entry-level Exchange solution

executive summary

Messaging and collaboration tools are changing the way companies do business today. The ability to communicate with co-workers, customers, and suppliers through 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 large and small businesses 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 messaging needs today and to grow with your requirements over time. This flexibility and scalability ensure your solution provides you the lowest total cost of ownership possible.

This document presents an Exchange 2000 solution supporting up to 1,000 users. It provides:

- A low-cost solution to get your messaging system started with the lowest possible investment.
- An expandable solution that can grow as your organization and requirements grow.
- A solution based on HP servers, industry leaders in reliability and scalability.
- A storage solution built around the HP StorageWorks Virtual Array 7100, providing exceptional data protection and availability with ease of management.

Diagrams, design rules, scalability options, and a bill of materials are included for the example configuration. In addition, information is provided on HP Services that can help you design, install, and maintain your Exchange 2000 messaging application. See the "for more information" section at the end of this document for additional information on HP Exchange Solution blueprints.

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 its failure can pose a significant threat to a company's success. The three major concerns customers have for their Exchange 2000 environment are:

- Availability — eliminate downtime and minimize the recovery window in case of downtime
- Scalability — scale up capacity and performance as an organization grows without affecting availability
- Manageability — establish effective management to achieve availability and scalability requirements

why an hp Exchange solution?
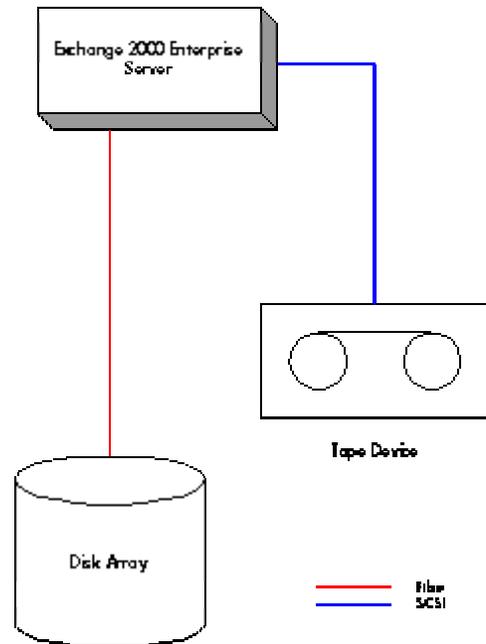
figure 1 - entry-level Exchange solution logical view

HP provides a tested and supported Exchange solution built with world-class servers and storage, supported by a single point of contact—HP. HP servers and storage are Microsoft-certified platforms. In addition, as a result of the strong services alliance between HP and Microsoft that spans over 15 years and the ongoing collaboration around key Microsoft technologies, HP can provide you with the highest level of services and support for Microsoft technology available today. With a service and support organization of over 65,000 professionals in 160 countries and a broad portfolio of services, HP offers customers the peace of mind that comes from knowing that their solution works right now and can expand into their future with them.

HP servers consistently rank among the top performing platforms in Exchange testing, as reported by Microsoft (www.microsoft.com/exchange/techinfo/planning/2000/PerfScal.asp). This solution is designed around an HP ProLiant DL380 G2. HP servers provide a broad range of server-based solutions for a variety of needs. These servers feature the latest technology and can be configured to meet your specific requirements, including the number of processors, the amount of available RAM, or the number of network adapters. HP service and warranty offerings make HP servers the perfect platform for your Exchange solution.

HP StorageWorks tape devices and HP OpenView Data Protector software provide a secure and manageable solution for customer data protection. Data Protector and Exchange integration provides flexible backup protection with minimal impact on system performance and application availability. Depending on the available hardware, Data Protector can write backup streams to the same tape drive or to different ones. Backup streams can either go to devices locally attached to the Exchange server, go through the LAN to any system or systems, or make use of a Storage Area Network (SAN) and move the data with maximum performance 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 a customer's infrastructure to provide highly reliable and cost-effective backup in systems of any size.

The va7100 uses HP virtual array technology to deliver the best availability and manageability of your data. A single va7100 delivers extremely high availability—up to 99.95 percent uptime. The array-based virtualization technology in the va7100 provides IT administrators with storage solutions that increase operational availability while reducing the IT management costs. The use of RAID 5 DP can virtually eliminate data corruption.

key components

HP ProLiant DL380 G2		• Two (2) 1.4 GHz processors • Two (2) 72 GB disk drives • 3 GB ECC SDRAM • Hotswappable, redundant power supplies • 2U rack-mountable enclosure
HP StorageWorks 1/16 Tape Superloader		• Up to 640 GB compressed • Up to 3 MBps native performance • One (1) DLT1 tape drive, 16 slots • 2U rack-mountable enclosure
HP StorageWorks Virtual Array 7100		• Up to 1.1 TB in 3U space • Available drive capacities: 18 GB, 36 GB, 73 GB

entry-level Exchange solution

This solution supports up to 1,000 users, each with a 50MB mailbox.
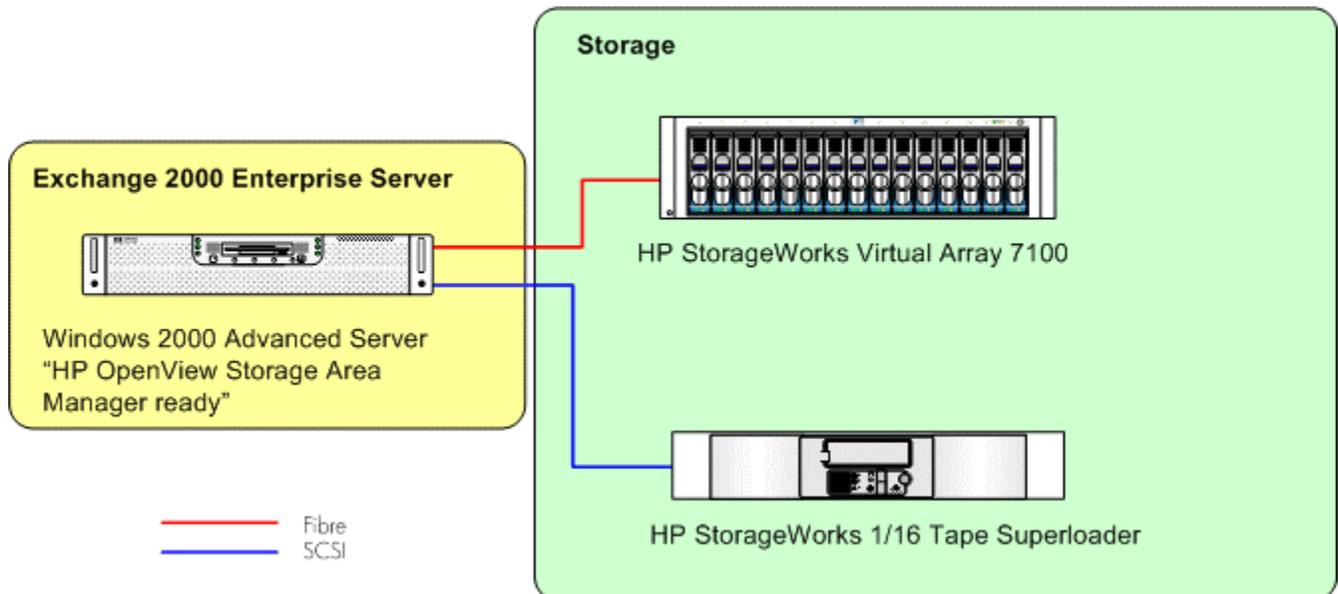
figure 2 - example entry-level Exchange solution physical view

HP Rack System/E25

ProLiant
DL380 G2
2U

Flat Panel
Monitor/Keyboard
2U

HP StorageWorks
1/16 Tape
Superloader
2U

HP StorageWorks
Virtual Array 7100
3U
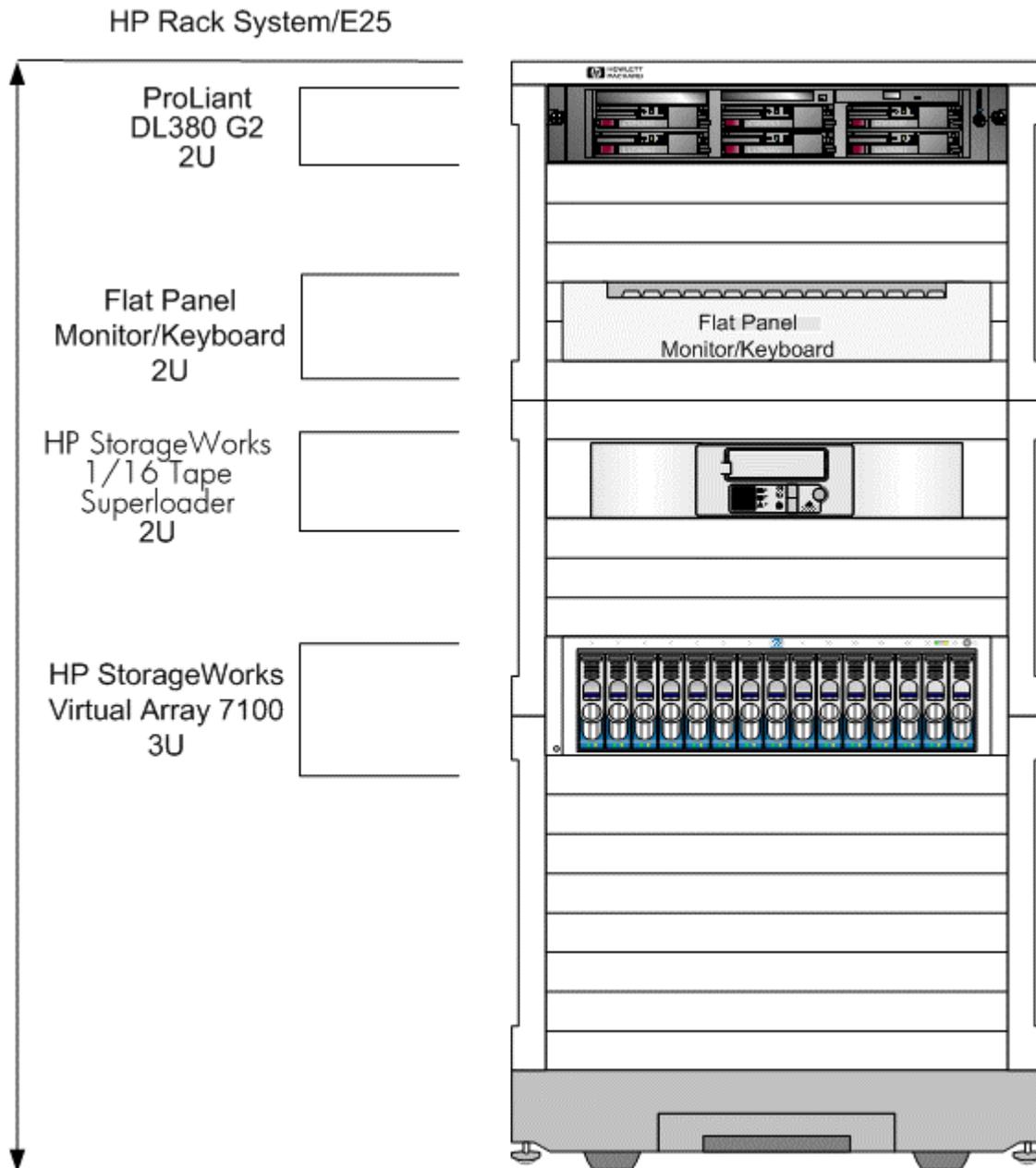
figure 3 - example entry-level Exchange solution rack

This Exchange solution can be racked in an HP Rack System/E25 rack to minimize space at a customer's site. The HP Rack System/E33 offers additional space to add components, for example, servers, va7100s, Fibre Channel switches, or tape libraries, as the solution grows. The example rack in Figure 3 includes an HP rackmount flat monitor and keyboard. This optional component provides device management capability at the rack in a minimum amount of space.

entry-level Exchange configuration

The example Exchange solution in this blueprint can be modified to meet specific customer needs. The following are assumptions, design rules, and scalability. This information is intended as a guide in configuring a specific Exchange solution to meet a customer's requirements. The HP Exchange Solution Design Wizard may be used to build configurations using different assumptions and requirements.

assumptions:

Exchange usage profile

Exchange parameter	value	Exchange parameter	value
Mailbox size	50MB	Internet users	10%
Maximum number of users	1,000	Bridgehead servers	No
Average message size	10KB	Front-end servers	No
MAPI users	90%		

Exchange architecture
- An existing Windows 2000 Active Directory Domain.
- One Storage Group with four mailbox stores (250 users per store).
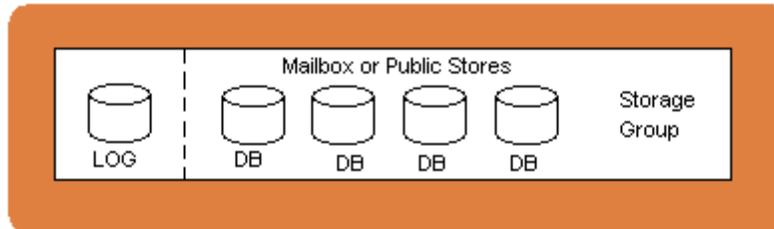
figure 4 - Exchange storage group for entry-level Exchange solution

- Total storage required for mailbox stores is 50GB (each user has a 50MB mailbox). Per Microsoft recommendations, twice that amount of storage 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 LUNs on the disk array.

server
- ProLiant DL380 G2 with dual processors and redundant power supplies is used. See "entry-level Exchange solution specifications" for specifics.
- The HP StorageWorks Command View VA and HP OpenView Data Protector Cell Manager Starter Packs applications run on the Exchange server.
- A built-in network interface card (NIC) is used.

array
- va7100 array with two 512MB controllers.
- Disk capacities are calculated with the va7100 array in RAID 1+0 mode with one hot spare.
- Two LUNs are created for use by Exchange (one for Storage Group log files, one for Storage Group databases).

tape
- HP StorageWorks 1/16 Tape Superloader has 16 DLT Type IV tapes loaded.

design rules:

- Log files are stored on separate LUNs from databases to enable a database recovery using the log file should a database be corrupted.
- Multiple mailbox stores should be configured within a 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.

backup strategy:

- Data Protector software is used to manage online backups.
- Circular logging is turned off. Log files are not overwritten after they are applied to a database. This allows the log files to be used with the last full database backup to recover a database. If you enable circular logging, you can restore data only up to the last backup. You may not be able to restore data from the last backup to the point of the failure because the required log files may not be available.
- Full Exchange database backups occur seven days a week. Full daily backups delete log files that contain transactions already committed to the database, minimizing the amount of storage space needed for log files. They also minimize the number of tapes needed for recovery.
- Backups should be scheduled during periods of low system load. A system load up to 30 percent has minimal impact on backup time.
- Several incremental backups should be run during the day.
- The Exchange application and the Active Directory server are backed up regularly as part of the customer's normal backup procedure.
- Full Exchange database backups take no more than 2.5 hours (system load < 30 percent).
- Best case (no system load) backup speeds are listed in the following table.

	Native Transfer Rate	2:1 Data Compression
DLT1 tape drive	10.8GB/h	Up to 21.6GB/h

table 1 - tape backup speeds

- Recovery time is determined by the restore time plus the time needed to replay log files. The number of log files varies depending on the time interval between incremental backups and the arrival rate of new email messages. Complete database recovery is expected to take less than 3 hours.

availability

- The Exchange server database is available during backups.
- In the event that a single database recovery is required, only the individual Exchange database that is being restored is not available during the recovery. All other databases are available.
- The absence of redundant paths and a clustered server make this solution vulnerable to single points of failure.
- Response time is less than 500ms.
- The Data Protector Cell Manager Starter Packs application running on the Exchange server decreases its performance during backups and restores.

scaling options for the entry-level Exchange solution

availability

- Use of a server cluster can improve availability should a server fail.
- An increase the number of databases or the number of Storage Groups will decrease the restore time and lessen the impact on users when a database fails.
- Adding a second HBA to the Exchange Server to connect to the second controller on the va7100 and using the HP StorageWorks Auto Path VA application can increase availability in the event of a controller failure.

adding additional messaging users
- Expanding this configuration beyond 1,000 users requires an additional server and storage.

online storage
- va7100 capacity may be expanded online by adding additional disks. The array controller will recognize that a new disk has been added, and will include the disk in the array configuration automatically if the Auto Include feature is enabled. To make the additional capacity available to the host, a new logical drive must be created, and the resulting drive must be configured into the operating system.

decreasing the backup and recovery window
- Using a faster tape drive, such as an HP Ultrium tape drive, would speed backup and recovery.
- The number of Storage Groups should be increased and a one-to-one Storage Group to tape drive ratio should be used.
- Employing the HP Zero-Downtime Backup (ZDB) approach and Instant Recovery can significantly reduce the Exchange database recovery window, from hours to minutes. ZDB automates the creation and splitting of a business copy. Instant Recovery automates the recovery from that business copy.
- The recovery window also can be reduced from hours to minutes using the HP Fast Recovery Solution for Exchange. The Fast Recovery Solution automates the recovery of an Exchange database from a recovery-ready copy.

entry-level Exchange solution specifications

Use the latest released software, firmware, and driver revisions for each component. Your HP sales representative or channel partner can assist you.

server

Exchange 2000 Server Configuration

Operating System	Server	Host Bus Adapter	Processors	ECC SDRAM	Disk Drives	Network Interface Card
Windows 2000 Advanced Server, SP 2	DL380 G2	64-bit/66-MHz Fibre Channel	2 x 1.4 GHz	3 GB	2 x 72 GB	Built In (NC3163 Fast Ethernet)

storage

Disk Storage

Features	va7100 18 GB Drives	va7100 36 GB Drives	va7100 73 GB Drives
Number of Drives	15	8	7
Usable Capacity with RAID 1+0 and 1 Hot Spare	122 GB	130 GB	230 GB
Raw Capacity	269 GB	287 GB	502 GB

Note 1: Shaded areas represent hardware used in example technical blueprint configuration.

Note 2: A minimum of seven disks is required. If HP AutoRAID is used, the number of disks needed will be different.

Tape Storage

Features	1/16 Superloader	SSL2020 Tape Library	MSL5026 Tape Library	
Drive Type	DLT1	AIT	DLT 8000	SDLT
Number of Drives	1	2	2	2
Number of Slots	16 + 1	20	26	26
Max Native Storage Capacity	640 GB	1 TB	1 TB	4 TB
Max Native Data Transfer Rate (Fully loaded)	3 MBps	12 MBps	12 MBps	32 MBps

Note: Shaded areas represent hardware used in example technical blueprint configuration.

software components

Exchange Server Software

Software Name	Description
Microsoft Exchange 2000 Enterprise Server	Supports messaging application for multiple Storage Groups.
HP Data Protector Cell Manager	Provides data protection through automated backups.
HP StorageWorks Command View VA	Provides device configuration and management for the HP Virtual Array family of products.
HP OpenView Storage Area Manager - host agent component (optional)	Allows Exchange server to be managed as part of a SAN. Host agent was loaded on Exchange server during solution testing.

services

HP Services

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's 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 multivendor products.

entry-level Exchange bill of materials

The following bill of materials (BOM) represents the hardware and software used in the example Exchange solution configuration in Figure 2 of this blueprint.

Bill of Materials

Exchange Server

QTY	DESCRIPTION	COMMENTS
1	DL380 G2	Order Windows 2000 Advanced Server (SP2 or better)
	2 Processors (1.4 GHz) 3 GB or more of 133 MHz ECC SDRAM Redundant power supplies Monitor, keyboard, and mouse	
2	HP 72.8 GB 10K Ultra3 Wide SCSI-3 HS HD	Order a minimum of 2, a maximum of 6. Choose between 18.2 GB, 36.4 GB, or 72.8 GB disks drives.
1	64-bit/66-MHz PCI-to-Fibre Channel Adapter	

HP Tape Libraries

QTY	DESCRIPTION	COMMENTS
1	HP StorageWorks 1/16 Tape Superloader	

Tape Media

QTY	DESCRIPTION	COMMENTS
16	HP DLT Type IV media	
1	HP DLT1 Cleaning media	

Disk Array

QTY	DESCRIPTION	COMMENTS
1	va7100, Dual Controller	Available with 256 / 512 / 1024 MB Cache
8	36 GB Disk Drives	Order a minimum of 4, a maximum of 15 drives. Choose from 18 GB, 36 GB, and 73 GB drives.

Application Software

QTY	DESCRIPTION	COMMENTS
1	Microsoft Exchange 2000 Enterprise	Exchange software for DL380 G2.
0	HP Command View VA	One host license included with array.
1	HP Data Protector	

figure 5 - example entry-level Exchange solution BOM

for more information

Exchange solutions

Additional HP Exchange Solution technical blueprints are available at
www.hp.com/products1/storage/application/email/info_library.html

Mid-Market Exchange Solution

Enterprise-Level Exchange Solution

For more business-level information, take a look at our business blueprint available at
www.hp.com/products1/storage/application/email/info_library.html

To get answers on additional Exchange implementation questions, contact your HP sales representative who can consult our Solution Design Wizard to tailor a solution that meets your requirements.

hp Exchange solution components

To get further information on the individual components, go to www.hp.com

hp services

A full range of Exchange services are available including planning, implementing, and evolving your Exchange solution as your needs change. For full details see www.hp.com/go/mstechservices. Available services include:

Exchange consulting 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, co-existence with other messaging systems, global deployment, definition of service level objectives, and implementation of management policies.

support services

These comprehensive and flexible services provide single point-of-contact for both HP and multivendor products. Specific support services from HP include:

- software support
- multivendor hardware support
- multivendor network support