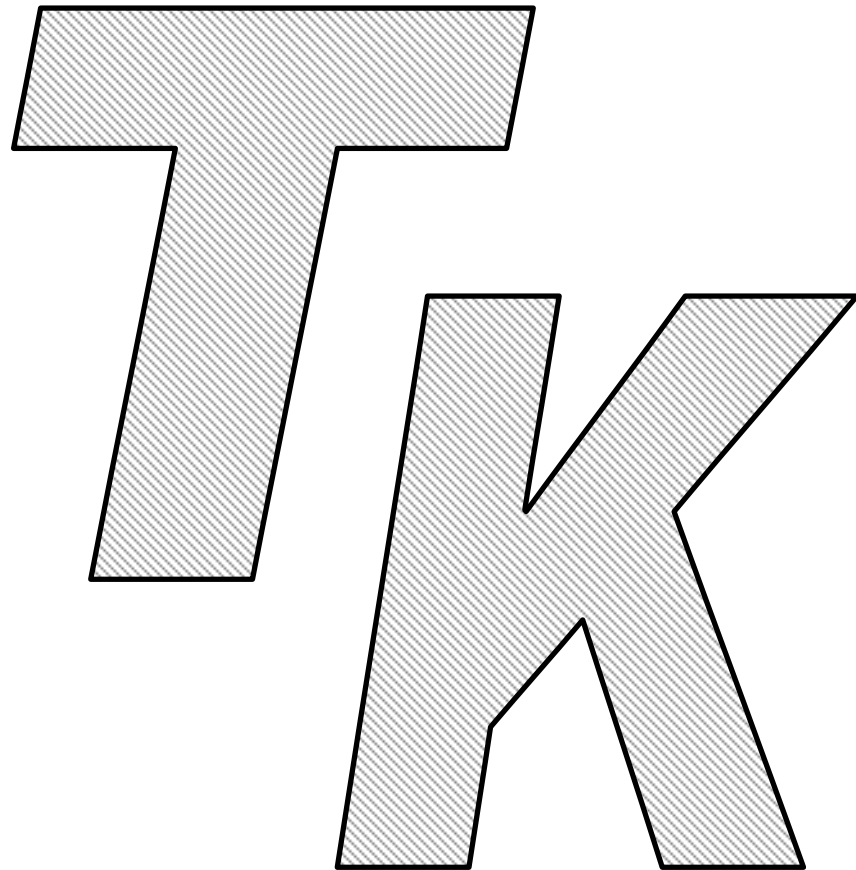


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MCSE STUDY GUIDE



**Installing, Configuring, and
Administering Microsoft
Exchange 2000 Server
Exam 70-224**

Edition 2

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*This study guide is a selection of concepts and keypoints similar to the skills being measured on the **official Installing, Configuring, and Administering Microsoft Exchange 2000 Server MCSE 70-224 exam**. Study and memorize the following concepts, and keypoints for approximately 15 to 20 hours and you will be prepared to take the exams. We guarantee it!*

Installing, Configuring, and Administering Exchange 2000 Server Concepts

Installation and Upgrading

Requirements

The recommended hardware for Exchange 2000 Server is as follows:

- 128 to 256 MB of RAM
- 2 GB of available disk space on the drive for Exchange 2000 Server with 500 MB available on the system drive. All drives that Exchange 2000 Server interacts with should be NTFS partitions.
- VGA compatible display adapter
- Paging file set to at least twice the amount of RAM
- CD-ROM drive
- Pentium 300 MHZ or faster processor

Exchange 2000 Server must be installed on a Windows 2000 Server, Advanced Server, or Datacenter Server computer that has Service Pack 1, Internet Information Services (IIS) with TCP/IP, Network News Transfer Protocol (NNTP), and Simple Mail Transport Protocol (SMTP) installed. Exchange 2000 Server must have access to a DNS server, and the installing user should have permission to change the Active Directory schema.

An installer should thoroughly plan the configuration of Exchange 2000 Server before installation. You should take into account the size, scope, network topology, and arrangement of the organization that the Exchange 2000 Server will serve.

Initial Configuration and Setup

Preparing Active Directory Schema for Installation

There are certain changes that need to be made to Active Directory before Exchange 2000 Server may be installed. The Exchange administrator may not necessarily be the network administrator and therefore may not have the proper permissions to make the necessary pre-installation changes to Active Directory. In this case, Active directory must be prepared using the */forestprep* and/or the */domainprep* command switch of the Exchange 2000 Server setup program. These options run installation utilities that separate the activities that require high lever Active Directory access from the activities that can be run under a lower security/administration context.

The */forestprep* switch executes the ForestPrep utility which executes Active Directory changes that require SchemaAdmin and EnterpriseAdmin permissions. ForestPrep creates the Exchange organization in Active Directory, and extends Active Directory to include Exchange specific information. The person running ForestPrep must have SchemaAdmin and EnterpriseAdmin permission.

The */domainprep* switch will execute the DomainPrep utility. The DomainPrep utility executes Exchange server installation activities that require DomainAdmin permissions on the network. ForestPrep must be run and all changes by ForestPrep must be replicated before DomainPrep can successfully be executed.

Routing Groups

Routing groups are used to define areas of high-speed connection on a network used to control the flow of messages between servers. Routing groups are typically used when segments of a network are geographically separated. Servers in the same routing groups communicate with each other via SMTP. Messages whose origin and destination are within the same routing group are directly transferred using SMTP as well. Contact and message flow between routing groups requires connectors.

Administrative Groups

Administrative groups are used to allow an administrator to define how an Exchange organization should be managed. Administrative groups define boundaries of authority for groups of administrators to manage designated servers. Administrative groups also prevent an administrator from making administrative actions on a server that the administrator is not responsible for.

Front-End and Back-End Servers (FE/BE)

Front-end servers are computers that receive all user requests and then relay those requests to back-end servers that contain the actual data. Data on a back-end server can be accessed from and through a front-end server but it can be totally isolated to external user change if necessary. The typical front-end/back-end configuration consists of a small amount of back-end servers that handle all information and a larger group of front-end servers that handle client requests. The front-end/back-end server scheme is useful when dealing with users who access resources over the Internet. Servers in a front-end/back-end configuration have the ability to enforce encryption between front-end servers and Internet based clients through the use of Secure Socket Layer (SSL).

Upgrading to Exchange 2000 Server from Exchange Server 5.5

There are two methods of upgrading from Exchange 5.5 to Exchange 2000. The first option is an in-place upgrade, and the second option is a mailbox migration.

In-Place upgrade

The in-place upgrade is supported when upgrading from an installation of Exchange 5.5 server with service pack 3 installed. The setup program is invoked on the computer that you plan to upgrade. The setup program will automatically detect the previous installation and perform the in-place upgrade. An in-place upgrade will not allow you to make any configuration changes. To make any configuration changes, you will need to run the setup program again in maintenance mode.

Mailbox Migration

Mailbox Migration is a clean installation of Exchange Server 2000, which is joined to an existing Exchange 5.5 organization. Once Exchange 2000 has been installed and joined, the mailboxes are then migrated to the new server. Existing connectors must be updated if you plan to remove the old site. The advantage of a mailbox migration is that operations are not interrupted by the upgrade.

Replicating Directory Information

Changes made to a domain controller or Exchange server can be replicated all across the network on computers that support Active Directory through the use of Active Directory replication features. The Active Directory Connector (ADC) included with Windows 2000 is a basic connector that provides for functionality and replication between Windows 2000 and Exchange 5.5 server. Exchange 2000 installs a new ADC when it is first installed. This new ADC has enhanced replication functionality and is required to operate Exchange 2000 Server. The new ADC can be integrated with Exchange 5.5 to allow for the replication. There must be at least one instance of the Exchange 2000 ADC in the Active Directory forest.

Site replication is achieved through the use of the Site Replication Service (SRS). The SRS is the Exchange 2000 version of the directory service from Exchange 5.5. SRS replicates information via Remote Procedure Call (RPC) for data sent within a site. E-mail messages are used to replicate directory data between sites.

Messaging Client Deployment

Exchange 2000 supports several different types of messaging such as real time chat in the form of IRC and Instant Messenger in addition to Internet e-mail.

Microsoft Outlook

Microsoft Outlook is the recommended e-mail program for use with Exchange 2000 Server. Exchange 2000 was designed with Outlook in mind and therefore Outlook is able to take advantage of all the features that Exchange 2000 has to offer. When Outlook is first invoked it will prompt the user for the information required for it to function. This information creates a mail profile that specifies the setting that Outlook will use to function as a messaging client. Organizations that want to ensure a uniform profile among their users can elect to use the Custom Installation Wizard, which will allow the setup program to automatically generate a uniform messaging profile when Outlook is installed.

Outlook Web Access

Outlook Web Access (OWA) is a server-based application based on Microsoft's Internet Server Application Programming Interface (ISAPI). The version of OWA included with Exchange 2000 is not compatible with earlier versions of OWA. Any Internet browser that supports frames and Java can utilize OWA. In addition to e-mail, OWA also has contact management and calendar features.

POP3 and IMAP

POP3 and IMAP are e-mail messaging protocols. Post Office Protocol 3 or POP3 is a protocol that e-mail clients use to download messages from a remote server. Internet Message Access Protocol 4 or IMAP4 is a protocol that allows a user to manipulate messages on a remote server without actually retrieving the message.

IRC

IRC stands for Internet Relay Chat. IRC allows a user to join live discussions from anywhere on the Internet. Joining an IRC discussion requires an IRC client and an Internet connection. The primary IRC client for Exchange 2000 is Microsoft Instant Messenger, which is included with Exchange 2000 Server.

Installation and Upgrading Keypoints

1. Your company just acquired a company that had an existing e-mail system with a large number of users. You plan to add the users from the acquired company to your existing e-mail system, and will be adding additional servers to handle the load. You want the administrators who handled the other system to administer the same users on this system but you do not want them to have access to other users on the existing system. To do this, you should **create a new administrative group. Once created you should install the new servers into this group and run the Exchange Administration Delegation Wizard to assign the appropriate permissions.**
2. If you are planning on installing Exchange 2000 Server on a Windows NT computer with no messaging software installed, you should **upgrade the PDC to Windows 2000, install Windows 2000 Server, and Install the NTP service on server 1.**
3. You are planning to add 12 servers while creating a new Exchange 2000 Server environment to support 10,000 IMAP users. To do this, you should **install six of these servers as domain controllers. Two of these domain controllers should have Exchange 2000 installed on them and should be configured as front-end servers. The other servers should be installed as Exchange member servers and load balancing should be configured among the front-end servers.**
4. After migrating an entire Exchange organization to Exchange 2000 Server from Exchange 5.5, storage limits are not being enforced. You have configured the prohibit send and receive storage limits to 25-MAILBOX for each mailbox store on each server, set deleted item retention periods for each mailbox store by using a mailbox store policy, and applied the policy to each mailbox store. To ensure that policies are set for the mailbox store you should **choose “Apply new” from the shortcut menu for the mailbox store policy**
5. You are preparing the servers for five new branch offices that will each have three new Exchange 2000 Server computers. Three of these new branch offices will have a separate IT administration staff that will be responsible for the Exchange servers in three of the branch offices. The Exchange servers at the other two branch offices will be administered by corporate IT staff at the main office. To properly configure these new servers you should **create three administrative groups, and install three servers into each new administrative group. You should then install the remaining Exchange servers into an existing administrative group and run the Exchange Administration Delegation Wizard to assign the appropriate permissions for each administrative group.**
6. The Exchange organization that you administer includes one Exchange 2000 Server computer located at the main office and one located at a branch office connected by a WAN link. To reduce the impact that e-mail messages larger than 5 MB impose during business hours, you should **set a different delivery time for messages large than 6 MB and schedule the connection time for those messages to occur during non-business hours.**

7. If you receive an error message stating that the server was not found while attempting to access BIND DNS server through Microsoft Outlook 2000 when installing a new Exchange 2000 Server computer into the Windows 2000 domain that you administer, you should **create an A record on the Exchange 2000 Server that points to the BIND DNS server.**
8. Group membership is configured as shown. You wish to install Exchange 2000 Server and Instant Messaging on a server that has no messaging software installed. Minimizing the administrator involvement in the process, you should **insure that the Administrator runs *setup /forestprep* on a domain controller.**

Person	Group membership
The Administrator	Enterprise Admins Schema Admins Domain admins
You	Enterprise admins Domain admins

9. Your Exchange organization contains a mixed environment of Exchange 5.5 server computers and Exchange 2000 Server computers, all of which are in the same domain. There are two sites in the organization. Site 1 contains a Windows 2000 Server computer named DC1 and designated as a domain controller, an Exchange 2000 computer named Server1, and a Windows NT 4.0 Exchange 5.5 computer named Server2. Server1 is an Exchange 5.5 Server computer that has been upgraded to Exchange 2000 Server. The second site contains a Windows NT 4.0 computer named Server3, running Exchange 5.5. Server2 and Server3 will not be upgraded to Exchange 2000 in the near future. You are able to send messages between Site 1 and Site 2, but you find that Exchange 2000 recipient property changes made in Site 1 are not visible in Site 2. To ensure that modifications to objects in Exchange 2000 Server are visible in other sites, you should **create a one-way connection between DC1 and Server3 on DC1.**
10. Your Exchange organization contains a mixed environment of Exchange 5.5 and Exchange 2000 Servers. You upgrade server2 to Exchange 2000 Server, verify that messages can be sent between Site1 and Site2, but Exchange 2000 recipient property changes in Site1 are not visible in Site2.

Site 1 contains:

- Server1 - Windows 2000 domain controller
- Server2 - Windows 2000 Server, Exchange 5.5 Server
- Server3 - Windows NT 4.0 Server, Exchange 5.5

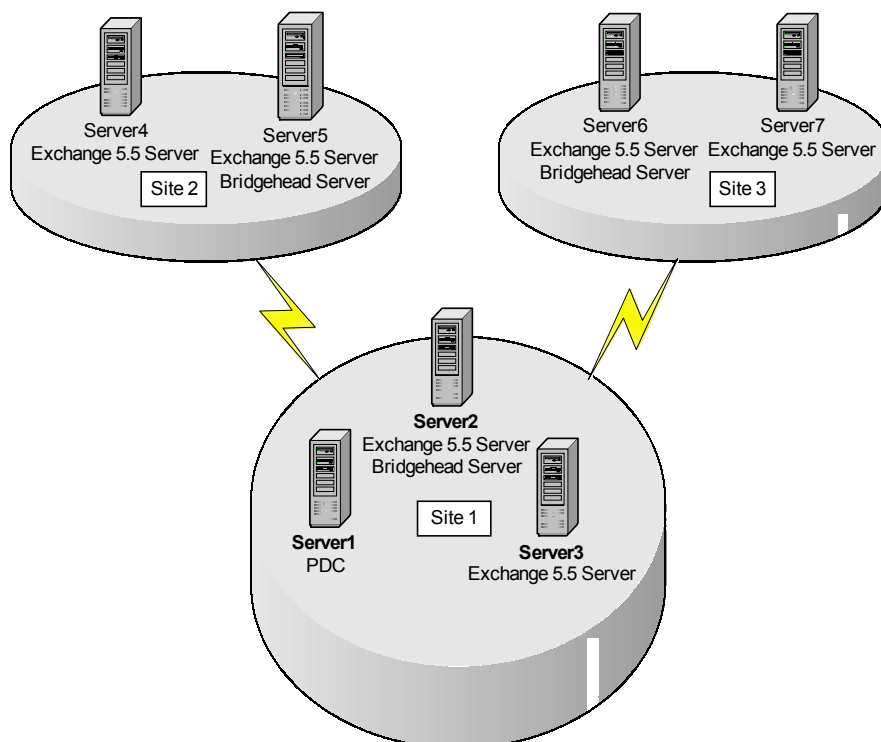
Site 2 contains:

- Server4 - Windows NT 4.0 Server, Exchange 5.5

To resolve the problem, you should **create a two-way connection agreement between server4 and server1 on server1.**

11. A user is unable to connect to the Exchange 2000 Server computer, and unable to connect to the Windows 2000 domain controller, but is able to browse the Internet. To solve this you should You should **change the IP address for the preferred DNS server to 10.10.10.5.**

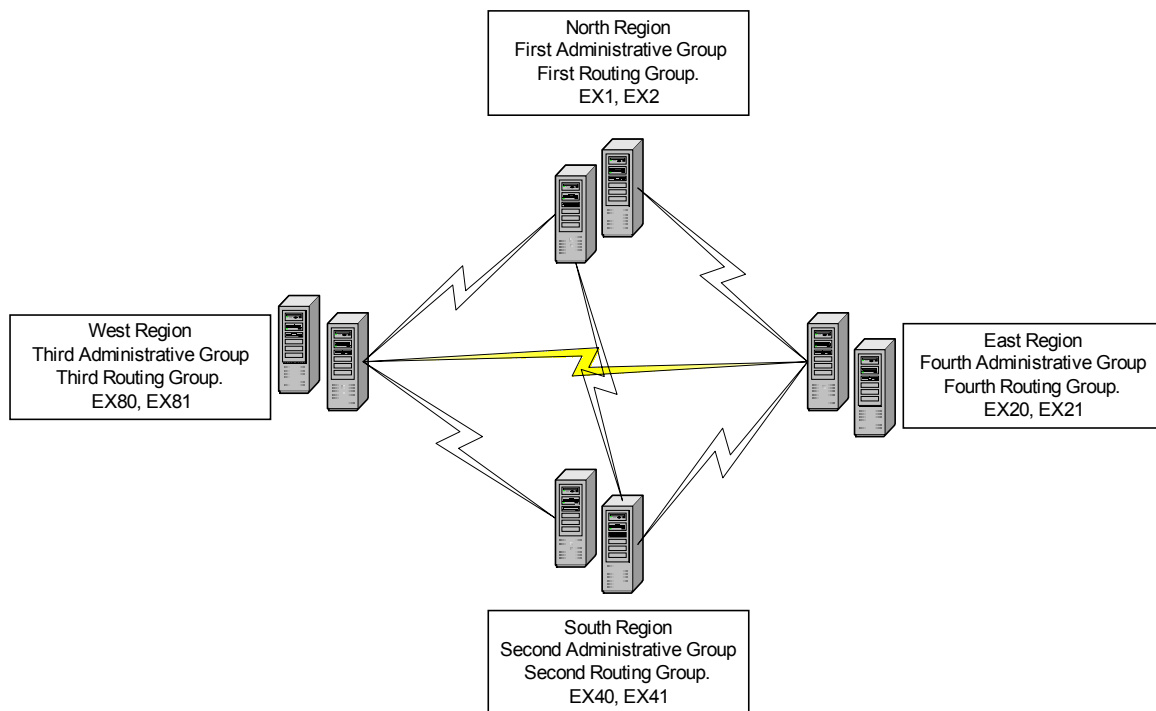
12. Your Exchange 2000 Server computers each support 1,500 mailboxes. Some users connect with Microsoft Outlook 2000, and some use Outlook Web Access. Recently you have enabled SSL for the default web site on all servers. You require all Outlook Web Access users to connect using secure HTTP to minimize slowdowns but retain the enhanced security of SSL. In order to do this, you will need to **install an additional Exchange 2000 Server computer to support the secure HTTP users, and configure it as a front-end server.**
13. Your Exchange organization has three Exchange 5.5 server sites and the sites and connectors are configured as shown below. All of the server computers currently run Windows NT 4.0, you are planning to upgrade the Exchange 5.5 servers to Exchange 2000. Your network is configured as shown:



You upgrade server1 to Windows 2000 Server, install Active Directory Connector on server1, and configure a connection agreement between server 1 and Exchange 2000 Server mailbox. Configuration changes made in Site 2 and Site 3 are not visible to Site 1. To solve this problem you should **create a two-way connection agreement between server 5 and server 1, and then create a two-way connection agreement between server 6 and server 1.**

14. You are adding an Exchange 2000 Server to an existing Windows 2000 domain that uses Ethernet and has existing Exchange 5.5 servers. You must be able to manage all Exchange mailboxes from the Active Directory Users and Computers console and ensure that changes made to Active Directory are reflected in the Exchange 5.5 servers. Prior to installing the new Exchange 2000 Server computer you should **create a one-way connection agreement from the first Exchange 5.5 member server and the newly added Exchange 2000 Server**. You should then **connect the connection agreement to the recipient's container in the existing Exchange 5.5 server site**.
15. Your company has many branch offices located throughout the country. The servers at each branch office form a routing group and create an e-mail backbone for routing messages in the company. The routing groups for each branch office are connected to the appropriate regional backbone routing groups in order to send messages throughout the organization. The company recently opened a new branch office in the north region with an Exchange 2000 Server computer named EX4.

Each server in this group is dedicated to a region as shown:



To configure the routing group connector to ensure e-mail delivery during a single server failure in the first routing group, and decrease the number of WAN connections that are used to deliver e-mail messages between branch offices in the same region, you should perform the following steps: **From the first routing group, create a routing group connector that connects to the new routing group. Then, select Ex1 and Ex2 as the local bridgehead server and Ex4 as the remote bridgehead server.**

16. You are a member of the Administrators group and the group permissions are configured as follows:

Teams	Group Membership	Responsibilities
Administrators	Enterprise admins Schema admins Domain admins	All changes made to Active Directory.
Support Professionals	Enterprise admins Domain admins	All messaging system operations, server maintenance, and user support calls.

A member of the Support Professionals group needs to install the Microsoft Exchange Messaging and Collaboration services component of the first Exchange 2000 Server computer on the network. You should **run *setup /forestprep***.

17. Your company has four departments: sales, administrative, manufacturing and technical. You plan to deploy messaging client software for your users and you want to accomplish the following goals:

- Technical users must be able to access public folders.
- Administrative users must be able to access public folders and calendaring.
- Manufacturing users must be prevented from accessing calendaring components.
- All sales users must be able to access their mailboxes from the Internet.
- All users must have to access their mailboxes.

Client software is deployed as shown:

Software	Sales	Administrative	Manufacturing	Technical
Microsoft Outlook				X
Outlook Web Access	X			
IMAP3				
POP3		X		
IRC		X	X	X

You will achieve the following goals:

- **All sales users can access their mailboxes from the Internet.**
- **Manufacturing users are prevented from accessing calendaring components.**

18. A user requires owner permissions to a public folder named HumanResources and ten subfolders under the HumanResources folder. The permissions role for these folders is set to “none” for the default user. The System Manager will allow you to **modify the permissions on the HR folder and propagate the folder rights to all subfolders**.

Configuring Exchange 2000 Server

Configuring Server Objects

Configuring Storage Groups

There are several types of mechanisms that Exchange 2000 uses to store information on a server. Data can be arranged to take advantage of the hardware configuration and to streamline administration. Storage groups define groups of associated mailbox and public stores. The files in a storage group share one set of transaction logs. Each server in an Exchange organization can contain a maximum of four storage groups.

There are several options that can be configured for storage groups and the files contained within:

- **Enable/disable circular logging:** unless transaction log files are purged by a successful shut down of Exchange 2000 Server or by a successful full or incremental backup they are retained. Circular logging re-uses existing log files to minimize disk space requirements.
- **Transaction log location:** designates the physical disk location that the log files are to be kept.
- **System path location:** designates the location of any temporary files that are required for use by Exchange 2000 Server.
- **Zero out deleted database pages:** increases the security of various Exchange databases by removing deleted pages from the database file.

Files in storage groups can be further administered by implementing mailbox store and public store policies.

Public Store Policies

Public store policies allow you to configure several options for public stores. The policy template allows you to graphically create a custom maintenance schedule. You can also designate full-text indexing options like rebuild and refresh times. The public store policy template also allows you to define disk storage limits for public stores and folders as well as replication schedules and options.

Mailbox Store Policies

Mailbox store policies allow you to configure nearly the same options on mailbox stores as public store policies do on public stores. The most notable exception is replication. You are able to define maintenance schedules, storage limits, and full-text indexing options.

Creating Multiple Storage Groups for Data Partitioning

While each storage groups requires that you designate a physical disk location for the transaction files and databases, the places for these objects does not necessarily have to be the same. Indeed there can be some compelling performance reasons for the objects not inhabiting the same space. If transaction logs and database files exist on separate physical disks, then they do not compete for the same disk access resources and therefore will increase the performance of your Exchange 2000 Server. Placing storage groups on separate physical disks or arrays of physical disks creates a similar performance enhancement.

Configuring Multiple Databases in a Single Storage Group

In a large Exchange organization mailboxes should be split between a larger number of mailbox store databases rather than one large mailbox store. The spreading of mailboxes has several benefits. In a large organization, if mailbox stores are spread across several physical disks, there is a potential for performance gains as there is less competition for disk resources. Disaster recovery becomes easier and quicker when mailboxes are decentralized. Multiple smaller mailbox store databases are more easily and quickly restored.

Configuring Virtual Servers to Support Internet Protocols

Through the use of virtual servers, you can make a single computer appear as multiple servers. Virtual protocol servers are created and managed from the Exchange System Manager utility. There is only one virtual server created for each protocol by default, but others can be created. Each virtual server must be assigned a separate IP address or a customized TCP port for unsecured and SSL communication or both.

Configuring Exchange 2000 Server Information in Active Directory

The integration of Exchange 2000 with Active Directory enables an administrator to manage user accounts through Active Directory reducing administrative overhead. Exchange 2000 relies on Active Directory for user account information through the Global Catalog server. The Global Catalog server is a domain controller that supports forest-wide directory lookups. Earlier versions of Exchange used their own directory services systems and therefore must be adapted to be able to interface with Exchange 2000 and Active Directory. Exchange 2000 has a feature called DSProxy that will relay Exchange 5.5 server information requests to the Global Catalog server.

Configuring Instant Messaging Objects

The primary Instant messaging client program for Exchange 2000 is MSN Messenger, which comes with Exchange 2000 Server. Instant messaging requires IIS 5.0 to be installed on a server in the forest to function. Instant messaging is installed by invoking the Exchange 2000 setup program. The setup program will further update the Active Directory schema with new classes and attributes for instant messaging. Instant messaging is managed from the Exchange System Manager. To implement Instant Messaging, an Instant Messaging virtual server must be created.

Configuring Chat Objects

Exchange 2000 Chat Service is managed through chat communities, which are a series of channels and user classes. When the initial configuration is performed, a single default chat community is created. Other communities can be added as needed. An administrator can create permanent communities within a community, called registered channels, or users can create channels dynamically. Chat channels are typically organized by the subject of discussion. An administrator can designate the security permissions on all user accounts. There are three levels of security instant messaging:

- **Sysop:** monitors and controls chat channels. Sysops are able to ban users from chat conversations.
- **Administrator:** have full Sysop permissions and can override Sysop decisions. Administrators become the owner of every channel they join and they cannot be banned from joining any channel.
- **User:** able to participate in chat conversations.

Creating and Managing Administrative Groups

Administrative groups are used to simplify the delegation of authority in multi-server, multi-domain, or multi-location environments. Administrative groups are created in the Exchange System Manager. Once an administrative group is created, it is empty. Once the group is created, you can add servers and policies. Control of administrative groups can be delegated to other administrators in order to spread the responsibilities. Configuration objects can be copied between administrative groups.

Configuring Exchange 2000 Server Resources for High-Volume Access

For performance and fault tolerance reasons, it is beneficial to locate mailbox and public folder stores and their associated transaction logs on different physical disks. This configuration reduces competition for disk access resources. When there is a large volume of traffic on the server the performance gains yielded by physical disk separation can be great.

RAID disk configurations are also useful disaster prevention tools. RAID stands for Redundant Array of Independent (or Inexpensive) Disks. In RAID systems, data and error-checking parity values are striped across three or more physical disks. This insures that if one of the disks fails, the data on the array can be reconstructed and accessed.

Diagnosing and Resolving Exchange 2000 Performance Problems

The Computer Management snap-in and the Performance utility are useful tools in monitoring performance and system state data. Both allow an administrator to access the performance logs and Alerts tool but the Performance utility also provides access to the System Monitor. An administrator can examine performance data supplied in real-time charts with the Performance Monitor. The Alerts tool is useful for notifying administrators when certain performance conditions or system problems occur.

Configuring Exchange 2000 Server for High Security

Configuring Exchange 2000 Server to Issue v.3 Certificates.

Certificate Services are part of the standard components of Windows 2000 and can be installed as needed. Certificate Services are installed through Add/Remove Programs in the Control Panel. A Certificate Authority destined for use with Exchange 2000 will be integrated with Active Directory and therefore, depending on the Public Key Infrastructure, the Certificate Authority (CA) should be an Enterprise Subordinate or Enterprise Root CA.

Enabling Digest Authentication for Instant Messaging

Digest Authentication sends login information in an encrypted hash to the authenticating server. An Administrator can enable Digest Authentication for Instant Messaging in the Web Site container of the Internet Services Manager.

Configuring Virtual servers to Limit Access through Firewalls

A network containing a Firewall could consist of several areas:

- **External Users and/or the Internet:** users who you want to prevent gaining unauthorized access but whom you still want to grant appropriate authorized access.
- **External Network:** area of the network that has the little if any sensitive information. Web servers are typically installed on the external network.

- **Firewall:** hardware or software that keeps users from accessing internal resources.
- **Perimeter Network:** also called the Demilitarized Zone or DMZ. This is the only area to which network communication on either side of the firewall is allowed.
- **Internal Network:** most of the network data is kept here. This prevents direct access to the data as all data is transferred from the Internal Network through the DMZ and out through the firewall.

Virtual protocol servers are set up in the DMZ. From the DMZ all communication and access is routed through the firewall.

Configuring Key Management Service (KMS) to Issue Digital Signatures

The Key Management System (KMS) is a system that Exchange 2000 uses to encrypt e-mail that integrates Windows 2000 Certificate Services. If you plan to send encrypted e-mail messages you must install KMS. Each user who encrypts a message has a private encryption key that only they have access to. To decrypt the encrypted message there must be a corresponding public key, which is available to the entire organization.

A digital signature is a mathematical value derived from analysis of the message that is to be digitally signed. The message is then encrypted using the sender's private signing key. The digital signature is attached to a message when it is sent. Once received, the message is decrypted using the sender's public decrypting key and again analyzed. The mathematical value derived in the second analysis is compared to the value obtained during the first analysis. If the values are equal then the message has not been altered between the time it was sent and received.

Creating, Configuring, and Managing a Public Folder Solution

A public folder is contained in a public folder tree and contains information that can be accessed by users. Much like the hierarchical system of directories and files on a hard disk, public folders can contain subfolders, which can also contain subfolders. Public folders are also similar to the system of directories and files in that their security can be implemented in much the same way.

Configuring the Active Directory Object Attributes of a Public Folder

An administrator can alter the attributes of a public folder in Active Directory through the use of Exchange System Manager. Exchange System Manager will allow you to mail enable a folder. Once enabled, the folder will display new, changeable e-mail related Active Directory attributes in addition to the Standard tab in the properties sheets.

Configuring the Store Attributes of a Public Folder

Using the Exchange System Manager you can alter the store attributes of a public folder. You are able to place disk space restrictions that send warning messages when users near the storage limits and also prohibit users from adding items that will put them over the storage limit. You can also define maximum item size, which will disallow the storage of objects in a public folder if the objects are larger than the designated size.

Configuring Multiple Public Folder Trees

A public folder tree is a hierarchical grouping of Public folder trees are created in the Exchange System Manager. There are two types of public folder trees, MAPI and general purpose. MAPI trees

are used to interface with messaging programs like Microsoft outlook. There is a limit of one MAPI public folder tree per store. General-purpose trees are not MAPI compatible and cannot be viewed with MAPI applications. Unlike MAPI public folder trees, there can be multiple general-purpose trees in a store.

Configuring and Managing System Folders

All public stores contain folders that are not visible in the hierarchy. These folders can be viewed through the Exchange System Manager. These are important system folders viewable in the Exchange System Manager:

- **Schema:** contains the list of properties for objects contained in the public store.
- **Events Root:** contains subfolders that hold scripts for the Event service.
- **StoreEvents:** contains internal and external event links for a specific server

There are also containers that are viewable through the Exchange System Manager:

- **Schedule+ Free/Busy:** has a subfolder for each administrative group for Schedule+ Free/Busy information, which allows users to view availability status of other users in Outlook.
- **EForms Registry:** holds forms published through the Organizational Forms Library.
- **Offline Address Book:** holds folders that contain offline address books, which can be downloaded by clients.

The default setting is that only the first server installed in an administrative group will contain the Schedule+ Free/Busy and the Offline address book containers. Public folders can be replicated between servers.

Configuring Exchange 2000 Server Keypoints

1. The Exchange server that you administer is approaching its limit of available disk storage space. You expect your server to completely run out of disk space in approximately two months. Managers in your company often send very large attachments with their e-mail messages whereas other users rarely send attachments larger than 1 MB.

You want to accomplish the following goals:

- All employees other than managers must be limited to 50 MB of storage space for messages on the Exchange server.
- The managers must be able to have access to e-mail prior to other employees of Exchange server needs to be restored.
- Managers must have unrestricted message storage space on the Exchange server.
- A separate set of transaction log files must be created for the managers.
- The Exchange server must not run out of hard disk space.

You take the following actions:

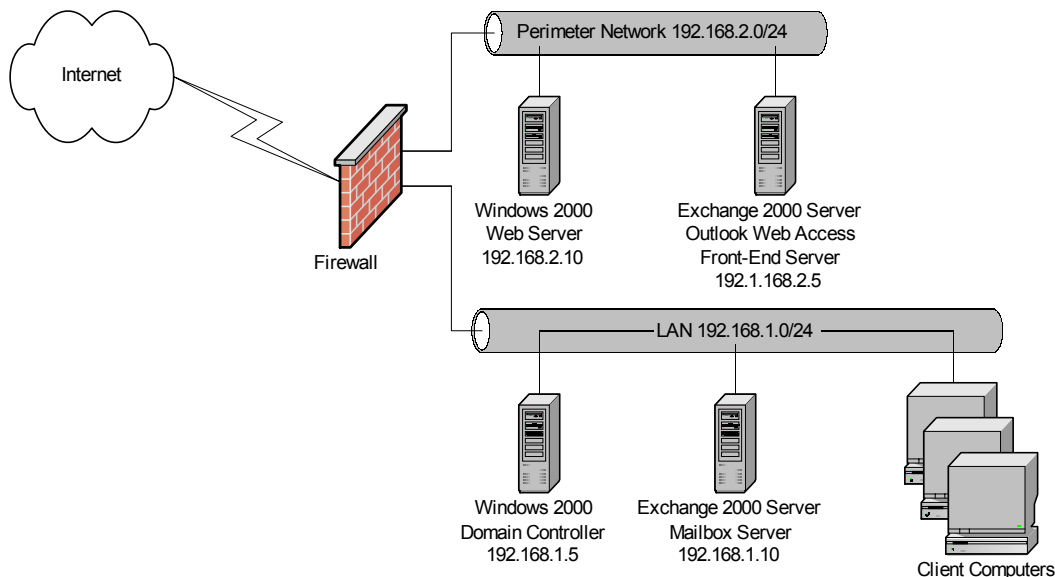
- Create a new storage group.
- Create a new monitor store in the new storage group.
- Move the mailboxes of all the managers to the new mailbox store.
- On the existing mailbox store, set a maximum storage limit of 20MB.

You will achieve the following goals:

- **The managers have unrestricted message storage space on the Exchange server.**
- **All employees other than executives are limited to 50 MB of storage space for messages on the Exchange server.**
- **A separate set of transaction log files is created for the managers.**
- **The managers can have access to e-mail prior to other employees of Exchange server needs to be restored.**

2. Your network spans two widely separated geographic locations. There is one Exchange 2000 Server in each location. The local server is named EXCH1 and the remote server is named EXCH2. Users on EXCH2 are reporting slow performance when using forms stored in the organizational forms library. To combat this, you should **create a public folder store on the EXCH2 and replicate the organizational forms library from the EXCH1 to EXCH2.**
3. You need to allow candidates for job openings to submit their resumes to jobs@quick-ind.com, while preventing users in other departments accessing these messages. You should:
 - **Change the SMTP address of the job inquiries folder to jobs@millertextiles.com**
 - **Change the permissions role for the default user to Contributor.**
4. You utilize a mailbox store policy that enforces mailbox storage limits for your entire Exchange organization but notice that several mailboxes on a recently added Exchange 2000 Server computer are over the storage limits. To enforce the set limits, you should **add the default mailbox store on the new server to the mailbox store policy.**

- The public folders in your organization contain over 10,000 documents. To make it easier and faster to find specific documents you should **configure a public folder store policy, and create a full-text index on the public folder store.**
- Your network is configured as shown:



Users use Microsoft Outlook or Outlook Express to connect to the Exchange 2000 Server computers while in the office and Outlook Web Access to connect when working outside the office. To prevent unauthorized use of your SMTP server while still allowing all of your users to connect to your Exchange servers from in or out of the office and while still allowing users to exchange Internet e-mail messages with anyone, you should **configure the SMTP servers to accept connections from anyone and to allow relaying for only IP addresses 192.168.1.0/24 and 192.168.2.0/24.**

- A user cannot browse the Internet or connect to any network resources and the TCP/IP properties are as shown:

IP address	10.10.10.200
Subnet Mask	255.255.255.224
Default Gateway	10.10.10.1
Preferred DNS server	10.10.10.5
Alternate DNS server	192.168.1.100

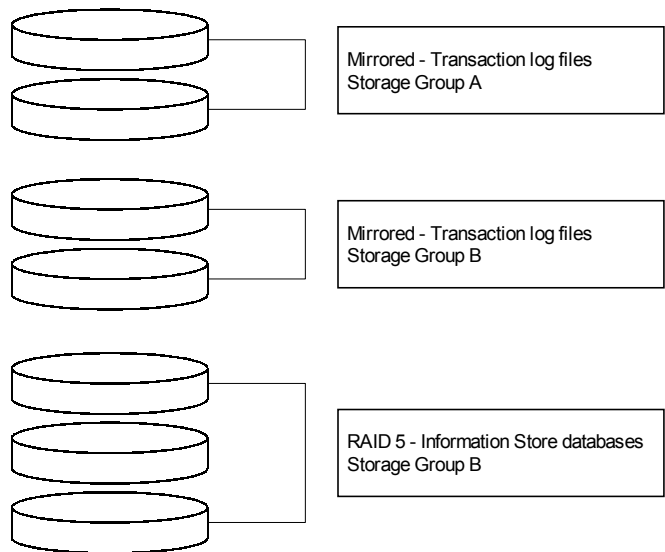
To configure the computer to connect to the Exchange 2000 Server computer you should **change the subnet mask of the computer to 255.255.255.192.**

- After analyzing performance with Task Manager and System Monitor, you should **install an additional CPU on the server** to decrease the amount of time that it takes to open a mailbox.

9. Your organization includes five Exchange 2000 Server computers, each with a single mailbox store. You want to restrict the use of HTTP to all users except members of the Research group. You should **export the user accounts from Active Directory, modify the export file to disable the HTTP protocol for all mailboxes, and then re-import the file**. You should then **use the Active Directory Users and Computers console to modify the mailboxes of the members of the Research group**.
10. You wish to decrease the time it takes for users to open their mailboxes. You examine the System Monitor and notice the following:
- CPU Usage is at 88%
 - Memory total: 218450, Available: 15900
 - Disk I/O reads are very high

If all components are functioning normally you should **move the mailbox store to a RAID-5 array** to decrease the amount of time it takes users to open their mailboxes.

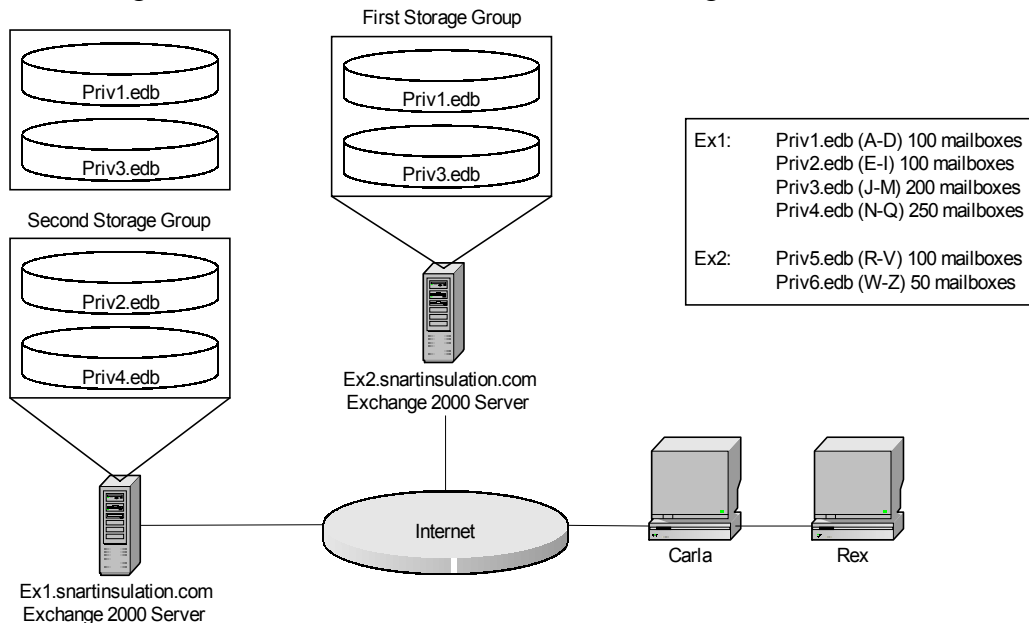
11. To accommodate two storage groups while providing the best performance and availability, you should configure your physical disks as follows:



12. To send digitally signed e-mail messages, you should **install and configure an enterprise certificate authority and install Key Management Service on the existing mailbox server** on an Exchange 2000 Server computer.
13. You are going to create a newsfeed and direct it to a public folder. In determining whether viewing other messages in the public folders takes longer after configuring a newsfeed, you should **use System Monitor to create a performance log for a week monitoring the public folder services, CPU usage, and memory usage, and then compare the findings to what they were before you configured the newsfeed**.

14. You need to conserve disk space on an Exchange 2000 Server computer through storage limits for the mailboxes of all staff employees but not on mailboxes used by executives. To configure the storage limits with the least amount of administrative effort and the least amount of system resource usage you should **create a new mailbox store in the default storage group**. You should then **move all executive mailboxes to this mailbox store and configure storage limits on the default mailbox store**.
15. You need to be able to compare the current performance statistics of your Exchange environment with past performance statistics. To do so you should **use System Monitor to create a weekly performance log**. You should **add LDAP search counters, server work queries, and network usage to the log**. **This log should be run weekly and the information should be evaluated monthly**.
16. You have created a new offline address book containing mailbox entries that users will need when they are working remotely. To allow users to use the new offline address, using the least amount of administrative effort, you should **create a mailbox store policy that assigns the offline address book, and add each mailbox store to this policy**.
17. A user in your Exchange environment that uses Key Management Service (KMS) to secure e-mail messages has lost their encryption password. All client computers use Outlook 2000 to connect to the Exchange servers. To enable the user to again read and send encrypted e-mail messages you should **open the recover keys dialog box from the KMS object in the System Manager and recover the account**. You should then **and give the user a new token so that you can re-enroll the user in Outlook 2000**.
18. Users are reporting that one of the Exchange 2000 Server computers that supports 3,000 mailboxes on a single storage group on a single physical disk has become slower than it was in the past. Your hardware budget allows you to upgrade only a single item on the server. To obtain the biggest performance gain you should **install a new hard disk, and move the transaction log files for the storage group to the new disk**.
19. To retain a copy of all e-mail messages sent and received by the users in your Financial department you should:
 - **Use the Active Directory users and computers console to create a mailbox to hold the Financial department's messages, and designate this mailbox in the archive mailbox.**
 - **Configure an additional mailbox store, set this mailbox store to archive messages, and move the Financial department's mailboxes to this mailbox store.**
20. You have users that access their e-mail through Microsoft Outlook 2000, IMAP, and HTTP, and most users read their e-mail over the Internet by connecting to an Exchange 2000 front-end server computer located outside the firewall. To prevent unauthorized users from viewing the e-mail messages, user names, and passwords you should:
 - **Use the Internet Services Manager console to configure a server certificate for the web server and redirect all HTTP communications to the secure web server.**
 - **Use Exchange system manager console to configure a server certificate for the IMAP4 virtual server and require a secure channel.**

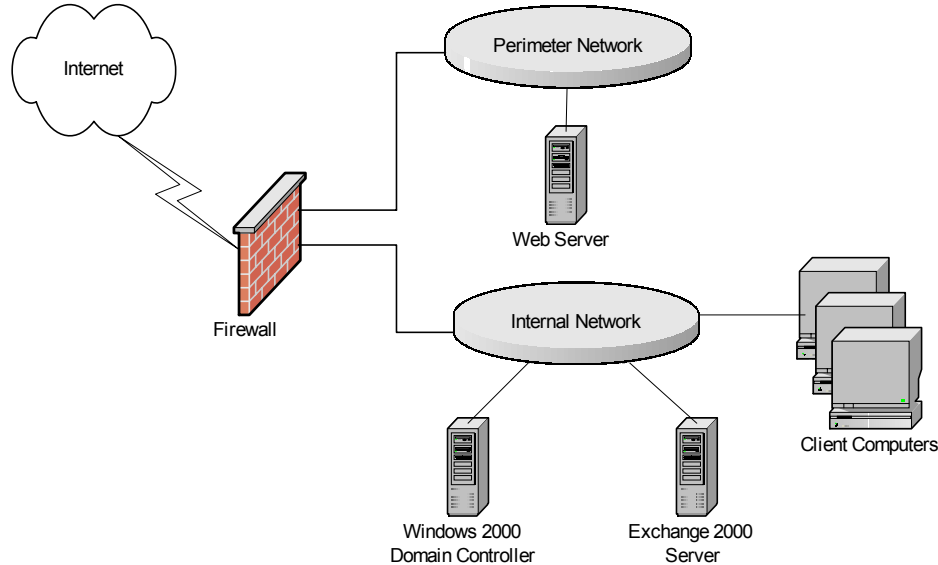
21. Users are reporting that they are unable to logon to the instant messaging server. You verify that you can log on to the server and communicate with other users on the network. To allow the users to utilize Instant Messaging, you should **use the Active Directory Users and Computers console to select the users who are unable to log on. Run Exchange Task Wizard and enable Instant Messaging.**
22. There are large numbers of mailboxes in your exchange organization, and mailboxes are grouped by users' first names. You administer the Exchange environment for Snart Insulation. The server computers on the network all have identical processors and 512 MB of RAM. Mailboxes are grouped according to users' first names. The network is configured as shown:



A user named Carla reports that it takes almost two minutes to open her mailbox. You verify that a user named Rex can open his mailbox immediately. To decrease the amount of time that it takes for Carla to open her mailboxes you should **create a new storage group on Ex2.snartinsulation.com. Create a new mailbox store in the new storage group. Move Carla's mailbox to the new mailbox store.**

23. You are configuring a network for users who travel to locations throughout the country from portable computers. To allow access only to e-mail with the least amount of configuration of the portable computers, you should **subscribe to a nationwide Internet service for the users.** You should then **install a new Exchange 2000 Server computer as a front-end Microsoft Outlook web access server at the corporate headquarters and configure the server to have certificate services.** Finally, **allow port 443 into the front-tree server from the Internet.**
24. To configure your network to allow users to connect to their mailboxes with Microsoft Outlook Web Access you should **move the Outlook Web Access server to the perimeter network, and change the IP address of the server to 10.10.10.15.** You then need to **configure the Outlook Web Access server as a front-end server and configure the firewall to allow port 443 into the front-end server from the Internet.**

25. You have an Exchange Environment of 1,500 users configured as shown:



You need to configure Microsoft Outlook web access on the network for users connecting over the Internet, and users connecting from the internal network client computers will access their mailboxes only through Outlook 2000. You need to have a high degree of security on the network, and the failure of a single server should not disable Outlook Web Access. Users should also have a single point of contact for the Outlook Web Access Exchange servers. You should install **two front-end servers on the perimeter network**.

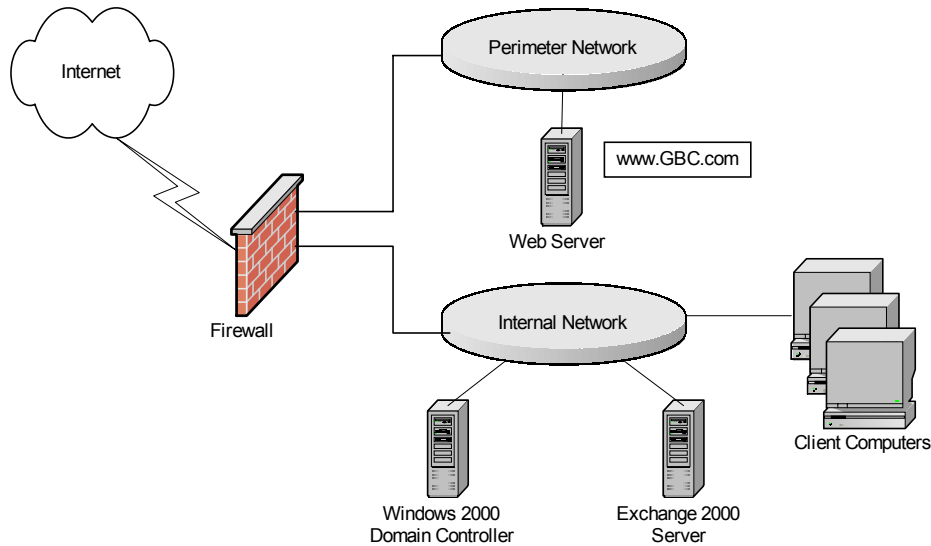
26. There are documents in a public folder named Products. These documents are accessed by a large number of users and are stored on a local Exchange server named EXCH1. These documents need to be accessed in a timely fashion. There are two branch offices that each has an Exchange server, named EXCH2 and EXCH3 respectively. You need to ensure that access to these documents is as fast as possible while using the least amount of administrative effort. You also must optimize the traffic over the WAN links between locations generated by accessing and managing the folder during the day. You should:

- **Create a public folder store on EXCH1, EXCH2, and EXCH3.**
- **Create an instance of products in each of the public folder stores.**
- **Configure the products public folder to replicate between 8 PM and 4 AM.**

27. You want the capability of recovering all other messages that have occurred since the last full backup. You have a limited amount of storage space and you want to minimize the amount of space occupied by the posts from a newsfeed that you plan to configure. If your server fails you will recover all newsfeed items from the main server your Internet service provider. You should **configure the new public folder store in a new storage group, and create the newsfeed public folder in this store. Enable circular logging for this public folder.**

28. A user named Sandy must have access to the mailboxes of another user named Wesley. Sandy should be able to open the mailbox and all folders in the mailbox. To do this, you should **ensure that Editor permissions have been granted to the Sandy in Outlook 2000.**

29. Your network is configured as shown:

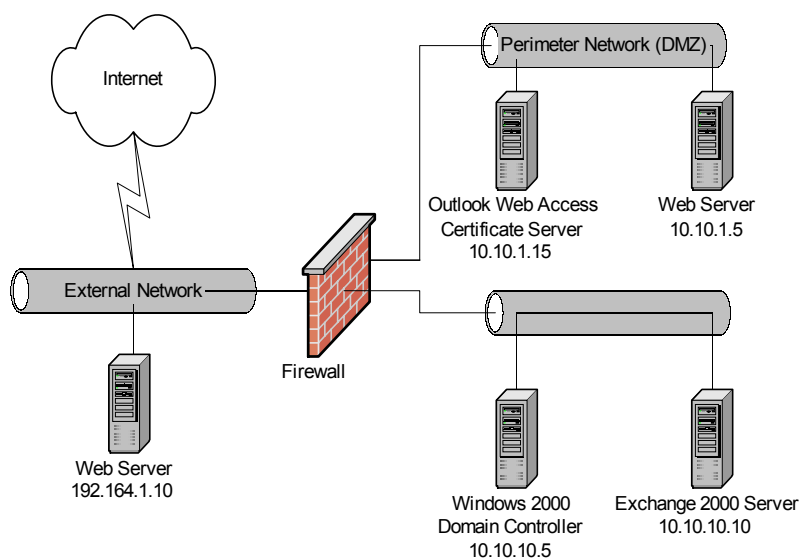


You are going to configure Outlook Web Access servers to provide fault tolerance, the highest level of network security, and encrypted connections. You will add six regional offices throughout the country in the next six months. To implement this configuration, you should **install two front-end Exchange 2000 Server computers.** You should then **place the new servers on the perimeter network and configure load balancing between the two servers.** Finally, **configure certificate servers, and create a rule on the firewall to redirect port 443 to the servers.**

30. You have an Exchange server that handles the e-mail for your company as well as a public folder store that contains large number of USENET groups. Because of the vast quantities of data on the server you are having trouble creating back ups. To back up the server without backing up the newsgroup data you should **create a new storage group and move the public folder store to the new storage group.** You then need to **enable circular logging for the new storage group while ensuring that internal public folder data is replicated to another server.**

31. You administer an Exchange server that was created and not upgraded from a previous version. You are going to configure an Exchange 2000 Server computer as a recovery server for single mailbox recovery. The recovery server is the only domain controller on a new Windows 2000 forest that you create, and you have created an administrative group and an Exchange organization that exactly mirrors your current production environment. To be able to restore the database to the recovery server from an online database you will need to **create a storage group and database that uses the logical names from the production server. On the new database select the “This database can be overwritten by a restore” check box.**

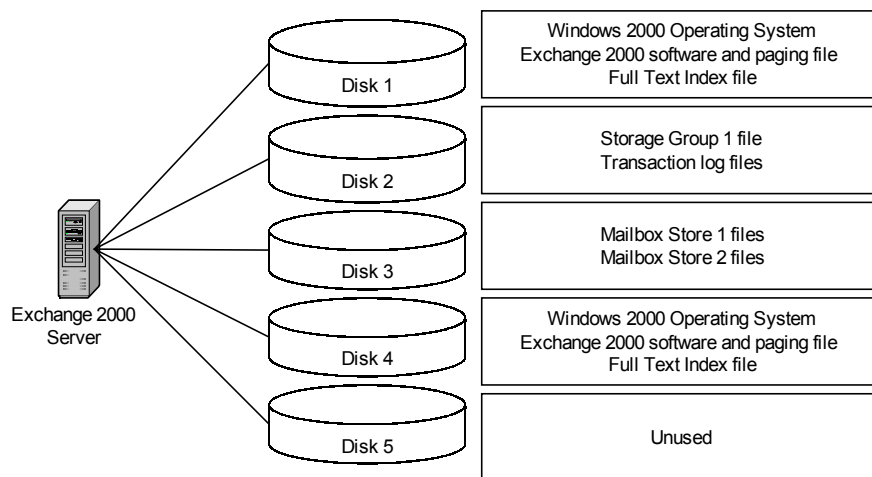
32. Your server has a single RAID-5 disk array that contains a 4-GB logical drive named Drive 1 and a 32-GB logical drive named Drive 2, with a single storage group located on drive 2 and the transaction logs on drive 1. To improve the responsiveness of the Exchange server, you should **install a new hard disk, configure it independently of the RAID-5 array, and move the transaction log files to the new hard drive.**
33. A local user is having trouble sending e-mail messages with attachments to a user at a remote server that uses an older e-mail system, and there is a long series of random characters at the end of the message. To configure the local Exchange 2000 Server computers to properly deliver attachments properly to the older remote domain you should **configure a new IMAP4 virtual server and change the MIME message encoding to provide the message body as plain text.** You should then **modify the connection control value to allow access from only the remote server's domain.**
34. Your network is configured as shown:



You need to allow remote users to access their mailboxes by using Outlook Express. You also need to allow internal users to access their mailboxes only by using Outlook. To apply the highest level of encryption while allowing remote users to store information and messages from public folders for offline viewing you should **open port 993 and port 636 on the firewall.** You should then **Install a web server certificate on the Exchange 2000 Server computer and assign the certificate to the IMAP4 virtual server.** Next you should **configure the IMAP4 virtual server communication properly to require a secure channel with 128-bit encryption and configure the IMAP4 virtual server connection property to deny access for a group of computers by specifying the IP address 10.10.2.0 and subnet mask 255.255.255.0.**

35. You have two storage groups with each storage group containing four mailbox stores with all storage limits assigned by using a single Mailbox Store Policy. You want to create separate storage limits for a group of users. To do this, you should **create a new mailbox store policy that separates increased storage limits, and assign that policy to the group's mailbox store.**

36. Each of the Exchange 2000 Server computers that you administer support 800 mailboxes and has identical processors and amounts of RAM you should. The mailboxes are divided among three storage groups that contain four mailbox stores each. To increase the performance of the server without purchasing any hardware you should **move the mailboxes to only three mailbox stores in a single storage group and remove the extra mailbox stores and storage groups.**
37. You are migrating your Exchange organization from Exchange 5.5 to Exchange 2000 and need to implement instant messaging between managers and their assistants as soon as possible. To do this, you install the instant messaging server and create an RVP virtual server on the Exchange 2000 Server computer. If you are not ready to migrate the mailboxes to the Exchange 2000 Server computer, you should **use the Active Directory users and computers console to enable instant messaging for the managers and their assistants. Specify the Exchange 2000 Server computer as the instant messaging home server.**
38. The disk layout of your server is configured as shown:



To optimize the responsiveness of the Exchange server, you should **move one of the mailbox stores from disk 3 to disk 5.**

39. Your Exchange 2000 Server was server was originally configured to use mailbox storage limits through a mailbox store policy, and recently you created an additional mailbox store and moved 300 mailboxes there. To ensure that the storage limits are enforced with the least amount of administrative effort you should **add the new mailbox store to the Mailbox Store Policy.**
40. You want to give access to your network to an outside user who prefers to receive all of their e-mail at an external address. To allow the user to receive mail from the external address but still allow the external address to appear in the Exchange address book you should **create a user account that does not have an Exchange mailbox in Active Directory.** You should then **use Exchange Task wizard to assign an SMTP address as the external address.**

Managing Recipient Objects

Configuring a User Object for Messaging

Configuring a User Object for E-mail

The extended Active Directory schema installed with Exchange 2000 allows you to manage and create user e-mail accounts through Active Directory Users and Computers. If the Microsoft Exchange System Management Tools are installed when a new user is created in the Users and Computers console you are asked if you would like to create a mailbox for the new user. Creating a mailbox in this way allows the user to immediately participate in the Exchange organization. You can later return and add mailboxes for users who do not already have them.

Configuring a User Object for Instant Messaging

Any user that will use Instant Messaging must have permissions to do so. Permissions may be granted through the Active Directory Users and Computers console. When assigning permissions, you must designate which Instant Messaging virtual or home server and the domain name that you wish the user to use.

Configuring a User Object for Chat

Chat service is not installed by default. Therefore if you plan to use chat you should designate the setup program to install it when you are building the server. If you are going to implement chat after the server is already running you can run the setup program again to install chat service. It is possible to manage chat services through the Active Directory Users and Computers console.

Diagnosing and Resolving Problems Involving Store Placement

Security

Exchange 2000 information stores are protected with Windows 2000 security, which uses Active Directory information to grant and deny access to resources. Information stores are the most secure when they exist in a back-end server in a FE/BE configuration. In this configuration, information stores benefit from two levels of security, the initial FE login security and the FE/BE interface.

Performance

When dealing with large groups of users, performance considerations are very important. Information store placement can contribute to, as well as hinder, performance. Performance will be impacted if the transaction logs for a mailbox store are on the same physical drive as the mailbox store. The transaction log update operation and the mailbox store update operation will have to share the disk access resources for the physical disk. This slows down both processes, especially if there are a large number of changes to the mailbox store over a given period of time. Similarly, if several public stores that are accessed frequently by many users exist on the same physical disk, performance problems could arise because of access sharing.

Disaster Recovery

Disaster recovery is a very important consideration when placing information stores. If all the stores for an organization are on the same server and that server fails, the network may be out of service for a long time. It is important to spread information stores widely to keep any one server from becoming

too important. It is also important to perform regular backups to ensure that if a disaster does occur, your network will be down for the shortest period of time. Information disaster recoveries also benefit from fault tolerant drives, such as RAID arrays and mirrored volumes. These hardware/software solutions may be able to limit network downtime considerably.

Creating and Managing Address Lists

Exchange 2000 groups are created through the Active Directory Users and Computers console. Groups are receptacles that contain other objects, like users and contacts. There are two types of groups, security and distribution.

Distribution Groups

A Distribution group is a mechanism for grouping e-mail recipients. Distribution groups cannot have permissions applied to them.

Security Groups

Security groups are groups of Windows 2000 users that can be assigned permissions in Active Directory to access resources. Security groups can also function as distribution groups if they have been mail enabled.

Recipient Update Service

Recipient Update Service is the mechanism that Exchange 2000 uses to propagate changes to user information throughout the network. The changes include attributes like group membership and e-mail address. The service uses the membership lists contained on a Windows 2000 domain controller to generate its updates so it is vital that the service be able to communicate with the domain controller. The Exchange System Manager is used to configure the Recipient Update Service. The service can be set to “Always Run”, which means that any changes that are made to user accounts are immediately replicated to other servers or it can be set to run on a user defined schedule. There must be a Recipient Update Service assigned to each domain.

Managing Recipient Objects Keypoints

1. Your network spans multiple Windows 2000 domains. There are two recently installed child domains that do not contain an Exchange 2000 Server computer. To allow new mailboxes created in the child domains to appear in the global address list you should **configure a Recipient Update Service for each new domain**.
2. Your Exchange 2000 organization contains many mailboxes and users are finding it difficult to locate other mail users quickly because of the large global address list. To allow users to sort the company's e-mail addresses based on the department or city, you should **use the System Manager to create address lists for each city and department in your organization**.
3. You are adding a preexisting Exchange organization, ferrisaircraft.com, to your existing organization. You want users from the ferrisaircraft.com to continue receiving mail at addresses from their former domain. To accomplish this, while allowing users to continue to receive e-mail directed to their e-mail addresses at both domains, you should:
 - **Create a recipient policy that appears to the department users so that it creates an additional SMTP address for each of those users.**
 - **Create an MX record that directs Internet mail designated for the ferrisaircraft.com address to the SMTP connector.**
4. Your Exchange organization includes one Exchange 5.5 server computer named server1. You have added an Exchange 2000 Server computer named server2 into the existing organization. When you installed the new server you verified that all messages within the Exchange organization were being delivered. Several users are now reporting that some of the e-mail messages that they have sent are not being delivered to users within the company. Messages from users on server2 are not being delivered to the users on server 1, however users from both servers are able to send and receive e-mail messages. You receive the following error message when you attempt to examine the appropriate link queue on server2:

Exchange Systems Manager

The queue viewer script is unable to retrieve an interface to the queues. The queue viewer script will be disabled until you refresh. Check the event log and verify that the appropriate services are running.

ID number:
Exchange Server Manager.

OK

To ensure that all users within the company are able to send and receive messages from all users in the company, you should **start the MTA stacks service on server 2**.

5. To mailbox-enable a list of new accounts so that e-mail can immediately be sent, you should **force the recipient update service to update immediately**.

6. Users in your Sales department want to be able to easily locate other users in the sales department. It is difficult now because your company contains many thousands of users. You should **create an address list named sales department, and build a filter that displays only mailboxes that have Sales in the department name.**
7. Users are reporting that new mailboxes and contents are not appearing in the global address list or other address lists on the Exchange 2000 Server computer. You test the problem by creating a new mailbox and find that it takes nearly four hours for the new mailbox to appear on the global address list. To make new objects appear in the address list in a reasonable time period, you should **configure the recipient update service to run once each hour.**

Monitoring and Managing Messaging Connectivity

Managing Exchange 2000 Server Messaging Connectivity

Multiple Virtual Servers

The initial Exchange 2000 setup configures all servers to use one SMTP virtual server to communicate with other servers in the routing group. This virtual server is also capable of supporting Internet mail users. One virtual server is usually adequate for most implementations of Exchange 2000. There are circumstances where multiple virtual servers are appropriate, such as if an administrator wants the ability to manage message sizes and settings separately.

Message Relay

Message Relay is the process by which a remote SMTP forwards messages through another SMTP host, using that host's network resources to relay the messages. Message Relay is commonly used by Internet advertisers to relay unsolicited advertising messages. Exchange 2000 Server can be configured to allow message relay from certain servers or to disable message relay completely.

Filter Management

Filters may be used to prevent the receipt of unsolicited advertising e-mail messages from specific sources. Filters are created in the Filtering tab of the Exchange System Manager. Wildcards can be used in the creation of filters and can thwart many typical methods of circumventing filters. Filtered messages can be archived for review later to ensure that only valid messages were ignored.

Managing Connectivity to Foreign Mail Systems

Exchange 2000 Server has the ability to connect to a variety of foreign hosts. The most internally supported of which is MS Mail, a legacy Microsoft mail system. Connection to an MS mail system is achieved through the Microsoft Mail connector, which is installed through the Exchange 2000 Server setup program. The SMTP transport engine is used to transfer messages from Exchange 2000 systems to foreign hosts. The transfer engine collaborates with the Mail Transfer Agent (MTA) to handle the foreign host message transfer. When transferring messages to MS Mail systems, the MS Mail connector receives messages from the MTA. The connector converts the messages to MS Mail format and then sends them to the appropriate destination post offices.

Internet Messaging Connectivity

X.400

Exchange 2000 Server supports connections to X.400 foreign systems through the use of the Microsoft Exchange Message Transfer Agent (MTA). An Exchange 2000 Server uses an X.400 connector to connect to a X.400 foreign system. To use the X.400 connector, you must install an MTA Transport Stack and configure the X.400 connector to properly connect the foreign system. The X.400 connector very efficiently transmits messages over networks, which makes it a good choice for networks with limited bandwidth.

SMTP

SMTP connectors are used to connect to other Exchange 2000 Servers, Exchange 5.5 servers, and remote Internet hosts. The SMTP connector supports SSL message encryption. Either side in a SMTP connector relationship can queue messages to be sent at once in order to efficiently use bandwidth.

Diagnosing and Resolving Routing Problems

A multiple routing group organizational model should be used when portions of a network are separated geographically. Wide Area Networks (WAN) generally fall into this category. WANs typically have high cost communications links that have limited bandwidth. Constant SMTP server traffic across these communications links is not desirable. The typical problem with routing groups is performance across WAN links generated by excessive traffic from various sources.

Replication of resources that are accessed over WAN links is a useful way to reduce WAN traffic. Replication between routing groups is possible, but be aware that replication requires network resource overhead. Replication of large amounts of data between routing groups can greatly decrease network performance if the replication is performed at times of peak network usage. Replication schedules can be set to replicate data at off-peak times.

Messaging connectors can also prevent inefficient use of bandwidth. Servers can queue messages that must travel between routing groups and transmit them when connection costs are lower or during off-peak times. Routing group connectors can also be configured to use alternate delivery schedules for messages that are overly large.

Diagnosing and Resolving Problems Reported by Non-Delivery Report Messages (NDR)

A NDR is generated whenever the transport of a message cannot be completed. There can be several reasons for this. When diagnosing the cause of an NDR it is useful to first determine what the sender was attempting to do with the message. If the recipient is incorrect then a NDR will be generated and delivered to the sender. An improperly configured routing group connector object could also cause a NDR to be generated.

Managing Messaging Queues for Multiple Protocols

The paths that messages take through an organization can be tracked to determine where problems are and how these problems should be fixed. The Message Tracking Center is the tool used for this purpose. Message tracking is disabled by default. Message tracking allows an administrator to locate the specific queues that a message is in, quantify delays on each segment of a route, and verify successful message delivery.

SMTP Queues

Each SMTP virtual server allows an administrator to access connector and system queues. If a message is blocking the successful delivery of other messages in a particular queue, the message may be deleted. Messages can also be frozen, which prevents a message from being delivered until unfrozen. Notifications may also be configured for SMTP queues. If the number of messages or the growth of the number of messages in a queue rises above a designated threshold the system can notify a specified user or administrator.

X.400 Queues

X.400 queues can be monitored in much the same way as SMTP queues. For X.400 messages to be monitored the MTA Stacks service must be running. Like SMTP servers, messages can be deleted or frozen from queues.

Monitoring Link Status

Monitoring Messages between Exchange 2000 Server Computers

An administrator can use the System Monitor to regularly check and determine the status of specified resources on a server. If a resource is available and operating below a defined threshold the system is designated as active, but if a resource violates criteria by being either unavailable or problematic the system enters a critical or warning state. If a server enters the critical state, the link status information (LSI) on that server is updated and the status of the server is propagated to other servers on the network.

The following items are monitored by default and if any stop functioning the server enters a critical state:

- Microsoft Exchange Information Store
- World Wide Web Publishing Services
- Microsoft Exchange System Attendant
- Microsoft Exchange Routing Engine
- SMTP
- Microsoft Exchange Information Stacks
- Microsoft Exchange MTS Stacks

These are the services monitored by default but administrators can designate that other services be monitored as well. The System Monitor is also capable of monitoring system resources, such as disk space and CPU usage. The Exchange System Monitor can be configured to notify a user via e-mail if the system enters a critical state.

Configuring and Monitoring Client Connectivity

Microsoft Outlook

Outlook is the preferred messaging client for Exchange 2000 Server. Outlook 2000 is bundled with Microsoft Office but it is also available separately. The Exchange server transport is a MAPI component that Outlook uses to communicate with an Exchange 2000 Server. The Exchange server transport uses Remote Procedure Calls to communicate between the client and the server. You can test server connectivity and setting accuracy by clicking Check name in the General property sheet of the Exchange server dialog box.

Outlook Web Access (OWA)

OWA is capable of operating on any web browser that supports Java and frames. Any client that has a browser that meets these criteria can access their messages on an OWA server. OWA requires a HTTP virtual server and accesses resources on remote servers through the use of HTTP virtual directories. OWA is usually set up in a FE/BE configuration to prevent damage to internal resources by unauthorized Internet users.

Post Office Protocol 3 (POP3)

POP3 is a protocol that defines commands that enable clients to download messages. POP3 commands consist of keywords that can be followed by arguments if necessary. POP3 will only allow a user to download messages from a server-based inbox. After the messages are downloaded, they are typically removed from the server. POP3 clients require a POP3 virtual server, but utilize SMTP to send messages and therefore require a SMTP server as well. POP3 clients are unable to utilize Windows authentication.

Internet Mail Access Protocol Version 4 (IMAP4)

Unlike POP3 an IMAP4 client is not restricted to the server-based inbox, but allows a user to access different server-based mailboxes. With IMAP4 it is possible to perform all message processing on the server. Like POP3, it is also possible to download messages and perform all message manipulation on a local workstation. Outlook Express is an IMAP4 client.

Public Folder Connectivity

Configuring and Monitoring Public Folder Replication

There are times when it is advantageous to have instances of public folder information in several locations. Replicated folders can add an element of fault-tolerance and may decrease network traffic between servers. Exchange 2000 Server uses the Public Folder Replication Agent (PFRA) to replicate public folder information over existing network links. One disadvantage to folder replication is that it utilizes network resources to transport information between servers and may negatively impact performance.

Replication is configured using the Exchange System Manager. Replication is achieved by e-mail messages sent between servers. E-mail messages are always used no matter the link between the servers. This allows an administrator to create a replica anywhere in the Exchange organization. An administrator can designate the replication interval, age limits, and the maximum message size for replication.

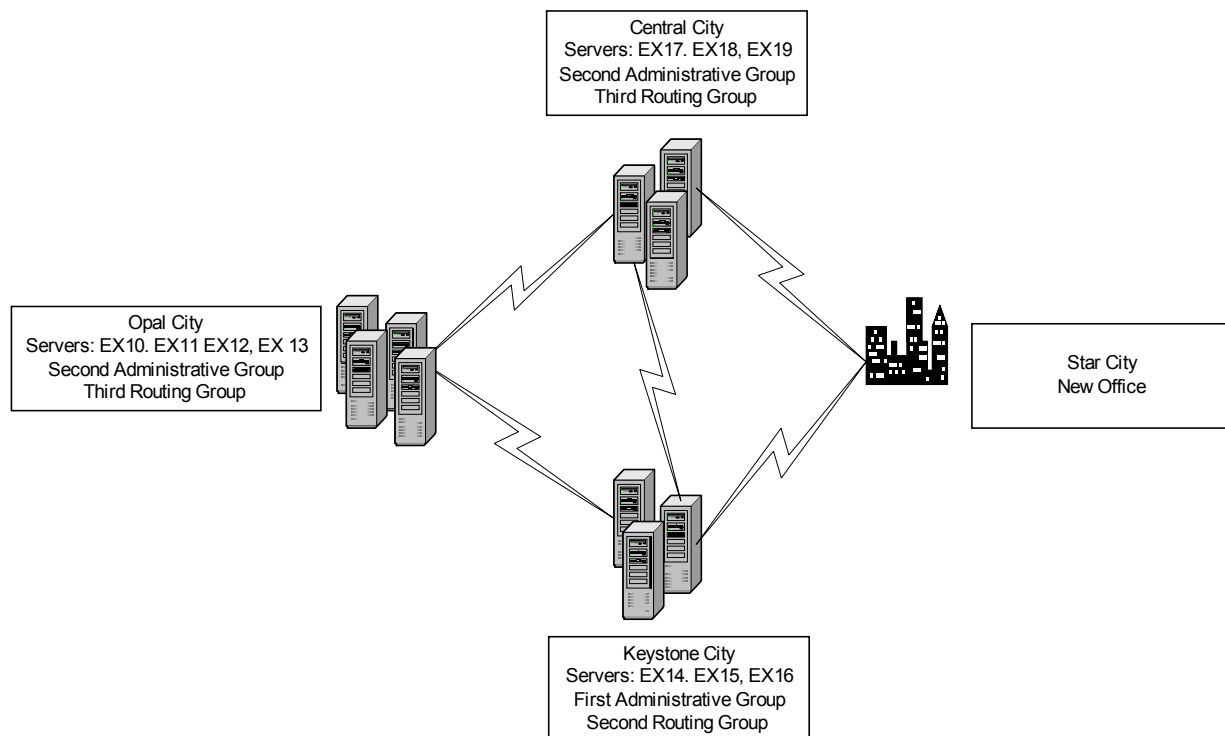
Diagnosing and Resolving Public Folder Replication Problems

Most replication problems are resolved by the PFRA itself. There are a few problems that require direct intervention. Many replication problems stem from replication latency. Latency is the lag time between when the original object was changed and when it was replicated. Latency can result in out of date information in public folders that have not had information replicated to them in a timely manner.

Another common problem is replication conflict. Replication conflict occurs when the same item is altered in two different locations at the same time and the PFRA cannot decide which should take precedence in replication. When conflict occurs the owners of the public folders are notified by a conflict message generated by the PFRA. An administrator will have to decide which version of the item is to be kept.

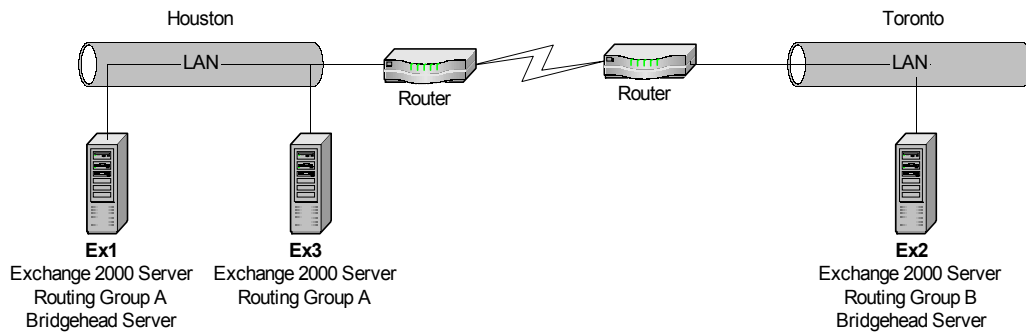
Monitoring and Managing Messaging Connectivity Keypoints

1. Users in the Exchange organization that you administer are reporting that each time they send an e-mail message to an external address, the message is not delivered and the sender receives a non-delivery report (NDR). To configure the server to allow messages to be delivered, you should first verify that there are no problems sending mail to small groups of external e-mail addresses or to single addresses. You should then **increase the maximum number of recipients on the SMTP virtual server**.
2. A local user is reporting that the e-mail message he sent more than 30 minutes ago to a remote user has not been received. You examine the SMTP queues on your Exchange 2000 Server computer and find more than 50 messages in queues. To expedite the delivery of the e-mail message between the local and remote users, you should **freeze all the messages in the .com SMTP link queue**. Then you should also **create a custom filter to unfreeze all messages to the remote user**.
3. Your company is expanding from three offices to four. Your network is configured as shown:



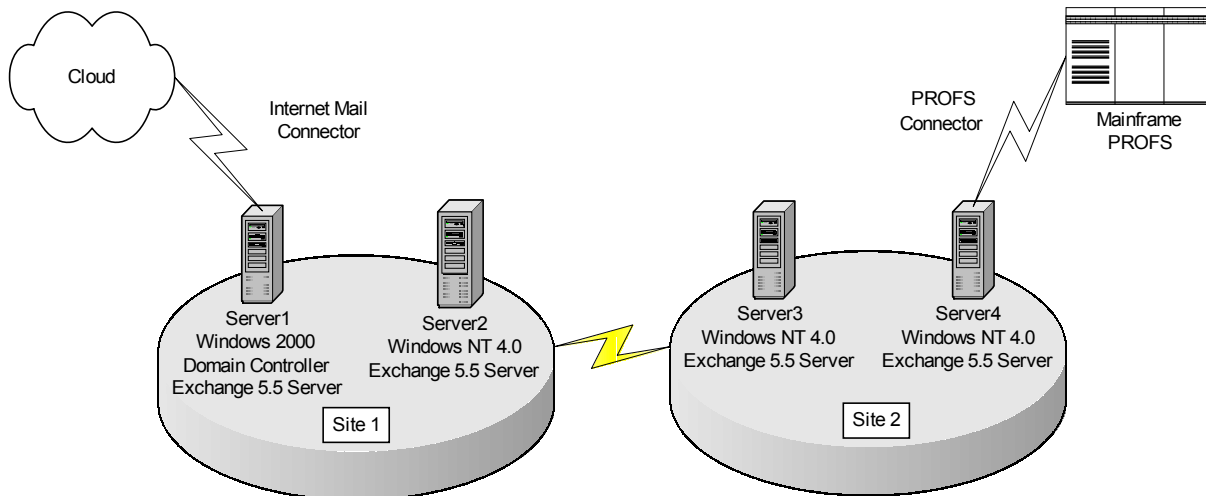
To allow administrators in the in the Keystone City office to be able to administer the Exchange servers at the Star City office, maintain routing efficiency, and minimize WAN traffic, you should replicate EX12 and EX13 from the Opal City office to the new Star City office. To accomplish these goals you should **create a new routing group in the first administrative group, and create routing group connectors between the first routing group and the new routing group**. Finally you should **move EX12 and Ex13 to the new routing group**.

4. Your network is configured as shown:



To configure an alert to notify you when an e-mail delivery between Houston and Toronto is interrupted, you should **add a mail message notification to the link monitor to send an e-mail message to your mailbox when a monitored server enters an alert state.**

5. Your messaging environment is in one Windows 2000 domain. The domain has four Exchange 5.5 server computers that coexist with a legacy IBM PROFS e-mail system. The configuration of the Exchange 5.5 server connectors is shown:



Your allocated budget will allow you to upgrade only two computers to Exchange 2000 Server. You need to allow users in each site to exchange e-mail messages after the upgrade, to exchange messages with PROFS e-mail users, and to have access to Internet e-mail. Administrators should be able to manage Exchange objects in both sites from any server in site 1 with System Manager. You should **perform an in-place upgrade to Windows 2000 and Exchange 2000 Server on server2 and server3.**

6. Users in your company send several hundred e-mail messages each day to a remote domain. You find that the remote domain's servers were unavailable for six hours but are now available. Because the remote domain's servers were unavailable there were over 300 messages in the queue. To expedite the delivery of the messages to the remote domain you should **force a connection on the remote domain's link queue.**

7. You are in process of migrating mailboxes in the Exchange environment from Exchange 5.5 server to Exchange 2000 Server. There is an Exchange 5.5 server public folder named Industrial Controls for the industrial controls department. There is a subfolder in the Industrial Controls folder named Capacitor Schematics. Users in the industrial controls department use Microsoft Outlook Web Access to access their mailboxes. Users in the industrial controls department who have had their mailboxes migrated to Exchange 2000 Server can no longer access the Industrial Controls folder or the Capacitor Schematics subfolder. You should **replicate the Industrial Controls public folder and all subfolders to the Exchange 2000 Server computer**. This will allow the industrial controls users to access the Capacitor Schematics subfolder.
8. There is a virus is affecting e-mail systems worldwide that attaches a 6-KB file named VirusAlert.vbs. You do not have an update for your anti-virus program immediately available. To prevent the virus from spreading with the least possible impact on your e-mail servers until an anti-virus software update is installed, you should **create an event sink that aborts message delivery when a message with the VirusAlert.vbs attachment is processed, and register the sink with the SMTP service**.
9. Your Exchange organization consists of two sites, corporate headquarters and a remote office. The corporate office has two Exchange 2000 Server computers named Exth1 and Exth2. The remote office has one Exchange 2000 Server computer named Exth2. Your telecommunications provider is performing maintenance on the WAN link between the branch office and headquarters. To notify you when e-mail delivery between the two offices is interrupted because of WAN link interruption, you should **create an e-mail notification monitor for Exth1, and configure the e-mail notification to send an e-mail message to your mailbox when the Exth1 enters a critical state**.
10. You are using monitoring and notification features on an Exchange 2000 Server. While you are managing messages in the queues, you disable all connections to the default SMTP virtual server on a server named EX2. The connections will be disabled for approximately one hour. To prevent your other Exchange 2000 Server computers from sending any notifications regarding EX2 during this period you should **disable all monitoring on EX2 until the connections have been enabled**.
11. You administer Exchange 2000 Server computers in 15 countries worldwide. You have created a routing group for each country and also a routing group connector between each country and the main office routing group. The networks in three of these countries are configured with 56-Kbps connections to your WAN, but the networks in the other 12 countries have faster connections. You need to configure the public folder replication to occur during non-business hours in those three countries, and users in those three countries should be prevented from accessing other public folders that have not been replicated to the Exchange servers located in their country. You begin by configuring several public folders to replicate to the Exchange servers in each of these three countries. You should then **configure the replication interval for the selected public folders to run at midnight, and configure the routing group connector for each of three countries to disallow public folder referrals**.

12. Your site consisted of a single server named EX1. You have recently installed an Exchange 2000 Server computer named EX2 into the Exchange 5.5 server site. You use Active Directory connector to import Exchange 5.5 server information into Active Directory. To ensure that the public folders to be replicated between EX1 and EX2 are always up to date, you should **start the site replication service on EX2**.
13. The Exchange organization you administer consists of an Exchange 2000 Server computer named EX1 and an Exchange 5.5 server computer named EX2. EX1 and EX2 reside in separate routing groups. You install Microsoft Mail connector on EX1. EX1 is connected to a single Microsoft Mail post office named MAIL1. Microsoft Mail users are not receiving e-mail messages sent by Exchange users. You should **enable the mail dispatcher MTA option on the connector for MS mail (EX1) and stop and restart the Microsoft mail connector interchange service on EX1**.
14. Users whose mailboxes reside on a server named Svr7 report that it sometimes takes an abnormally long time to receive their e-mail messages. You monitor the links queue and notice that there are sometimes as many as 30 queued messages. To determine if the server's link queue is the cause of the slow message delivery and to notify the Exchange Administrators when problems occur you should **configure the System Monitor to log the local queue length on the SMTP server**. You should also **configure System Monitor to send an alert when the local queue length value of the SMTP server object is greater than 30**.
15. Your Exchange organization contains a large number of mailboxes. Managers are reporting that it is difficult to search the global address list to find all the users in only their departments. To allow each manager to display only the mailboxes in the manager's own department and to only allow the managers to be able to access the new address lists, you should **create an address list for each department and limit the scope of each address list to only the members of that department**. You should then **grant the managers group the read permission to the address list, and remove the read permission from the authenticated users group**.

Managing Exchange 2000 Server Growth

Monitoring Public Folder Usage

An administrator can set several limits on a public folder to regulate its growth. These limits include:

- **Maximum size:** a maximum size can be established as well as a size threshold that will trigger a notification that the user is nearing the size limit.
- **Age Limits:** an administrator can designate the length of time that files are retained in public folders. This will ensure that out-of-date items are not kept.

By using the public folders object, a user can obtain the status of a public folder including total disk space used, last access time, and number of items in the folder.

Managing Growth of User Population and Message Traffic

Exchange 2000 Server gives an administrator concerned with diminishing resources caused by user growth several tools to monitor that growth. The System Monitor is a very valuable tool that allows an administrator to see how well the current hardware configuration serves the users. The Active Directory Users and Computers snap-in allows an administrator to manage the user accounts in the Exchange organization.

The Computer Management utility allows an administrator to control all services currently operating on local and remote servers. The Computer Management utility also allows the administrator access to several different system management utilities like Disk Management, Event Viewer, and System Information.

The Performance utility allows an administrator to monitor the system in much the same way as the Computer Management utility, however the Performance utility also gives access to the System Monitor.

Managing Recipient and Server Policies.

Policies are an excellent way of managing changes to large groups of user accounts. Policies allow an administrator to establish and change default values associated with existing and new user accounts. Policies can be applied to single users or to entire groups of users. Policies are developed and added in the Exchange System Manager.

Diagnosing and Resolving Problems Involving Recipient and Server Policies

Policies apply to the objects to which they are explicitly assigned. Policies may also propagate from parent to child objects. If policy inheritance is blocked or the policy has not been assigned to an object then the policy will not apply. There are areas to check when diagnosing policy problems. Another concern is the situation where policies have conflicting settings. The policy defined at the lowest level will supercede all other policies.

Optimizing Public Folder and Mailbox Searching

Searching folder items is accomplished through the use of the Microsoft Search utility, which is installed with Windows 2000. Microsoft Search both indexes and searches the items in a store. Full-text indexing catalogs significant words in documents, messages, and attachments to support

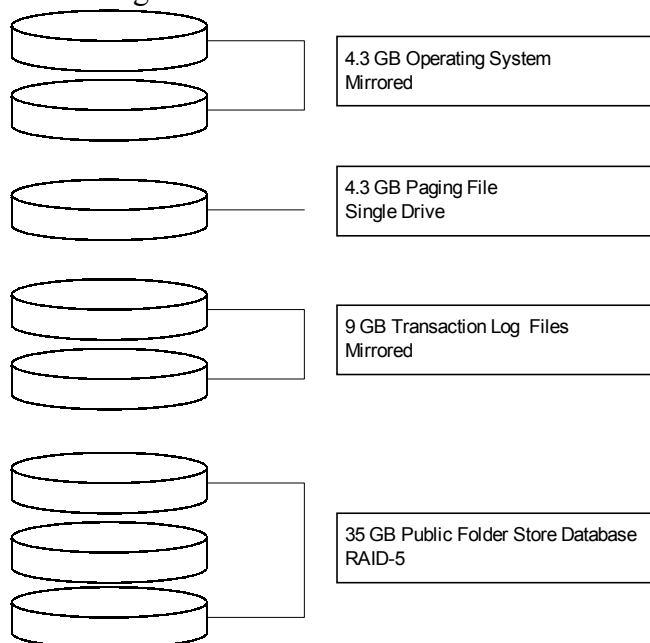
comprehensive word searches. Full-text indexing allows the index to be searched and not the actual message, which increases efficiency.

Configuring a Public Folder for Full-Text Indexing

Full-text indexing is a feature that allows the IMAP4 compatible clients to keyword searches of messages. Full-text indexing can be enabled on a store-by-store basis. To create a full-text index for a store right-click the store and select Create Full-Text index from the shortcut menu, then designate the default directory. Once the catalog is created you must set it to begin population again by right clicking. As indexed documents change, their index becomes more and more out of date, so periodically the index must be updated. It is possible to set the interval between updates or to designate a custom update schedule to minimize impact on server resources. Updating a full-text index can be both time and resource intensive and, if possible, should be scheduled for off-peak server hours to minimize the impact on the mail system.

Managing Exchange 2000 Server Growth Keypoints

1. There are a vast number of documents in the Exchange public folders. The hard disks on your Exchange 2000 Server are configured as shown:



To make it easier to find specific documents and decrease the time it takes, **you should create a new full-text index, and place it on the existing RAID-5 disk array.**

2. One of the your Exchange 2000 Server computers supports five departments and 4,500 mailboxes in a single mailbox store. Recently, users in the research department requested faster access to their e-mail messages when searching for words and phrases. You enable full-text indexing, and set the update interval to “Always”. Users are now reporting that response is slow at peak times during the business day. To decrease the size of the index file, maintain full-text indexing and improve the server response time you should **create an additional Mailbox Store, move the Research mailboxes to the store, and index only the new mailbox store.**
3. Your Exchange organization has three Windows 2000 Server computers on the network. Two servers are dedicated Windows 2000 domain controllers and one server is configured as an Exchange 2000 member server. Your company hires 50 new employees each month and the rate is expected to double within the next year. To ensure that your Exchange organization can handle anticipated growth, without affecting performance, you should **install Exchange 2000 Server on a new Windows 2000 Server computer and configure the server to be a mailbox server.**

Restoring System Functionality and User Data

Applying a Backup and Restoration Plan

When designing a backup and restoration plan an administrator should take into account the goals they wish to achieve. A balance must be struck between the conflicting needs of the organization, speed and reliability.

Backing up an Exchange 2000 Server is not particularly difficult, but great care should be taken to maintain the integrity of backup data. You select the items that you wish to backup, such as information stores or security databases, and the method that you want to use, online or offline, full, incremental, or differential. Exchange 2000 Server should be installed on a domain controller to easily backup the configuration of the server with Active directory information included. There should be regularly scheduled backups performed on all servers to ensure that any failed server can be restored quickly, with the most current data available.

Restoring User and System State Data

Since the Exchange databases do not contain configuration information, it is not adequate to only perform database backups if the entire server is to be restored. Active Directory information, the IIS metabase, and registry information need to be backed up as well to ensure the successful recovery of a failed server. If the Exchange 2000 Server is a domain controller, this data can be backed up by checking the “System State” checkbox of the Windows 2000 Backup utility.

Recovering Deleted Mailboxes

An accidentally deleted mailbox can be restored through the Exchange System Manager. The deleted mailboxes are not initially deleted, but marked as disconnected. There is a default time period of 30 days before the Exchange 2000 Server Cleanup Agent will purge the mailbox. After that point, the mailbox must be recovered from a backup. If has been less than 30 days, the deleted mailbox can be reconnected to any user account through the Exchange System Manager.

Recovering Deleted Items

It is possible for Exchange 2000 to retain items deleted by users after they have been deleted, without the need to restore from a backup. If the items are found to have been deleted by mistake, they can be recovered as long as the item is still in the store. The administrator can set the interval that the system will retain deleted objects to ensure that there is enough time to reconsider the deletion. This interval is set in the Limits tab of the store.

To recover a deleted item, select Recover Deleted Items from the Tools menu. This will bring up the “Recover Deleted Items From” window. You can select the objects that you wish to recover in this window. Clicking the Recover Selected Items button in the toolbar then restores items to the Deleted Items folder where the items can be manipulated as if the Wastebasket had not been emptied.

Configuring a Server for Disaster Recovery

Circular logging

A server may be configured to delete a transaction log file and its associated entry once the transactions have been committed to the database. This is called circular logging. Circular logging is

useful when disk space is at a premium as it prevents duplicate disk space usage, but it does reduce the fault tolerance of the information contained in the database. Circular logging is not compatible with certain types of backup options that require transaction log files to perform restoration.

Backup

Offline Backups

Offline backups are standard file backups of the Exchange server system files and directories. The Offline backup can only be performed when services are stopped and the server is offline. Offline backups can include several items that other backups cannot. Offline backups can include the program files of the server, the message queues of the MTA connectors, or the MS Mail Dirsync database. Offline backups are not aware of mailbox databases and do not purge transaction log files. Since the server must be offline while the offline backup is taking place, it is only undertaken occasionally, after upgrades or large changes in structure.

Online Backups

Unlike offline backups, online backups do not require that the server services be stopped while the backup is running. Online backups are aware of mailbox databases and in some cases they do purge transaction log files. Online backups can be much faster than offline databases because they do not include the server's program files. There are four types of online backups:

- **Copy:** copies files and transaction logs but does not purge files from the system. Copy backups are generally used whenever minor configuration settings are changed.
- **Full:** backs up entire information store, both databases and transaction log entries. Transaction logs already committed to the database are purged. The full backup allows the entire server to be restored from one database but require more storage space than any other backup.
- **Incremental:** saves new transaction files and purges them after backup. The incremental backup does not save any database files, only the transaction logs that have been created since the last full or incremental backup. Circular logging will not work with Incremental backups.
- **Differential:** like the incremental backup, the differential backup saves only transaction files. The differential backup saves transaction files created since the last full backup and does not purge the transaction log files. Circular logging will not work with differential backups.

Restoration

Restoring to the Same Server

Restoring backed up databases to their original location does not require the server to be offline unless the Key Management System (KMS) or Site Replication Service (SRS) databases are being restored. The database that will be restored must be dismounted before the restoration. Other databases may remain mounted and functioning during restoration.

Restoring with Incremental or Differential Backups

When using differential or incremental backups to restore, you must first restore the last full database backup. If you are using a Differential backup to restore information you should restore the differential backup after restoring the last full backup. If you are using the incremental backup you should restore the last full backup and then all incremental backups made after the full backup starting with the oldest and moving to the most recent. When you reach the last backup that you plan to restore

step in your restoration process you should check the Last Restore Set check box. If this is not done, the databases cannot be mounted.

Restoring to a Different Server

When restoring the backups of an Exchange 2000 Server to a different computer you should be aware of potential problems that might arise because of differing hardware between the old system and the new. The steps for restoration are as follows:

1. Install the same version of the Windows 2000 operating system in exactly the same way that it was on the previous computer and reapply all service packs. Designate the same system directories and drives as they existed on the old server.
2. Restore all system state and file backups.
3. Run the Exchange 2000 Server setup program with */disasterrecovery*.
4. Restore all backups of Exchange server information, beginning with the most recent full backup.

Diagnosing and Resolving Security Problems Involving User Keys

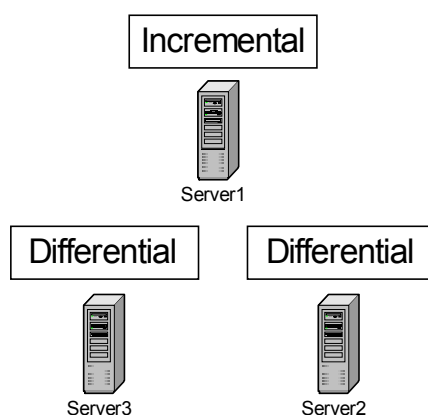
When diagnosing problems regarding user keys, first check to ensure that both parties involved have advanced security enabled. Encrypted messages can only be exchanged with users who have this enabled.

Problems with user keys normally involve a user losing their encryption password, which renders their encrypted messages unreadable. In these instances, you can use the KMS object in the System Manager to recover the account. The user must then be provided with a new token and re-enrolled into the KMS.

Restoring System Functionality and User Data Keypoints

1. You administer seven Exchange 2000 Server computers. Each of the servers support 1,800 mailboxes that are distributed among five mailbox stores located in two storage groups. All mailbox store settings are configured to use the default values. Tape backups are set to occur on all servers between 4 A.M and 7 A.M. Users on the night shift report that sending and opening messages often takes several seconds between 1 AM and 2:30 AM, but response times are acceptable at other times. To improve response times between 1 AM and 2:30 AM you should **configure the maintenance interval of each of the mailbox stores so that maintenance is staggered across a wider period of time.**
2. You are in the process of moving a group of 200 mailboxes from a mailbox store in one storage group to a new store in a newly created storage group. These mailboxes use less than 45 MB of disk space. The new mailbox store volume has 20 GB of available disk space, and the new storage group's transaction log volume has 2 GB of available disk space. To prevent the destination mailbox store from dismounting and stopping the process stops, you should **enable circular logging for the storage group that contains the destination database until all of the mailboxes are moved.**
3. You are implementing a disaster recovery plan for your Exchange organization. The three Exchange 2000 Server computers you have are named server1, server2 and server3. You want to meet the following requirements:
 - Daily backups of server 1 must include only the information changed that day.
 - Backups of all database files must be run only on the weekend.
 - Backing up server3 must not truncate the transaction log files during the daily backup.
 - Restoring server2 near the end of the week must be performed with as little administrator effort as possible.

To configure the weekday backup jobs for each server to meet these requirements, you should use the following backup scheme:



4. The information store on your Exchange 2000 Server has stopped abruptly, causing the mailbox store to shut down improperly. You examine the header of the database, and find that the database is in an inconsistent state. To allow you do to bring the mailbox store online without potentially causing damage to the database, you should **restart the information store service on the server**. You should also **log on as an administrator then mount the mailbox store**.
5. A large number of mailboxes in your Exchange 2000 Server computer are infected with a virus that you are unable to clean. You export uninfected e-mail messages to files. You want to remove the mailboxes from an online backup performed prior to infection. Circular logging is enabled. When preparing to restore the files, you configure Windows backup with the “Always overwrite the files on your computer” option. You perform a restore from your online backups and find that the restore progress report indicates a successful restore with skipped files. You examine your Exchange mailbox and discover that the mailbox database files were not restored. To resolve this problem prior to merging the uninfected messages into the databases, and completing the restore process you should **dismount the database, and then perform the restore again, selecting the same overwrite options**.
6. You are responsible for the backup and restore strategy for your company's Exchange 2000 Server computer. There is a single storage group that contains two mailbox stores and one public folder store. You want to you accomplish the following goals:
 - The mailbox databases must be backed up each night.
 - The public folder database must be backed up each week.
 - The transaction log files must be purged only once each week.

To accomplish this, you should perform:

- **A nightly normal backup of the mailbox databases.**
 - **A weekly normal backup of the entire storage group.**
7. One of the three hard disks on server fails. You replace the faulty hardware and restart Windows 2000 Server on the failed server. You have an online backup of the Exchange databases on that server that you will use to restore the Exchange server's configuration from the Active Directory and restore the mailbox and public folder store data. Before mounting the databases you should **run *setup /disasterrecovery***. You should also **restore the databases from the online backup, and select the “Last Restore Set” check box**.
 8. Your Exchange 2000 Server computer has a single storage group that contains three mailbox stores and one public folder store. The backups that you perform nightly alternate between a normal backup of two of the mailbox stores on one night and a normal backup of the other mailbox store and public folder store the following night. You notice that transaction log files are not being purged, and they are now consuming nearly all the available disk space. You need to continue to perform alternating nightly backups of the mailbox stores and the public folder store and also make sure that the transaction log files are not taking up too much hard disk space. You should **perform a nightly incremental backup of the entire storage group in addition to the current backups**.

9. Users are reporting that they can't open certain e-mail messages in a public folder. You find that several folders in the public folder store are corrupt. To allow users to access messages again you should **dismount the public folder store, and then run *ISINTEG -fix* on it**. You should then **remount the store**.
10. You are creating a disaster recovery plan for your three Exchange 2000 Server computers. The servers are named server1, server2 and server3. Each Exchange server houses three databases and you plan to use a single backup for each storage group. You need to configure the server so that the following goals are met in the event of failure:
- You must be able to restore the database on server 1 and server2 to the state that existing one-minute before the failure.
 - You must be able to restore all the databases on server3 simultaneously.

You should **create a storage group on server3 to contain the databases and create a storage group for each database on server1 and server2**. You should also **disable circular logging on server3**.

11. If a user has deleted several e-mail messages from their e-mail box and you wish to recover the deleted e-mail messages with the minimum amount of disruption to the net current network. You have an online backup that was created the day before the deletion. You should **install Exchange 2000 Server in an isolated forest, and dismount the database in the System Manager of the new installation**. You should then **restore the appropriate database from the online backup and remount the database**.
12. You have configured an Exchange 2000 Server computer as a recovery server for single mailbox recovery. You restore the database files from your production Exchange server's online backup to the recovery server. You will need to specify the correct names and paths of the databases and **in System Manager, select the "This database can be overwritten by a restore" check box**. You should then **mount the databases**.
13. Users are reporting that they are unable to access their e-mail messages. After examining the Exchange 2000 Server, you find that the information store service stopped. You examine the event logs and find several 1018 ESE error messages that report hard faults when reading from the genetics mailbox store database. To bring the mailbox store back online with the most current data and without damaging the contents you should **restore the genetics database from backup, but do not overwrite the transaction log files**.
14. There is one domain controller and one Exchange 2000 Server computer on your Windows 2000 network. The domain controller fails when you do not have a backup of the server. After you reinstall the domain controller and create a new forest you will need to allow the users in this new forest to access the Exchange mailboxes on a second server. You should **reinstall Exchange 2000 on EX1. Configure the new installation to use the original database files, then reconnect mailboxes to new user accounts**.

15. A power outage results in a corrupt registry on one of your Exchange 2000 Server computers. To repair the server's registry and allow the Exchange and Netlogon services to properly start you should **use Windows backup to restore System State Data** .
16. A hard disk that contained the Exchange 2000 system files on one of your Exchange 2000 Server computers fails. The only available backup does not include system files, but the hard disk containing the Exchange databases and transaction log files was not affected. To bring the server back online, you should replace the failed hard disk and **reinstall Exchange 2000 Server by running *setup /disasterrecovery* on the server**.
17. A power failure causes one of your Exchange 2000 Server computers to shut down unexpectedly. You restore power to the computer. But when you restart, you find that the hard disk that contains the transaction log files was damaged and its contents are unrecoverable. You back up the Exchange database files to a safe location and replace the failed hard disk. To bring the mailbox store back online with the most current data and without an inconsistent header you should:
 - **Run *ESEUTIL /P* on the database.**
 - **Run *ISINTEG -fix* on the database.**
18. You want to formulate a plan to decrease the time that it takes to restore a mailbox store after a hard disk failure. The plan should provide for the restoration of the mailboxes of managers and executives more quickly without interfering with the simultaneous restriction of the mailboxes of other users. Your entire storage group should be capable of being backed up in one backup set. You should **create a new mailbox store in the existing storage group for the managers and executives**. You should then **modify the storage group properties so that the transaction log files are on a separate physical disk from the mailbox store files**.
19. You are examine the event logs on one of your Exchange 2000 Servers and discover several 1018 ESE errors that report transient faults when reading from the administration mailbox store database. To resolve this problem without damaging the contents of the administration mailbox store, you should **repair and upgrade the disk subsystem hardware, and restore the database files from backup**. You should do this even if users have not yet reported any problems connecting to their mailboxes.
20. You are configuring a disaster recovery plan on your Exchange 2000 Server computer. There are three hard disks on the server, disk0, disk1, and disk2. System files are stored on disk0. Disk1 and disk2 are currently not in use. There are online backups of the Exchange databases made each night. To configure the server to minimize the loss of data if one of the hard disks fails you should **place the log files on disk 1, place the .EDB and .STM files on disk 2, and disable circular logging on the Exchange server**.
21. You want to perform nightly incremental backups at your Exchange 2000 Server computer. When you attempt to perform an incremental backup, Windows backup reports that it is unable to attach to the database. Before performing the incremental backup, you should:
 - **Disable circular logging on all storage groups on the server.**
 - **Perform a normal backup of the database.**

22. You have limited storage capacity. You want to minimize the space occupied by a newsfeed that you have directed to a public folder. You must be able to recover all newsfeed items from a news server at your ISP. To be able to recover all other messages since the last backup you should **create a new public folder store in a new storage group**. You should also **create the newsfeed public folder in this store**, and **disable circular logging for this public folder**.
23. Your Windows 2000 domain contains includes two Exchange 2000 Server computers. The servers are named server1, and server2. Carol is a user in the finance department who has a mailbox on server1. Carol deleted several e-mail messages three days ago and she now wants to recover them. A support technician named Michael has attempted to restore Carol's mailbox to server2. After the restoration, Michael ran the Mailbox Cleanup Agent but was unable to reconnect Carol's restored mailbox to another Active Directory user account. You are still unable to recover the deleted items from Carol's mailbox. To recover them, you should **install Exchange 2000 Server on a new computer that is in an isolated forest**, and **restore DB1 to the new server**. You should then **and connect Carol's mailbox to a new user account**.
24. A user has corrupted the metabase through direct changes to an Exchange 2000 Server. You should **use Windows backup to restore the system state data**. You should use a prior backup made before the changes to allow you to make configuration changes to the virtual servers in the System Manager after the corruption of the metabase has been repaired.

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