

My First SAN

Moving to a SAN is child's play with HP

Simply StorageWorks
www.hp.com/eur/simply



Storage consolidation offers significant benefits for companies that need to manage ongoing data growth in their IT environments.

The benefits of storage consolidation include better storage utilisation, simplified management and improved control over their data. New innovations for Storage Area Networks (SANs) – such as IP SANs – are making it more affordable for even smaller customer environments to consolidate their storage, while at the same time achieving future scalability and the right infrastructure for a reliable backup and recovery strategy.

HP also delivers affordable external storage solutions that make the most of existing customer investments. HP StorageWorks MSA disk enclosures provide unrestricted capacity, enhanced availability and manageability – and now even more flexibility – with a simple modular concept that makes it easy to configure and order the right storage solutions.

Think outside the box. Be flexible, go external with MSA!

With internal server-based storage, capacity is only available to the host server and is often under-utilised. External storage, on the other hand, is located outside the server and increases available capacity to multiple servers. This allows IT managers to scale capacity more easily while increasing uptime and addressing single points of failure more effectively.

It's easier externally with MSA:

- Easier to afford than ever before
- Easier to use today and meet demands tomorrow
- Easier to consolidate, implement and manage highly available storage
- Easier to configure, buy and afford long-term
- Easier to scale storage capacity and performance

Give customers more peace of mind... and more for their money!
What does this poster contain?
This My First SAN poster offers a useful, easy-to-read overview of the full portfolio of SAN and external array solutions from HP StorageWorks. It shows how different models can be deployed in different business environments to achieve a complete end-to-end solution.

HP StorageWorks Modular Smart Array family

HP StorageWorks Modular Smart Array family		Entry-level consolidation		Midrange consolidation		HP StorageWorks Enterprise Virtual Array family		
Storage enclosures		MSA20	MSA30	MSA50	MSA500 G2	MSA1510i	MSA1500	
Solution description	<p>MSA20</p> <ul style="list-style-type: none"> Low-cost SATA disk enclosure Teams up with Smart Array controller in server or behind MSA1500 Scalability to 24 TB with 96 SATA HDD Support on ProLiant, Integrity and Alpha 	<p>MSA30</p> <ul style="list-style-type: none"> High-performance SCSI disk enclosure Teams up with Smart Array controller in server or behind MSA1500 Scalability to 24 TB with 96 SATA HDD Support on ProLiant, Integrity and Alpha 	<p>MSA50</p> <ul style="list-style-type: none"> Next-generation serial technology disk enclosure Teams up with P600 Smart Array controller Scalability with a second MSA50 cascaded together Support on ProLiant servers 	<p>MSA500 G2</p> <ul style="list-style-type: none"> Affordable shared storage solution Consolidation of up to 4 servers via SCSI Fully redundant (up to 2 controllers and multipath software) Ideal for 2-node clustering Scalability to 4.2 TB of high-performance Ultra320 SCSI storage ProLiant x86 support Host-based virtualisation and remote replication 	<p>Storage Server with SCSI Feature Pack</p> <ul style="list-style-type: none"> Server-based IP SAN solution Wide range of HP ProLiant Storage Servers combined with SCSI Feature Pack Software Multiple TB of scalability depending on model, including options to attach external disk enclosures One device for file and print serving as well as application data storage Software options for snapshots, replication and direct backup Can be deployed as an FC-to-IP SAN gateway, to get the advantages of both technologies 	<p>MSA1510i</p> <ul style="list-style-type: none"> Flexible IP SAN solution Scalability to 16.8 TB (SCSI) or 24 TB (SATA) behind a single controller Hot-plug redundant power and cooling Dual Gigabit Ethernet ports on each controller Embedded web-based management tool Supported in Windows environments Host-based remote application 	<p>MSA1500</p> <ul style="list-style-type: none"> Affordable starter FC SAN solution Enhanced storage consolidation in a fibre-channel SAN No single point of failure with up to 2 array controllers Multi-server clustering Expendability with MSA30 for scalability to 12.6 TB Heterogeneous support on HP ProLiant x86, IA-64 and Integrity servers, limited support on HPUX Host-based virtualisation and remote replication 	<p>High-end consolidation EVA4000/6000/8000</p> <ul style="list-style-type: none"> High-performance and high-availability virtualised array solution Scales up to 72 TB, offering storage consolidation for mid-range and enterprise organisations State-of-the-art virtualisation technologies Compatibility across major operating systems
Consolidation	Driven by server consolidation	Driven by server consolidation	Driven by server consolidation	Consolidate storage of up to 4 servers and/or one cluster	Consolidate storage of multiple servers in an IP SAN	Consolidate storage of multiple servers in an IP SAN	Enhanced storage consolidation in a FC SAN	
Storage	Ultra320 SCSI drive slots SATA drive slots SAS drive slots Scalability	14 12 – 4 TB; up to 4 shelves with SA6402	14 12 – 3 TB; up to 4 shelves with SA6402	– 10 (SFF) – 200 GB / 1u (plus 1+1 cascading)	14 drives / 4 TB / 4u; no expansion	24 TB (SATA) with 8 MSA20 or 16 TB (SCSI) with 4 MSA30 2U (no disk shelf) 8x MSA20 or 4x MSA30 or mixed	4 TB; 12 TB with 2 additional MSA30 2U (no disk shelf) 8x MSA20 or 4x MSA30 or mixed	
External / redundant controller RAID levels supported	Single Smart Array controller in server	Single Smart Array controller in server	Single Smart Array controller in server	Yes	Smart Array controller in server	Yes	Yes	
Server connect	HP ProLiant	HP 9000, HP ProLiant, Alpha and Integrity	HP ProLiant	HP ProLiant 300, 500, 700 series	–	HP 9000, HP ProLiant, Alpha and Integrity	HP 9000, HP ProLiant, Alpha and Integrity	
Operating system support	Microsoft® Windows®, Linux®, NetWare, Tru64, OpenVMS	Windows, Linux, NetWare, Tru64, OpenVMS	Windows, Linux, NetWare	Windows, Linux, NetWare, SCO	Windows, Linux, NetWare, HP-UX	Windows, Linux, NetWare, HP-UX	Windows, Linux, NetWare, HP-UX*	
Server connections	Single bus only	Single or dual bus option	Single server connection plus cascade port	2 standard, 4 optional	Up to 20 qualified	Up to 20 qualified	Up to 20 qualified	
Boot capability	Boot from server (internal or external disks)	Boot from server (internal or external disks)	–	Boot from server or array	–	Boot from server or SAN	Up to 20 qualified	
Clustering and high-availability	–	–	–	Single clusters	Multiple clusters	Multiple clusters	Multiple clusters	
Software options	–	–	–	Smart Array Multipath	–	MPIO	Secure Path, MPIO, QLogic	
Multipath option	–	–	–	Yes	–	–	Yes	
Host-based snapshots and virtualisation¹	–	–	–	–	–	–	Yes	
Data replication over IP²	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Bundles	–	–	–	–	–	–	–	
San Starter Kit	Yes	–	–	–	Yes	Yes (SMB Kit also available)	Yes	
Packaged Cluster option (HA High Availability) Upgrade Kit	–	–	–	–	Yes	Yes (SMB Kit also available)	Yes	
Misc. features	–	–	–	–	–	–	–	
Standard warranty	3-0-0 (drives 1-0-0)	3-0-0	3-0-0	3-3-3	3-3-3 (300 and 500 series)	3-1-1	3-1-1	

© Copyright 2005 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein. Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries. Linux is a registered trademark of Linus Torvalds.

*With HP OpenView Virtual Replicator for Windows environments
¹With HP OpenView Storage Monitoring for Windows environments
²HP-UX only as single controller. Dual controller and Active/Active planned for MSA1500. For the latest updates, check: www.hp.com/go/msa

Three simple steps to acquiring the right external storage solution

With the unique modular building block concept of the MSA family, it's easy for your customers to configure and order the exact external storage solution for their needs:

Step 1	Step 2	Step 3
<p>Basic server and storage building blocks</p> <p>MSA500 G2</p> <ul style="list-style-type: none"> ProLiant DL380 G3 Packaged Cluster with MSA500 G2 (381367xx1; needed: 381369xx1) Choose a MSA500 G2 including ProLiant server 	<p>Fully redundant high-availability configurations</p> <p>For Windows or Linux MSA500 G2 HA Kit (360229-B21)</p>	<p>Options</p> <ul style="list-style-type: none"> • Universal SCSI or SATA hard disk drives • HP OpenView Virtual Replicator and Storage Mirroring software • Rack and power infrastructure options • SAN and LAN networking infrastructure options • Tape autoloaders and libraries • Backup software options
<p>MSA1000</p> <ul style="list-style-type: none"> ProLiant DL380 G3 Packaged Cluster with MSA1000 (811707xx1) <p>Choose a ProLiant, Alpha or Integrity server</p>	<p>MSA1000 HA Kit (397079-B21)</p> <p>MSA1000 Small Business HA Kit (A7452A)</p>	<p>Need more capacity or spindles MSA30-SB (302969-B21) or MSA30-DB (302970-B21)</p>
<p>MSA1500</p> <ul style="list-style-type: none"> Choose a ProLiant, Alpha or Integrity server 	<p>MSA1500 HA Upgrade Kit (AE327A)</p>	<p>MSA20 (335921-B21) or MSA30-SB or MSA30-DB</p>

Customers choose their preferred HP server and appropriate MSA Starter Kit, or order the world's best-selling server model – the ProLiant DL380 – in a packaged cluster with either the MSA500 G2 or MSA1000.

They then take the solution to the next level and increase its availability with the appropriate High Availability Upgrade Kit and preferred connectivity options. Capacity can be increased by adding an MSA20 or MSA30 enclosure, which is as easy as adding a few part numbers to the shopping cart.

Customers can also choose from the world's broadest selection of highly integrated hardware and software options, designed to run effortlessly inside their highly available server and external MSA storage solution.

HP Services offerings for the MSA family

HP Care Pack Services are cost-effective, easy-to-buy warranty extensions that provide consistent, predictable, pre-packaged support, and that make the most of existing investments while containing TCO. Various support levels are available to match particular needs – from basic to mission-critical – and to cover all aspects

of the IT environment; including servers, MSA storage, networking hardware, plus related software and systems.

This is a list of the most important fixed HP Care Packs for the MSA family. Most Care Packs still exist as hardcopy format with the suffix "A", as opposed to the suffix "E" for electronic format.

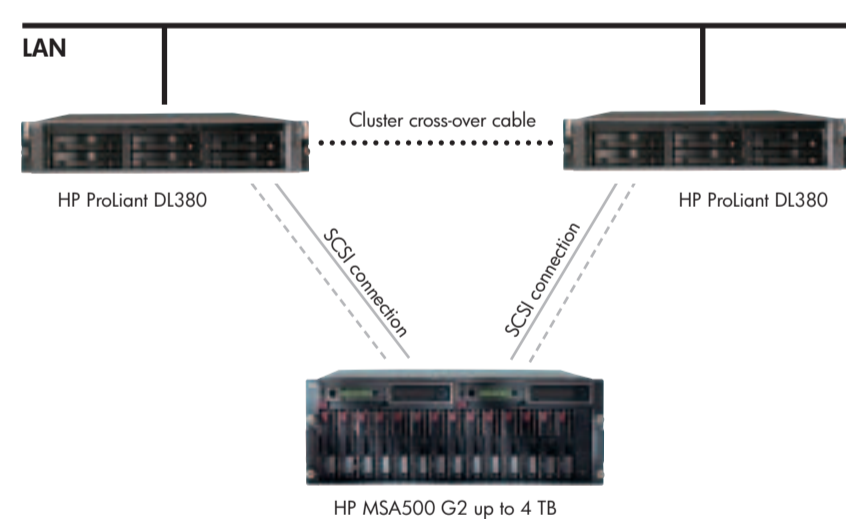
	MSA20/MSA30/MSA50	MSA500	MSA1000 (Base and Starter Kit)	MSA1500/MSA1510i (Base)	MSA1500/MSA1510i (Starter Kit)	Packaged cluster MSA500/MSA1000
Basic Installation	U8132E	U6458E	U4368E	U4368E	U8358E	U4570E
Installation & Start-up	N/A	N/A	UA688E	UA688E	U2870E	U2870E
Basic or Start-up installation for HA Kit	N/A	Included above	UC717E	–	–	–
3-year	–	–	–	–	–	–
Next Business Day/onsite	U8128E	–	Warranty	U6355E	U8153E	U8350E
Some Business Day/13x5 onsite	U8129E	U6455E	–	U6356E	U8154E	U8351E
24x7 onsite	U8130E	U6456E	–	U6357E	U8155E	U8352E
6-hour call to repair/24x7	U8131E	U6457E	–	U9344E	U8156E	U8353E

* For ongoing support, the MSA HA Upgrade Kits (for MSA500/1000/1500) do not require specific HP Care Pack Services – this is covered by the Starter Kit Care Pack. The installation of an HA Upgrade Kit requires a separate Care Pack in addition to the Starter Kit installation.

For more information, visit: www.hp.com/go/storageservices

The following examples show how customers use HP storage consolidation solutions to solve their specific business challenges.

Shared storage solution for clusters with MSA500 G2



- Servers are connected with SCSI cables to the storage array, and act as fallback or recovery servers to each other.
- The above two-node cluster configuration can be expanded to full redundancy with MSA500 G2 HA Upgrade Kit.
- Alternatively, a non-redundant cluster can be configured for up to four nodes. If the configuration has less than four nodes, it is possible to connect additional servers as shared storage to the array.
- As a shared storage array, the MSA500 G2 can store the data of up to four servers with selective storage presentation.

Typical redundant two-node configuration

Solution components	Part number	Quantity	Additional information/recommendations
HP ProLiant DL380 G4 Packaged Cluster w/MSA500 G2	381367xx1 (needed: 381369xx1)	1	Includes 2 x DL380 (w/SCSI HBAs), 1 x MSA500 G2 and cabling
HP StorageWorks MSA500 G2 HA Upgrade Kit	360229-B21	2	Includes 1 x MSA500 G2 redundant controller, 1 x 4-port I/O module, 2 x MSA500 HBAs and cabling
72.8-Gb, 15k rpm, SCSI U320 disk drive	286778-B22	10	13k high-performance disk
MSA500 256-MB controller cache	254786-B21	2	Optional. Offers the highest controller performance.
HP ProLiant Cluster Starter Kit	364023-B21	1	Requires 2 x cxs for each controller. Includes cluster cross-over cable

MSA50 offers SAS and new disk form factors

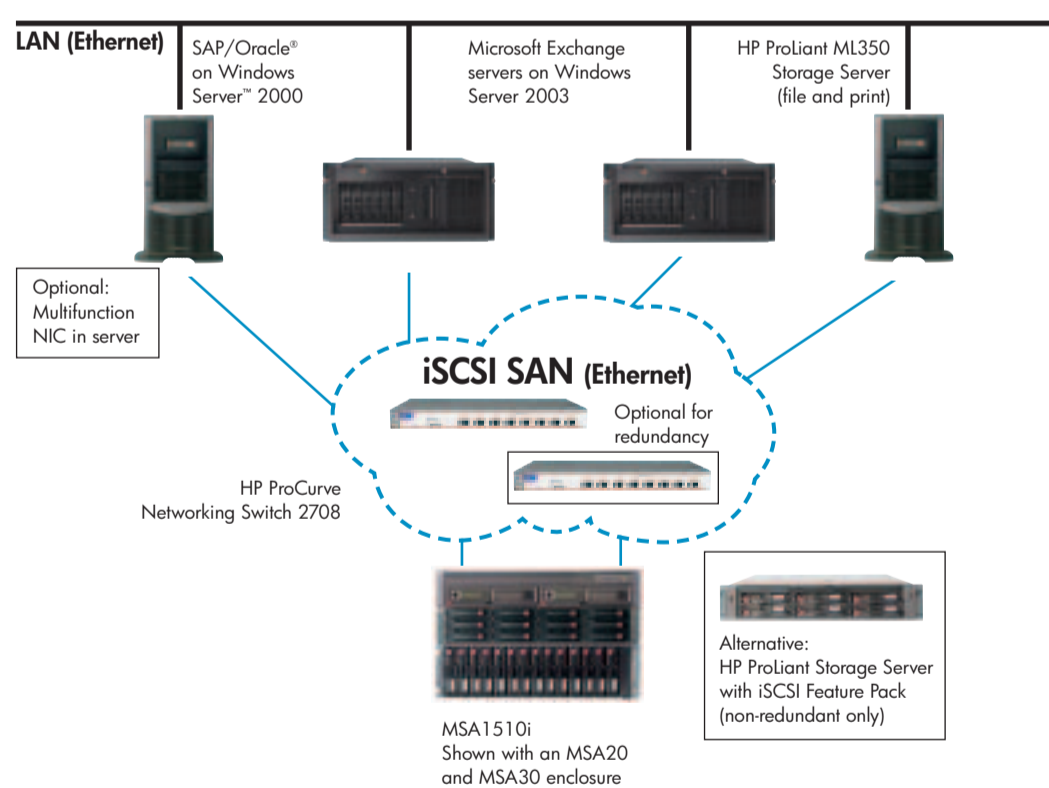
HP Serial Attached SCSI (SAS) and Serial ATA (SATA) solutions are the next generation in storage technology, offering better performance, flexibility and scalability.

The HP StorageWorks Modular Smart Array 50 (MSA50) enclosure supports both SFF SAS and SATA drives. It is a 1U storage enclosure that delivers industry-leading data performance, availability, storage density and upgradeability to meet customers' demanding and growing storage needs.

The Small Form Factor (SFF) SAS platform better manages the heat generated by new-generation processors, by using only half the power of normal SCSI platforms, as well as addressing space constraints.

SATA drives offer a lower acquisition cost by leveraging the volume of the desktop market and adding entry-level functionality, such as hot plug and command queuing. They are best used to store non-mission-critical data and for non-HDD-intensive applications.

Consolidation into an IP SAN with MSA1510i



- Networked storage through an IP SAN offers a great balance between efficiency and affordability.
- A redundant infrastructure using two switches can be designed when using an MSA1510i.
- Can be achieved either array-based using the MSA1510i or server-based using the HP ProLiant storage servers with iSCSI Feature Pack.
- You may choose from a wide variety of HP ProLiant storage servers to meet your exact performance and scalability requirements.
- HP recommends separating the storage network from the public LAN to ensure consistent performance.

Typical non-redundant IP SAN configuration with online and near-online storage

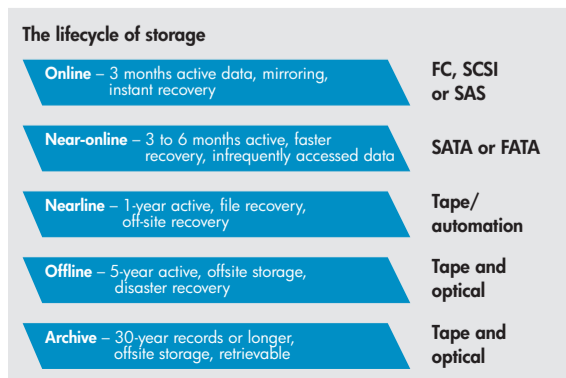
Solution components	Part number	Quantity	Additional information/recommendations
HP StorageWorks MSA1510i	AD537A	1	Includes 1 controller and I/O modules to IP network and SCSI disk enclosures
HP StorageWorks MSA30-SB	302969-B21	1	Provides up to 4.2TB SCSI disk storage capacity
146.8-Gb, 15k rpm, SCSI U320 disk drive	347708-B22	10	–
HP StorageWorks MSA20	335921-B21	1	Provides up to 3TB SATA disk storage capacity
250-Gb 7200 rpm SATA HDD	349239-B21	4	An unmanaged 8-port Ethernet switch, very affordable and well-suited for these kind of environments
HP ProCurve Networking Switch 2708	14996A	1	A special NIC that will soon enable to use as iSCSI NIC
HP NC 370T PCIX Multifunction NIC	374191-B21	1	A special NIC that will soon enable to use as iSCSI NIC with a TCP/IP offload engine. Check current specifications per server

SCSI and SATA disk drives: cost-effective solutions to differing values of data

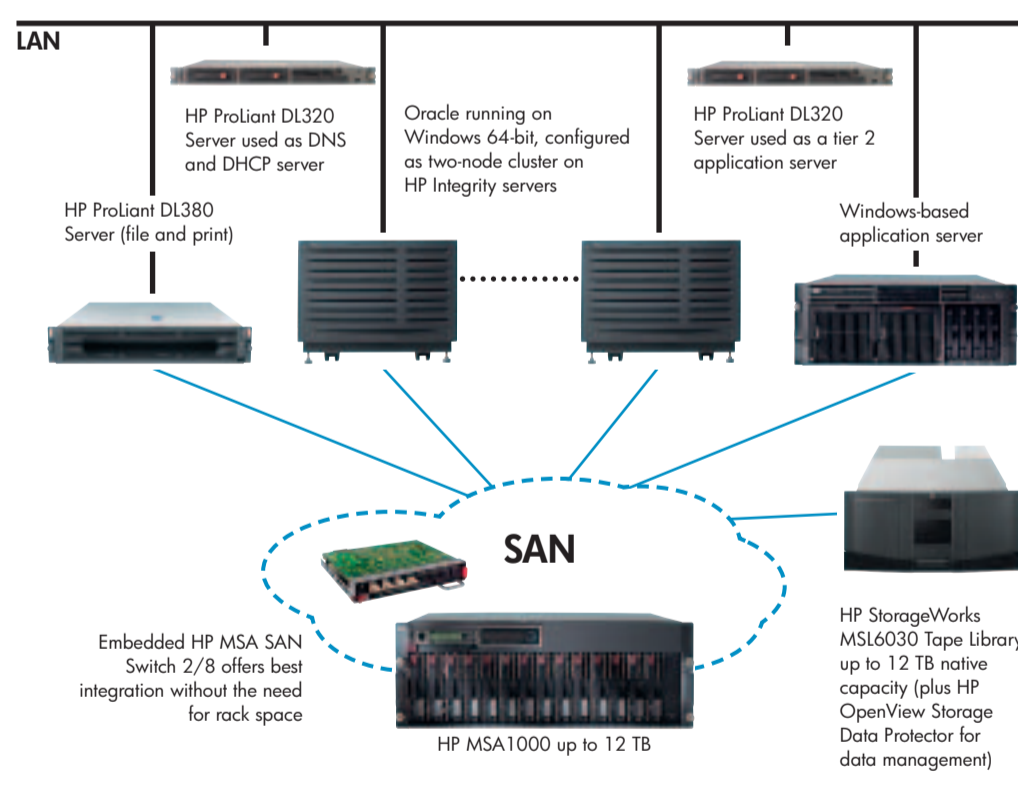
Exponential growth of reference data that is stored to meet regulatory demands is driving companies to look for cheaper disk technologies. As the majority of this data is rarely used, it makes little sense to store it on expensive, high-performing drives.

HP addresses differing "values" of data by enabling customers to integrate MSA20 systems carrying "near-online" (or infrequently accessed) storage into a hierarchy of storage, including online transactional data. Customers can segment data depending on the performance and reliability it requires, freeing up space on SCSI-based systems for business-critical data and storing less frequently accessed data on cheaper SATA disk storage. This ability is not, however, limited to high-end storage systems. It can also be used in networked

or direct-attached storage environments. Consolidating storage on the MSA1500 or MSA1510i arrays simplifies storage management and saves money. You can choose to store critical data on the SCSI-based MSA30 expansion cabinet or less-critical data on the SATA-based MSA20 – or deploy a mixed configuration that supports both.



Starter Fibre Channel SAN with MSA1000



- A SAN solution based on the MSA1000 offers the best efficiency, flexibility and scalability when consolidating storage from multiple servers.
- The above diagram shows a non-redundant configuration that's perfect for cost-sensitive customers.
- Full redundancy can be achieved simply by adding the MSA1000 HA Upgrade Kit.
- One or multiple clusters may be connected to a single MSA1000, both redundant or even preferred, non-redundant.
- Consider the Small Business SAN Kit for cost-effective FC SAN deployment (see below for more information).

Typical configuration

Solution components	Part number	Quantity	Additional information/recommendations
HP StorageWorks MSA1000 SAN Starter Kit	333803-B22	1	Includes 1 MSA1000, 1 embedded 2/8 FC Switch and 2 HBAs – ready to hold 14 SCSI disks
72.8-Gb, 10k rpm, SCSI U320 disk drive	286714-B22	5	–
FC4 2214 Single Channel 2Gb FC HBA	281541-B21	1 per server	For additional server connect
HP StorageWorks MSL6030 Tape Library	AD5958A	1	Contains 1 Ultrium 460 Tape Drive

Simple, pre-configured SAN solution: MSA1000 Small Business SAN Kit

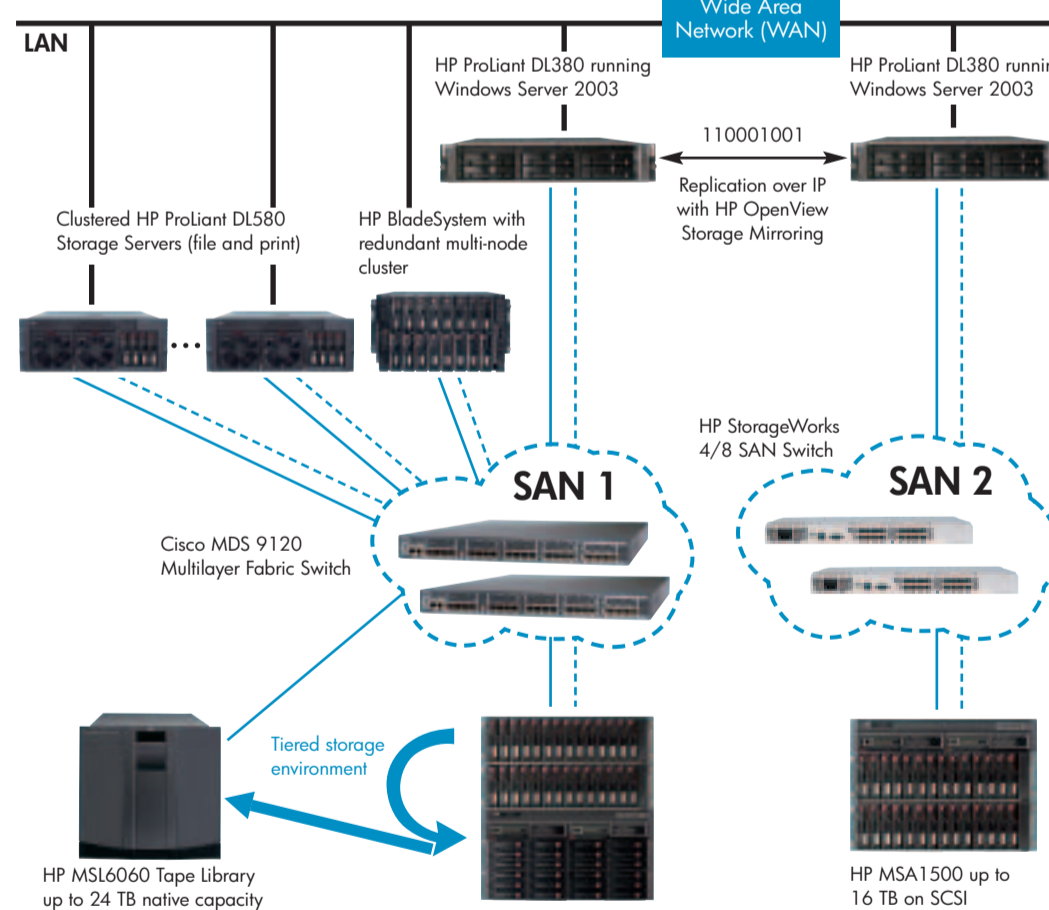
The MSA1000 Small Business SAN Kit is designed to reduce the complexity, expense and risk of SAN deployment for small and medium-sized businesses. It comes with an FC switch and cost-reduced FC HBAs, as well as SANsurfer Express management software that allows all components – including array, switch and HBAs – to be installed and administered from a single console. Furthermore, powerful, easy-to-use

wizards enable management functions to be performed quickly. For cost-conscious environments that need no more than seven Windows or Linux host connections, this is the ideal solution.

- MSA1000 Small Business SAN Kit (A7450A)
- MSA1000 Small Business HA Kit (A7452A)



Fully integrated high-availability SAN with MSA1500



- In this scenario, the MSA1500 provides the option of low-cost near-online storage based on SATA disks.
- A second SAN at a remote site is also shown.
- Data can be copied from SAN 1 to SAN 2 using IP replication – ensuring data remains available, even if a disaster occurs at the primary site.

Fibre Channel infrastructure

The following Fibre Channel switches for storage area networks help expand core-edge infrastructures so they can respond quickly to growth and change.

A full range of additional switches and directors, plus switch options and software, are available from HP. For more information, visit: www.hp.com/go/san

	MSA SAN Switch 2/8*	SAN Switch 4/8	SAN Switch 4/16 and SAN Switch 4/16 Power Pack**	Cisco MDS 9120	Edge Switch 2/12	Edge Switch 2/24
Performance	1,0625 - 2,125 Gb/sec line speed, full duplex; 1.1/2Gb/sec auto-sensing	4,25 Gb/sec line speed, full duplex; 1.1/2.4/4Gb/sec auto-sensing	4,25 Gb/sec line speed, full duplex; 1.1/2.4/4Gb/sec auto-sensing	2,125 Gb/sec line speed, full duplex; 1.1/2Gb/sec auto-sensing	1,0625 - 2,125 Gb/sec line speed, full duplex; 1.1/2Gb/sec auto-sensing	1,0625 - 2,125 Gb/sec line speed, full duplex; 1.1/2Gb/sec auto-sensing
Form factor	Embedded	Embedded	Embedded	1U	1U	1U
Fibre Channel ports	8 universal self-configuring ports (F, FL, E, I internal to controller), 7 external	8 active ports with optional licence to upgrade to 16 ports in 4-port increments	16 universal ports	20 FC ports	8 ports as standard; upgradeable to 12 ports in 4-port increments	8 ports as standard; upgradeable to 24 ports in 8-port increments
Part number	286247-B21	A7984A Base *0 port; A8000A Full Fabric and Power Pack	A7985A Full Fabric; A7987A Full Fabric and Power Pack	A7426A	348404-B21	316095-B21

* The MSA SAN Switch 2/8 can be cascaded to a similar switch in another MSA1000, or to any external fabric switch in the HP infrastructure family. For more details, see the MSA1000 compatibility matrix at: www.hp.com/go/msa1000
** Power Pack model includes SL Tracking, Fabric Watch and Advanced Performance Monitoring. Remote Switch is now included in the fabric kit.



My First SAN

Moving to a SAN with HP is child's play.



www.hp.com/eur/myfirstsan