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HP storage

technical blueprint

HP StorageWorks DAS-to-SAN Exchange 2000 Migration Solution

Migrating an existing Exchange 5.5 environment to Exchange 2000 using SAN storage consolidation with the HP StorageWorks modular SAN array 1000.

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executive summary

The HP StorageWorks DAS-to-SAN Exchange 2000 Migration solution delivers a documented strategy for migrating an existing distributed Exchange 5.5/Windows NT 4.0 environment to a storage area network (SAN) based Exchange 2000/Windows 2000 environment.

Based on the msa1000 entry-level SAN array, this is an affordable and high performance storage solution for departmental and remote office environments with 500 to 3000 Exchange seats.

Co-developed with Microsoft and leveraging documented Microsoft best practices for Exchange and Windows migration, this HP solution uses an Exchange migration strategy that minimizes disruption to Exchange applications while recommending a configuration for server and storage consolidation.

solution overview

This HP solution provides all the tools needed to migrate an Exchange 5.5 environment to Exchange 2000. In conjunction with a companion *Microsoft Project Guide*, the solution provides the necessary procedures and best practices to plan and perform a successful migration. All processes and procedures are based on Microsoft's recommended guidelines, with links to Microsoft documentation where appropriate. End-to-end Exchange and Windows migration support is also offered through HP services.

No other vendor offers this complete package of documentation, hardware, software, and support services in one place.

"The relationship between Microsoft and HP is historical, broad, and deep. The HP DAS-to-SAN Exchange 2000 migration solution expands the scope of that relationship again by offering the strengths of both companies to enable simplified migration from older Exchange platforms. Our customers will benefit both from reduced operational and management costs, as well as the exceptional features available in Microsoft's current products.

By building the solution around standardized Microsoft guidelines, the customer can easily migrate to an Exchange 2000 environment with minimal effort and investment. These guidelines will also facilitate the introduction of a SAN storage environment to consolidate Exchange computing infrastructure. HP, as a prime integrator for Microsoft Exchange 2000, has the most experience of any company in the industry with planning, deploying, and supporting Exchange environments, and this expertise is apparent with the introduction of this customer-focused solution and its supporting Exchange services portfolio. **Microsoft enthusiastically endorses this solution for our customers.**"

Kevin McCuistion
Director of Exchange Marketing
Microsoft Corporation

business needs

If your business still uses Windows NT 4.0 and Exchange 5.5, now is the best time to plan the migration to Windows 2000 and Exchange 2000.

For some small or medium businesses, a complete migration to Exchange 2000 can be somewhat intimidating. Many businesses do not have on-site Exchange expertise or access to the necessary information, tools, and best practices to plan and deploy a successful, cost effective Exchange migration project. Such businesses need a migration plan with limited downtime or disruption to Exchange users, and they need a partner who can offer a full range of Windows and Exchange migration implementation services, all within Microsoft guidelines.

Upgrading to Windows 2000 also offers an opportunity to consolidate your existing Exchange server and storage infrastructures, which makes it easier to manage your new Exchange environment. A SAN-based Exchange 2000 storage architecture requires minimal initial investment, yet allows for future growth as additional Exchange seats are added or as their existing Exchange database increases. This HP solution offers a configuration that grows with your organization or the addition of new applications.

features and benefits

The HP StorageWorks DAS-to-SAN Exchange 2000 Migration solution overcomes the Exchange migration challenges facing small businesses by providing a simple, cost effective, fully documented solution, endorsed by Microsoft.

For additional details, see the companion *Microsoft Project Guide* (available from Microsoft at http://www.microsoft.com/partners) and the *HP Implementation Blueprint* (available from your HP sales representative). Details include:

- Procedures to consolidate a Windows 2000/Exchange 2000 server environment
- Step-by-step migration plans to move from Exchange 5.5 to Exchange 2000 using the 'move mailbox' method (providing minimal disruption to Exchange services)
- Migration to an msa1000-based SAN environment, for storage consolidation
- Best practices for Exchange and SAN configurations
- Links to Microsoft and HP supporting documentation
- Information on available supporting HP Services for both Windows and Exchange
- Comparison of Exchange performance before and after migration

table 1. comparative benefits – Exchange 5.5 DAS configuration vs. Exchange 2000 SAN configuration

	Exchange 5.5 Direct Attached Environment	Exchange 2000 SAN Environment
Recovery	In a direct attached storage environment, the Exchange server and Exchange databases are directly coupled. If a server failure occurs, database information may need to be recovered from tape, as the Exchange databases cannot be accessed.	Storage is a separate physical resource from the Exchange server. Fast and simple recoveries from Exchange server failures occur by re-mapping the Exchange database to the Exchange backup server. This solution follows the Microsoft recommendation of configuring a backup Exchange 2000 server as part of the SAN.
Growth	Adding new users or increasing storage capacity may require adding servers and storage devices.	New storage is easily allocated from a central SAN-based storage pool. New storage is allocated quickly and easily to the Exchange server as needed.
Upgrades	A distributed environment makes upgrades difficult to manage and has adverse effects on application availability.	A migration strategy to consolidate the server and storage devices provides an opportunity to upgrade server and storage hardware and software. A consolidated environment also makes future upgrades more manageable.
Investment	A distributed environment results in poor use of storage resources.	A consolidated environment provides the opportunity to permit shared storage resources across the enterprise, resulting in better utilization of your storage investment.
Consolidation	A distributed environment does not consolidate resources.	A SAN configuration consolidates storage resources and offers an environment capable of integrating other applications, such as file services through SAN/NAS fusion.
Management	Distributed server and storage environments are difficult to manage centrally. Managing multiple backup sources becomes a major issue.	Centralized storage is easily managed and can use many feature-rich storage management applications. Backups can be easily managed from a single source.
Performance		Exchange performance is comparable, even after consolidation to a single Exchange server. Migration to a SAN dramatically improves backup and restores performance.
Support	Microsoft will downsize mainstream support for Exchange 5.5 on December 31, 2003. After that time, extended support for Exchange 5.5 will be available for an additional fee.	Moving to Exchange 2000 provides the benefits of Microsoft support until December 31, 2005. With the additional purchase of Microsoft Software Assurance, each Exchange 2000 license also allows for the future install of Exchange 2003, the next release of Exchange that operates on Windows Server 2003.

configuration

The HP StorageWorks DAS-to-SAN Exchange 2000 Migration solution provides a fully validated Exchange migration path for:

- Exchange 5.5 to Exchange 2000
- Windows NT 4.0 to Windows 2000
- Direct Attached Storage to Storage Area Network (SAN) infrastructure
- LAN-based backup to SAN-based backup

This solution leverages the capabilities of the SAN-attached HP msa1000 entry-level array and the ml530 departmental class server, as illustrated in Figure 4.

Start Configuration   **End Configuration**

| Distributed Microsoft Exchange Servers | Server Consolidation → | HP ml530 Microsoft Exchange Server |

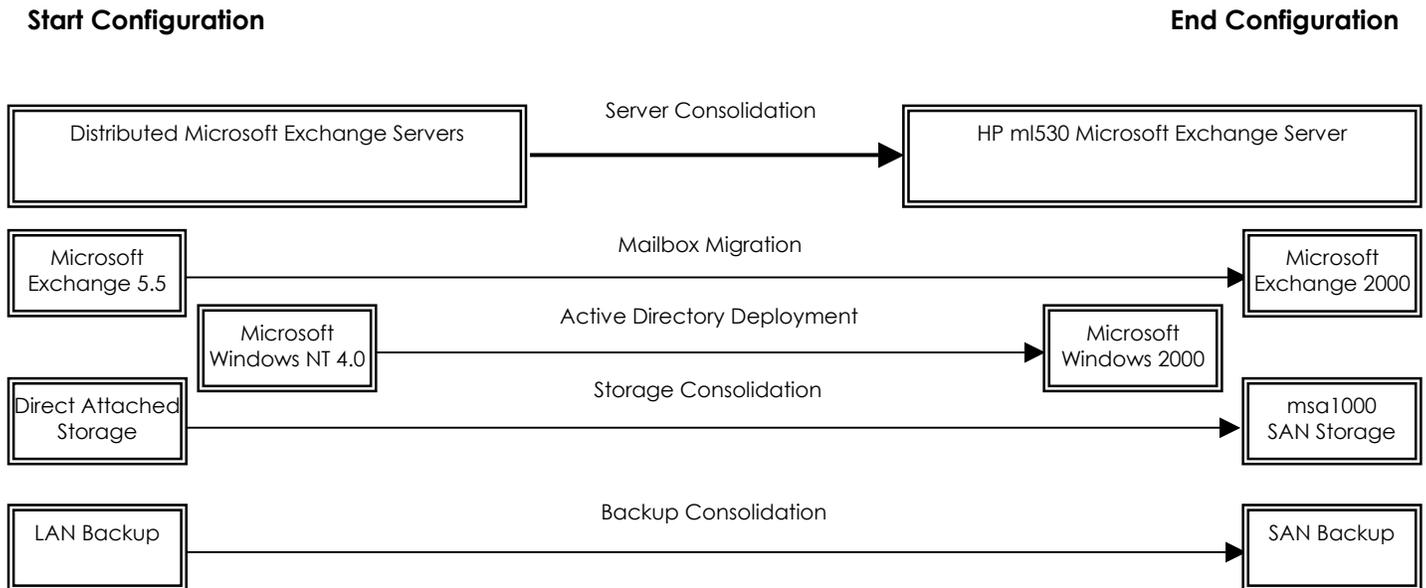| Microsoft Exchange 5.5 | Mailbox Migration | Microsoft Exchange 2000 |
Microsoft Windows NT 4.0	Active Directory Deployment	Microsoft Windows 2000
Direct Attached Storage	Storage Consolidation	msa1000 SAN Storage
LAN Backup	Backup Consolidation	SAN Backup

figure 1. Exchange 2000 Migration Solution block diagram

solution components

The StorageWorks DAS-to-SAN Exchange Migration solution consists of the following core components:

Microsoft Windows 2000 Server

The successor to the Windows NT 4.0 operating system, Windows 2000 Server offers improved reliability, server management, and extended hardware support. Migration to the Windows 2000 operating system is required for the successful application of Exchange 2000. This solution presents new Windows 2000 servers (primary and backup server) into the existing server environment as platforms for the new Exchange 2000 application. Introducing new servers offers the opportunity for server upgrades and consolidation, and avoids lengthy application downtimes caused by an existing server operating system upgrades.

Migration to Windows 2000 also requires the implementation of Active Directory. Active Directory is an essential part of the Windows 2000 architecture, offering a directory service designed for distributed computing environments. A new Primary Domain Controller server should be introduced into the new Windows 2000 environment should a robust Window NT4.0 domain controller service not already exist. Links to Active Directory implementation information and supporting Active Directory services are part of the Exchange 2000 Migration solution.

Microsoft Exchange 2000 Enterprise Edition

Exchange 2000 Enterprise Edition allows for the configuration of multiple storage groups and multiple databases. When used with a SAN-storage architecture, it allows for virtually unlimited database scalability. Exchange 2000 is loaded on the Windows 2000 servers. All existing Exchange 5.5 mailboxes are migrated from the various distributed Exchange 5.5 servers to one Exchange 2000 server, with minimal disruption to the user. One Exchange server supports the existing Exchange users after migration, and another server acts as a backup Exchange server, a best practice configuration in the event of primary Exchange server failure. After migration, all distributed Exchange services are consolidated onto a single Exchange server for improved manageability.

Modular SAN Array 1000 (msa1000)

The msa1000 storage array offers a low-cost entry into a fully scalable SAN configuration. The array is configured with the Exchange 2000 databases and log volumes to support all Exchange users. All storage is consolidated on a single msa1000 and is accessible to the SAN-attached Exchange and backup servers.

SAN Infrastructure

The SAN infrastructure provides a fully scalable 2-Gigabit dedicated storage network. The SAN also permits resource sharing, high-speed backup and an easy upgrade path for additional application servers or SAN/NAS fusion.

Backup

A backup and recovery solution using a dedicated backup server and a SAN-attached msl5026 tape library is recommended for improved speed and manageability. HP OpenView storage data protector or CommVault Galaxy Backup and Recovery for Microsoft Exchange 2000 is recommended for backup of the Exchange 2000 database and log files.

HP OpenView storage data protector provides message-level backup, on-line message-level restoration, and Exchange 5.5 to Exchange 2000 message-level restoration. CommVault Galaxy Backup and Recovery for Microsoft Exchange 2000 provides message-level backup, on-line message-level restoration, Exchange 5.5 to Exchange 2000 message-level restoration, and a built-in Exchange archiving option.

Note that for message-level backups and restores, a copy of the Exchange 2000 application must exist on the backup server.

pre-migration
configuration

An Exchange configuration that exists prior to migration typically consists of any number of Windows NT 4.0/Exchange 5.5 servers distributed over the public network. These servers may have the Exchange database stored on disks internal to the server, or on an external disk shelf or array. Note that the entire Exchange data is located in several places across the network, making it more difficult to manage. In this configuration, backups are typically performed over the LAN, with each Exchange server's data being scheduled as independent jobs.

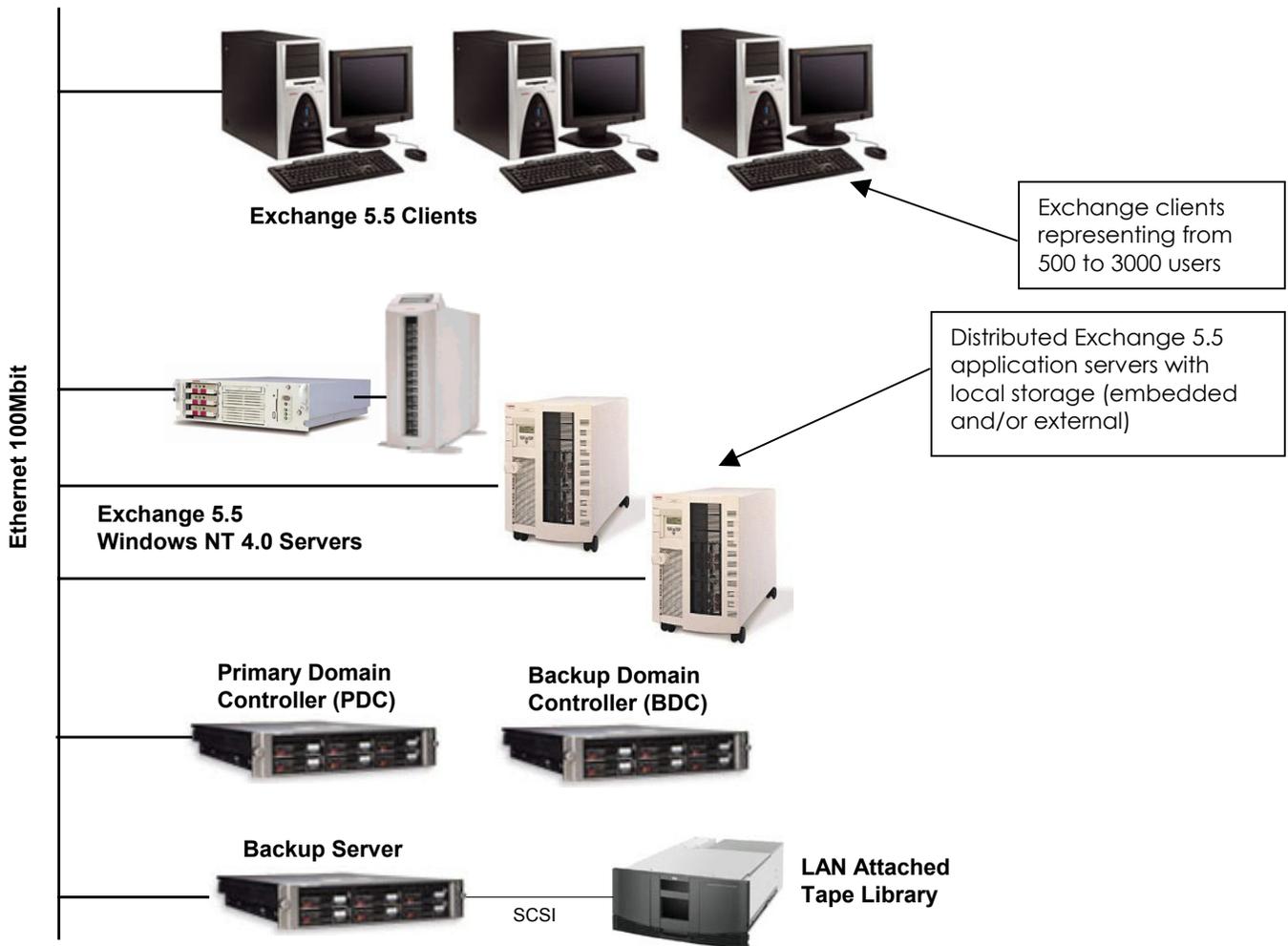**Distributed Exchange 5.5 / Direct Attached Storage Configuration**

figure 2**.** DAS-to-SAN Exchange 2000 Migration Solution pre-migration configuration

post-migration
configuration

The new Exchange configuration consolidates all users onto a single Windows 2000/Exchange 2000 server. A backup Exchange 2000 server is also configured in the event of primary Exchange server failure. A single msa1000 array, with connectivity to the Exchange servers through a 2-Gigabit fibre channel SAN switch stores all Exchange storage group data (database and log files). Consolidation of both the Exchange server and Exchange storage infrastructure improves the management of the Exchange application. A dedicated backup server is also available for SAN-based backup to a fibre-attached tape library.

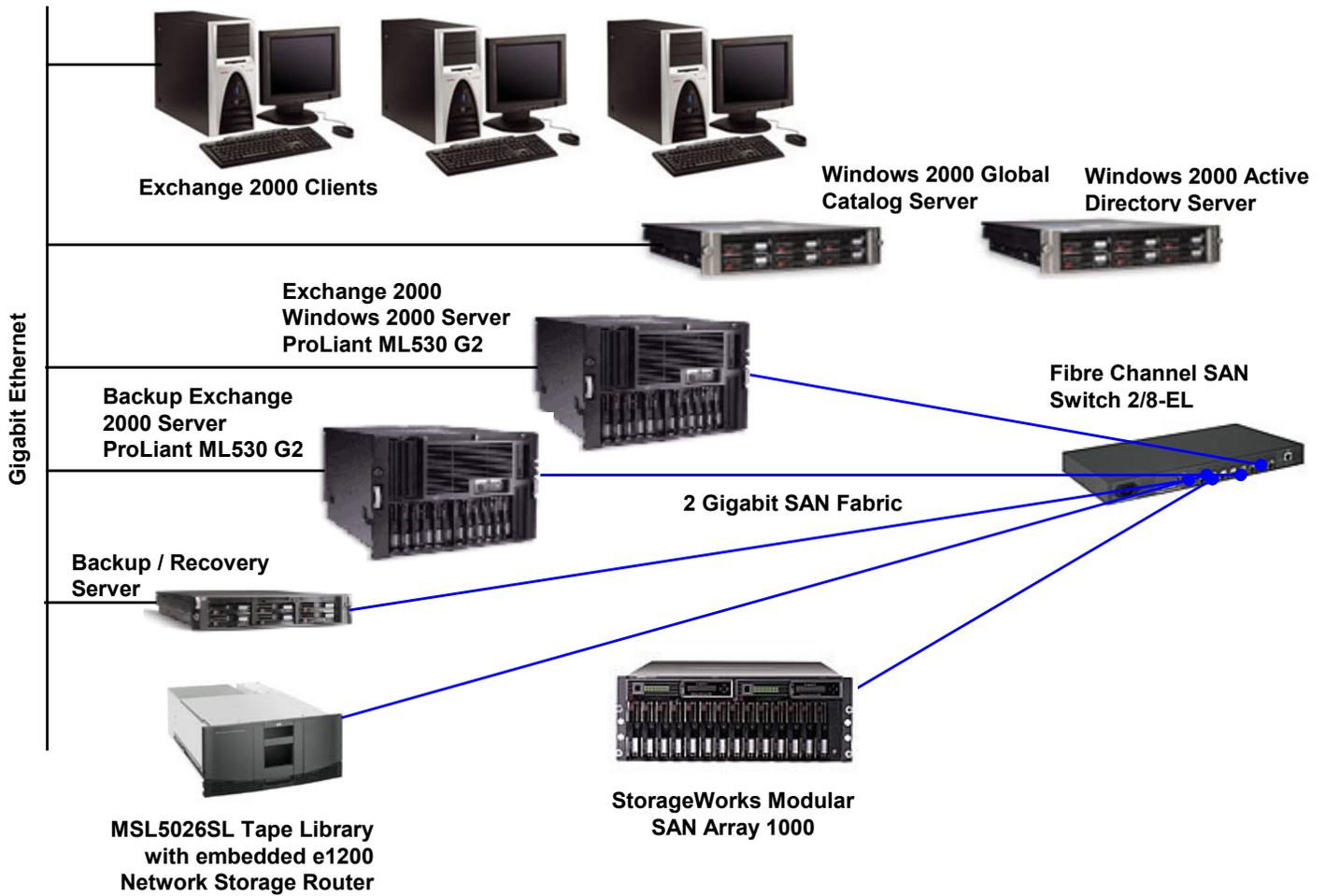**Consolidated Exchange 2000 / Storage Area Network Configuration**

figure 3. DAS-to-SAN Exchange 2000 Migration Solution post-migration configuration

hardware and software requirements

Figure 4 and Table 2 represent the recommended core solution components required for migration. Table 2 also provides recommended optional components for SAN-based backup, high availability, and improved storage management.

Exchange 2000 Server Backup Exchange Server HP ProLiant ml530 G2		Dual Xeon 2.4 GHz processors, 4096 MB ECC SDRAM (4) 36 GB, universal disk drives Integrated Gigabit Ethernet NIC NC7770 StorageWorks FCA2101 2 Gb FC HBA Windows 2000 Standard Server SP3 Exchange 2000 Enterprise Edition SP3
Backup Server HP ProLiant DL380		2.4-GHz processor, 1 GB SDRAM (2) 36 GB, universal disk drives Integrated Gigabit Ethernet NIC NC7770 NC3164 Gigabit Ethernet NIC StorageWorks FCA2101 2 Gb FC HBA Windows 2000 Standard Server SP3 Exchange 2000 Server* SP3 Backup Application Software and associated agents (choose one): OpenView Storage Data Protector v5.0 CommVault Galaxy 4.0 * Allows for individual mailbox restores and offline integrity checks.
Active Directory Server Backup Domain Server HP ProLiant DL380		2.4-GHz processor, 1 GB SDRAM (2) 36 GB, universal disk drives Integrated Gigabit Ethernet NIC NC7770 NC3164 Gigabit Ethernet NIC StorageWorks FCA2101 2 Gb FC HBA Windows 2000 Standard Server SP3 Exchange 2000 Server* SP3
Fibre Channel Switch HP StorageWorks SAN switch 2/8-el		(8) 1 Gb / 2 Gb universal auto-sensing ports
Storage Array HP StorageWorks msa1000		Modular SAN Array 1000 256 MB cache (6) 36-GB Ultra3 SCSI 10K Disk Drives
Tape Library HP StorageWorks msl5026		StorageWorks msl5026SL library (2) StorageWorks SDLT 110/220 tape drives StorageWorks Network Storage Router N1200

figure 4. DAS-to-SAN Exchange 2000 Migration solution components

table 2. hardware and software components to support migration of a 500 to 3000 user environment

Required Components	Quantity	Part Number
Exchange Server		
ProLiant ML530 G2, dual Intel Xeon 2.4GHz processors, 512kb level 2 cache, 1024 MB ECC memory	2	180286-001
4 GB (2 x 2048 MB) ECC SDRAM Memory Kit	1	203539-B21
HP NC7770 PCI-X Gigabit Server NIC	1	244948-B21
36.4-GB Wide Ultra3 SCSI 10,000-rpm Universal Disk Drives	4 per server	286713-B22
FCA 2101 2-Gb FC HBA	1 per server	245299-B21
Windows 2000 Server SP3	1 per server	Microsoft reseller
Exchange 2000 Server Enterprise Edition SP3	1 per server	Microsoft reseller
Exchange Clients		
Windows 2000 Server Upgrade - 5 Client Server Licenses	1 per server	Microsoft reseller
Microsoft® Exchange 2000 Server Upgrade Software - 5 Clients	1 per server	Microsoft reseller
Backup/Recovery Server		
HP ProLiant DL380 G3 server—Intel Xeon 2.4 GHz	1	257917-001
RAM Memory Upgrade, 512-MB ECC SDRAM	1	300678-B21
HP NC7770 PCI-X Gigabit Server NIC	1	244948-B21
36.4-GB Wide Ultra3 SCSI 15,000-rpm Universal Disk Drives	2	232916-B22
FCA 2101 2-Gb FC HBA	1	245299-B21
Windows 2000 Server SP3	1	Microsoft reseller
Microsoft Exchange 2000 Server SP3 *required for mailbox level backup and restore	1	Microsoft reseller
Active Directory and Global Catalog Server (Each server requires these components.)		
HP ProLiant DL380 G3 server—Intel Xeon 2.4 GHz	1	257917-001
RAM Memory Upgrade, 512-MB ECC SDRAM	1	300678-B21
HP NC7770 PCI-X Gigabit Server NIC	1	244948-B21
36.4-GB Wide Ultra3 SCSI 15,000-rpm Universal Disk Drives	2	232916-B22
FCA 2101 2-Gb FC HBA	1	245299-B21
Windows 2000 Server SP3	1	Microsoft reseller
Storage – Modular SAN Array 1000		
Modular SAN Array 1000	1	201723-B22
36.4 GB Ultra 3 Universal Hard Drives, 10k rpm	6	176496-B22
Note: Additional disk drives may be required as spare or backup drives, to support additional users, and/or for RAID 1+0 database configuration.		

table 2. hardware and software components (cont.)

Storage Area Network		
StorageWorks SAN switch 2/8-EL	1	258707-B21
2Gb SFF-SW Transceiver kit	8	221470-B21
Fibre Channel Cables	As required	234457-B2x
Client Network		
HP ProCurve 6108 Gigabit Ethernet Switch	1	J4902A
Optional Components	**Quantity**	**Part Number**
Backup		
MSL5026SL RM SDLT MiniLibrary (1 drive)	1	302512-B21
MSL5000 Embedded Fibre option e1200	1	262672-B21
HP OpenView Storage Data Protector V5.0, Starter pack (optional) SAN drive extension Online backup extension	 1 per drive 1 per server	B6961AA B6953AA B6965BA
CommVault Galaxy V4.0 with associated agents (optional) Single server license for Windows 2000 with 1or 2 drive Library plus One Application Agent and 10 File system Agents.		281582-B21 or contact CommVault
High Availability		
MSA1000 Redundant Controller	1	218231-B22
FCA 2101 2-Gb FC HBA (required for dual paths or clustering)	1	245299-B21
Secure Path V4.0 for Windows Workgroup Edition	1	165989-B22
Windows 2000 Advanced Server Microsoft Cluster Server (MSCS)	1 per server	Microsoft reseller
SAN Management Software		
OpenView Storage Area Manager v3.0 – Node Manager		J5368AA
OpenView Storage Area Manager v3.0 – Storage Builder		J5376AA
OpenView Storage Area Manager v3.0 – Storage Optimizer		J5372AA

The table above is accurate as of the date of printing. The above version numbers and part numbers are subject to change as new hardware and software becomes available.

design

A pre-migration and post-migration baseline Exchange configuration was developed as part of the solution validation process. Not all existing pre-migration configurations need to match exactly and the post-migration configuration described can be modified based on individual requirements.

Exchange clients

Five clients are connected to a 100 Mb network in the pre-migration scenario. In the post-migration clients are upgraded to a Gigabit Ethernet network. Otherwise clients have identical hardware configurations. For pre-migration configuration testing, Microsoft LoadSim generated MMB1 workloads during performance and backup testing. For the post-migration configuration, Microsoft LoadSim generated an MMB2 workload for performance and backup testing. The workload was balanced across all clients with 300 users each.

Exchange 5.5 servers

pre-migration

The Exchange servers used Microsoft Windows NT 4.0 SP6. One legacy ProLiant 1850R (Intel Pentium III, 600 MHz) and two legacy ProLiant 5500 (dual Pentium Xeon III, 500 MHz) servers, each attached to the 100 Mbit network, powered the Exchange 5.5 Server application. All Exchange database and log files were stored locally on 9 GB, 10k rpm, Ultra-SCSI 3 disk drives. The physical storage was either embedded in the server or externally attached using a legacy Smart Array 4200 controller.

post-migration

The Exchange 2000 servers used Microsoft Windows 2000 Server SP3. Two ProLiant ml530 G2 servers, each with a single FCA2101 (2-Gb HBA) adapter to connect to the SAN and a Gigabit Ethernet connection to the public network, powered the Exchange 2000 Server application. One server was used as the primary Exchange server, carrying the load for all users. The second server was configured as a backup server in event of primary server failure.

Exchange 5.5 database configuration

pre-migration

Each Exchange 5.5 server contained a local Exchange information store to support 500 users.

post-migration

Refer to storage configuration, post-migration

storage configuration

pre-migration

The Exchange 5.5 database and log files were configured on separate volumes. The database files used RAID 5 and the log files were mirrored using RAID 1+0. This configuration has circular logging enabled during the migration process to prevent the logs from overflowing.

Note: Once the migration process is complete, we recommend you disable circular logging. This will enable you to restore using incremental logs as part of your database recovery strategy.

post-migration

Note: The following is the recommended storage configuration for 1500 users, each with 50MB mailbox storage limits. The actual test configuration used differed from that shown here due to specific requirements dictated by the MMB2 workload simulation tool.

The Exchange configuration contained a single Storage Group - supporting 1500 users. The Storage Group was configured with 2 databases, with 750 users each. One RAID 5 LUN, comprised of four 36 GB disks, was used for database files and public folders. This configuration supported the 1500 users, with additional capacity available for 500 additional users, each with 50-MB mailboxes, or the additional space may be used for increasing mailbox sizes. Additional disks are required to support 3000 users. A similar storage configuration utilizing RAID 1+0 for database files, for improved array performance, would also require additional disks. Alternative disk configurations based on number of users and RAID configuration is shown in Table 3.

network configuration
pre-migration
A 10/100 Megabit Ethernet was configured as a public network for client access to the application servers and for Exchange server access to the backup server.
post-migration
A Gigabit Ethernet was configured as a public network for client access to the application servers. A 2-Gigabit 16-port SAN switch connected the Exchange servers, storage array, and backup component. A single Fibre Channel path was used for each server (no redundancy was provided).

backup server
Both LAN- and SAN-based tape backups used a dedicated ProLiant DL380 G3, loaded with Microsoft Windows 2000 Server SP3. Since there was no requirement for individual mailbox restores and offline integrity checks during our testing, Exchange 2000 Server SP3 was not installed.

pre-migration
The backup server was connected to the 10/100 Mbit Ethernet via SCSI to the tape library.

post-migration
The backup server was connected to the network using PCI-X Gigabit Ethernet, and to the 2-Gigabit SAN. The tape library was also connected to the SAN using a fibre to SCSI converter.

HP OpenView Storage Data Protector and CommVault Galaxy Backup and Recovery for Exchange 2000 were separately installed and used as the backup applications. The databases and logs were backed up to a msl5026 Tape Library using SDLT 110/220 tape drives. This configuration will have circular logging disabled.

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								
	database and public folder RAID 1+0				log files RAID 1+0							
1500 - 2000	database and public folder RAID 5				log files RAID 1+0							
	database and public folder RAID 1+0						log files RAID 1+0					
3000	database and public folder RAID 5						log files RAID 1+0					
	database and public folder RAID 1+0										log files RAID 1+0	

Note: RAID 1+0 is the ideal choice for database and log files, but requires a 4 disk minimum. In order to minimize disk usage, our configuration uses RAID 1 for log files.
Note: When configuring the msa1000 to use only two disks configured as RAID 1+0, the msa1000 configuration utility will automatically default to RAID 1. The msa1000 configuration interface will note this configuration as RAID 1+0.

Note the following best practices when configuring the Exchange environment:

Use traditional Microsoft Exchange 2000 configuration rules when planning storage configurations. For database files, use RAID 1+0 for best performance or RAID 5 to minimize disk utilization. For log files, use RAID1+0 to handle heavy write activity.

When configuring data and log files, it is an HP best practice and a Microsoft recommendation to use different RAID groups for log files and data files. Using this strategy, the log files are always on different volumes from the data files. You may also configure each Exchange database on a separate volume, increasing the number of spindles, for additional performance.

For any domain that spans multiple sites, Microsoft recommends the use of a separate Global Catalog server at each site where an Exchange 2000 server is present.

migration methods

Five basic methods are available to perform a migration from Exchange 5.5 to Exchange 2000.

Move Mailbox – a new Exchange 2000 server is introduced into an Exchange 5.5 configuration and all mailboxes and public folders are migrated using the Exchange Move Mailbox Wizard.

Swing Method – new Exchange 2000 servers are introduced into the Exchange 5.5 environment and all mailboxes are migrated using the Move Mailbox Method. After migration, the Exchange 5.5 servers are upgraded to Exchange 2000 and the original mailboxes are migrated back to the original servers.

In-Place Upgrade – Exchange 2000 is installed on an existing Exchange 5.5 server. All existing Exchange databases and connectors are upgraded to Exchange 2000.

ExMerge – the Exchange ExMerge utility exports all user mailboxes and public folder data .pst files and then imports the data back to an Exchange 2000 server.

Migration Wizard – Exchange 2000 Migration Wizard (MigWiz) migrates mailbox data from servers in an Exchange 5.5 organization to a separate Exchange 2000 organization.

The DAS-to-SAN Exchange 2000 Migration solution uses the Move Mailbox method as the basis for the Exchange migration. This is the preferred Microsoft method for Exchange 5.5 to Exchange 2000 migration. With the Move Mailbox method, the administrator can plan specific mailbox moves to a new Exchange 2000 server with the least impact to Exchange application availability. The only downtime experienced by the user is when mailbox groups, which include that specific user, are moved, while other users remain unaffected. After a user has been migrated, the user's MAPI profile is automatically updated. After the successful migration of all users, the old Exchange 5.5 servers can be decommissioned or redeployed.

Advantages of the Move Mailbox migration method include:

- Maintains availability of Exchange applications. Minimal impact to users.

- Administrators can plan user migrations by site, function, or user group. Not all users need to be upgraded concurrently.
- Client profiles are automatically reconfigured once the user logs on after migration.

- New Exchange 2000 servers can be pre-configured off-line prior to migration. Offers the opportunity for server consolidation.

Testing of the Move Mailbox migration method using the configuration described in this solution resulted in an average mailbox migration rate of 5 MB per minute (10 minutes for a typical 50 MB mailbox).

All mailbox migrations were performed in manageable groups to reduce the impact on users as well as to limit the size of the move in the event of an unsuccessful migration.

All user passwords were maintained. Individual user involvement in the migration process was minimal, with little Exchange application disruption.

migration process

The *Implementation Blueprint* and *Microsoft Project Guide* detail the required migration procedures as follows:

1. Assess the current Exchange 5.5 environment
2. Design the new Exchange 2000 environment
3. Develop user migration plans
4. Perform a complete backup of existing Exchange environment
5. Prepare Exchange Server 5.5 for migration
6. Prepare to introduce Active Directory
7. Introduce new Exchange 2000 servers
8. Install and configure msa1000 and storage array network
9. Connect Exchange servers to the SAN at the Exchange site
10. Migrate mailboxes, public folders, and system folders using Move Mailbox method
11. Re-route Internet Mail
12. Remove old Exchange 5.5 servers

performance results

The 1500 user simulated load (MMB1 for Exchange 5.5 and MMB2 for Exchange 2000) compared the performance of the pre-migration Exchange 5.5 environment to the post-migration Exchange 2000 environment. The Exchange application performance and backup performance confirmed that there was no deterioration in performance from a migration to Exchange 2000, consolidation from three Exchange servers to one, consolidation of multiple local storage sites to a singe SAN-based array, and migration from a LAN-based backup to a SAN-based backup configuration. See the results in Table 4.

Test 1. Exchange Performance
Multiple performance counters were monitored as the Exchange application handles 1500 user requests. Request wait time, a primary indication of application performance, verified a consistent level of Exchange performance. Exchange server CPU utilization was also monitored to validate consolidation to a single server Exchange application.

Results: Despite the migration from three servers to a single server, application wait times were not significantly affected, in fact, mean wait times were greatly improved to less than one-third of that for the Exchange 5.5 configuration. CPU utilization averaged 20% for the three Exchange 5.5 application servers, whereas, CPU utilization was less than 10% for the new Exchange 2000 server.

Test 2. Backup Performance
Data transfer rates were monitored, under a user load and a no-load condition for both the initial LAN-based and SAN-based backup configurations. Note that the same backup server was used for both configurations. The LAN configuration used the 100 Megabit network with a SCSI-attached SDLT tape library. The SAN configuration used the 2-Gigabit SAN for data movement.

Results: Both the no-load and 1500 user-load backup transfer rates, and associated backup times, were considerably improved using the SAN-based backup configuration and the PCI-X Gigabit Ethernet. No-load tape backup times for the post-migration configuration were one-third of that for the pre-migration configuration.

table 4. pre-migration performance vs. post-migration performance

	Exchange 5.5 DAS Configuration LAN / SCSI attached tape	Exchange 2000 SAN Storage fibre attached tape
Wait time (with 1,500 user load)		
95 percentile	.397 seconds	.425 seconds
Mean	.089 seconds	.039 seconds
Backup speed		
No user load	20 GB/hr	65.5 GB/hr
User load	14 GB/hr	27.3 GB/hr

services

Microsoft Exchange 2000 Upgrade Service
Installs two new Windows 2000 Servers, Windows 2000 operating system, Exchange 2000, and the migration of mailboxes.
Prerequisite: Appropriate Windows 2000 Server hardware
Part Number: FM-EXUG3-IN

msa1000 Installation and Startup Core Service
Installs and configures one StorageWorks msa1000 storage subsystem with up to five servers.
Prerequisite: Appropriate msa1000 hardware
Part Number: FP-CSTAR-10

Exchange 2000 Readiness Review
Provides consultation and review of an existing environment to ensure the successful implementation of Exchange 2000. Review includes:
– Overview of Exchange 2000
– Exchange 2000 Deployment
    Active Directory
    Network
    Security
    Storage
– Review Exchange 5.5 Directory content (optional)
    In an existing Exchange 5.5 environment, the HP ADC Checker tool reviews the Exchange 5.5 directory to identify any inconsistent data to ensure that only appropriate data populates the Active Directory.
Prerequisite: none
Part Number: U1503A

Additional HP Consulting and Integration Services
Exchange 2000 Business Value and Technical Assessment
Exchange 2000 Planning and Design
Exchange 2000 Implementation

future considerations: application consolidation

Migration from a distributed DAS-based environment to a SAN environment also offers the following additional advantages with regards to storage management, scalability, and application consolidation.

- Easy allocation of additional storage into the existing Exchange database

- Ability to implement host-based snapshot and on-line volume growth procedures using Virtualized Storage Management solutions for Exchange 2000

- Ability to implement storage management and SAN-monitoring tools using HP OpenView storage area manager software

- Consolidation of additional applications on the SAN, sharing the existing msa1000 storage array

- Consolidation of file services on the SAN using the HP NAS b3000 and msa1000 storage array for SAN/NAS fusion
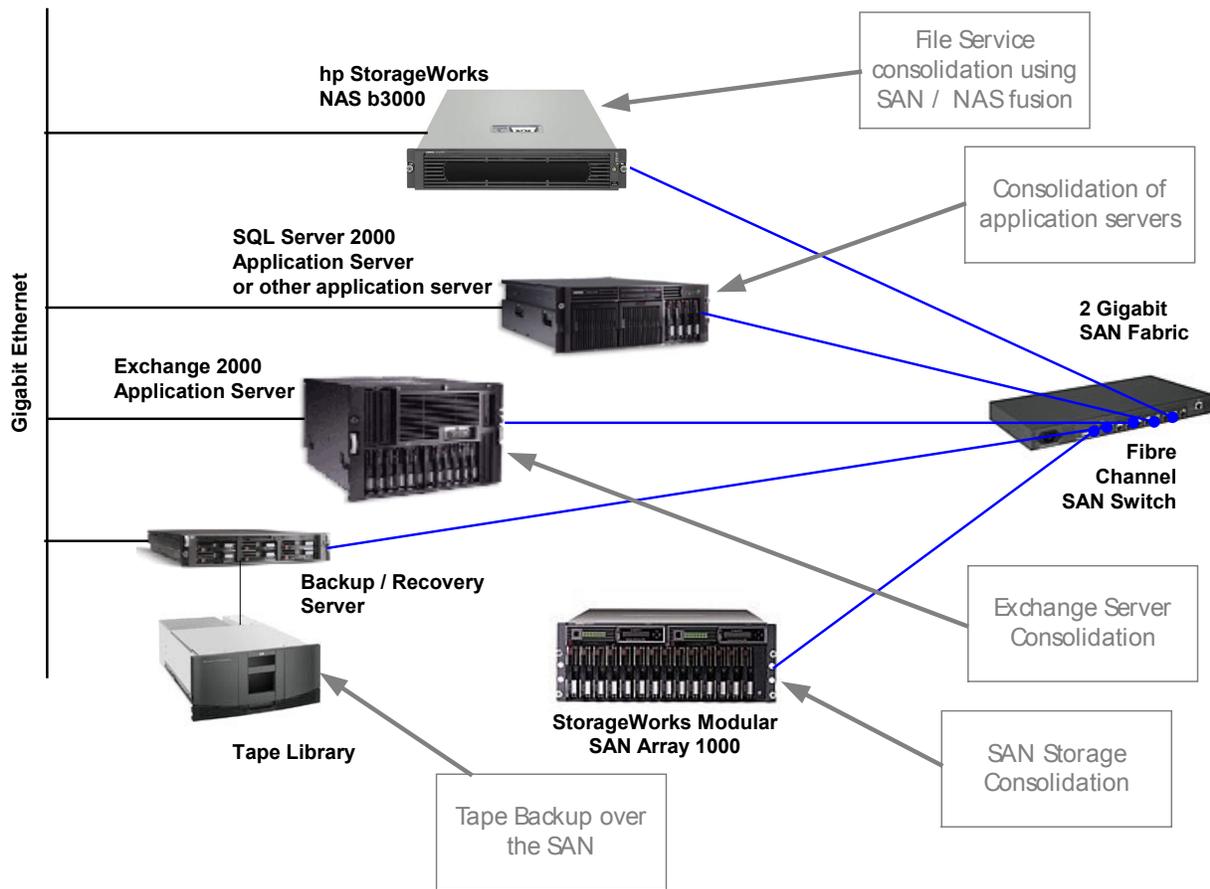
Consolidating Applications and File Services

figure 5. introduction of future applications and NAS/SAN fusion to existing Exchange 2000 configuration

future considerations: Exchange 2003 migration

Exchange 2003 is the next release of Microsoft Exchange. Like Exchange 2000, Exchange 2003 depends on Active Directory services for information on servers and users. Exchange 2003 also requires Windows Server 2000 SP3 or Windows Server 2003. Since it is not possible to directly upgrade a server from Exchange 5.5 to Exchange 2003 without going through Exchange 2000 first, HP suggests a phased approach.

Microsoft does not support Exchange 2000 or Exchange 5.5 on Windows 2003. If you plan to deploy Windows 2003, consider a migration to Exchange 2003.

For more information, visit:
Get Ready for Exchange Server 2003 at:
http://www.microsoft.com/exchange/evaluation/ti/default.asp

why HP

- HP provides tested and supported Exchange Solutions built with world-class servers and storage, supported by a single point of contact—HP.

- HP is a Prime Integrator of Exchange 2000 as designated by Microsoft and has over 3.7 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

See your HP sales representative or authorized reseller for the companion implementation blueprint, which contains detailed information for this solution.

Other important information:

HP Solutions
HP StorageWorks SAN consolidation solutions
http://h18006.www1.HP.com/products/storageworks/solutions/consolidation/index.html

HP Storage Solutions for Microsoft Exchange
http://h18006.www1.HP.com/storage/solutions/application.html#me

HP Storage Hardware and Software
HP modular san array 1000
http://h18006.www1.HP.com/products/storageworks/msa1000/index.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 StorageWorks NAS b3000
http://h18006.www1.HP.com/products/storageworks/b3000/index.html

HP Services
HP Services for Microsoft Exchange
http://h18005.www1.HP.com/services/messaging/

Microsoft
Microsoft for Partners, Project Guides
http://members.microsoft.com/partner/productssolutions/projectguides.aspx?nav=ln

Microsoft Exchange Server
http://www.microsoft.com/exchange/default.asp

Top Ten Reasons to Move to Windows 2000 Server
http://www.microsoft.com/windows2000/server/evaluation/whyupgrade/default.asp

Description of Exchange Server Migration Methods
http://support.microsoft.com/default.aspx?scid=kb;en-us;327928

CommVault
CommVault Galaxy Data Protection Suites and Configurations
http://www.commvault.com/go-HP/products.asp?pg=1&sku=281582-B21

Please contact us with any comments or suggestions on the information provided in this document at:

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