

entry-level Exchange configuration blueprint for the MSA1000

Configuring an entry-level Exchange 2000 environment to support up to 1000 users.

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executive summary

Messaging and collaboration tools are changing the way companies do business today. The ability to communicate with coworkers, customers, and suppliers via messaging applications is critical. With mission-critical data being sent and received, a messaging system must be available and provide reliable, flexible storage to enable business success.

Exchange 2000 from Microsoft® is a leading messaging application for businesses large and small today. Given the increasing importance of this messaging application to our customers, HP provides technical blueprints to build tested and supported Exchange solutions. These solutions are designed to meet your current messaging needs and to grow with your requirements over time. This flexibility and scalability ensure that your solution provides you with the lowest total cost of ownership possible.

This blueprint presents an entry-level Exchange 2000 solution supporting up to 1000 users. It documents:

- An entry-level SAN storage solution built around the HP StorageWorks Modular SAN Array1000, providing exceptional data protection and availability with ease of management.
- Optional components and add-ons to further enhance your configuration with high availability, backup, and storage management.
- Diagrams, design rules, scalability options, and a complete bill of materials, included as an example configuration.
- A solution based on HP servers, industry leaders in reliability and scalability.
- Information on HP Services that can help you design, install, and maintain your Exchange 2000 messaging environment.
- A scalable solution that grows as your organization and requirements grow.
- A low-cost solution to get your messaging system started with the lowest possible investment.

today's challenges in messaging applications

Exchange 2000 from Microsoft is one of the leading business-critical messaging applications available today. As more and more business activities rely on its operation, the cost of Exchange downtime can pose a significant threat to a company's success. The three major concerns customers have for their Exchange 2000 environment are:

- Availability – minimize the recovery window in case of downtime
- Scalability – scale up capacity and performance as an organization grows, without affecting availability
- Manageability – effective management of application and associated storage to achieve availability and scalability requirements

configuration overview

servers

This solution is designed around an HP ProLiant DL380 G3. These servers can support an Exchange server consolidation strategy and can be configured to meet your specific requirements, including the number of processors, the amount of available RAM, and the number of network adapters.

As reported by Microsoft, HP servers consistently rank among the top performing platforms in Exchange MMB2 performance testing (<http://www.microsoft.com/exchange/techinfo/planning/2000/PerfScal.asp>). This, together with HP worldwide service and warranty offerings make HP servers the perfect platform for your Exchange solution.

storage

The HP StorageWorks Modular SAN Array 1000 (MSA1000) is a 2 Gb Fibre Channel storage system for the entry-level to midrange storage area network (SAN). It is designed to reduce the complexity, expense, and risk of SAN deployments in an x86 server environment. This array provides you with a low-cost, scalable, high-performance storage system with investment protection. The MSA1000 comes standard with a single high-performance controller. Options include a second controller and, with the addition of two more drive enclosures, the MSA1000 controls up to 42 Ultra2, Ultra 3, or Ultra320 SCSI drives, providing a maximum capacity of six terabytes.




DtS (Direct Attach to SAN) architecture is an exclusive MSA1000 feature that provides a quick and easy way to migrate stored data protected by most Smart Array controllers to an MSA1000 storage system. Data that is currently stored on 1" Universal disk drives using newer HP Smart Array controllers, as well as data on an RA4100, can easily be migrated to the MSA1000. Simply remove the drives from the older systems and insert them into the MSA1000. All configuration information and data will be preserved, allowing migration to be completed in minutes, not hours or days. For more information, reference the *DtS Data Migration to the MSA1000, Microsoft Environments* white paper at: <ftp://ftp.compaq.com/pub/products/storageworks/whitepapers/15D6-0801A-WWEN.pdf>

backup

HP StorageWorks tape devices and the HP OpenView Storage Data Protector software provide a secure and manageable solution for customer data protection. Data Protector provides flexible backup protection for Exchange with minimal impact on system performance and application availability. Depending on the available hardware, data protector can write backup streams to single or multiple tape drives. Backup streams can go to devices locally attached to the Exchange server, go through the LAN to any system or, for maximum performance, make use of a SAN and move the data to fibre channel connected devices. By using this flexible architecture, data protector allows you to distribute the backup load and achieve the lowest possible backup times. Data Protector is scalable with your infrastructure to provide highly reliable and cost-effective backup in systems of any size.

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table 1. component overview

<p>HP StorageWorks Modular SAN Array 1000</p>		<ul style="list-style-type: none"> • Up to 2 TB in 3U space • Scalable to 42 drives • MSA hub 2/3 • Available drive capacities: 18 GB, 36 GB, 72 GB, 146Gb
<p>HP ProLiant DL380 G3</p>		<ul style="list-style-type: none"> • Two (2) 2.8 GHz processors • Six (6) 72 GB disk drives • 6GB ECC DDR SDRAM • Hot-swappable, redundant power supplies • 2U rack-mountable enclosure
<p>HP StorageWorks SSL1016 tape autoloader</p>		<ul style="list-style-type: none"> • Up to 2.5 TB native capacity • Up to 11 MB/sec native performance • One SDLT 160/320 GB tape drive, 16 slots • 2U rack-mountable enclosure

solution design

The example Exchange solution in this blueprint can be modified to meet your specific needs. The assumptions, design rules, and an example of its scalability are shown below.

configuration

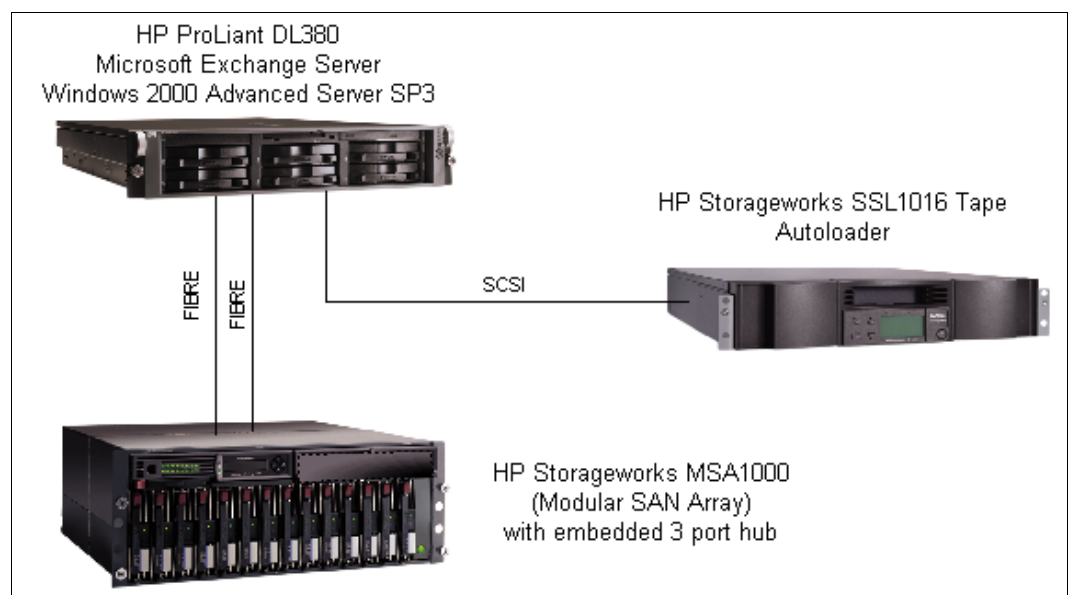


figure 1. example entry-level Exchange solution physical view, using one array controller

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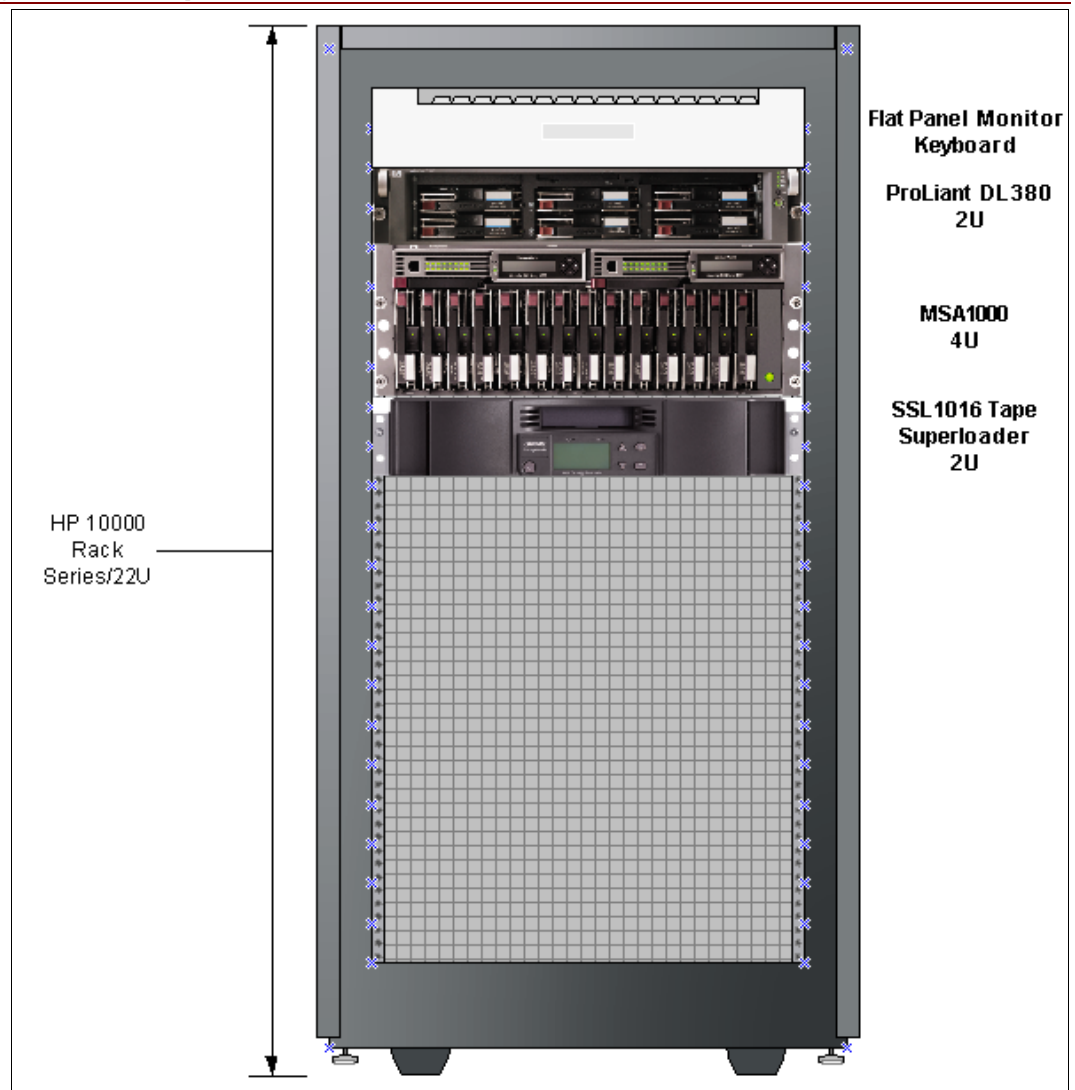


figure 2. example entry-level Exchange solution rack configuration

This Exchange solution can be assembled in an HP 10000 Series Rack System/22U rack to minimize space at your site. The HP 10000 Series Rack System/36U offers additional space to add additional components, including servers, MSA1000 disk arrays, fibre channel switches, or tape libraries, as the solution grows. The example rack in figure 2 includes an HP rack mount flat monitor/keyboard. This optional component provides device management capability at the rack within a minimum amount of space.

Exchange profile

table 2. Exchange user profile assumptions

Exchange parameter	value	Exchange parameter	value
mailbox quota	50 MB	Internet users	10%
maximum number of users	1000	Bridgehead servers	No
average message size	10 KB	Front-end servers	No
MAPI users	90%		

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Exchange architecture

- An existing Windows 2000 Active Directory Domain
- One Storage Group with 4 databases (250 users/database)

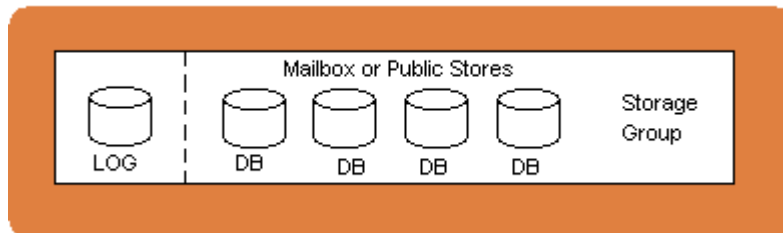


figure 3. Exchange storage group for entry-level Exchange solution

- Total storage required for mailbox stores is ~50 GB (each user has a 50 MB mailbox quota). Per Microsoft recommendations, twice the required storage capacity is provided to allow for restore and recovery operations. In addition, 10 GB is provided for each Storage Group's log files.
- Databases and transaction log files are on different physical disk groups on the array.

server

- ProLiant DL380 G3 with dual processors and redundant power supplies (See "specifications" for details.)
- HP OpenView Storage Data Protector Cell Manager applications run on the Exchange server
- Uses built-in Network Interface Card (NIC)

array

- MSA1000 array with one 256MB controller expanded to 512 MB cache
- Integrated MSA 2/3 hub
- Disk capacities are calculated using RAID 1+0 for exchange volumes (database and logs) with one hot spare
- Two physical disk groups are used by Exchange (one for Storage Group log files, one for Storage Group databases and public folders)

table 3. MSA1000 storage configuration options using 36 GB disk drives

Number of users (50MB mailboxes)	Disk1	Disk 2	Disk 3	Disk 4	Disk 5	Disk 6	Disk 7	Disk 8	Disk 9	Disk 10	Disk 11	Disk 12
500 - 1000	database and public folder RAID 5			log files RAID 1+0		hot spare						
	database and public folder RAID 1+0				log files RAID 1+0		hot spare					

tape

- HP StorageWorks SSL1016 Tape Autoloader for direct SCSI backup

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design rules

- Log files are stored on separate physical disks from databases. This provides for additional protection from failure and for improved performance (sequential I/O for log files, random I/O for databases).
- Use multiple databases inside the Storage Group to minimize the impact of restoring a single mailbox store.
- For best backup and restore performance, one tape drive per Storage Group is recommended.

optional configurations

The following is an example of an expanded configuration providing additional application availability. In this configuration a two-node MSCS cluster is introduced for added redundancy. Additionally, the MSA1000 has been upgraded to a dual controller configuration to provide continued access to the storage volumes in the event of a single controller failure. To accommodate the added cluster configuration and provide for a SAN-based backup and recovery, the selected tape device has been upgraded to a fibre attached MSL5026.

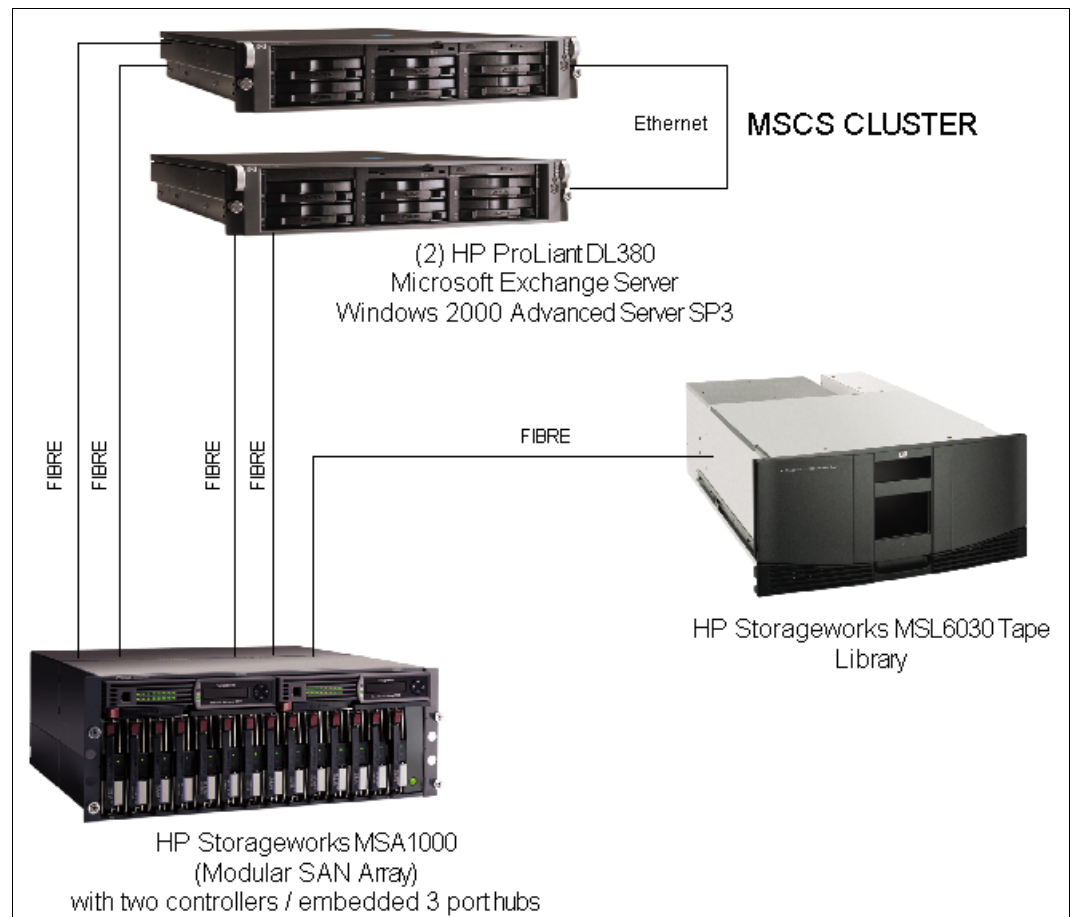


figure 4. expanded entry-level Exchange solution physical view

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specifications

servers

Operating System	Server	Host Bus Adapter	Processors	ECC DDR SDRAM	Disk Drives	Network Interface Card
Windows 2000 Advanced Server, SP 3	ProLiant DL380 G3	FC2101 2GB FC HBA	2 x 2.4 GHz	4.5 GB	2 x 18 GB	dual embedded NC7781 Gigabit Ethernet

storage

disk storage

Features	18 GB Drives	36 GB Drives	72 GB Drives	146 GB Drives
Number of Drives	9	7	5	Not recommended for this configuration
Usable Capacity with RAID 1+0 and 1 Hot Spare	database: 54.6 log: 18.2	database: 72.8 log: 36.4	database: 72.8 log: 72.8	
Raw Capacity	163.8 GB	254.8 GB	364 GB	
Note: Grayed areas represent hardware used in example technical blueprint configuration.				

tape storage

Features	SSL1016 Tape Autoloader	SSL2020 Tape Library	MSL5026 Tape Library	MSL6030 Tape Library
Drive Type	SDLT 160/320	AIT	SDLT 160/320	LTO Ultrium 460
Number of Drives	1	2	2	2
Number of Slots	15 + 1	19 + 1	25 + 1	29 + 1
Max Native Storage Capacity	2.5 TB	1 TB	4.1 TB	6.9 TB
Max Native Data Transfer Rate	11 MB/sec	6 MB/sec per drive	11 MB/sec per drive	30 MB/sec per drive
Note: Grayed areas represent hardware used in example technical blueprint configuration.				

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software

Software Name	Description
Microsoft Windows 2000 Advanced Server	Server Operating System.
Microsoft Exchange 2000 Enterprise Server	Messaging application supporting multiple Storage Groups.
HP OpenView Storage Data Protector	Provides data protection through automated backups.
HP StorageWorks Secure Path v4.0A for Windows Workgroup Edition (optional)	Maintains storage connections in redundant SAN environments. Only required if more than one connection to the MSA 1000 is used per server.
HP OpenView Storage Virtual Replicator (optional)	Provides server-based storage virtualization for Windows 2000 environments.
HP OpenView Storage Area Manager Host Agent (optional)	Allows Exchange server to be managed as part of a Storage Area Network (SAN). Host agent was loaded on Exchange server during solution testing. (Requires separate Management Server or Storage Management Appliance.)

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services

HP consultants can help you build an always-on messaging infrastructure that your organization can depend on. Available consulting services include:

- readiness assessment
- planning and design
- migration planning
- implementation

HP can help you address your requirements for availability, manageability, server consolidation, storage and capacity planning, backup and restoration, coexistence with other messaging systems, global deployment, definition of service level objectives, and implementation of management policies.

Exchange consulting services	HP can help you assess your current and future messaging and collaboration solution requirements and then design a solution that leverages the full power of Microsoft Exchange to meet those needs enterprise-wide.
Microsoft education services	HP has fully certified and integrated education solutions that get your IT professional and end users up-to-speed quickly on your Exchange server system.
Microsoft software licensing services	HP can help you manage Microsoft licensing on a worldwide basis, optimizing software procurement and deployment for your entire organization.
Global deployment services	HP onsite installation services are fully coordinated with our integration services to get your Microsoft Exchange solution up and running quickly and reliably.
Support services	Once HP has helped you build the messaging and collaboration solution, we keep it running strong with industry-leading software, hardware and network support services. These comprehensive services provide a single point-of-contact for both HP and multi-vendor products.

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bill of materials

The following is a bill of materials (BOM) representing the hardware and software used in the example Exchange solution configuration in figure 1 of this blueprint.

standard configuration

Description	Qty.	Part Number
Exchange Server		
ProLiant DL380 G3 Intel Xeon processor 2.4 GHz 512 MB DDR SDRAM (2) NC7781 PCI-X Gigabit NIC (embedded) 10/100/1000	1	257917-001
Intel Xeon 2.40 GHz-512 KB Processor Option Kit	1	257913-B21
4096 MB Advanced ECC DDR SDRAM DIMM Memory Kit (2x2048 MB)	1	300682-B21
18.2 GB 15,000 rpm U320 1" Universal hard drive, for operating system	2	286775-B22
Fibre Channel Adapter FCA2101, 2 GB FC HBA	1	245299-B21
Microsoft Windows 2000 Server (Service Pack 3) or Windows Advanced Server 2000 (enables clustering)	1	Microsoft Reseller
Microsoft Exchange 2000 Server (Service Pack 3)	1	Microsoft Reseller
Storage Array		
HP StorageWorks Modular SAN Array 1000 (MSA1000)	1	201723-B22
256 MB Cache Module for controller	1	254786-B21
HP StorageWorks MSA hub 2/3	1	286763-B21
36.4 GB Ultra 3 1" Universal hard drive, 15,000 rpm	14	232916-B22
Tape Backup		
HP StorageWorks SSL1016 Tape Autoloader	1	330816-B21
SDLT Connectivity Kit	1	330819-B21
HP Super DLT tape 220/320 GB data cartridge	14	C7890A
HP SDLT cleaning cartridge	1	C7982A
Library Tape Tool (LTT) - http://www.hp.com/support/tapetools		Web
OpenView Storage Data Protector		
Starter Pack for Windows		B6961AA
On-Line Backup for Windows		B6965BA

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optional configuration

Description	Qty.	Part Number
Exchange Server		
ProLiant DL380 G3 Intel Xeon processor 2.4 GHz 512 MB DDR SDRAM (2) NC7781 PCI-X Gigabit NIC (embedded) 10/100/1000	2	257917-001
Intel Xeon 2.40 GHz-512KB Processor Option Kit	2	257913-B21
4096 MB Advanced ECC DDR SDRAM DIMM Memory Kit (2x2048 MB)	2	300682-B21
18.2 GB 15,000 rpm U320 1" Universal hard drive, for operating system	4	286775-B22
Fibre Channel Adapter FCA2101, 2 GB FC HBA	4	245299-B21
Microsoft Windows 2000 Windows Advanced Server 2000 (Service Pack 3)	2	Microsoft Reseller
Microsoft Exchange 2000 Server (Service Pack 3)	2	Microsoft Reseller
HP ProLiant Cluster HA/F100 for MSA1000 (Microsoft)	1	252408-B21
Storage Array		
HP StorageWorks Modular SAN Array 1000 (MSA1000)	1	201723-B22
MSA1000 Controller, with 256 MB cache	1	218231-B22
256 MB Cache Module for Controller	2	254786-B21
HP StorageWorks MSA hub 2/3 (integrated)	2	286763-B21
36.4 GB Ultra 3 1" Universal hard drive, 15,000 rpm	14	232916-B22
Tape Backup		
HP StorageWorks MSL6030L tape library, 2 LTO Ultrium 460 drives MSL6000 Embedded Fibre Option Kit with network storage router E1200	1	330731-B35
HP Ultrium 400 GB data cartridge	28	C7972A
HP Ultrium Universal cleaning cartridge	1	C7978A
OpenView Storage Data Protector		
Starter Pack for Windows	1	B6961AA
On-Line Backup for Windows	1	B6965BA
SAN Drive Extension	1	B6953AA

scaling – growth – flexibility

improving availability

- Improve application availability through use of a clustered server configuration.
- Increase the number of databases or the number of Storage Groups to increase the restore rate and lessen the impact on users should a single database fail.
- Add a second host bus adaptor to the Exchange server to connect to a second controller on the storage array and use the HP StorageWorks Secure Path for Windows application to increase availability in the event of a controller failure.

adding messaging users

Expanding this configuration beyond 1000 users may require additional servers and storage. Refer to the *Mid-market Exchange Configuration Blueprint for the MSA1000 and EVA3000* for more information.

online storage growth

Array capacity may be expanded online using existing or added disks. The MSA1000 allows you to add capacity and grow the size of logical volumes without downtime.

why HP

- HP provides tested and supported Exchange Solutions built with world-class servers and storage and supported by a single point of contact—HP.
- HP is a Prime Integrator of Exchange 2000, as designated by Microsoft, and has over 4.3 million Exchange 2000 seats deployed or under contract.
- HP servers and storage arrays are Microsoft-certified platforms.
- HP storage supports Microsoft's corporate Exchange infrastructure as well as a development platform for Exchange.

"...HP is as knowledgeable on Exchange as it gets. In fact, HP has more people dedicated to working on Exchange than Microsoft has developing the product. When it comes to deployment—what works and what doesn't for real customers in the real world—they are the clear experts."

Eric Lockard

Former General Manager
Exchange Business Unit
Microsoft Corporation

for more information

HP Solutions

HP Storage Solutions for Microsoft Exchange

<http://h18006.www1.HP.com/storage/solutions/application.html#me>

HP StorageWorks SAN consolidation solutions

<http://h18006.www1.HP.com/products/storageworks/solutions/consolidation/index.html>

Mid-market and Enterprise Exchange Solution technical blueprints are available at

<http://h18006.www1.hp.com/products/storageworks/solutions/exchange2kconfig/index.html>

DAS-to-SAN Exchange Migration Solution

<http://h18006.www1.hp.com/products/storageworks/solutions/dassanex2k/index.html>

NAS/SAN Fusion with Exchange 2000 White Paper

<http://h18006.www1.hp.com/products/storageworks/solutions/request/das2sanex2kwp.html>

HP Servers

HP ProLiant DL and ML Servers

<http://h18004.www1.hp.com/products/servers/platforms/index-dl-ml.html>

HP Server Exchange Solutions

<http://h71028.www7.hp.com/HP/render/1,1001,5733-6-100-225-1,00.htm>

HP Storage Hardware and Software

HP Modular SAN Array 1000

<http://h18006.www1.HP.com/products/storageworks/msa1000/index.html>

HP Tape Storage Systems

<http://h18006.www1.hp.com/storage/tapestorage.html>

HP OpenView Storage Data Protector

<http://h18006.www1.HP.com/products/storage/software/dataprotector/index.html>

HP Open View Storage Area Manager

<http://h18006.www1.HP.com/products/storage/software/sam/index.html>

HP Services

HP Services for Microsoft Exchange

<http://h18005.www1.HP.com/services/messaging/>

Microsoft

Microsoft Exchange Server

<http://www.microsoft.com/exchange/default.asp>

To learn more about HP storage and our Exchange storage solutions, contact your local HP sales representative or visit our Web site at: www.hp.com/go/storage.

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