Monitoring Microsoft Exchange Server 2000-2003

eG Innovations Product Documentation

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Total Performance Visibility

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Chapter 1: Introduction

Microsoft's Exchange 2000/2003 server is an enterprise messaging system that is tightly integrated with the Windows 2000/2003 operating system. Figure 1.1 shows how the Exchange 2000/2003 Server interacts with the Internet Information Server and Active Directory within a domain. This figure also depicts how an Exchange 2000/2003 Server belonging to one domain communicates with another Exchange 2000/2003 server on another domain. The Simple Mail Transport Protocol (SMTP) is the primary protocol used by the Exchange server for sending e-mails and connecting to another Exchange server that are available in other domains. An user connecting to the Exchange server uses SMTP to send and Post Office Protocol (POP3) or Internet Messaging Access Protocol version 4.0 (IMAP4) to receive e-mails from the mailbox. SMTP, POP3, and IMAP4 are all implemented using virtual servers in the IIS server. Alternatively, clients also use MAPI which is based on remote procedure calls to communicate with the Exchange server.

Since IIS and Exchange servers run in separate address spaces, an RPC based communication layer is necessary to forward the requests to the corresponding mail protocol engines which are residing on the Exchange server. This layer is called the Exchange InterProcess Communication Layer (EXIPC).

The Exchange 2000/2003 Server internally uses two queues namely, the local queue and the remote queue. The local queue is meant for sending e-mails to users belonging to the same domain. The remote queue is used for sending e-mails to users of other domains.

The Exchange server stores all the e-mails in a repository called the Exchange Database. The server uses NTFS to connect to the Exchange Database. The user e-mail address and credentials are stored in the Active Directory. The Exchange server uses a cache (called the DSAccess cache) to avoid frequent accesses to the Active Directory service.

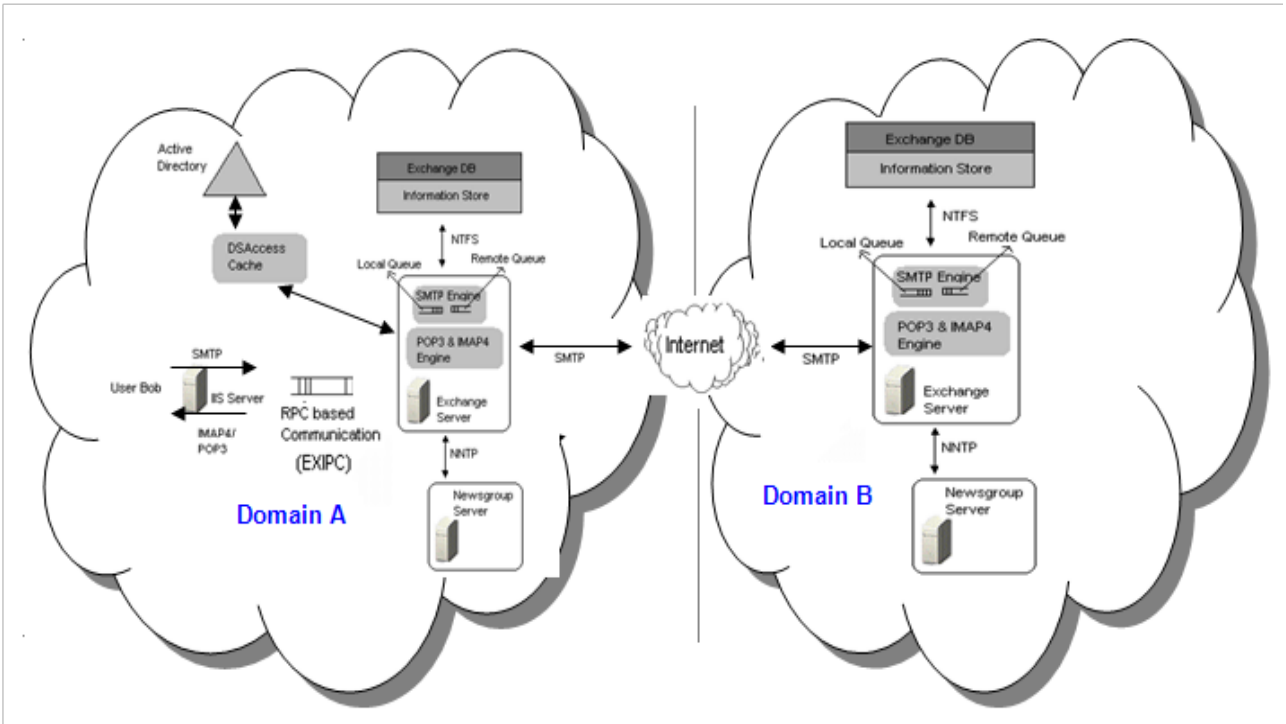

Figure 1.1: Architecture of a Microsoft Exchange server

The Exchange server uses Network News Transport Protocol (NNTP) to communicate with Newsgroup servers. NNTP is also implemented using a virtual server in the IIS server.

Since the Exchange server relies on Windows 2000/2003 Active Directory, Internet Information Services and Domain Name System, the Exchange server administrators need to be more proactive than reactive to ensure that critical messaging services remain available to the customers and end-users. One of the most common complaints that Exchange administrators receive from users is that of slow mail performance. The key challenge for an administrator here is to determine where and why a slow-down is occurring (e.g., is there a problem is receiving data from clients over a network? is the slow-down in the Exchange server's processing? or is the problem due to slow disk read/writes at the operating system level?), and what can be done to solve this problem. This is where eG Enterprise lends helping hands to Exchange administrators to determine and address the issues in Exchange server performance at the earliest.

Chapter 2: How to Monitor Microsoft Exchange Server 2000/2003 Using eG Enterprise

The eG monitor for Exchange makes monitoring and managing Exchange server performance easy and efficient. Using either an agent-based or an agentless approach, administrators can monitor various aspects of the Exchange server's performance including the instantaneous occupancy of the different Exchange server queues, the access patterns of users, and the interaction of the Exchange server with the Active Directory. Before starting to monitor the Exchange server, first you should configure the Exchange Server 2000/2003 to work with eG Manager. The procedure for achieving this has been detailed in the below section.

2.1 Configuring an Exchange Server 2000/2003 to work with eG Manager

The XchgMail test, which is executed by an eG external agent, mimics an MS Outlook mail client that sent and receives mails from an Exchange server. Whereas eG Enterprise's Mail test relies on SMTP and POP3/IMAP protocols to communicate with the mail server, the XchgMail test is used for emulating client accesses via the native Microsoft Mail protocol (i.e. in situations where SMTP/POP3/IMAP are not enabled for a mail server). This test takes two main parameters:

- An email ID of the user mailbox that the test uses to send and receive mails
- The Profile that is used by the configured user mailbox

In order to ensure that this test functions, the following conditions are to be fulfilled:

- The eG external agent that is executing the **XchgMail** test, should be installed on a Windows 2000 (or 2003) server/client in the same domain as the Exchange 2000/2003 server.
- This test uses only a Microsoft Outlook 2003 client for sending/receiving mails from the server. **Note that the XchgMail test will not work with Microsoft Outlook Client 2000/2002**.
- The Microsoft Outlook 2003 client used by the test should have been installed with the Collaboration Data Objects option enabled; to know how to modify your Outlook installation to enable this option, refer to Section 3.4 of this manual.
- The administrator configuring the test should ensure that the email ID being used in the test, exists on the Exchange 2000/2003 server. If it does not exist, then follow the instructions given below to create a mailbox (these instructions are specific to an Exchange 2000 server) and an email ID that corresponds to it:

1. Click the **Start** button on the task bar of the Windows 2000 server, and follow the menu sequence: Start -> Programs -> Microsoft Exchange -> Active Directory Users and Computers (see Figure 2.1):

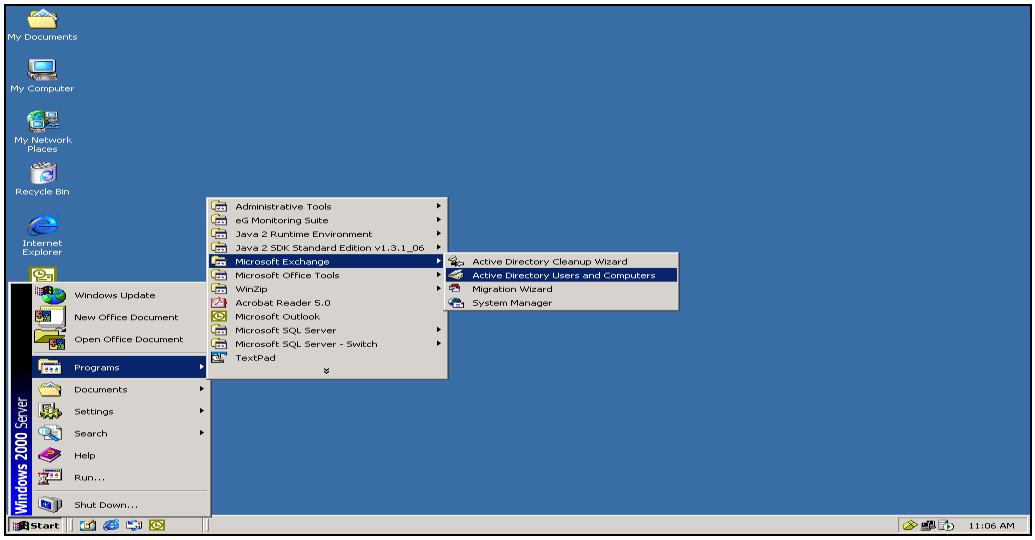

Figure 2.1: Opening the Microsoft Exchange Active Directory Users and Computers window

2. The window that appears has a tree structure in its left pane. Expanding the Active Directory Users and Computers node in the left pane will reveal a list of sites on the Exchange server. Expand the site on which the new mailbox is to be created, right-click on the **Users** folder within, select **New** from the shortcut menu that appears, and choose the **User** option from the **New** menu (see Figure 2.2).

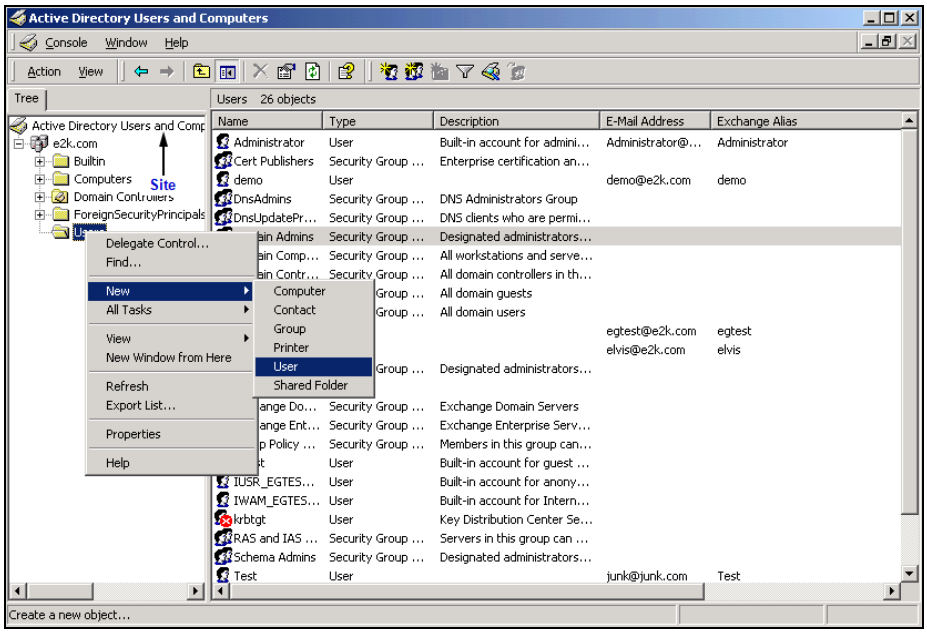

Figure 2.2: Creating a new Exchange mail box for user john

3. In the **New Object – User** dialog box that appears (see Figure 2.3), specify the details of the mailbox being created. After providing the user name, specify a **User logon name** (the name using which the user logs into the Exchange server), and select the site on which the mailbox is being created from the adjoining list box (here, the site name will be prefixed by an '@' symbol) (see Figure 2.3). The **User logon name** and the **Site** name together forms the **Email ID** of the user mailbox. For example, in Figure 2.3 below, the **Email ID** of the **mailbox** *elvis* is *elvis@e2k*.com. This is the email ID that will have to be specified against the xchgmailboxname parameter.

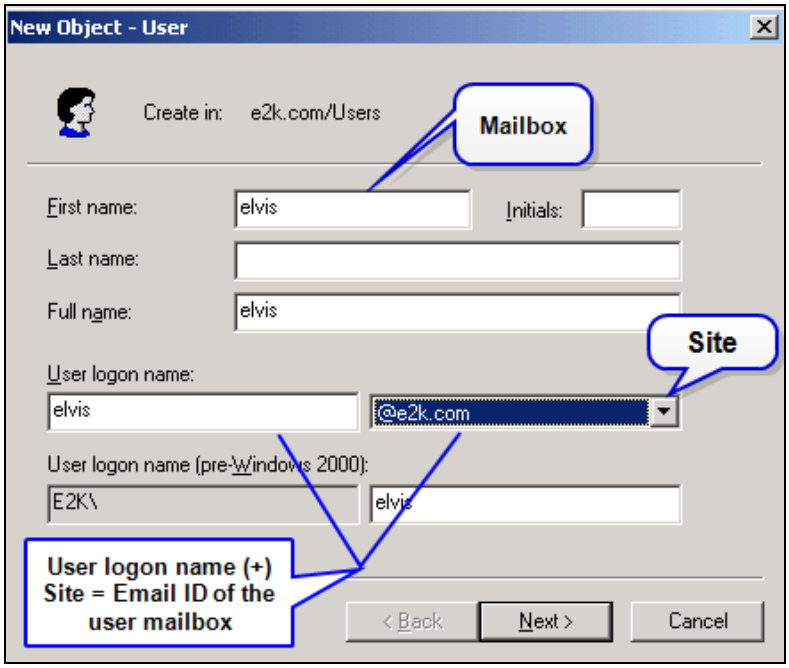

Figure 2.3: Specifying the details of the new user account

4. Next, specify the **Password** for the new user account and confirm it by retyping it in the **Confirm Password** text box. Then, check the **Password never expires** check box and click the **Next >** button to continue (see Figure 2.4).

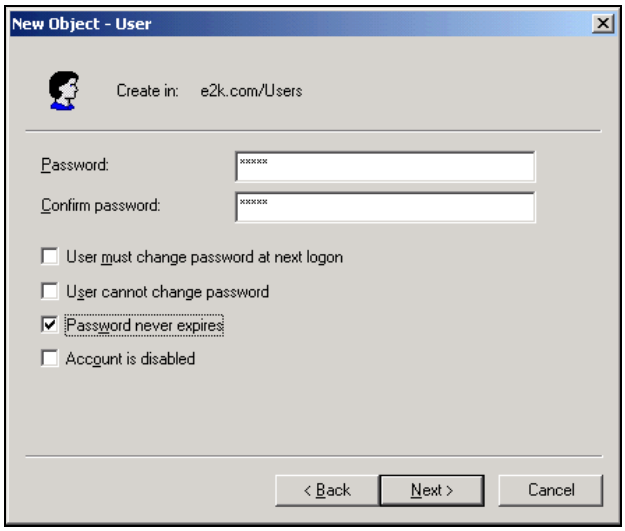

Figure 2.4: Specifying the password

5. Then, click on the **Create an Exchange mailbox** check box (see Figure 2.5) to create a mailbox for the user. Next, provide an alternate name for the mailbox in the **Alias** text box, and then specify the full path to the **Server** which hosts the Exchange 2000 server (You can view the full path using the tree structure in the **System Manager** window that appears when the following menu sequence is followed: Start -> Programs -> Microsoft Exchange -> System Manager). Also, specify the **Mailbox Store** and click the **Next >** button to continue.

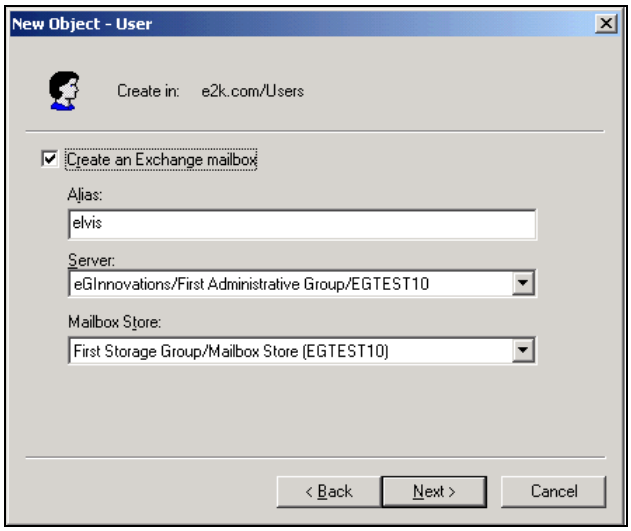

Figure 2.5: Creating a mailbox

6. Finally, view a summary of your specifications, and click the **Finish** button to quit setup (see Figure 2.6).

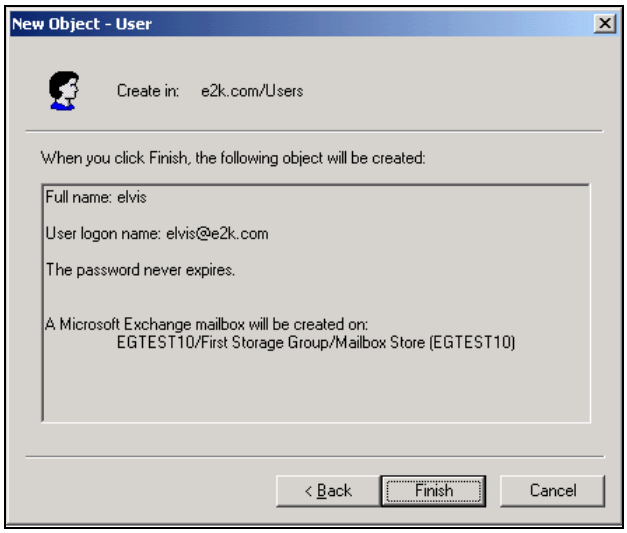

Figure 2.6: Summary of the specifications

7. The eGurkhaAgent service should run using the account information of the user whose mailbox has been configured for the **XChgMail** test.

8. By default, the eGurkhaAgent service uses the LocalSystem account for execution. This account however, may not permit an external agent to access the mailbox that has been configured for the **XChgMailTest**. Hence, the eGurkhaAgent service should be made to run using the login information of the user whose mailbox has been configured for the **XChgMail** test.

9. For example, assume that the administrator has decided to use the Windows 2000 user *elvis's* mail box for configuring the **XChgMail** test. To login to a Windows 2000 server/client, *elvis* uses the user name *elvis* and the password *elvis*. To ensure that the external agent gains access to *elvis's* mailbox for monitoring, the above-mentioned login information should be passed to the eGurkhaAgent service. The process to be followed for performing this, has already been discussed.

10. MAPI should be configured in the Exchange 2000/2003 server.

11. MAPI is used by an Exchange server (5.5/2000/2003) for internal messaging purposes. The **XChgMail** test and the **MsXMail** test require MAPI to be up and running in the Exchange server. While this service is configured in an Exchange server 5.5 by default, it is not the case in an Exchange 2000/2003 server. To configure this service, do the following:

    - Open the **Active Directory Users and Computers** window using the menu sequence: Start -> Programs -> Microsoft Exchange -> Active Directory Users and Computers.
    - In the tree-structure in the left pane, expand the node representing the site on which a mail box for the eG user has been configured. Click on the **Users** folder within the site, so that the complete list of

mailboxes appears in the right pane. Now, double-click on the eG user's mailbox. Then, click on the **E-mail Addresses** tab (see Figure 2.7) of the **Properties** dialog box that appears:

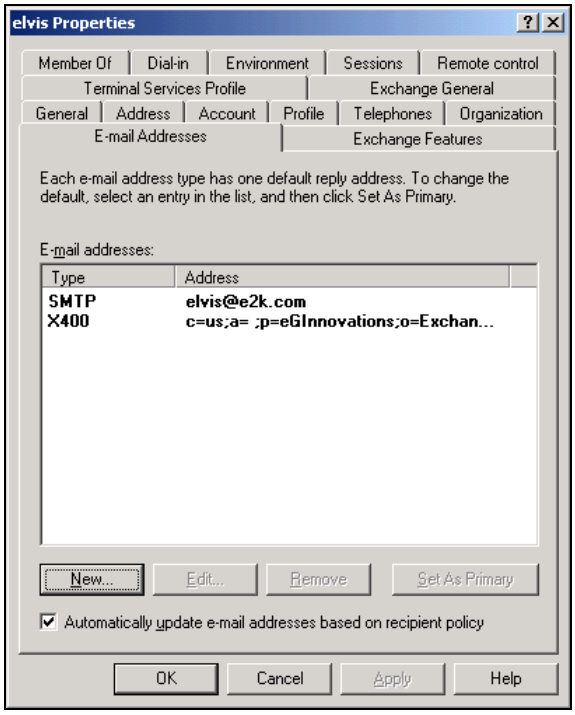

Figure 2.7: The E-mail Addresses tab

- To add the MAPI email-address to the list of addresses displayed therein, click on the **New** button in Figure 2.7. Upon clicking, an **E-mail address type** list will appear (see Figure 2.8). Select **Microsoft Mail Address** from that list and click the **OK** button (see Figure 2.8).

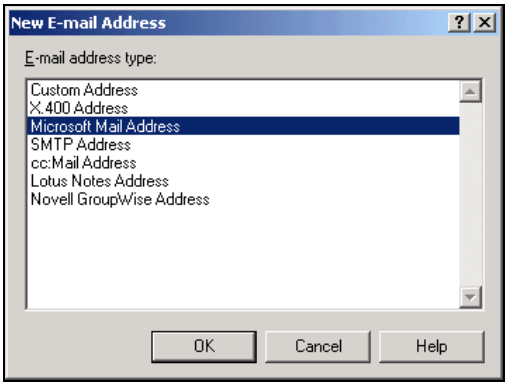

Figure 2.8: Selecting Microsoft Mail Address as the address type

- In Figure 2.8 that appears next, specify the properties of the chosen address type. Enter the name of the organizational unit (see Figure 2.9) that houses the mailbox, in the **Network name** text box. Then,

in the **Postoffice name** text box, specify the name of the site (see Figure 2.9) on which the mailbox has been configured. Finally, the **Mailbox name** (see Figure 2.9) is to be specified.

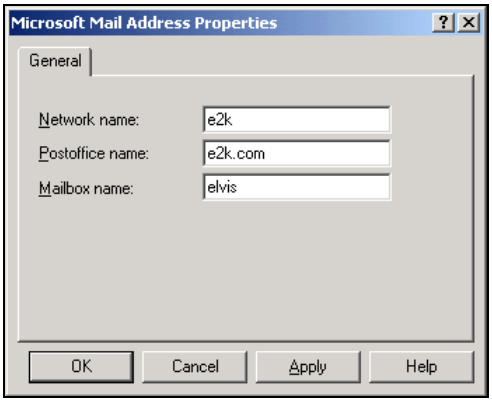

Figure 2.9: Specifying the properties of the address type

- Next, click on the **Apply** button, and then the **OK** button to return to Figure 2.9. Finally, click on the **Apply** and **OK** buttons in Figure 2.7 to complete the process of creating the MAPI service.

Once you configured the Exchange server to work with the eG manager, proceed to manage the Exchange server using eG administrative interface. The steps for managing the Exchange server have been detailed in Section **2.2**.

2.2 Managing the Microsoft Exchange 2000/2003 server

After installation of the eG agent, follow the steps given below to configure eG to monitor Exchange 2000/2003 servers. eG Enterprise provides two methodologies for configuring and managing the Exchange server. The

1. Login to eG user interface as an administrative user.
2. If a Microsoft Exchange 2000/2003 server is already discovered, then directly proceed towards managing it using the **COMPONENTS – MANAGE/UNMANAGE** page.
3. However, if it is yet to be discovered, then run discovery (Infrastructure -> Components -> Discover) to get it discovered or add the component manually using the **COMPONENTS**page (Infrastructure -> Components -> Add/Modify). Remember that components manually added are managed automatically. Discovered components, however, are managed using the **COMPONENTS – MANAGE / UNMANAGE** page.
4. To manage the Microsoft Exchange 2000/2003 server component that is auto-discovered, follow the Infrastructure -> Components -> Manage/Unmanage in the **Infrastructure** tile of the **Admin** menu.

5. In the **COMPONENTS – MANAGE/UNMANAGE** page that appears next, select *Exchange 2000/2003* as the **Component type**. Then, the auto-discovered components will be displayed under the **Unmanaged Components** section.

6. Next choose the component to be managed from the from the **Unmanaged Components** section. 2.2 and 2.2 clearly illustrate the process of managing the Exchange 2000/2003 component.

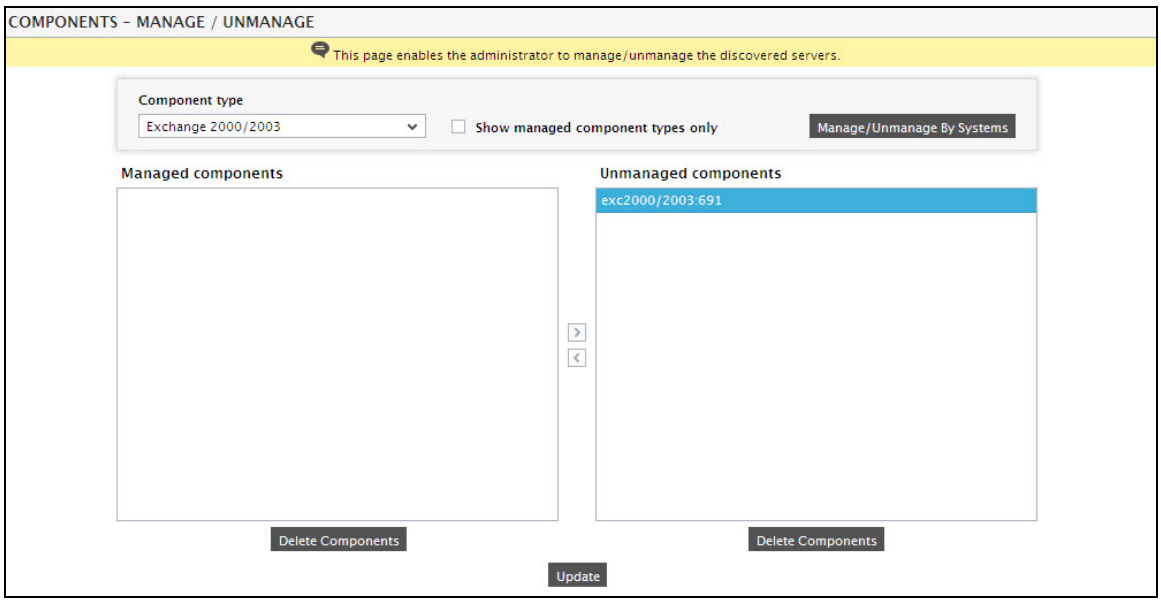

Figure 2.10: Viewing the list of unmanaged Exchange 2000/2003 servers

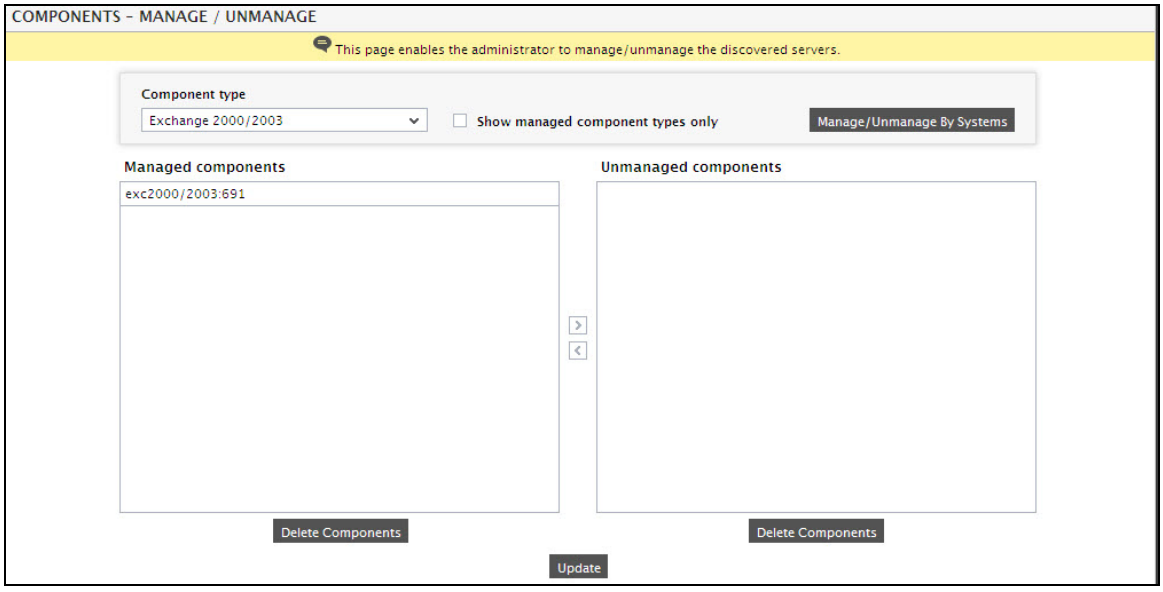

Figure 2.11: Managing an Exchange 2000/2003 server

7. Once the Exchange component is managed, try to signing out of the eG administrative interface, you would be prompted to configure the tests depicted by Figure 2.12.

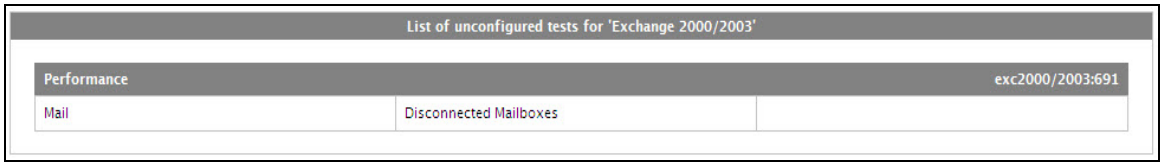

Figure 2.12: The list of unconfigured tests for an Exchange 2000/2003 server

8. If the **Mail** test is already configured (for eg., while configuring a Exchange server), then no such prompt will appear. Figure 2.13 displays the parameters of the **Mail** test for an Exchange 2000/2003 server.

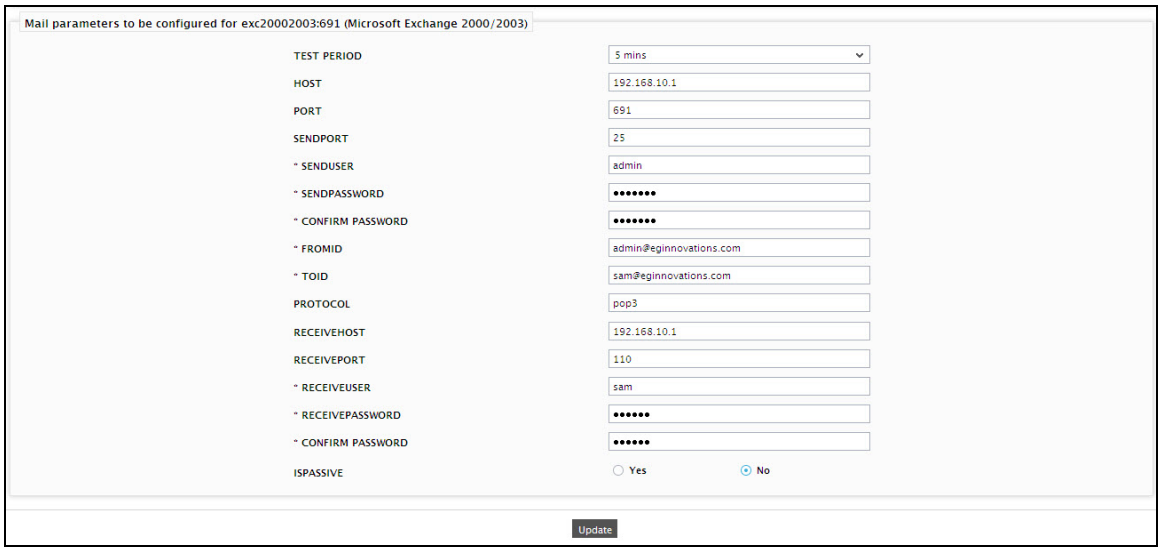

Figure 2.13: Mail test for an Exchange 2000/2003 server

9. If you try to sign out again, you will be prompted to configure the **Disconnected Mailboxes** test. This test automatically discovers and monitors the disconnected mailboxes on an Exchange server. The parameters of the test are depicted by Figure 1.14.

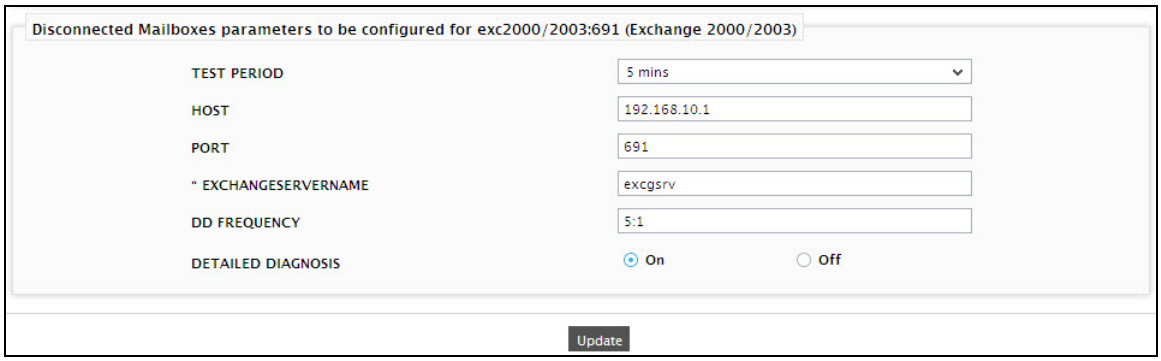

Figure 2.14: Configuring the Disconnected Mailboxes test.

10. To know the details on configuring these tests, refer to **Monitoring Exchange 2000/2003 Servers** chapter.
11. Once all the tests are configured, sign out of the eG administrative interface.
12. Then, start the eG agent on the system that is hosting the Exchange 2000/2003 server.

Chapter 3: Monitoring Exchange 2000/2003 Servers

eG Enterprise's unique layer model representation (see Figure 3.1) provides an intuitive and elegant way to correlate the application performance with network, CPU, memory, and disk performance, thereby allowing administrators to quickly interpret where the performance bottlenecks may be.

Figure 3.1: Layer model of an Exchange 2000/2003 server

Data collected by the eG agents is stored in a relational database, so historical analysis and diagnosis can be performed to determine how the server can be reconfigured for optimal performance. The key performance-related questions that the data so collected helps answer, are listed in the table below.

Service Monitoring	• Are client requests reaching the Exchange server, and is the response time acceptable? • Are any of the Exchange server queues indicating a malfunctioning/slow-down of the server? • Are RPC requests from MAPI clients being queued for processing at the Exchange server, or any change in the server's processing rate of RPC requests? • Is there any queue buildup at the Epoxy layer between the Exchange store and Microsoft IIS? • Are many retries being attempted for mail delivery? • Is there a significant slowdown in local mail delivery time? What is the delivery time

	of mail to remote locations? • Are there any critical errors related to Exchange in the Windowsevent logs? • Is the exchange database configured correctly? Are there enough log buffers, and is the cache hit ratio within acceptable limits?
Process Monitoring	• Are the critical Exchange processes working? • Is any process consuming excessive CPU or memory? • Is there any unusual activity on the server (e.g., backup jobs, antivirus software) that can be impacting the Exchange server's performance?
Mail Traffic Monitoring	• What is the workload on the server in terms of RPC requests from MAPI clients like Outlook? • Is there any unusual increase in mail traffic activity? • What are the peak times and how many users are connected at that time?
Network Monitoring	• Are there network congestion/collision issues that could be slowing performance as seen by end users? • Is there excessive queueing of requests on any of the network interfaces of the system hosting the Exchange server?
Memory Monitoring	• Does the system hosting the Exchange server have sufficient free memory? • Are there excessive page faults occurring that could be impacting performance?
Disk Monitoring	• Is there a disk bottleneck on the system hosting the Exchange server? • Are there requests queued on any of the disks on the system hosting the Exchange server? • Are disk read/writes to any of the disks on the system very slow? • Is the load on the disks balanced well or is one of the disks handling a much higher load than the others?
CPU Monitoring	• Is the system CPU on the Exchange server very heavily used? • Which process(es) are taking up CPU? Is there a specific time period daily when

	system usage tends to peak?
Active Directory Monitoring	• Is the Exchange server able to communicate with the Active Directory server? • Is the length of the categorizer queue which handles requests to the global catalogs unusually high?

The sections to come describe each layer of Figure 3.1.

3.1 The Epoxy Layer

Epoxy (ExIPC) is a shared memory mechanism that enables the Internet Information Services (inetinfo.exe) and the Microsoft Exchange Information Store (store.exe) processes to quickly shuttle data back and forth. This allows for bi-directional inter-process communication between inetinfo.exe (which accepts requests for internet protocols such as WebDav, IMAP4, NNTP, POP3, and SMTP) and the store.exe process. This memory is also used by DSAccess, the Exchange component that caches the Active Directory Information. The **Epoxy** layer reports statistics pertaining to Epoxy.

If there are performance issues in either the Store.exe or Inetinfo.exe processes, it is common for a queue to build up in the Epoxy as one process performs faster than the other. The Store_out_queue contains messages sent from the Store.exe process to the Inetinfo.exe process. The Client_out_ queue contains messages from the Inetinfo.exe process to the Store.exe process. By monitoring these queues, an exchange administrator can determine which queues are building up and degrading performance.

Figure 3.2: Tests mapping to the Epoxy layer

3.1.1 Exchange Epoxy Test

This test reports statistics pertaining to the Epoxy on an Exchange 2000/2003.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Epoxy being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates. The default is 691.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable' by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Client out queue length	The number of messages sent by the Inetinfo.exe process that are in the queue.	Number	This queue size should be below 10 at all times. If the queue size exceeds 10, it is indicative of a bottleneck in the Inetinfo.exe process.
Exchange store out queue length	The number of messages sent by the Store.exe process that are in the queue.	Number	This queue size should be below 10 at all times. If the queue size exceeds 10, it is indicative of a bottleneck in the Store.exe process. Disk performance issues on the Exchange store may prevent the Store.exe process from effectively handling incoming requests.

3.2 The Exchange AD Layer

An Exchange server depends on the global catalog domain controllers. Any adverse performance of the Active Directory servers can impact the Exchange server's performance. The **Exchange AD**

layer monitors the Exchange server's interactions with the Active Directory server. The tests associated with this layer are shown below.

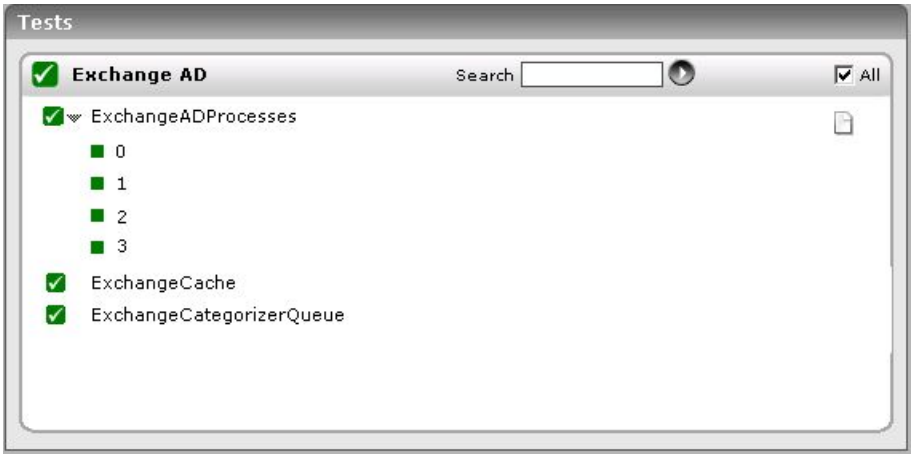

Figure 3.3: The tests associated with the Exchange AD layer

3.2.1 Exchange AD Processes Test

This test reports whether there is a slow-down in communicating with the global catalogs.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange server process.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates. The default is 691.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable' by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
LDAP read time	The time that an LDAP read request from the Exchange server takes to be fulfilled.	Secs	The average value should be less than 50 milliseconds. Spikes (Maximum) should not be higher than 100 milliseconds.
LDAP search time	The time that an LDAP search request takes to be fulfilled.	Secs	The Average value should be less than 50 milliseconds. Spikes (Maximum) should not be higher than 100 milliseconds.

3.2.2 Exchange Cache Test

This test measures the performance of the Exchange Server Directory Service Access (DSAccess) cache. The DSAccess cache is a shared memory cache that is used by several components such as the information store, message categorizer (a component in that handles distribution lists), message transfer agent (MTA, used in non-SMTP delivery) or any other component or service that requires directory service information. This cache improves the performance of messaging operations like sending e-mails and provides access to both configuration information and recipient data from the Active Directory to Exchange server. The idea of DSAccess cache is used to reduce the number of queries going directly to the Active Directory. This caching implementation helps to reduce the cost overhead associated with the direct access to the Active Directory.

To attain the maximum performance, the cache memory can be increased by tuning the registry key “MaxMemory” available under the tree

```
“HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\MSExchangeDSAccess”.
```

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.

Parameters	Description
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable' by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Cache hit ratio	This measure indicates the rate at which the events are being generated in the DSAccess cache. (An event is generated whenever an object has been located in the DSAccess cache or whenever new objects have been added in the cache.)	Percent	A zero value for this measure may indicate that the Exchange server is not performing any activity on the Active directory or no operations are happening on the Exchange server itself. A non-zero value indicates that the directory service has found the required objects in the DSAccess cache thereby reducing the access to the Active Directory. A non-zero value for this measure also may indicate that the required objects are not found in the DSAccess cache thereby resulting in the addition of newer objects from the Active Directory. A high value for this measure ensures better performance of the Exchange server.

3.2.3 Exchange Categorizer Queue Test

This test indicates how well SMTP is processing LDAP lookups against the global catalog servers. The Exchange Categorizer queue length should be around zero unless the server is expanding distribution lists. While expanding distribution lists, this counter can occasionally go up higher. This is an excellent measure of how healthy the global catalogs are. If there are slow global catalogs, this queue length will increase.

Purpose	Indicates how well SMTP is processing LDAP lookups against the Global catalog

	servers		
Target of the test	An Exchange server 2000/2003		
Agent deploying the test	An internal agent		
Configurable parameters for the test	1. TEST PERIOD - How often should the test be executed 2. Host - The IP address of the machine where the Exchange Server is installed. 3. Port – The port number through which the Exchange Server communicates. 4. ISPASSIVE – If the value chosen is **YES**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable' by the agent if the server is not up.		
Outputs of the test	One set of results for every Exchange server being monitored		
Measurements made by the test	Measurement	Measurement Unit	Interpretation
	Categorizer queue length: This value indicates how well SMTP is processing LDAP lookups against the Global catalog servers.	Number	The value should be below 10 most of the time.

3.3 The Mail Service Layer

This layer handles the connectivity of the Exchange server to different hosts in the environment.

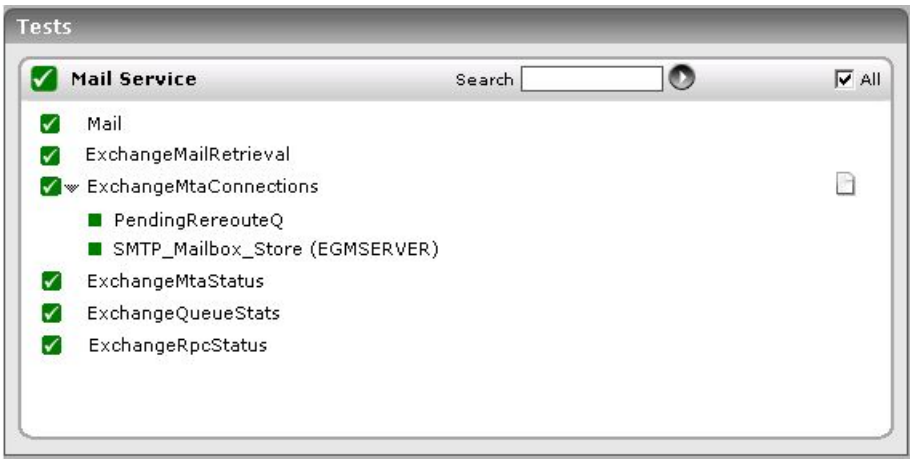

Figure 3.4: Tests mapping to the Mail Service layer

This layer also monitors the traffic on the protocols that have been described below.

The Internet Messaging Access Protocol version 4.0 (IMAP4) works like POP3. This protocol enables clients to access and manipulate messages stored within their mailboxes. Unlike POP3, IMAP4 allows a user to access multiple e-mail folders, search through a mailbox, and maintain read and unread message flags. In addition, a user can download an entire message or a portion of a message, such as an attachment. The traffic statistics pertaining to the use of POP3 and IMAP4 protocols via an Exchange server are monitored using eG Enterprise's XchgMailRetrieval test (see Figure 3.4). SMTP is the primary protocol that is used by mail clients to send email messages to a mail server. Moreover, SMTP is also the main mechanism used by mail servers to exchange emails between themselves. eG Enterprise's XchgMailTransfer test (not shown in Figure 3.4) is used to monitor SMTP protocol usage statistics for an Exchange server.

3.3.1 Exchange Connectors Test

A connector is a software module that allows integration of third party applications (e.g., fax applications, integration with MS MQ, connection to an external POP3 service, etc.) into an Exchange mail server environment. Monitoring the status of each of the connectors registered with the Exchange server is important, so as failure of a connector can impact services being offered to users of the Exchange server. This test monitors the status of the different exchange connectors registered with an Exchange server.

This test is disabled by default. To enable the test, go to the **ENABLE / DISABLE TESTS** page using the menu sequence : Agents -> Tests -> Enable/Disable, pick *Exchange* as the desired **Component type**, set *Performance* as the **Test type**, choose the test from the **DISABLED TESTS** list, and click on the **<** button to move the test to the **ENABLED TESTS** list. Finally, click the **Update** button.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange connector being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Exchange connector status	Indicates the current status of this connector.	Percent	When the value is 100, it means that the connector is up and if it is 0 then it means that the connector is down.

3.3.2 Mail Test

This test monitors the availability of the mail server from an external perspective. To do this, the **Mail** Test sends a test mail periodically from one user account to another and measures whether the mail was sent successfully and what the delivery time was. This test uses SMTP protocol for sending and POP3 or IMAP protocols for receiving mails.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every mail server monitored.

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Exchange server.

Parameter	Description
Port	The port number of the Exchange server's routing engine.
SendPort	The SMTP port of the mail server. The default SMTP port is 25.
SendUser	Denotes the user name with which the test sends mails.
SendPassword	The password associated with the above user name. The SendUser and SendPassword can be '*none*' if the target Exchange server does not need authentication to send mails.
Confirm Password	Confirm the SendPassword by retyping it here.
FromID	Takes the email id from which the test generates mails.
ToID	Takes the email id to which the test sends mails. It is advisable that a separate email account be created for the MailTest.
Protocol	The protocol to be used for receiving the mails (could be POP3 or IMAP).
ReceiveHost	Indicates the IP address at which the test receives mails. Typically, this would be the IP address of a POP3 or IMAP server.
ReceivePort	Indicates the port number of the host, which receives the mails. The default port for POP3 is 110 and that of IMAP is *143*.
ReceiveUser	Indicates the user name with which the test receives mails.
ReceivePassword	Indicates the password corresponding to the above user.
Confirm Password	Confirm the ReceivePassword by retyping it here.
SSL	If the mail server is SSL-enbled, set this flag to **True**. By default, this is set to **False**.
IsPassive	If the value chosen is **Yes**, then the mail server under consideration is a passive server in a mail server cluster. No alerts will be generated if the system is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Here are example settings of the **Mail** Test parameters:

- SendUser = sam
- SendPassword = send user's password
- FromID = sendtest@test.com
- ToID = receivetest@test.com
- Protocol = POP3

Parameter	Description

- ReceiveHost = mail.test.com (the POP3 server's host)
- ReceivePort = 110
- ReceiveUser = mailreceiver
- ReceivePassword = mailreceiver's password

It is advisable that you create a separate user account on your mail server for this test to use.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Ability to send mail	Indicates the availability of the mail server to which the test attempts to connect to send mail	Percent	A value of 0 indicates that the test was not successful in sending a mail. Possible reasons for this could include the mail server being down, the network connection to the server not being available, etc.
Ability to receive mail	Indicates the availability of the POP3/IMAP server to which the test attempts to connect to receive mail messages	Percent	A value of 0 indicates that the test was not successful in receiving a mail message from the POP3/IMAP server. Possible reasons for this could include the POP3/IMAP server being down, the user login being invalid, a failure of the authentication system that the POP3/IMAP server uses for authenticating user requests, etc.
Outstanding messages	Indicates the number of messages that have been sent but have not been received	Number	A large value is usually associated with a very high value of the *Roundtrip time* measurement. This is usually attributable to excessive load on the SMTP mail server. Delivery delays may also happen if the server is not able to send mail out (e.g., due to DNS failures, due to large number of failed messages which are being retried often, etc.).

Measurement	Description	Measurement Unit	Interpretation
Roundtrip time	The average delay between the transmission of one message and its reception by a user.	Mins	This is a key measure of the quality of the mail service. An increase in Roundtrip time may be indicative of a problem with the SMTP mail service. Possible reasons could include spamming, queuing failures, disk space being full, etc.

Note:

The accuracy of the *Roundtrip time* measurement is dependent on the frequency at which the **Mail** test is executed. For example, assume that **Mail** test is executed once every 5 minutes. Since the **Mail** test only checks for message receptions every time it executes, the *Roundtrip time* may be reported as 5 mins even if the message has actually been delivered to the user within a minute of its transmission.

3.3.3 Exchange Mail Transfer Test

Exchange Servers use SMTP as the default transport for messages across servers and to the Internet. All mail that is not being sent from senders and recipients homed on the same server goes through SMTP.

The following steps trace the path of a message:

1. The message is submitted using MAPI or SMTP
2. The message is then categorized, which means the Exchange server consults the Active Directory for information regarding its recipients.
3. The message is routed, which means the Exchange server decides if the message should be delivered locally (the recipient is homed on this server) or to which server should this message be sent (to the Internet, another server, other domains, and so on).
4. SMTP either delivers the mail locally or queues it for remote transfer

The local and remote queues are key indicators of bottlenecks on the Exchange server. The ExchangeMailTransfer Test monitors both these queues.

This test is disabled by default. To enable the test, go to the **ENABLE / DISABLE TESTS** page using the menu sequence : Agents -> Tests -> Enable/Disable, pick *Exchange* the desired **Component**

type, set *Performance* as the **Test type**, choose the test from the **DISABLED TESTS** list, and click on the **<** button to move the test to the **ENABLED TESTS** list. Finally, click the **Update** button.

Target of the test : An Exchange Server

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable' by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Local queue size	This measure indicates the number of messages in the SMTP queue for local delivery.	Number	This measure is close to zero under normal operating conditions. The maximum value should be less than 1000. Also, the queue should remain steady near its average, with small variance. If this measure increases steadily over a period, there is probably a problem with the information store to which the user is trying to deliver. In the majority of cases, a buildup of messages in the Local Delivery queue indicates a performance issue or outages on the server, because the server is no longer able to deliver the incoming mail in a timely manner. This

Measurement	Description	Measurement Unit	Interpretation
			hold up can come from a slowness in consulting Active Directory or in handing messages off for local delivery or SMTP. It can also come from databases being dismounted.
Remote queue size	This measure indicates the number of messages SMTP queue for remote delivery.	Number	This measure is close to zero under normal operating conditions. The maximum value should be less than 1000. Also, the queue should remain steady near its average, with a small variance. The value of this measure may increase if mails are sent to different external domains. A rise in this measure means that value is not being sent to other servers. This failure to send mail can be explained by outages or performance issues with the network or remote servers. Those outages or performance issues are causing the network or remote servers from receiving the mail efficiently.
Current SMTP connections	This measure shows the total number of current inbound connections.	Number	A zero value for this measure either indicates that no SMTP clients are accessing the Exchange server or some network problems exist that is blocking the user requests. A substantial high value for this measure indicates that the SMTP server is overloaded. This problem can be solved by limiting the number of connections to the SMTP virtual server in the Exchange System Manager.

Measurement	Description	Measurement Unit	Interpretation
Bad mails	This measure indicates the number of bad mails generated from the time this test was last executed.	Number	A non-zero value for this measure indicates that the mails are not delivered to the destination. This situation may arise due to one of the following reasons: • No recipients might have been mentioned for the mail • A network failure • A general failure in the Exchange server
Data received	This measure shows the rate at which the Exchange server receives data.	KB/Sec	An above normal value for this measure over a period may indicate that the SMTP server is overloaded. Limiting the number of simultaneous connections to the SMTP virtual server in the Exchange System Manager can solve this problem.
Data sent	This measure shows the rate at which the Exchange server sends data.	KB/Sec	A high value over a period is indicative of an excessive use of the SMTP server. Limiting the number of simultaneous connections to the SMTP virtual server in the Exchange System Manager can solve this problem.
Avg message delivery retries	Messages that could not be delivered by the Exchange server are sent to the retry queue. This measure indicates the number of messages entering the retry queue as a fraction of the overall message delivery.	Number	This measure is a good indicator of the general message delivery problems in the target environment. This measure should be close to zero. If a large number of messages are being retried, this measure will approach to 1.

Measurement	Description	Measurement Unit	Interpretation
Avg retry messages sent	This measure shows the average number of retries per outbound message sent as a fraction of the overall messages that is being sent from the Exchange server.	Number	This measure should be close to zero under normal operating conditions. If a large proportion of the sent messages are entering the retry queue, this measure will approach to 1.

3.3.4 Exchange Mail Retrieval Test

This test monitors the usage of POP3 and IMAP protocols via an Exchange server.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as “Not applicable’ by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Current POP3 connections	This measure shows the number of current POP3 connections to the server.	Number	A high value for this measure indicates that a large number of POP3 clients are connected to the Exchange server. This measure helps the administrator in planning or upgrading the following

Measurement	Description	Measurement Unit	Interpretation
			parameters: • The server's memory requirements • Control of unnecessary traffic on the mail server • The server's processing capabilities
Current IMAP connections	This measure shows the number of current IMAP connections to the server.	Number	A high value for this measure indicates that a large number of IMAP clients are connected to the Exchange server. This measure helps the administrator in planning or upgrading the following parameters: • The server's memory requirements • Control of unnecessary traffic on the mail server • The server's processing capabilities
POP3 authentication failures	This measure shows the number of POP3 authentication failures since the last measurement.	Number	A high value for this measure indicates that either the Exchange server is down or invalid/erroneous user credentials are being used during authentication resulting in a failure.
IMAP authentication failures	This measure shows the number of IMAP authentication failures since the last measurement.	Number	A high value for this measure indicates that either the Exchange server is down or invalid/erroneous user credentials are being used during authentication resulting in a failure.

3.3.5 Exchange PC Status Test

When using Outlook clients in MAPI mode, clients' actions in Outlook translate to remote procedure calls (RPCs) between the clients and the server. If the client is running in online mode, these RPC calls occur synchronously. Any delay by the server in fulfilling these synchronous requests directly

affects user experience and the responsiveness of Outlook. Conversely, if the client is running in cached mode, the majority of these requests will be handled asynchronously. Asynchronous processing means that the performance of the RPC mechanism does not affect the overall user experience.

The test monitors the performance of RPC mechanisms between the clients and the Exchange server.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
RPC operations	Indicates the rate of RPC operations handled by the Exchange information store during the last measurement period.	Operations/Sec	Generally, spikes in RPC requests that do not increase RPC operations/sec indicate that there are bottlenecks preventing the store from fulfilling the requests in a timely manner. It is relatively simple to identify where the bottlenecks are occurring with regards to RPC requests and RPC operations/sec. If the client experiences delays, but the RPC requests are zero and the RPC

Measurement	Description	Measurement Unit	Interpretation
			operations/sec are low, the performance problem is happening before Exchange processes the requests (that is, before the Microsoft Exchange Information Store service actually gets the incoming requests). All other combinations point to a problem either while Exchange processes the requests or after Exchange processes those requests.
Current RPC requests	Indicates the number of MAPI RPC requests presently being serviced by the Microsoft Exchange Information Store service.	Number	The Exchange server is configured with a pre-set maximum number of RPC requests that can be handled simultaneously (default is 100). If this value is exceeded, client requests to the server will be rejected. This measure should be below 30 most of the time.
RPC traffic	Indicates the number of MAPI RPC packets being handled by the Exchange Information Store during the last measurement period.	Packets/Sec	
RPC latency	Indicates the RPC latency in milliseconds, averaged for the past 1024 packets.	Secs	This value should be below 50ms at all times. A slowdown in RPC packet processing can adversely impact the user experience.

3.3.6 Exchange MTA Status Test

The Exchange MTA (Message Transfer Agent) is a core component of Exchange Server 2000/2003 and is responsible for all non-SMTP message transfer. This includes message transfer to external X.400 messaging systems and Exchange servers connected through X.400 connectors. Message transfer to non-Exchange messaging systems, such as Lotus Notes and Domino or Microsoft Exchange Connector for Novell GroupWise, is controlled by the Exchange MTA through MAPI-based connectors, such as Microsoft Exchange Connector for Lotus Notes or Microsoft Exchange

Connector for Novell GroupWise. Exchange MTA is also responsible for remote procedure call (RPC)-based communication with Exchange Server 5.5.

A healthy MTA is key to the error-free transmission of messages across MTAs. Any deterioration in the processing ability of the MTA could therefore result in slower delivery or even non-delivery of critical messages, longer outstanding message queues, and consequently, an inefficient mail server. The ExchangeMtaStatus test monitors the status of an Exchange server's MTA and proactively alerts administrators of abnormalities (if any) in MTA-related operations, so that issues can be resolved quickly and the MTA can resume functioning normally in no time.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mta associations	Indicates the number of open associations that this MTA currently has to other MTAs.	Number	
Messages/sec handled by an MTA	Indicates the rate at which messages are processed by this MTA during the last measurement period.	Messages/Sec	A consistent dip in this value is a cause for concern, and warrants further investigation.
Message data rate to	Indicates the rate at which	KB/Sec	This measure again is a good indicator

Measurement	Description	Measurement Unit	Interpretation
MTA	message data is processed by this MTA during the last measurement period.		of the processing ability of the MTA. A high value is hence desired.
Free elements	Indicates the number of free buffer elements currently in the MTA pool.	Number	
Free headers in the MTA	Indicates the number of free buffer headers currently in the MTA pool.	Number	
Threads in use in MTA	Indicates the number of threads currently in use by the MTA.	Number	This number can be used to determine whether additional processors might be beneficial.
Work queue length in MTA	Indicates the number of outstanding messages currently in the work queue.	Number	This value represents the number of messages not yet processed to completion by the MTA. A steady increase in this value implies that messages are not being processed as fast as they should be. This is a clear indicator of a bottleneck at the MTA or a malfunctioning connector component.
XAPI gateways	Indicates the number of XAPI gateways connected to the MTA using the XAPI interface.	Number	To communicate with the Exchange store, the MTA uses an internal API named XAPI, which is a wrapper around MAPI. XAPI gateways handle the message transfer in and out of the message queues in the Exchange store. A single gateway can have multiple XAPI gateway sessions. The XAPI_receive_rate and XAPI_ transmit_rate measures serve as effective indicators of the health of the XAPI interface.
XAPI clients	Indicates the number of XAPI clients connected to the MTA using the XAPI interface. A single client can have multiple XAPI client sessions.	Number	
XAPI receive rate	Indicates the rate at which data is received over a XAPI connection.	KB/Sec	

Measurement	Description	Measurement Unit	Interpretation
XAPI transmit rate	Indicates the rate at which data is transmitted over a XAPI connection.	KB/Sec	
TCP data receive rate in MTA	Indicates the rate at which data is received over a TCP/IP connection.	KB/Sec	The Exchange MTA uses a number of thread pools to handle communication tasks between the various layers of the Open Systems Interconnection (OSI) stack. These thread pools include reliable transfer service (RTS) threads, kernel threads, RPC threads, transport threads, and TCP/IP or X.25 threads. However, the TCP/IP protocol does not fit exactly into the OSI stack. This is because the TCP/IP protocol, although a layered protocol stack, is not OSI- compliant (although most elements of TCP/IP can be mapped to OSI). To support X.400 communication over TCP/IP according to the OSI standard, the Exchange MTA implements a Transport Protocol Class 0 (TP0) interface on top of TCP/IP. The values of these measures indicate the rate at which data is exchanged over the TCP/IP protocol.
TCP data transmit rate from MTA	Indicates the rate at which data is transmitted over a TCP/IP connection.	KB/Sec	
X25 receive rate	Indicates the rate at which data is received over an X.25 connection.	KB/Sec	The X.25 protocol is an OSI-compliant protocol designed specifically for wide area network (WAN) connections on packet-switching networks (such as a public X.400 provider). It is the network protocol that operates on top of HDLC so that the local system can communicate with the next node in the X.25 network. The values of these measures reveal the effectiveness of the X.25 protocol.
X25 transmit rate	The rate at which data is transmitted over an X.25 connection.	KB/Sec	

3.3.7 Exchange MTA Connections Test

This test tracks the connections to and from message transfer agents of Exchange servers. The statistics reported by this test can indicate the connection over which maximum message traffic is flowing.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every MTA connection being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Inbound associations	Indicates the current number of inbound (remote initiated) associations with the entity.	Number	
Outbound associations	Indicates the current number of outbound (locally initiated) associations with the entity.	Number	
Messages queued in MTA	Indicates the number of outstanding messages currently queued for transfer to the entity.	Number	A consistently increasing value could indicate that fewer messages are being processed by the MTA. This could necessitate further scrutiny.
Data in MTA queue	Indicates the total volume of message content currently stored in an entity's queue.	KB	

Measurement	Description	Measurement Unit	Interpretation
Recipients in MTA queue	Indicates the total number of recipients specified in all messages currently stored in the entity's queue.	Number	
Data receive rate over MTA connection	Indicates the rate at which message data is received from the connected entity during the last measurement period.	KB/Sec	These values indicate the level of activity on an MTA connection.
Data transmit rate over MTA connection	Indicates the rate at which message data is sent from the connected entity during the last measurement period.	KB/Sec	
Data received	Indicates the amount of message data received from the connected entity during the last measurement period.	KB	The values of these measures indicate the load handled by an MTA connection.
Data transmitted	Indicates the amount of message data transmitted to the connected entity during the last measurement period.	KB	
Message receive rate over MTA connection	Indicates the rate at which messages are received from the connected entity during the last measurement period.	Messages/Sec	The values of these measures indicate how quickly messages are processed by the MTA connection.
Message transmit rate over MTA connection	Indicates the rate at which messages are sent to the connected entity during the last measurement period.	Messages/Sec	
Messages inbound	Indicates the number of messages received from the connected	Number	These values indicate the message traffic on an MTA connection.

Measurement	Description	Measurement Unit	Interpretation
	entity during the last measurement period.		
Messages outbound	Indicates the number of messages sent by the connected entity during the last measurement period.	Number	

3.3.8 Exchange Queueing Test

This test monitors the different SMTP and X.400 queues on an Exchange server.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for the Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
DD Frequency	Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against DD Frequency.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Messages in queue	Indicates the number of messages currently in the queue.	Number	An unusually high number of messages in the queue is indicative of any problem with the corresponding

Measurement	Description	Measurement Unit	Interpretation
			queue or its end points.
Data in queue	Indicates the amount of message data currently in the queue.	KB	

3.3.9 Exchange Traffic Test

When monitoring an Exchange server, it is critical to understand the workload on the server. For example, how much mail traffic is the server handling? How many of these mails are intended for local (i.e., internal) recipients, and how many are intended for external recipients? Further, this information when provided over time can be used to determine what days or hours are the busiest periods. This test addresses these requirements. To enable this test, the message tracking log setting of the Exchange server needs to be turned on.

This test is disabled by default. To enable the test, go to the **ENABLE / DISABLE TESTS** page using the menu sequence : Agents -> Tests -> Enable/Disable, pick *Exchange* as the desired **Component type**, set *Performance* as the **Test type**, choose the test from the **DISABLED TESTS** list, and click on the **<** button to move the test to the **ENABLED TESTS** list. Finally, click the **Update** button.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for the Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mails sent	Indicates the number of mails sent by the Exchange mail server during the last measurement period.	Number	Using the values reported for the 'Internal' and 'External' descriptors, you can determine the traffic generated by internal and external (i.e from the local domain to domains not included in the DOMAINNAME list) mails. The 'total' descriptor is the sum of internal and external mail traffic. A sudden increase in mail activity may require investigation - e.g. to determine whether any user is spamming other users/mailboxes.
Mails received	Indicates the number of mails received by the Exchange mail server in the last measurement period.	Number	If there is an unusual increase in the incoming mail traffic, you can use the values reported for the 'Internal' and 'External' descriptors, to identify the root-cause of the spike - is it due to internal (i.e., within the domains indicated by the DOMAINNAME list) mails or external (i.e from the local domain to domains not included in the DOMAINNAME list) mails? Once again, the 'total' descriptor is the sum of internal and external mail traffic.
Mail data sent	Indicates the mail traffic (in MB) sent by the Exchange server to internal and external users in the last measurement period.	MB	Both these measures indicate the workload and amount of data handled by the Exchange mail server. An abnormal data size might require deeper investigation to figure out whether any unusually large attachments were sent/received.
Mail data received	Indicates the mail traffic (in MB) received by the Exchange server from internal and external users in the last measurement period.	MB	

3.3.10 Mapi Mail Service Test

This test monitors the availability and performance of a Microsoft Exchange mail server from an external perspective. The test mimics the mail client activity by using the MAPI (Messaging Application Programming Interface) for sending and receiving mails. This test is disabled by default. To enable the test, go to the **ENABLE / DISABLE TESTS** page using the menu sequence : Agents -> Tests -> Enable/Disable, pick *Exchange* as the desired **Component type**, set *Performance* as the **Test type**, choose the test from the **DISABLED TESTS** list, and click on the **<** button to move the test to the **ENABLED TESTS** list. Finally, click the **Update** button.

Note:

- This test uses only a Microsoft Outlook 2003 mail client for sending/receiving mails from the server; therefore, you can, if you so desire, configure a separate Outlook Mail client on the Exchange server for use by this test. Note that the XChgMailTest will not work with Microsoft Outlook Client 2000/2002.
- The eG external agent that is executing the XchgMail test, should be installed on a Windows 2000 server/client in the same domain as the Exchange 2000/2003 server.
- The Microsoft Outlook client used by the test should have been installed with the **Collaboration Data Objects** option enabled; to know how to modify your Outlook installation to enable this option.
- The administrator configuring the test should ensure that the mailbox being used in the test, exists on the Exchange 2000/2003 server.
- The eGurkhaAgent service should run using the account information of the user whose mailbox has been configured for the XchgMail test.
- MAPI should be configured in the Exchange 2000/2003 server.
- The Exchange client should exist in the system on which this test is executed.

Target of the test : An Exchange server

Agent deploying the test : An external agent

Outputs of the test : One set of results for every Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.

Parameters	Description
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.
XchgMailboxName	Specify the email ID on the Exchange server that is to be used by this test for sending/receiving mails. To know the email ID that corresponds to a user mailbox, refer to the procedure discussed in Section **3.3.10.1**.
SMTPServer	The IP address of the Exchange server being monitored; by default, the IP address of the host is displayed here.
SMTPPort	The port number at which the SMTPServer listens; by default, it is 25.
ProfileName	The profile that the email ID in the XchgMailboxName text box is configured to use. To know the existing profiles, open the **Control Panel** on the Microsoft Outlook client that houses the XchgMailbox that has been configured for this test, and double-click on the **Mail** option within. The **Mail Setup** dialog box will open. Click on the **Show Profiles** button therein to view the existing list of profiles.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Can mails be sent?	Indicates the availability of the mail server for receiving the mails sent by the test.	Percent	A value of 0 indicates that the test was not successful in sending a mail. Possible reasons for this could include the mail server being down, the network connection to the server not being available, or the test configuration information being incorrect.
Sent messages	Indicates the number of messages sent to the mail server.	Number	A value of –1 indicates that the mail server may be down or the configuration information may be incorrect.
Avg time to send messages	Indicates time taken to send a mail from to the mail server	Secs	A high value of this measure could indicate high network traffic or that the mail server is busy.

Measurement	Description	Measurement Unit	Interpretation
Can mails be received?	Indicates the availability of the exchange server for sending mails to the mail client	Percent	The value of 0 indicates that the test was not successful in receiving a mail message from the Exchange server. Possible reasons could be incorrect configuration information.
Received messages	Indicates the number of messages received by the mail client from the mail server	Number	The value of 0 indicates that the test was not successful in receiving mail messages from the Exchange server. The possible reasons could be: • The sent messages could be in the message queue of the mail server but not routed to the mail box • Configuration information may be incorrect • Network failure • The mail service may not be running in the user account
Mail received time	Indicates the time taken by the mail client to receive a mail from the mail server	Secs	A high value in this measure indicates that the mail server is busy or the network traffic is high.
Avg roundtrip time	The average of the round trip time (the time lapse between transmission and reception of a message by the server) of all the messages received by the mail server during the last measurement period	Mins	This is a key measure of quality of the mail service. An increase in the value of this measure may be indicative of a problem with the mail service. Possible reasons could include queuing failures, disk space being full, etc.
Max roundtrip time	The high water mark of the round trip time (the time lapse between transmission and reception of a message by the	Mins	If the value of the Received messages measure is 1, then the value of the Max roundtrip time measure will be the same as the Avg roundtrip time.

Measurement	Description	Measurement Unit	Interpretation
	server) of all messages received by the mail server during the last measurement period		

3.3.10.1 Determining email ID to be specified against XchgMailboxName

To know the email ID to be specified against XchgMailboxName, do the following:

1. On the Exchange server, follow the menu sequence, Programs -> Administrative Tools (or Control Panel -> Administrative Tools) -> Active Directory Users and Computers.
2. Figure 3.5 will then appear. In the tree structure in the left pane of Figure 3.5, expand the node that corresponds to the **Site** on the Exchange server, and then, click on the **Users** folder within.

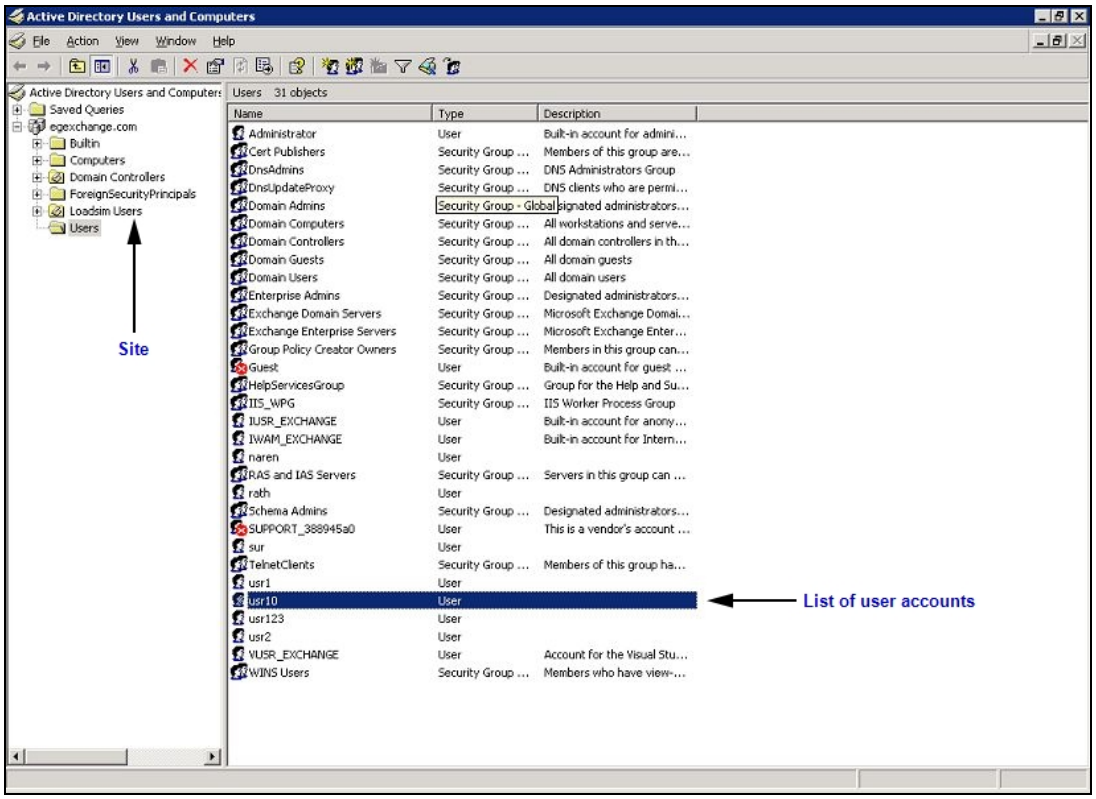

Figure 3.5: The Active Directory Users and Computers console

3. From the list of user accounts displayed in the right pane, select the account that you intend using for the test and double-click on it.
4. Figure 3.6 will then appear displaying the properties of the chosen mailbox. For configuring the XchgMailboxName parameter of this test, specify the **E-mail** address displayed in Figure 3.6.

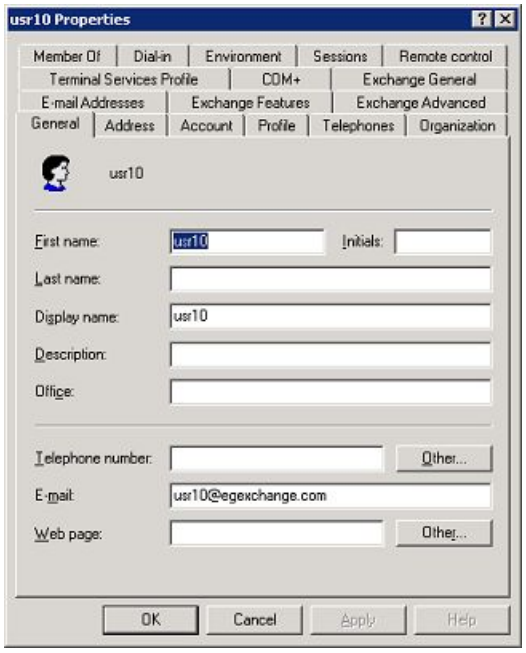

Figure 3.6: Properties of the chosen user account

3.3.11 Virus Scans Test

Messages received on an Exchange server and the attachments they contain are often scanned by anti-virus software prior to acceptance and delivery. This test monitors the performance of the mail scanning and virus processing sub system. Information about bottlenecks in the Virus scanning subsystem, or situations when excessive viruses are being delivered via mail messages or attachments can be detected by this test.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for the Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Virus scan queue length	The number of requests that are currently queued for virus scanning.	Number	An excessive value for this metric could result in slowdown of mail delivery.
Files cleaned by virus check	The percentage of all files scanned during the last measurement period that required to be cleaned.	Percent	
Files quarantined by virus check	The percentage of all files scanned during the last measurement period that required to be quarantined.	Percent	
Messages cleaned by virus check	The percentage of messages scanned during the last measurement period that required to be cleaned.	Percent	
Messages quarantined	The percentage of all messages scanned during the last measurement period that required to be quarantined	Percent	
File clean rate	The rate at which separate files were cleaned by virus scanner during the last	Files/Sec	

Measurement	Description	Measurement Unit	Interpretation
	measurement period		
File scan rate	The rate at which separate files are processed by virus scanner during the last measurement period.	Files/Sec	A very low scan rate could result in over-crowded scan queues, which would eventually slowdown mail delivery.
File quarantine rate	The rate at which separate files were marked to be quarantined by virus scanner during the last measurement period.	Files/Sec	
Message clean rate	The rate at which top-level messages were cleaned by virus scanner during the last measurement period.	Msgs/Sec	
Message process rate	The rate at which top-level messages were processed by virus scanner during the last measurement period.	Msgs/Sec	Ideally, messages should be quickly processed by the virus scanner. Any dip in this rate is a cause for concern, as it would lengthen scan queues and ultimately delay mail delivery.
Message quarantine rate	The rate at which top-level messages were put into quarantine by virus scanner during the last measurement period.	Msgs/Sec	

3.3.12 Exchange Clients Test

Monitoring the RPC activity to an Exchange server and the responsiveness of the server to RPC requests can provide an indication of user satisfaction levels with the performance of the Exchange server. Foreground RPCs happen during interactions of Outlook clients with the Exchange server, and any slow down or failure of these RPCs will be directly visible to users of the Exchange server. Background RPCs are caused by “behind-the-scene” activities internal to the Exchange server.

The Exchange Clients Test monitors the performance of RPC activities on the Exchange server. Since RPC related metrics are available only from Exchange Server 2003 onwards, this test is only relevant for Exchange 2003 or higher versions.

Target of the test : An Exchange server 2003/2007

Agent deploying the test : An internal agent

Outputs of the test : One set of results for the Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The variable name of the port for which the test is to be configured.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
RPC attempts	The rate at which RPC calls were attempted to the Exchange server during the last measurement period.	Atttempts/sec	This metric provides an indicator of the RPC workload on the server.
RPC failures	This metric is the rate of failed RPCs to the Exchange server during the last measurement period.	Failures/Sec	Typically, this value should be low
RPC successes	The rate of successful RPC requests handled by the Exchange server during the last measurement period.	Successes/Sec	
Foreground RPC failures	This metric is the client-reported rate of failed foreground RPCs during the last measurement period.	Failures/sec	Typically, this value should be low.
Foreground RPC successes	Shows the client-reported rate of successful foreground RPCs handled by the Exchange server	Successes/Sec	

Measurement	Description	Measurement Unit	Interpretation
	during the last measurement period.		
RPC success ratio	This metric is the ratio of the foreground RPC successes to the total number of foreground RPCs attempted during the last measurement period, expressed as a percentage.	%	This metric is one measure of client satisfaction levels with the Exchange server. The closer this value is to 100, the better the client satisfaction level.
RPCs with latency > 2secs	Shows the client-reported rate of successful RPCs during the last measurement period with latencies > 2 seconds.	Rpcs/sec	
RPCs with latency > 5secs	Shows the client-reported rate of successful RPCs during the last measurement period with latencies > 5 seconds.	Rpcs/sec	
RPCs with latency > 10secs	Shows the client-reported rate of successful RPCs during the last measurement period with latencies > 10 seconds	Rpcs/sec	
Fast RPC ratio	This metric indicates whether client RPCs are happening fast or not.	%	This metric is another key measure of client performance. This metric is computed as the ratio of successful client RPCs with latency less than 2 seconds to the total number of successful RPCs, expressed as a percentage. Hence, the value of this metric indicates the percentage of client RPCs that are taking more than 2 seconds. A value closer to 100 indicates better RPC performance.

3.4 The Exchange Store Layer

The tests associated with the **Exchange Store** layer report statistics revealing the health of the mailbox stores and the Exchange database, and alerts administrators to mailbox disconnects.

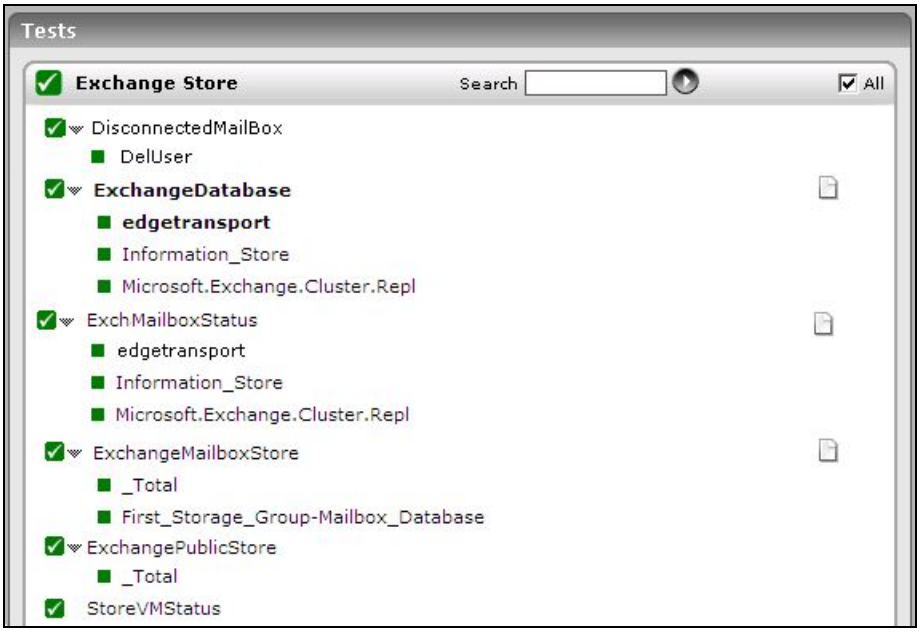

Figure 3.7: The tests associated with the Exchange Store layer

3.4.1 Disconnected Mailboxes Test

On an Exchange server, when a mailbox enabled user or a mailbox is deleted, the mailbox will be moved to a disconnected state and is left in the mail store for a retention period (this is a configuration setting - usually about 30 days). While the mailbox is in a disconnected state, administrators have the option to reconnect to the mailbox and restore the user/mailbox at any time during the retention period. Once the retention period is reached, the mailbox is removed permanently from the mail store.

Exchange administrators need to monitor the disconnected mailboxes on their servers for two reasons. First, by checking what mailboxes are in the disconnected state, administrators can identify if any mailbox or user has been inadvertently deleted. Secondly, by tracking the time for a disconnected mailbox to be purged by the system, administrators can determine when the storage space reserved for the disconnected mailbox will be released.

The **Disconnected MailBoxes** test automatically discovers and monitors the disconnected mailboxes on an Exchange server. This test works only on Exchange 2003 or higher. The measures reported by this test are given below.

Target of the test : An Exchange 2003 Server only

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every mailbox on the Exchange 2003 server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange Server communicates.
ExchangeServerName	Enter the name of the Exchange server to be monitored.
DD Frequency	Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against DD frequency.
Detailed Diagnosis	To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option. The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled: • The eG manager license should allow the detailed diagnosis capability • Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Is mailbox disconnected?	Indicates whether the mailbox is disconnected or	Boolean	When the value is 1, it means that this mailbox is disconnected.

Measurement	Description	Measurement Unit	Interpretation
	not.		
Messages in disconnected mailbox	The total number of messages that are in the disconnected mailbox	Number	
Disconnected mailbox size	Indicates the total size of the disconnected mailbox.	MB	
Time to purge disconnected mailbox	Indicates the time left before a disconnected mailbox is to be removed permanently from the mail store.	Hours	Administrators can configure alerts to be generated before a disconnected mailbox is to be removed from the Exchange server, so that they can cross verify whether the deletion is valid. The detailed diagnosis of this measure, if enabled, displays the date and time at which the disconnected mailbox was marked for permanent deletion (the Mailbox_deletion_date), and the date and time at which the mailbox is likely to be permanently removed from the Exchange server (the Mailbox_purge_date). This knowledge enables administrators to configure alerts that are to be generated before a disconnected mailbox is to be removed from the Exchange server, so that they can cross verify whether the deletion is valid.

3.4.2 Exchange Database Test

This test measures the performance of the Exchange server database. The Exchange server database comprises of files with ".edb" and ".stm" extensions. A database is a collection of mailboxes. A pair of ".edb" and ".stm" files makes a mailbox.

When an Internet mail message enters into the Exchange server, the body of the message is saved in the ".stm" file, and the header information (From, To, Cc, Time Sent, and so on) is converted to

Rich Text Format (RTF), and then stored in the ".edb" file. The transaction log file maintains the state and integrity of ".edb" and ".stm" files.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates. The default is 691.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Database cache hit ratio	This measure shows the percentage of database requests that were fulfilled by the database buffer pool without incurring disk input/output activity.	Percent	A significantly low value indicates that the Exchange server is not having enough free memory. Increasing the memory available to the server may solve this problem.
Database tables cache hit ratio	This measure shows the percentage of database tables opened using the cached schema information.	Percent	A significantly low value indicates that the Exchange server is not having enough free memory. Increasing the memory available to the server may solve this problem.
Log record waits	This measure shows the number of log records that cannot be added to the log buffers because the log	Records/Sec	This measure should be as close to zero as possible. Abnormal values of this metric indicate that the size of the log buffer is

Measurement	Description	Measurement Unit	Interpretation
	buffers are full.		insufficient. The average value should be below 10 per second. Spikes (maximum values) should not be higher than 100 per second.
Log thread waits	This measure shows the number of threads waiting for their data to be written to the log buffer so that the update of the database can be completed.	Number	This measure should be as low as possible. A high value for this measure may indicate that the transaction log buffer might be a bottleneck.

3.4.3 Exchange Mailbox Store Test

The Information store is responsible for data storage and management. It is the interface between the clients and the server running Exchange Server. There are two components of the Information Store, namely:

- Mailboxes
- Public Folders

The test reports statistics pertaining to the Mailbox component of the Information store.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Information store being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Active client logons	The number of logons that have been active on the information store within the last ten minutes time interval.	Number	When a MAPI client (outlook) connects, the first request to the server will establish a session. Once the session is established, the client will make a request to logon to the current session. Sometimes, the number of Active client logons can be larger than the number of mailboxes on the server. This may be caused by any of the following: • A client frequently keeps more than one logon per session. Thus, each user that is reading mails may have 2 (or more) active logons. • Additionally, it includes users from other databases or other servers who are logged on to other users' mailboxes (such as in the case of checking calendar tasks, if the users have shared their calendars) • If the users are logging on and logging off frequently. In short, Active client logons are incremented with each logon, and removed every 10 minutes if they are inactive. If clients are logging on multiple times in a 10 minute period, the active client logons number can be higher than "Client logons".
Client logons	The number of ‘distinct’	Number	This measure is a good indicator of

Measurement	Description	Measurement Unit	Interpretation
	users logging into their information store.		user activity in the Exchange Server. This information can be used by the administrator for planning the capacity of the mail server.
Mail messages in send queue	The number of messages in the send queue of an information store.	Number	This measure is usually zero under normal conditions. This measure can be non-zero in the case of very busy systems (2000 users and more).
Mail receive queue length	This measure shows the number of messages in the receiving queue of the information store.	Number	This measure is usually zero under normal conditions. A non-zero value for this measure indicates that the SMTP service is choking up memory.
Mails opened	This measure indicates the rate at which the requests to open the messages are being submitted to the information store.	Msgs/Sec	This measure shows the overall picture of user activity. An abnormally high value for this measure may indicate that the Exchange 2000 Server is overloaded.
Mails sent	This measure indicates the rate at which messages are sent by the information store.	Msgs/Min	
Avg mail delivery time	This measure indicates the average time between the submission of a message to the information store and the submission to other storage providers for the last 10 messages.	Secs	A non-zero value for this measure indicates a change in user workload. An abnormally high value for this measure indicates inability to deliver to one or more destinations. One of the possible reasons for this can be a network failure.
Avg local mail delivery time	This measure indicates the average time between the submission of a message to the information store and the delivery to all local	Secs	A non-zero value for this measure indicates a change in the user workload. An abnormally high value for this

Measurement	Description	Measurement Unit	Interpretation
	recipients (recipients on the same server) for the last 10 messages.		measure may indicate that the server is overloaded.

3.4.4 Exchange Public Store Test

This test reports statistics pertaining to the public folders of the Information store.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Information store being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Active client logons	The number of active client logons into the Information store.	Number	
Client logons	The number of clients logging into their Information store.	Number	This measure is a good indicator of user activity in the Exchange Server. This information can be used by the administrator for planning the capacity of the mail server.
Mail send queue size	The number of messages	Number	This measure is usually zero under

Measurement	Description	Measurement Unit	Interpretation
	currently in the send queue of an information.		normal conditions. This measure can be non-zero in the case of very busy systems (2000 users and more).
Mail received queue size	This measure shows the number of messages currently in the receiving queue of the information store.	Number	This measure is usually zero under normal conditions. A non-zero value for this measure indicates that the SMTP service is choking up memory.
Mails opened	This measure indicates the rate at which the requests to open the messages are being submitted to the information store.	Msgs/Sec	This measure shows the overall picture of user activity. An abnormally high value for this measure may indicate that the Exchange 2000 Server is overloaded.
Avg mail delivery time	This measure indicates the average time between the submission of a message to the information store and the submission to other storage providers for the last 10 messages.	Secs	A non-zero value for this measure indicates a change in user workload. An abnormally high value for this measure indicates inability to deliver to one or more destinations. One of the possible reasons for this can be a network failure.
Avg local mail delivery time	This measure indicates the average time between the submission of a message to the information store and the delivery to all local recipients (recipients on the same server) for the last 10 messages.	Secs	A non-zero value for this measure indicates a change in the user workload. An abnormally high value for this measure may indicate that the server is overloaded.

3.4.5 Store VM Status Test

Each store.exe process of a server has limited amount of memory called the Store Virtual memory that it can address. This test reports statistics related to the usage of the Exchange store's virtual memory.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Exchange server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Largest block size	It is the largest free block of virtual memory.	MB	At no point should this value go below 32 MB. As you scale a server to accommodate more users and more usage, the server may run low on virtual memory. When a server is low on virtual memory, overall performance degrades as the low situation forces the store.exe process to use the page file and begin paging rapidly.
16MB free blocks in virtual memory	The total number of free virtual memory blocks that are greater than or equal to 16MB.	Number	At no point should this value go below 1.
Free blocks in virtual memory	The total number of free virtual memory blocks regardless of size.	Number	At no point should this value go below 1.
Large memory blocks in virtual memory	The sum of all the free virtual memory blocks that are greater than or equal to 16MB	MB	At no point should this value go below 50 MB.

3.4.6 Exchange MailBox Test

This test automatically discovers all the mailboxes on a monitored Exchange 2000/2003 server, and reports the usage of each mailbox. Mailbox monitoring enables Exchange administrators to be proactively alerted when the mailbox usage grows close to the mailbox quota. In the long run, such a practice could deter mailbox users from storing unnecessary mails, thus automatically making room for important ones.

This test is disabled by default. To enable the test, go to the **ENABLE / DISABLE TESTS** page using the menu sequence : Agents -> Tests -> Enable/Disable, pick *Exchange* the desired **Component type**, set *Performance* as the **Test type**, choose the test from the **DISABLED TESTS** list, and click on the **<** button to move the test to the **ENABLED TESTS** list. Finally, click the **Update** button.

Note:

In order to enable this test to run, the eG agent executing the test should be configured to run using the Exchange administrator account.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every mailbox configured on the specified exchangeserver.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
LogonUser	By default, a "*" is displayed here, indicating that the test automatically discovers all the mailboxes configured for all the users on the Exchange server.
ExchangeServerName	The name of the Exchange server instance on which mailbox monitoring is to be performed.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Exchange mailbox size	Indicates the current size of this mailbox.	MB	
Quota size	Indicates the maximum size upto which the mailbox can grow.	MB	
Exchange mailbox usage	Indicates the percentage of mailbox space that has been utilized currently.	Percent	This is computed as Mailbox_ size/Quota_size*100. If the value of this measure is very high, it indicates that the mailbox is being over-utilized. If the situation is left unchecked, then soon the mail server will bounce off all new mails that are being delivered to the mailbox. You might want to clear unwanted mails from your mailbox to prevent such an occurrence.

3.4.7 Exchange Store Groups Test

A Storage Group will contain one or more Mailbox and Public Folder stores, depending on the version and the needs of the organization. Mailbox stores contain the user and system mailboxes and the Public Folder Store contains the Public Folders and their contents.

A default Exchange installation will create a Storage Group that contains a Mailbox Store and a Public Folder Store. Each Mailbox Store is made up of a database set that contains two files:

- Priv1.edb is a rich-text database file that contains the email messages, text attachments and headers for the users e-mail messages
- Priv1.stm is a streaming file that contains multi-media data that is formatted as MIME data.

Similarly, each Public Folder Store is made up of a database set that also contains two files:

- Pub1.edb is a rich-text database file that contains the messages, text attachments and headers for files stored in the Public Folder tree.
- Pub1.stm is a streaming file that contains multi-media data that is formatted as MIME data

For every EDB file there will be an associated STM file.

This test periodically observes the fluctuations in the store group size and the size of the mailbox and public folder stores within. Using the statistics reported by this test, administrators can effectively analyze and accurately predict growth trends and its implications on server performance; based on these inferences, administrators can even initiate, if required, measures to reconfigure the store group so as to prepare it for handling any additional load that is anticipated.

This test is disabled by default. To enable the test, go to the **ENABLE / DISABLE TESTS** page using the menu sequence : Agents -> Tests -> Enable/Disable, pick *Exchange* the desired **Component type**, set *Performance* as the **Test type**, choose the test from the **DISABLED TESTS** list, and click on the **<** button to move the test to the **ENABLED TESTS** list. Finally, click the **Update** button.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every store group configured on the specified exchangeserver.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates.
ExchangeServerName	The name of the Exchange server instance on which the store group(s) to be monitored exists.
Detailed Diagnosis	To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option. The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled: • The eG manager license should allow the detailed diagnosis capability • Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Exchange mailbox store size	Indicates the current size of the mailbox stores within this store group.	MB	If the database size appears to be growing continuously, you might want to consider splitting one large database into multiple smaller databases so as to ease management. The detailed diagnosis of the Exchange mailbox store size measure, if enabled, reveals the size of the EDB and STM files within each mailbox store of the monitored store group. A look at this break-up is recommended when the value of this measure shows sudden/steady increase; with the help of this detailed diagnosis information, you can quickly determine the root-cause of the anomaly - is it the EDB file or the STM file?
Exchange public folder store size	Indicates the current size of the public folder stores within this store group.	MB	If the database size appears to be growing continuously, you might want to consider splitting one large database into multiple smaller databases so as to ease management. The detailed diagnosis of the Exchange public folder store size measure, if enabled, reveals the size of the EDB and STM files within each public folder store of the monitored store group. A look at this break-up is recommended when the value of this measure shows sudden/steady increase; with the help of this detailed diagnosis information, you can quickly determine the root-cause of the anomaly - is it the EDB file or the STM file?

Measurement	Description	Measurement Unit	Interpretation
Exchange total storage group size	Indicates the total size of this store group.	MB	This, in effect, is a sum of the Exchange mailbox store size and Exchange public folder store size measures. If you find the value of this measure increasing consistently, you might want to create additional storage groups so that the load is balanced across the groups. On an Exchange 2003 server for instance, up to 4 store groups can be created. Alternatively, you might also want to consider splitting one large database into multiple smaller databases so as to ease management.

3.4.8 Exchange Mailbox Status Test

Mounting a database puts it online, thereby making its data available to users. If a mailbox database is not mounted, then users will be denied access to the mailbox data. It is therefore important that the mount status of the mailbox databases is monitored periodically.

This test reports the mount status of every mailbox database in an Exchange server.

Target of the test : An Exchange server 2000/2003

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every Mailbox database being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine where the Exchange Server is installed.
Port	The port number through which the Exchange server communicates. The default is 691.
XchgExtensionShellPath	Specify the full path to the Exchange management shell. By default, this will be *none*.

Measurements made by the test

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td>Mount status of mailbox</td><td>Indicates the mount status of this mailbox database.</td><td></td><td>If the value of this measure is Mounted, it indicates that the database is mounted. The value Dismounted, on the other hand, implies that the database is not mounted.

The numeric values that correspond to the mount status' discussed above are listed in the table below:

<table><tr><th>State</th><th>Value</th></tr><tr><td>Mounted</td><td>100</td></tr><tr><td>Dismounted</td><td>0</td></tr></table>
Note:

By default, this measure reports the value Mounted or Dismounted to indicate the mount status of a mailbox. The graph of this measure however, represents the mount status using the numeric equivalents – 0 or 100.

An unmounted database can render critical data inaccessible to users. Commonly, mounting issues may occur owing to one/more of the following reasons:

• To mount a database, typically, the user should belong to the local Administrators group for the target server and should be assigned the Exchange Server Administrator role. If the user account used for mounting does not have these privileges, then</td></tr>
</table>

Measurement	Description	Measurement Unit	Interpretation
			the database will not mount. • You can mount a database only if the Microsoft Exchange Information Store service is running. If this service is not running, then you would be unable to mount the database. • An Exchange mailbox database might not be able to mount if it reaches the 16-GB limit • If a file-level antivirus software deletes or modifies the transaction log files, then the database might not mount. • Hardware issues can prevent a database from mounting. • If Exchange runs out of hard drive space, then the databases might not mount. • If hard disk NTFS file system permissions have been modified, then the databases might not mount.

Note:

Apart from **Processes** test, a **TCP Port Status** test also executes on the **Application Processes** layer of the Exchange server. For more details about the **TCP Port Status** test, refer to the *Monitoring Unix and Windows Servers* document.

3.5 Troubleshooting

The Exchange Mail test mimics the mail client activity by using the MAPI (Messaging Application Programming Interface) for sending and receiving mails. If this test does not report measures, then it could indicate that the test is unable to send mails using the test parameters that have been configured. To verify this, run the following command from the command prompt of the Microsoft Outlook 2003 client on which the mailbox that has been configured for this test, exists:

```
cscript <Path_to_dir_containing_XChgMailTest.vbs>\XChgMailTest.vbs "<The profile name
that has been configured for this test>" <Exchange mail box that has been used by this
test> <SMTP Server IP configured for this test> <SMTP Port used by this test>
```

For example, assume that the Exchange Mail test takes the following parameters:

a. xchgmailboxname: egtester@egexchange.com

b. profilename: Outlook

c. smtpserver: 192.168.10.228

d. smtpport: 25

Also, assume that the **XChgMailTest.vbs** is available in the **C:\eGurkha\lib** directory.

In such a case, the command to execute the test will be as follows:

- cscript c:\eGurkha\lib\XChgMailTest.vbs "Outlook" egtester@egexchange.com 192.168.10.28 25

  If, upon execution, the command returns the measures of the XChgMailTest, it indicates that the test is functioning properly.

  If the test does not execute properly, then either of the following may occur:

- You might receive the following error message:

  [C:\eGurkha\lib\XChgMailTest.vbs(66, 1) Collaboration Data Objects: The Microsoft Exchange Server computer is not available. Either there are network problems or the Microsoft Exchange Server computer is down for maintenance. [Microsoft Exchange Server Information Store - [MAPI_E_FAILONEPROVIDER(8004011D)]],]]

- The message box depicted by Figure 3.8 may appear:

Figure 3.8: Message box indicating a problem in sending mails

If the message (a) or any other message bearing references to *Collaboration Data Objects (CDO)* appears, then it indicates that the **Collaboration Data Objects** option was not enabled while installing the Microsoft Outlook 2003 client on the box. The Collaboration Data Objects (CDO) library allows you to access the Global Address List and other server objects, in addition to the contents of mailboxes and public folders. As the XChgMailTest actively uses this library, the absence of CDO results in the failure of the test. In such a case, follow the procedure given below to modify your installation, so that CDO is enabled:

1. Insert the Microsoft Office CD in your CD drive, and run its Setup.exe on the system hosting the Microsoft Outlook Client that has been configured for the XChgMailTest.
2. Figure 3.9 appears requesting your confirmation to reinstall/uninstall/add or remove features to your existing Microsoft Outlook installation.
3. Choose the **Add/Remove Features** option and click the **Next** button to proceed.

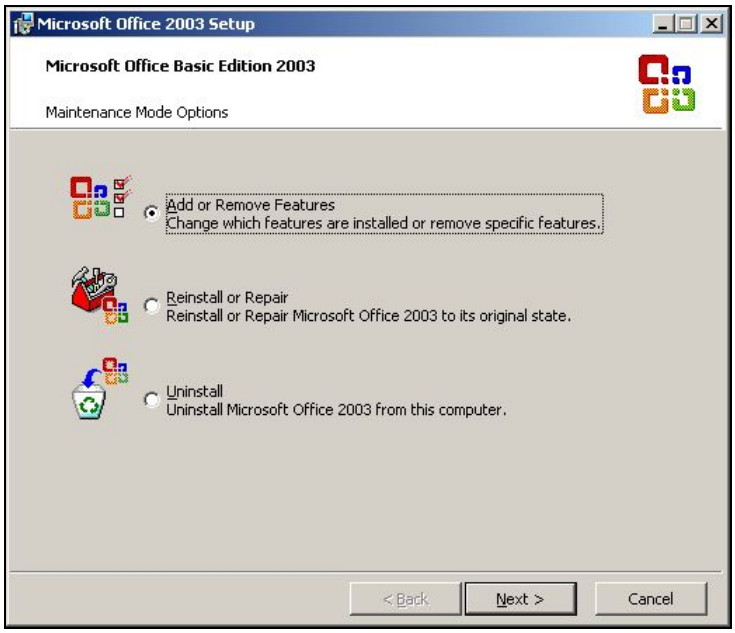

Figure 3.9: Selecting the 'Add/Remove Features' option

4. Then, select the **Outlook** option from Figure 3.10, and also click the **Choose advanced customization of applications** check box. Click the **Next** button to move on.

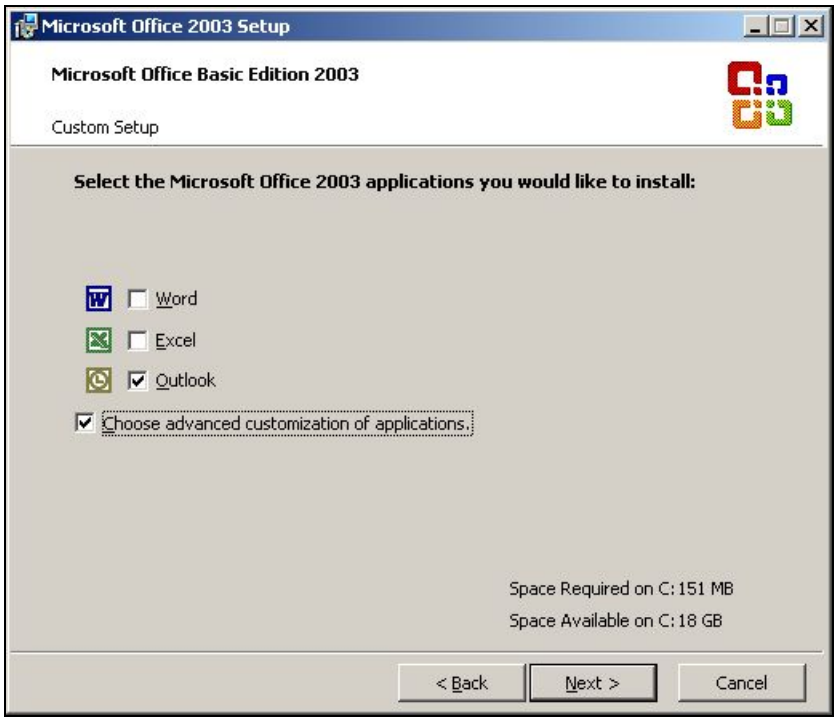

Figure 3.10: Choosing to customize the Outlook installation

5. In Figure 3.11 that appears next, expand the **Microsoft Office Outlook** tree to view the applications/tools within. By default, the **Collaboration Data Objects** option in the tree will be prefixed by an **X** mark, indicating that the option is disabled (see Figure 3.12). To enable the option, click on the **X** mark, and select the **Run from My Computer** option from the shortcut menu that appears (see Figure 3.12).

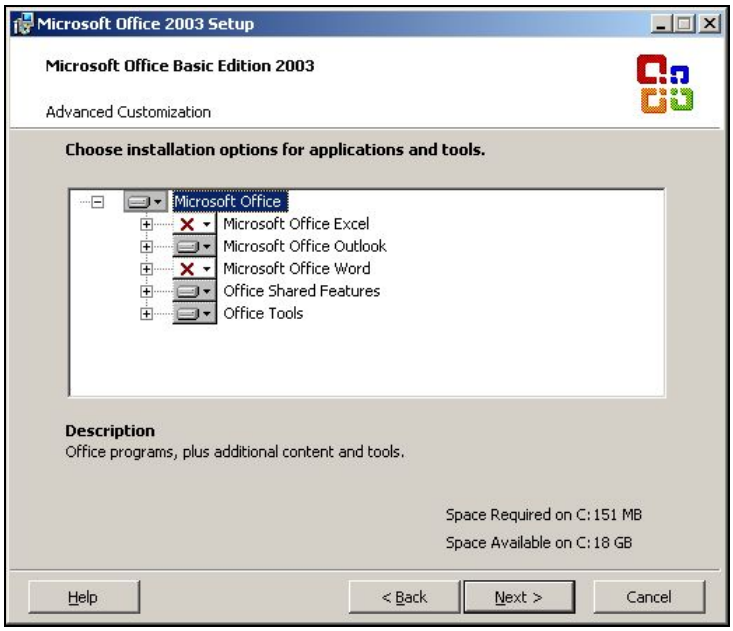

Figure 3.11: Viewing the currently installed applications

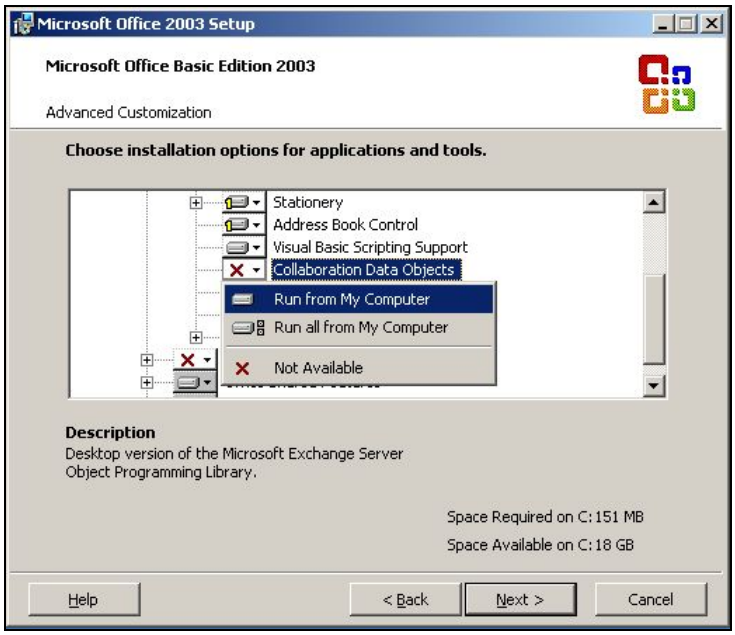

Figure 3.12: electing the Collaboration Data Objects option

6. Click on the **Next** button in Figure 3.12 to proceed.
7. Finally, when setup completes, click the **Finish** button to exit.

On the other hand, if manual command execution returned the message box depicted by Figure 3.8, it indicates that a security patch named O2kSp3.exe is installed on the Outlook client. To ensure that this patch does not affect the functioning of the XchgMail test, do the following:

1. Download **Orktools.exe** and **admpack.exe** from the following URL: http://www.microsoft.com/office/orkarchive/2000ddl.htm to the Outlook client.
2. Begin installing **Orktools.exe** on the Outlook client by double-clicking on it. Figure 3.13 will appear first.

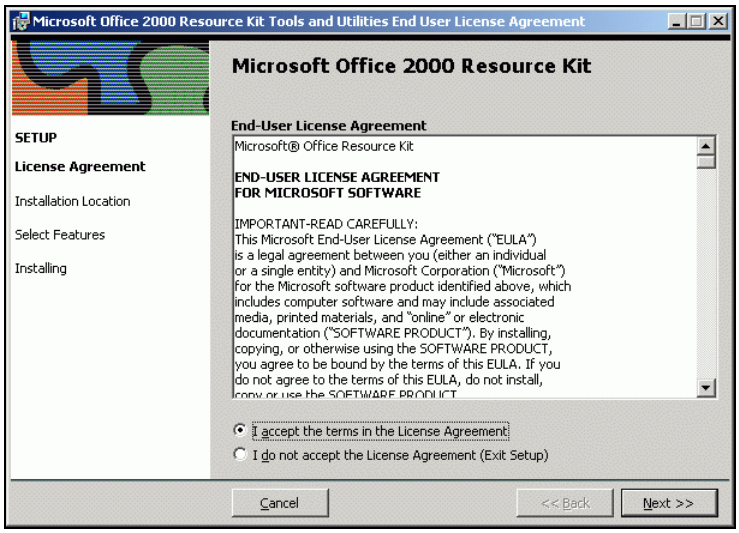

Figure 3.13: The End-use license agreement

3. Accept the license agreement displayed in Figure 3.13 by selecting the **I accept the terms in the License Agreement** option and clicking the **Next >>** button.
4. Figure 3.14 will then appear, from where an installation location will have to be selected. Then, click the **Next >>** button.

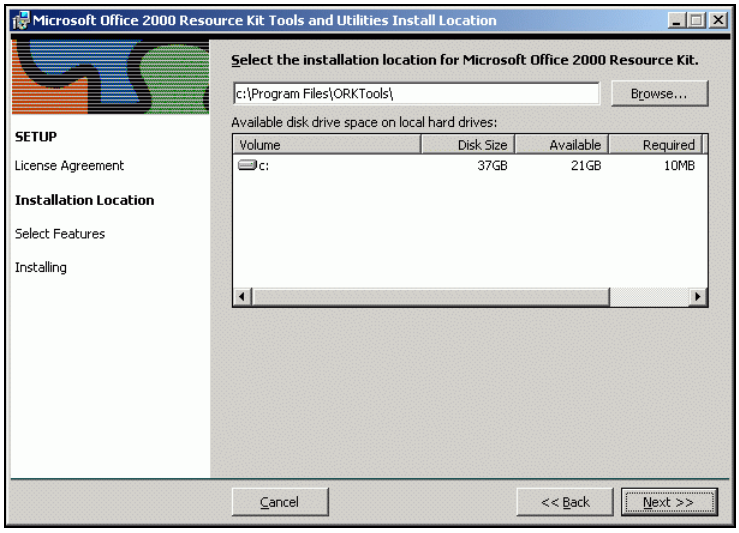

Figure 3.14: Selecting the install directory

5. Finally, click on the **Install Now** button in Figure 3.15 to begin installing the **Orktools.exe**.

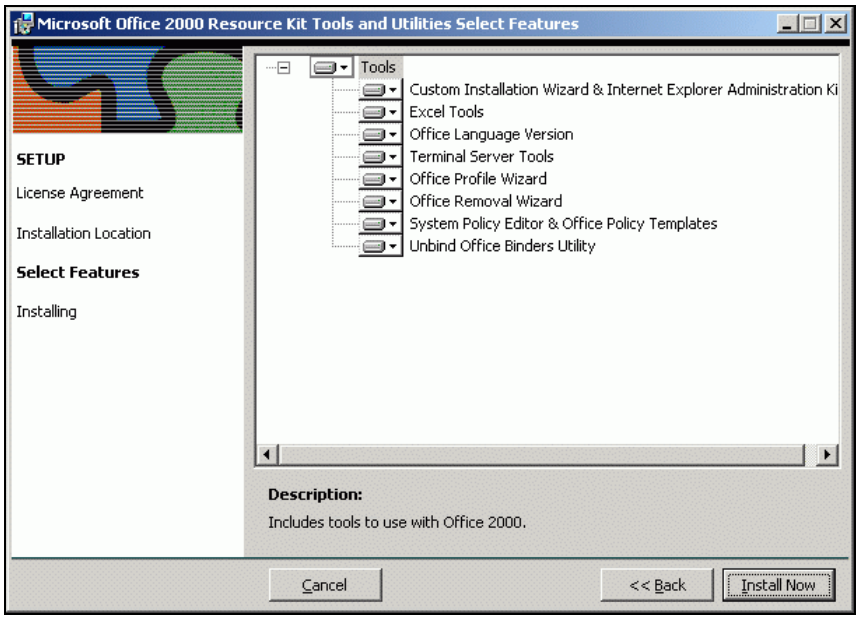

Figure 3.15: Installing Orktools.exe

6. Next, proceed to install **admpack.exe** on the Outlook client by double-clicking on it. Select **Yes** from Figure 3.16 that appears.

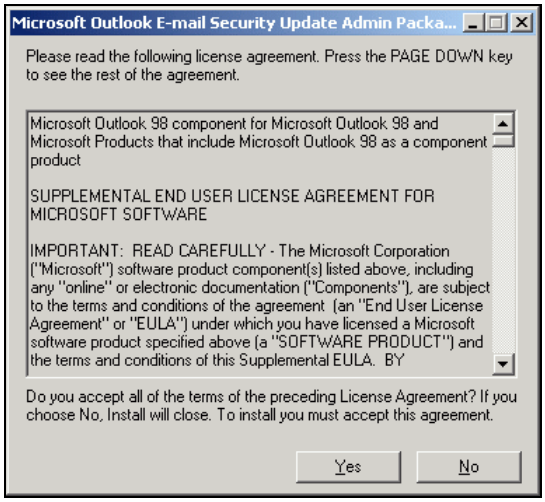

Figure 3.16: Accepting the license agreement for admpack.exe

7. Next, specify the location to which the files of **admpack.exe** need to be extracted, and then click the **OK** button (see Figure 3.17).

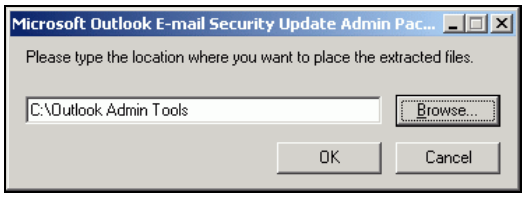

Figure 3.17: Specifying the location of the admpack files

8. Once installation completes, Figure 3.18 will appear. Click on the **OK** button to exit the setup.

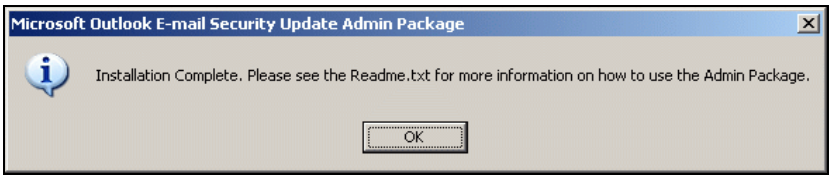

Figure 3.18: Completion of admpack installation

9. Then, go to the **Microsoft Exchange Server** and open its **System Manager** using the menu sequence depicted by Figure 3.19.

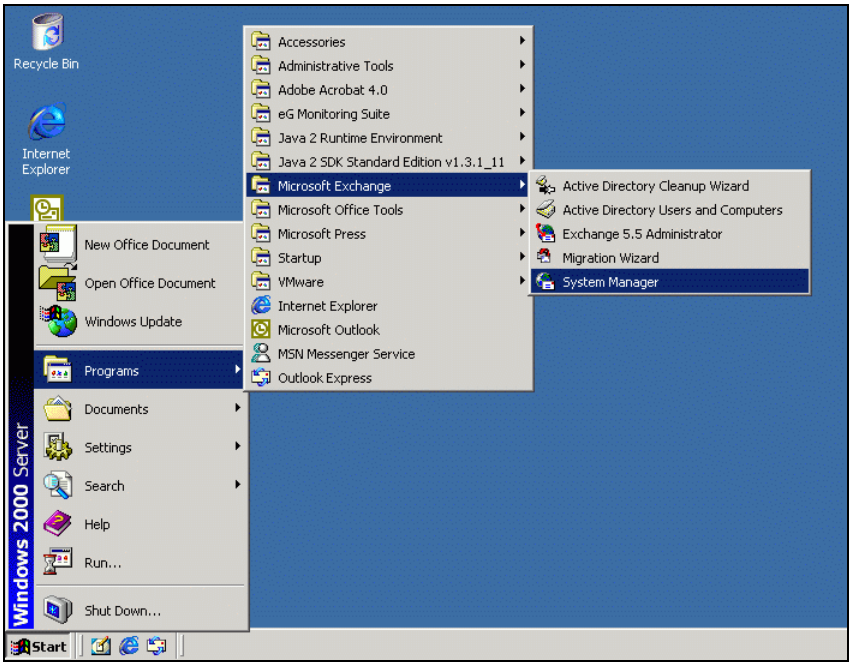

Figure 3.19: Opening the System Manager of the Microsoft Exchange Server 2000

10. Expand the **Folders** node in the tree-structure in the left pane of the System Manager, right-click on the **Public Folders** sub-node within, select the **New** sub-menu from the shortcut menu that appears,

and then choose the **Public Folder** option, to create a new public folder on the Exchange server (see Figure 3.20).

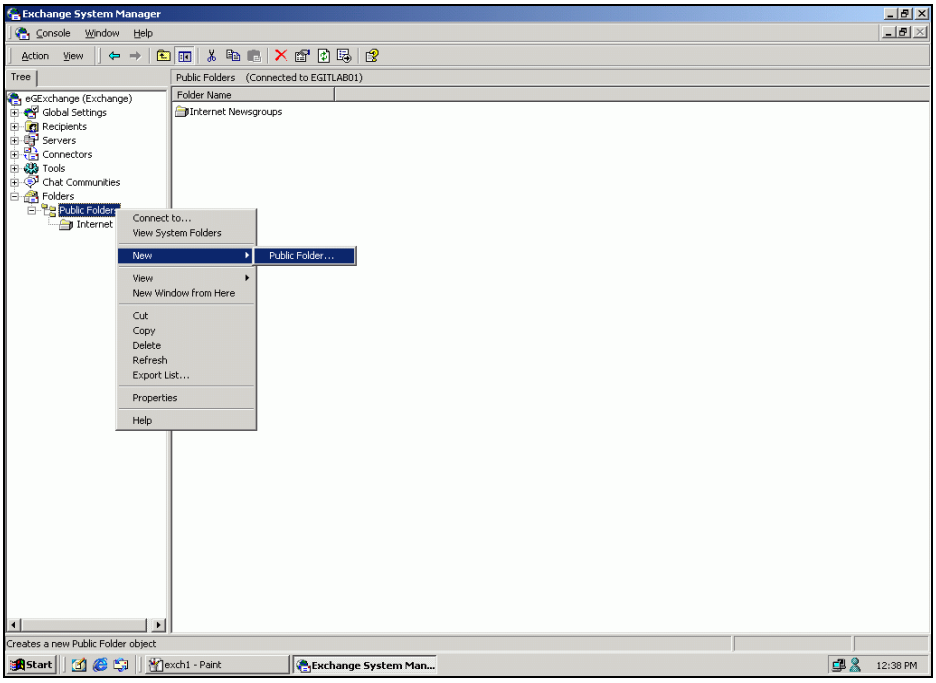

Figure 3.20: Creating a new Public Folder

11. Name the new public folder as **Outlook Security Settings** (see Figure 3.21), and then click the **Apply** and **OK** buttons therein to register the changes.

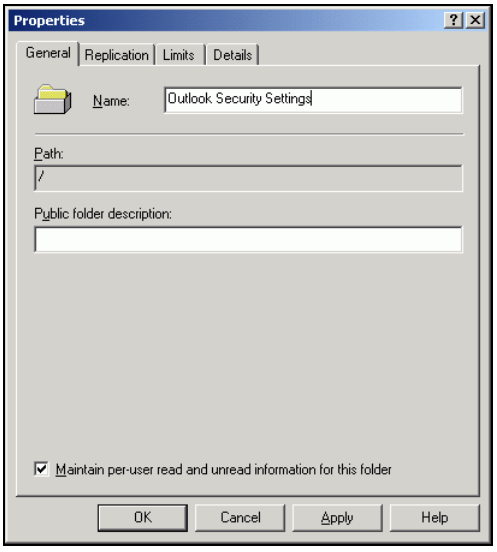

Figure 3.21: Naming the new public folder

12. Then, switch back to the Outlook client, and open the directory to which the files of **admpack.exe** have been extracted. Double-click on the **OutlookSecurity.oft** within to open the template file (see Figure 3.22).

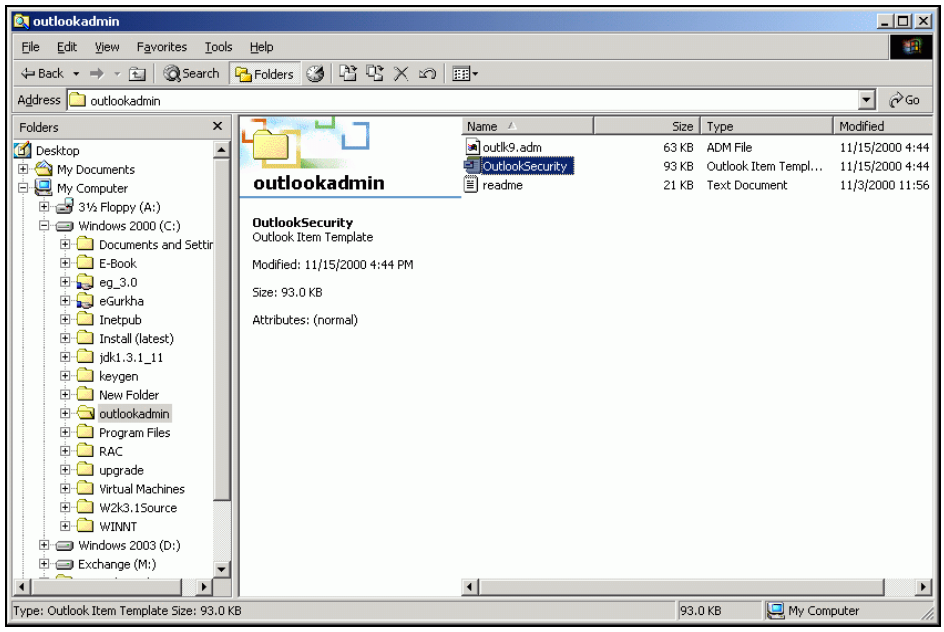

Figure 3.22: Opening the OutlookSecurity.oft template file

13. The **Select Folder** dialog box will then appear (see Figure 3.23). Expand the **Public Folders** node within, followed by the **All Public Folder** sub-node, and then select the **Outlook Security Settings** folder that was created in the Microsoft Exchange server. Next, click the **OK** button in Figure 3.23.

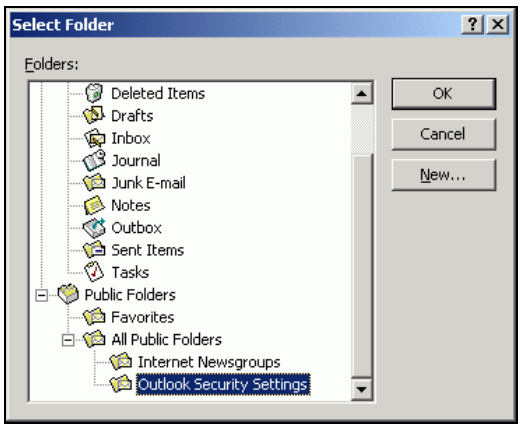

Figure 3.23: Selecting the Outlook Security Settings folder

14. The **Default Security Settings** form (see Figure 3.24) will open. Now, follow the menu sequence

Tools -> Forms -> Publish Form (see Figure 3.24) to publish the form in the chosen **Outlook Security Settings** folder.

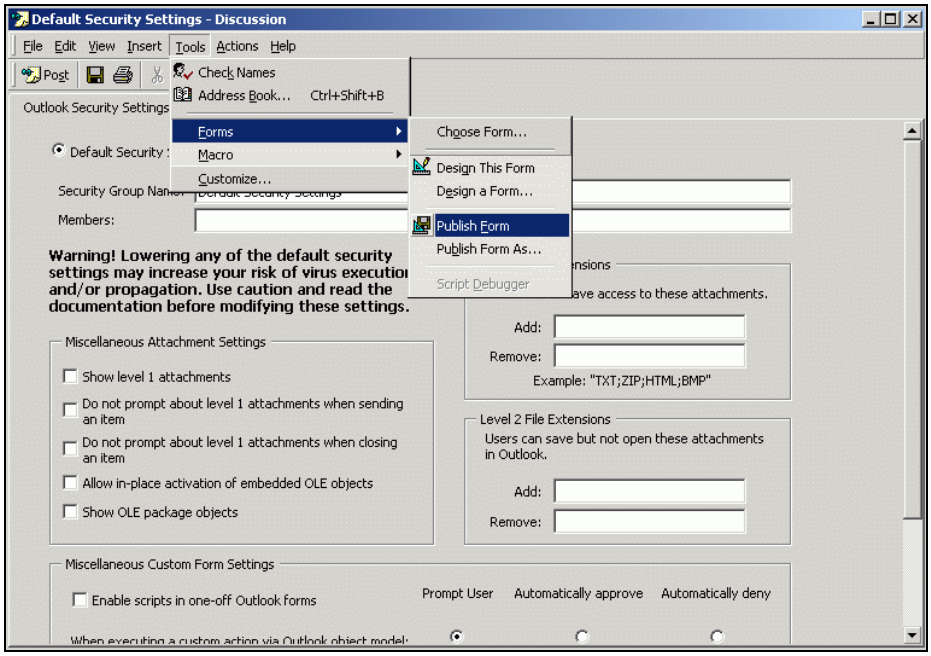

Figure 3.24: Publishing the form

15. Provide the name **Outlook Security Form** to the form being published (see Figure 3.25), and click the **Publish** button to publish it.

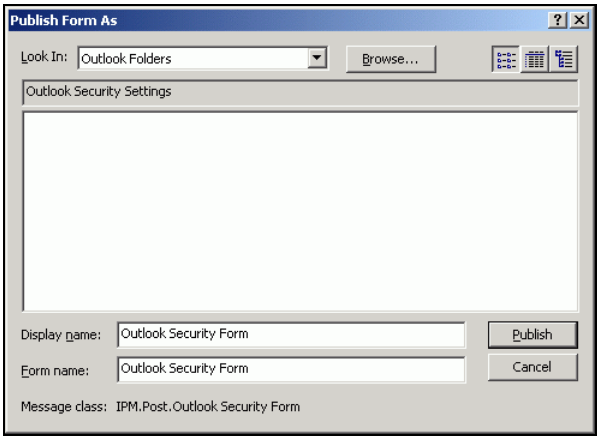

Figure 3.25: Specifying a name for the form

16. Close the form you opened from the .oft file.
17. Open **Microsoft Outlook**, select the **Outlook Security Settings** public folder, right-click on it, and choose **Properties** from its shortcut menu. In the **General** tab of the **Properties** dialog box

that opens (see Figure 3.26), ensure that **Outlook Security Form** option is chosen from the **When posting to this folder, use** list box.

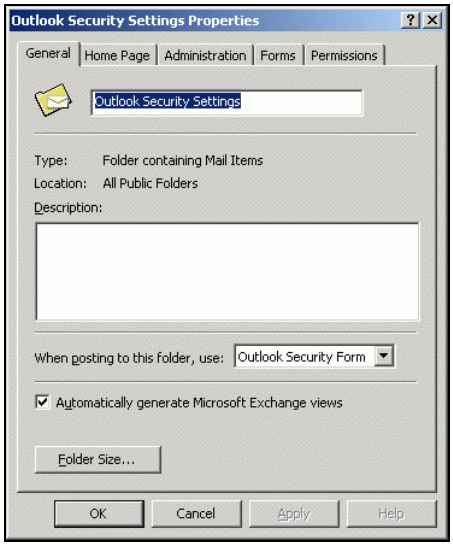

Figure 3.26: Choosing the Outlook Security Form option

18. Then, click on the **Permissions** tab in Figure 3.26, and set the **Reviewer** role for the **Default user** (see Figure 3.27). Give the Editor role only to people who administer Outlook security settings.

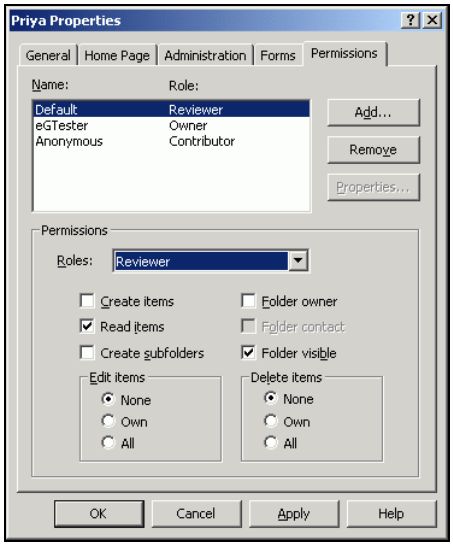

Figure 3.27: Selecting the Reviewer role

19. Finally, click the **Apply** button and then the **OK** button to save the changes.

Chapter 4: Externally Monitoring the Exchange server

eG Enterprise prescribes an Exchange server model (already discussed) that requires an agent to be deployed on the Exchange 2000/2003 server to continuously monitor its internal health. However, some administrators might not have access to the Exchange mail servers for installing agents. Such administrators might at least want to know whether the Exchange server is available or not, and if so, how responsive it is to requests. To capture and view such external metrics alone, eG Enterprise offers the exclusive, External Exchange server model (see Figure 4.1). Using a single eG external agent and no application-level instrumentation, this model can indicate the availability of the Exchange mail server, the efficiency with which it processes messages, the overall health of the network connection between the agent host and the mail server host, and the availability of critical TCP ports on the mail server.

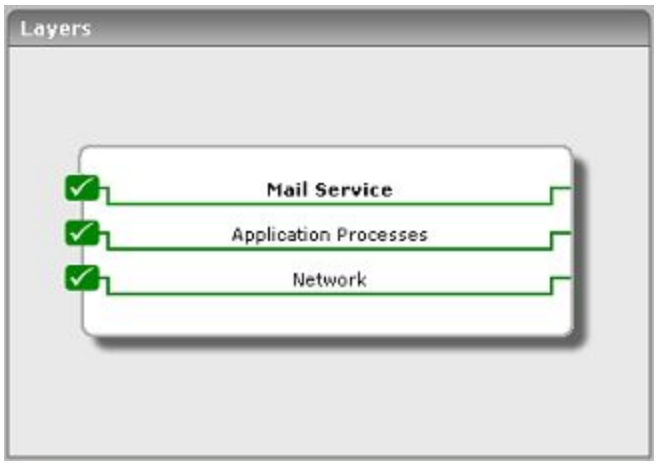

Figure 4.1: Layer model of the Exchange Server

Only the **Network** test is mapped to the **Network** layer; this external test, upon execution, reveals network bottlenecks that could be denying users access to the mail server. The **TcpPortStatus** test that is mapped to the **Application Processes** layer indicates whether/not critical TCP ports are available. The **Mail** test that is associated with the **Mail Service** layer is executed by an external agent; the test emulates a mail send-receive activity to verify the availability of the mail server and the speed with which it sends/receives mails.

For an in-depth discussion on the **Mail** test, refer to Section **3.3.2**. For details regarding the other tests mapped to this layer, please refer to the *Monitoring Unix and Windows Servers* document.

Chapter 5: Monitoring the Exchange Cluster Service

An Exchange cluster service is a collection of physical Exchange mail servers that can act as a single logical server. Requests to a cluster are routed through a virtual cluster server that is assigned a cluster IP address and TCP port. Requests to this server can be handled by any of the individual nodes in the cluster at any given point in time, depending on which node is active at that time.

Since clusters are deployed in environments where 24*7 availability and responsiveness are critical, it is imperative that the performance of the clusters is monitored all the time.

To monitor an Exchange cluster, an eG external agent is deployed, which emulates a mail send-receive activity on the Exchange cluster. The emulated requests are directed at the virtual cluster server. Therefore, you need to manage the virtual cluster server as an Exchange Cluster service using the eG administrative interface.

Note:

For more details on how eG Enterprise monitors clusters, refer to *Administering eG Enterprise*.

The layer model used by the eG Enterprise suite to monitor the Exchange cluster service is given below (see Figure 5.1)

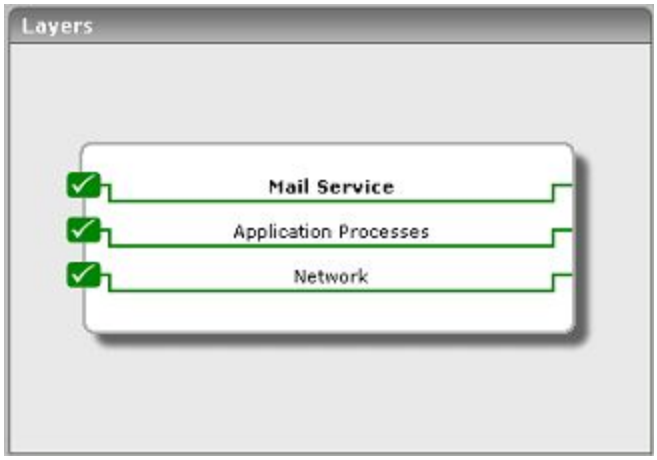

Figure 5.1: Layer model of the Exchange Cluster service

The following section will deal with the first layer of Figure 5.1 only.

5.1 The Mail Service Layer

The Mail test associated with this layer, emulates a mail send-receive activity on the cluster to determine its availability and responsiveness. The test sends the emulated request to the virtual

cluster server (i.e., the Exchange Cluster), which will promptly forward the request to that node in the cluster that currently owns the cluster server. If at least one node in the cluster is currently active, then the mail will be successfully sent/received, indicating the good health of the cluster. On the other hand, if none of the nodes in the cluster are active, then the emulated request will fail, indicating the non-availability of the cluster.

Figure 5.2: Tests mapping to the Mail Service layer

About eG Innovations

eG Innovations provides intelligent performance management solutions that automate and dramatically accelerate the discovery, diagnosis, and resolution of IT performance issues in on-premises, cloud and hybrid environments. Where traditional monitoring tools often fail to provide insight into the performance drivers of business services and user experience, eG Innovations provides total performance visibility across every layer and every tier of the IT infrastructure that supports the business service chain. From desktops to applications, from servers to network and storage, from virtualization to cloud, eG Innovations helps companies proactively discover, instantly diagnose, and rapidly resolve even the most challenging performance and user experience issues.

eG Innovations is dedicated to helping businesses across the globe transform IT service delivery into a competitive advantage and a center for productivity, growth and profit. Many of the world's largest businesses use eG Enterprise to enhance IT service performance, increase operational efficiency, ensure IT effectiveness and deliver on the ROI promise of transformational IT investments across physical, virtual and cloud environments.

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