 SAN Starter Kit
- MSA1000
- HBAs and cables for 2 servers
- 8-port Fabric switch

MSA1500 Starter Kit
- MSA1500 controller shelf
- 1 controller,
- 1 Fibre Channel module
- 1 SFP transceiver
- 1 dual channel SCSI I/O card
- 2 power cables
- Redundant fans, redundant power supplies universal rack-mounting kit

MSA500 G2 High Availability Upgrade Kit
- MSA500 G2 controller
- MSA500 G2 4-port module
- 2 HBAs and cables
- Smart Array multi-path software

Add this kit to the MSA500 G2 for a fully redundant 2-node cluster or 4-node shared storage system

MSA1000 High Availability Upgrade Kit
- MSA1000 controller
- MSA SAN Switch 2/8
- HBAs and cables for 2 servers
- HP StorageWorks Secure Path multi-path software

Combine the starter kit and a high availability kit for a complete MSA1000 SAN with dual data paths to insure uninterrupted business

HP ProLiant DL380 Packaged Cluster with MSA500 G2
- 2 HP ProLiant DL380 G3 servers
- MSA500 G2
- Cabling for 2 servers
- HBAs for server connections

(hard drives not included)

Combine the HP ProLiant DL380 Packaged Cluster with MSA500 G2 high availability kit for fully redundant cluster with dual data paths to protect against failure

HP ProLiant DL380 Packaged Cluster with MSA1000
- 2 HP ProLiant DL380 G3 servers clustered MSA1000
- HBAs and cabling for 2 servers
- 8-port Fabric Switch

(hard drives not included)

Combine the HP ProLiant DL380 Packaged Cluster with MSA1000 and high availability kit for fully redundant MSA1000 cluster with dual data paths to protect against failure

HP makes MSA products easy to order and deploy

HP has created packaged kits and product solution bundles for HP StorageWorks Modular Smart Array customers. Packaged Kits and Server-Storage Bundles make our "best of breed" solutions easier to order and deploy.

An affordable response to change

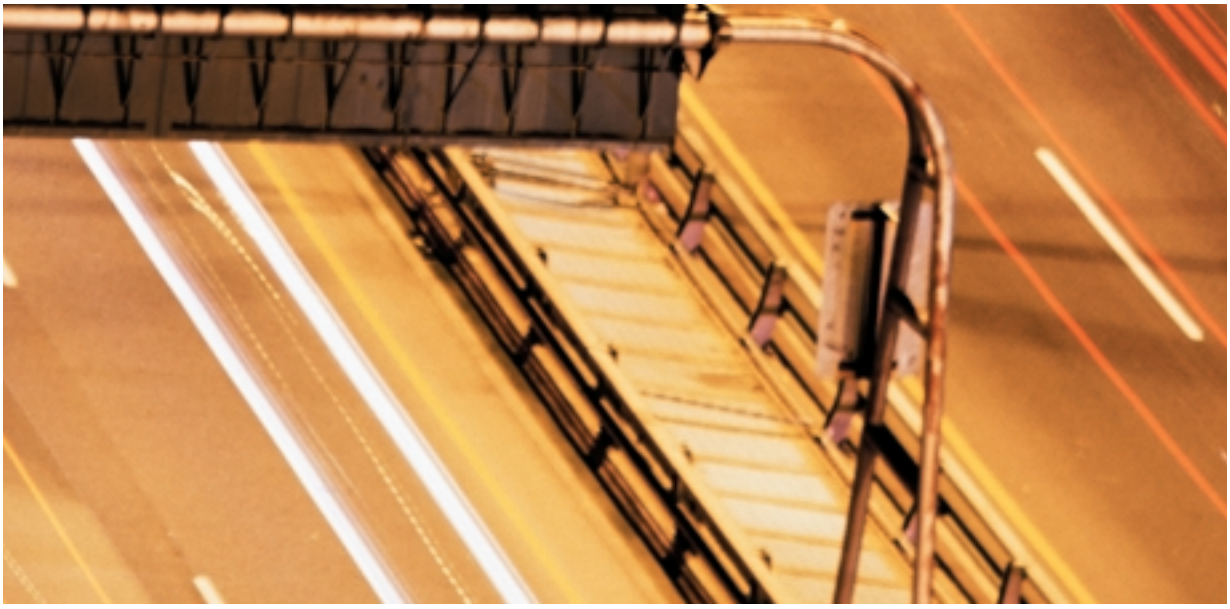
The HP StorageWorks Modular Smart Array family is an easy, efficient, and affordable response to change. MSA family technology is ideal for SMBs. Created using proven innovation and time-tested Smart Array technology, this family provides solutions for demanding and growing storage needs. And, when you choose HP, we give you more by delivering more reliability, more service and support, and more local expertise—all at a competitive price. Our leading-edge services and proven technologies help businesses optimize their storage domain to achieve higher productivity levels and greater return on IT assets.

Stories in success

AutoTradeCenter (ATC), one of the world's leading Internet-based automotive remarketing companies, depends on the performance, reliability, and responsiveness of its HP e-commerce infrastructure to attract and retain blue-chip clients. To accomplish this, HP developed an HP ProLiant Parallel Database Cluster with HP ProLiant servers and an HP StorageWorks MSA1000 system. "The MSA1000 system was less than half the price of the EMC-Dell solution, which allowed us to buy two SAN systems," says Jorge Borbolla, Chief Information Officer, AutoTradeCenter. "It all comes down to a very attractive ROI proposition," says Borbolla. "By maintaining an extremely reliable site based on HP solutions, we've seen a marked increase in revenue due to our robust HP e-commerce platform, and we're solidifying our reputation as a technology leader."

For more success stories on HP storage products and MSA1000 solutions, please visit:
http://h18006.www1.hp.com/storage/casestudies/index.html

For success stories on HP ProLiant servers and MSA500 G2 and MSA30 cluster solutions, please visit:
http://h18004.www1.hp.com/solutions/enterprise/highavailability/dl380/endorsements-g3.html



The smartest way to invest in IT

You understand the value of being able to capitalize on change. But the question still remains: can you afford it? HP Financial Services provides innovative financing and financial asset management programs to help you cost-effectively acquire, manage, and ultimately retire your HP solutions.

HP Financial Services offers flexible financing options, tailored for your needs. We also provide transition services—programs that make it easier for you to migrate from existing technology to your new HP solution by providing value for the equipment you no longer need. Furthermore, our services are global, so you can deploy your lease solution in a consistent manner across the world.

When you finance your new HP solution from HP Financial Services, you avoid paying a large, up-front investment; facilitate add-ons and upgrades; remove the risks of ownership; and eliminate costs and risks associated with equipment disposition when the equipment no longer meets your needs. Our flexible approach to financing enables you to wrap your equipment (including third party components), services and software into one convenient payment, and get it all from HP. Leasing helps you capitalize on change, making it the smartest way to invest in IT.

For more information on these services, please contact your HP sales representative, or visit: **www.hp.com/go/hpfinancialservices**

For more information

For more information on HP StorageWorks Modular Smart Array products visit: **www.hp.com/go/msa**

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