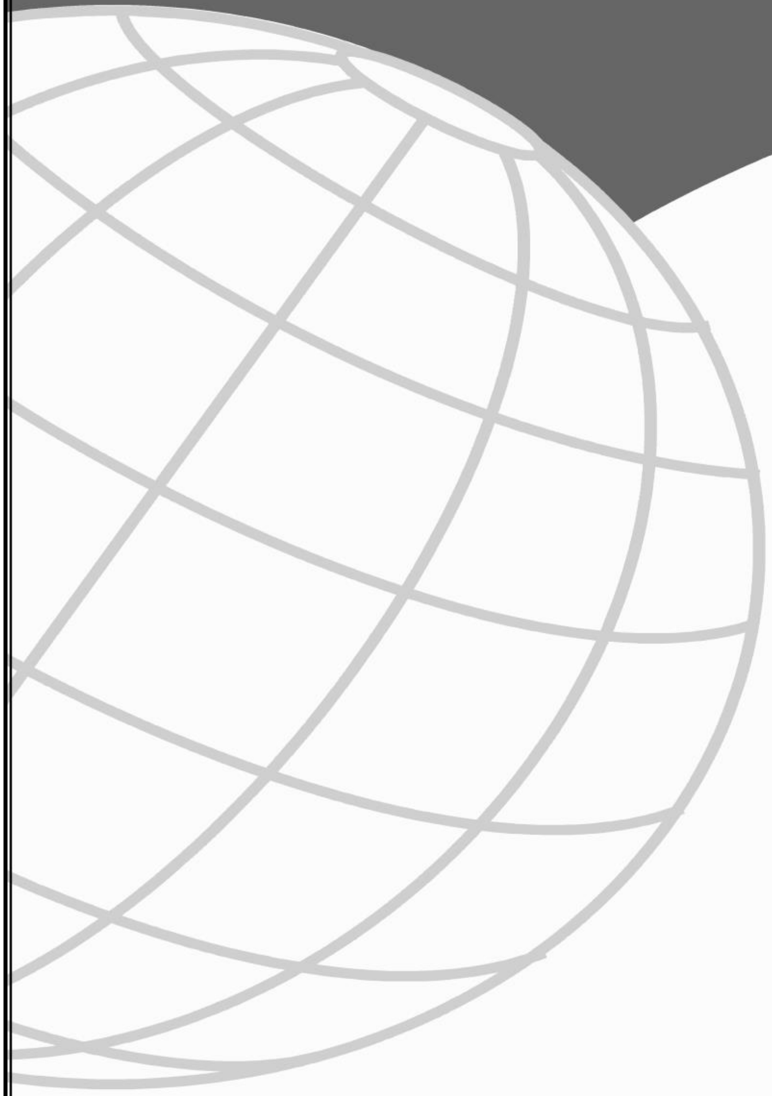

Monitoring Mail Servers

eG Enterprise v5.6

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1

Introduction

Web servers may be the most important and ubiquitous servers on the Internet, but mail servers rank a close second. E-mail is generally considered the most important service provided by the Internet, which makes servers that move and store mail a crucial piece of software. Naturally, these components also need constant monitoring.

eG Enterprise provides varied models for monitoring the health of a wide variety of mail servers. These models execute tests on the mail servers at pre-configured intervals, and report plenty of useful performance metrics which reveal the availability of the mail server, time taken by the server to send/receive mails, the health of critical internal components and services offered by the mail server, the effectiveness of the protocols employed while mailing, etc.

This document discusses the monitoring models that eG Enterprise prescribes for monitoring each popular mail server.

Chapter

2

Monitoring Generic Mail Servers

The *Mail* server model that eG Enterprise offers out-of-the-box, is typically meant for situations where administrators only want to know whether the mail server is available or not, how quickly is it able to send/receive mails, and alongside determine the overall health of the mail server host. To assess these performance parameters, users can manage any mail server, regardless of type (Exchange, Domino, etc.), as a generic *Mail* server using the eG administrative interface.

The layer model that the eG Enterprise suite uses for monitoring generic mail servers is shown in Figure 2.1. The **Operating System**, **Network**, **Tcp**, and **Application Processes** layers have already been discussed in the *Monitoring Unix and Windows Servers* document. This chapter therefore will deal with the **Mail Service** layer only.

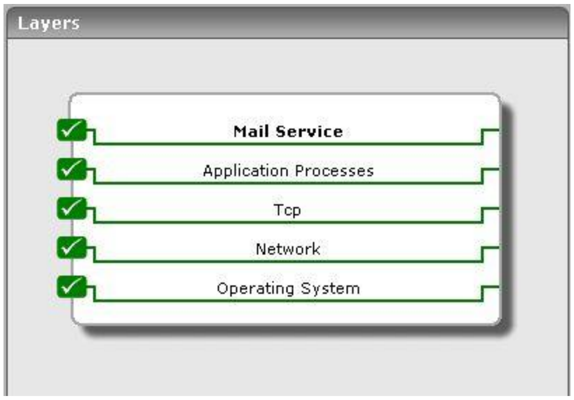
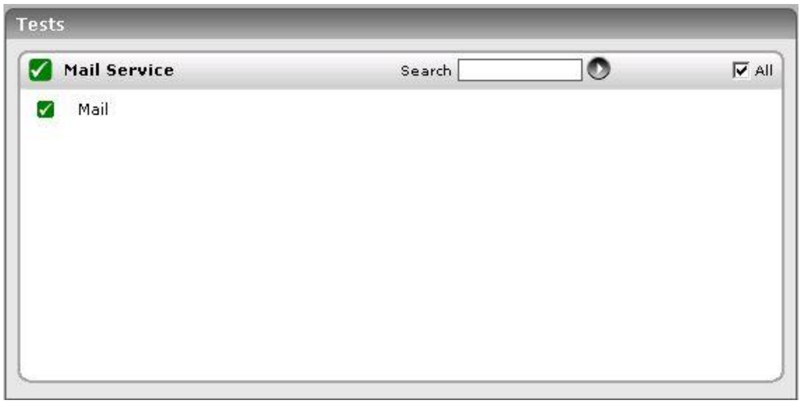


Figure 2.1: Layer model for a generic mail server

2.1 The Mail Service Layer

This layer handles the connectivity of the mail server to different hosts in the environment using the Mail test that is shown in Figure 2.2.



Tests

☑ Mail Service Search ☑ All

☑ Mail

Figure 2.2: Tests mapping to the Mail Service layer

2.1.1 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.

Purpose	This test measures the status of a mail server.
Target of the test	A mail server
Agent deploying the test	An external agent

Configurable parameters for the test	1. **TESTPERIOD** - Indicates how often this test needs to be executed. 2. **HOST** - Indicates the IP address of the mail server 3. **PORT** - The port number of the mail server's routing engine 4. **SENDPORT** - The SMTP port of the mail server. The default SMTP port is 25. 5. **SENDUSER** - Denotes the user name with which the test sends mails. 6. **SENDPASSWORD** - The password associated with the above user name. The **SENDUSER** and **SENDPASSWORD** can be 'none' if the target mail server does not need authentication to send mails. 7. **CONFIRM PASSWORD** – Confirm the **SENDPASSWORD** by retyping it here. 8. **FROMID** - Takes the email id from which the test generates mails. 9. **TOID** - Takes the email id to which the test sends mails. It is advisable that a separate email account be created for the MailTest. 10. **PROTOCOL** - The protocol to be used for receiving the mails (could be POP3 or IMAP). 11. **RECEIVEHOST** - Indicates the IP address at which the test receives mails. Typically, this would be the IP address of a POP3 or IMAP server. 12. **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. 13. **RECEIVEUSER** - Indicates the user name with which the test receives mails. 14. **RECEIVEPASSWORD** - Indicates the password corresponding to the above user. 15. **CONFIRM PASSWORD** – Confirm the **RECEIVEPASSWORD** by retyping it here.		
	Here are example settings of the Mail Test parameters: • **SENDUSER** = none • **SENDPASSWORD** = none • **FROMID** = mailtest@test.com • **TOID** = mailtest@test.com • **PROTOCOL** = POP3 • **RECEIVEHOST** = mail.test.com (the POP3 server's host) • **RECEIVEPORT** = 110 • **RECEIVEUSER** = mailtest • **RECEIVEPASSWORD** = mailtest's password It is advisable that you create a separate user account on your mail server for this test to use.		
Outputs of the test	One set of results for every mail server monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**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.
	Abiity 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.).
	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 5mins even if the message has actually been delivered to the user within a minute of its transmission.

Note:

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

Chapter

3

Monitoring Exchange 2000/2003 Servers

Microsoft's Exchange 2000/2003 server is an enterprise messaging system that is tightly integrated with the Windows 2000/2003 operating system. Figure 3.1 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.

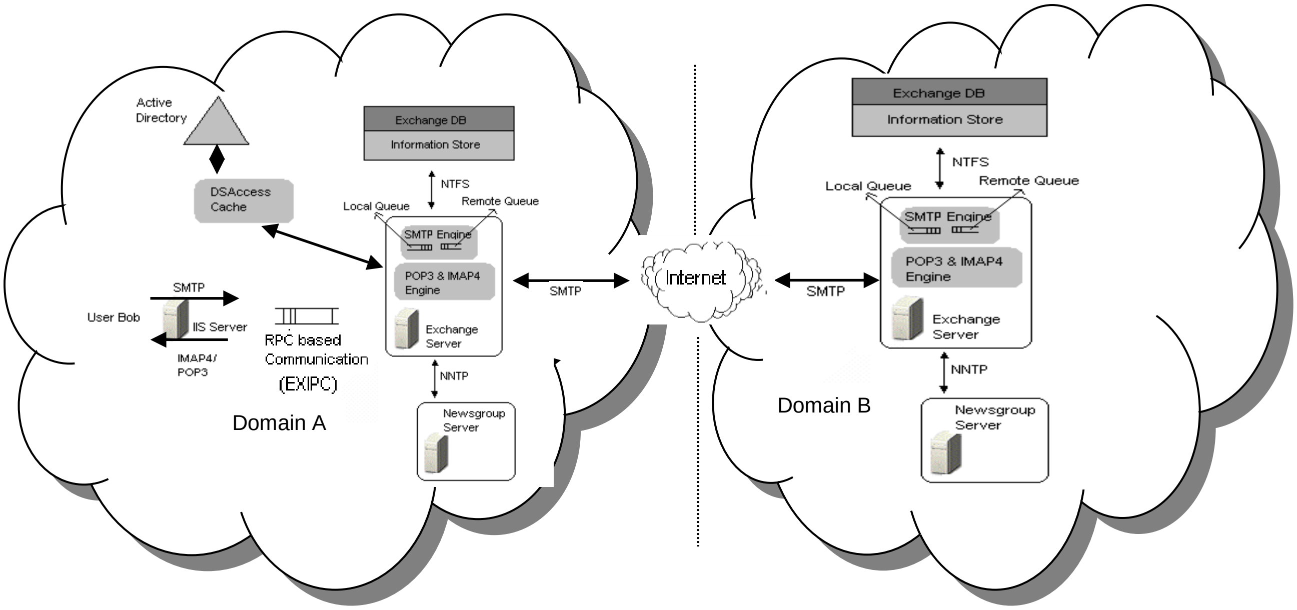


Figure 3.1: Architecture of a Microsoft Exchange server

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.

The eG monitor for Exchange makes monitoring and managing Exchange server performance easy and efficient. Using either an agent-based on 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. eG Enterprise's unique layer model representation (see Figure 3.2) 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.

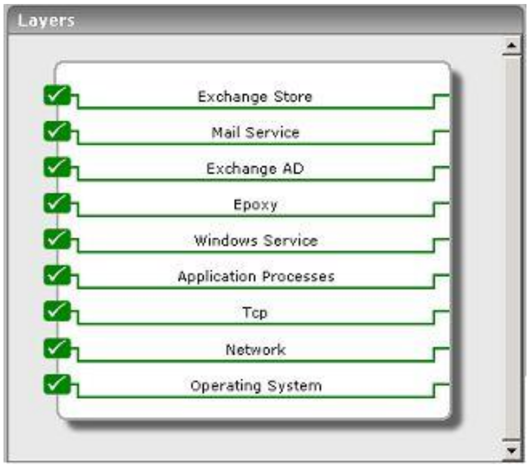


Figure 3.2: Layer model of an Exchange 2000/2003 server

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 3.2.

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.

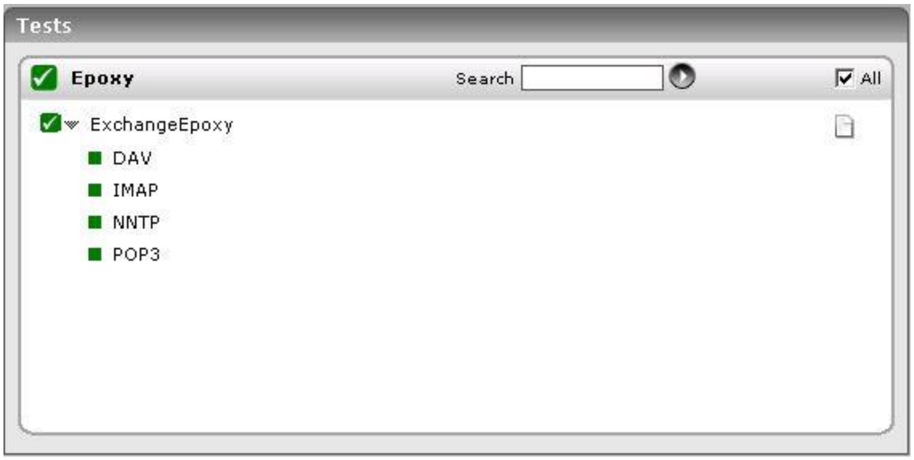


Figure 3.3: Tests mapping to the Epoxy layer

3.1.1 Exchange Epoxy Test

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

Purpose	Reports statistics pertaining to the Epoxy (ExIPC)		
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. The default is 691. 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 Epoxy being monitored		
Measurements made by the test	**Measurement**	**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.

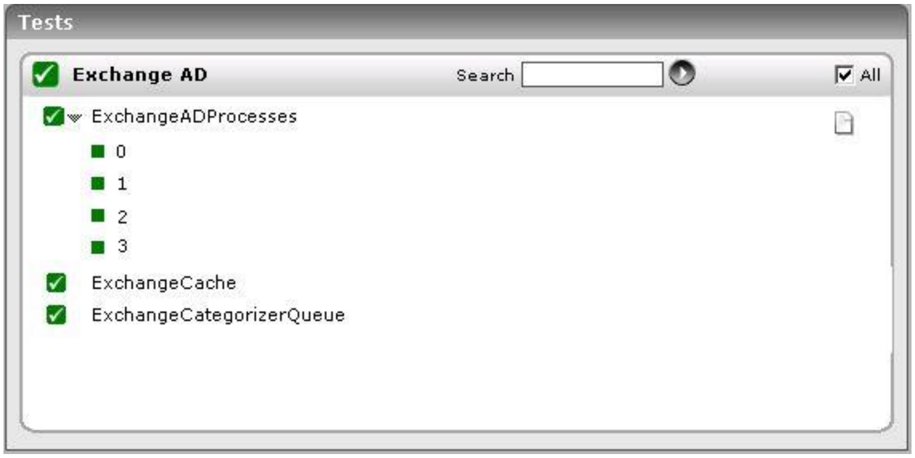


Figure 3.4: The tests associated with the Exchange AD layer

3.2.1 Exchange AD Processes Test

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

Purpose	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

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. The default is 691. 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 process		
Measurements made by the test	**Measurement**	**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 100milliseconds.
	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`".

Purpose	This test monitors the performance of Exchange Server DSAccess cache.
Target of the test	An Exchange server 2000/2003
Agent deploying the	An internal agent

test			
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**
	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

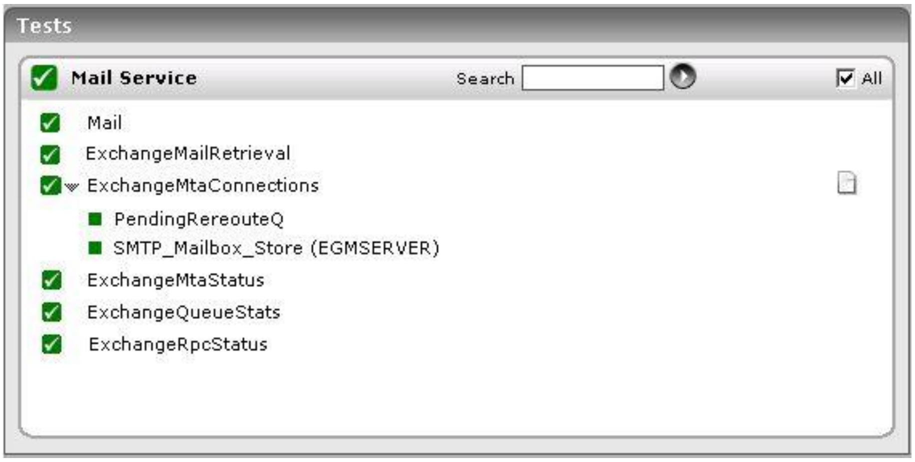
This test indicates how well SMTP is processing LDAP lookups against the global catalog servers. The Exchange Categorizer queue length should be around zero unless the server is expanding distribution lists. While expanding distribution lists, this counter can occasionally go up higher. This is an excellent 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	An internal agent

<table>
<tr><td><b>test</b></td><td colspan="3"></td></tr>
<tr><td><b>Configurable parameters for the test</b></td><td colspan="3">1. <b>TEST PERIOD</b> - How often should the test be executed
2. <b>HOST</b> - The IP address of the machine where the Exchange Server is installed.
3. <b>PORT</b> – The port number through which the Exchange Server communicates.
4. <b>ISPASSIVE</b> – If the value chosen is <b>YES</b>, 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.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for every Exchange server being monitored</td></tr>
<tr><td><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td></td><td><b>Categorizer queue length:</b>
This value indicates how well SMTP is processing LDAP lookups against the Global catalog servers.</td><td>Number</td><td>The value should be below 10 most of the time.</td></tr>
</table>

3.3 The Mail Service Layer

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



☑ Mail
☑ ExchangeMailRetrieval
☑ ExchangeMtaConnections
- PendingRereouteQ
- SMTP_Mailbox_Store (EGMSERVER)

☑ ExchangeMtaStatus
☑ ExchangeQueueStats
☑ ExchangeRpcStatus

Figure 3.5: 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 3.5). 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 3.5) 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 **Component type**, set *Performance* as the **Test type**, choose this 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.

<table>
<tr><td><b>Purpose</b></td><td colspan="3">Monitors the status of the different exchange connectors registered with an Exchange server</td></tr>
<tr><td><b>Target of the test</b></td><td colspan="3">An Exchange server 2000/2003</td></tr>
<tr><td><b>Agent deploying the test</b></td><td colspan="3">An internal agent</td></tr>
<tr><td><b>Configurable parameters for the test</b></td><td colspan="3">1. <b>TEST PERIOD</b> - How often should the test be executed
2. <b>HOST</b> - The IP address of the machine where the Exchange Server is installed.
3. <b>PORT</b> – The port number through which the Exchange Server communicates.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for every Exchange connector being monitored</td></tr>
<tr><td rowspan="2"><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td><b>Exchange connector status:</b>
Indicates the current status of this connector.</td><td>Percent</td><td>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.</td></tr>
</table>

3.3.2 Mail Test

Mail test has already been discussed elaborately in the previous chapter. This test is to be used if the Exchange server is configured to support SMTP and POP3/IMAP access. In the case of Exchange 2000/2003 servers, the Mail test takes an additional **ISPASSIVE** parameter. If the value chosen against this parameter 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. This Parameter is applicable to Exchange 2000/2003 servers only, though it appears in the **Mail** test configuration pages of MS Exchange 5.5 and Lotus Domino servers.

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* as the **Component type**, *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..

Purpose	This test monitors the both the local and remote queues of an Exchange server, and also reports statistics pertaining to the SMTP protocol.		
Target of the test	An Exchange server		
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	**Measurement**	**Measurement Unit**	**Interpretation**

test	**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 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.

	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: 1. No recipients might have been mentioned for the mail 2. A network failure 3. 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.
	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.

<table>
<tr><td><b>Purpose</b></td><td colspan="3">This test monitors the usage of POP3 and IMAP protocols via an Exchange server</td></tr>
<tr><td><b>Target of the test</b></td><td colspan="3">An Exchange server 2000/2003</td></tr>
<tr><td><b>Agent deploying the test</b></td><td colspan="3">An internal agent</td></tr>
<tr><td><b>Configurable parameters for the test</b></td><td colspan="3">1. <b>TEST PERIOD</b> - How often should the test be executed
2. <b>HOST</b> - The IP address of the machine where the Exchange server is installed.
3. <b>PORT</b> – The port number through which the Exchange server communicates.
4. <b>ISPASSIVE</b> – If the value chosen is <b>YES</b>, 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.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for every Exchange server being monitored</td></tr>
<tr><td><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td></td><td><b>Current POP3 connections:</b>
This measure shows the number of current POP3 connections to the server.</td><td>Number</td><td>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 parameters:
1. The server’s memory requirements
2. Control of unnecessary traffic on the mail server
3. The server’s processing capabilities</td></tr>
<tr><td></td><td><b>Current IMAP connections:</b>
This measure shows the number of current IMAP connections to the server.</td><td>Number</td><td>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:
1. The server’s memory requirements
2. Control of unnecessary traffic on the mail server
3. The server’s processing capabilities</td></tr>
</table>

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

Purpose	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		
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	**Measurement**	**Measurement Unit**	**Interpretation**

test	**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 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.

Purpose	Monitors the status of an Exchange server's MTA		
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**
	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 MTA: Indicates the rate at which message data is processed by this MTA during the last measurement period.	KB/Sec	This measure again is a good indicator 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	
	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.

Purpose	Tracks the connections to and from message transfer agents of Exchange 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.

Outputs of the test	One set of results for every MTA connection being monitored		
Measurements made by the test	**Measurement**	**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	
	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 entity during the last measurement period.	Number	These values indicate the message traffic on an MTA connection.
	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.

Purpose	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		
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. **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**.		
Outputs of the test	One set of results for the Exchange server being monitored		
Measurements made by the test	**Measurement**	**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 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. The ExchangeTraffic 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.

Purpose	Measures the mail traffic that can be handled by the server
Target of the	An Exchange server 2000/2003

test			
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.		
Outputs of the test	One set of results for the Exchange server being monitored		
Measurements made by the test	**Measurement**	**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 Exchange 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 **Component type**, *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, refer to the *Configuring and Monitoring Mail Servers* document.
- 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.

Purpose	Monitors the availability and performance of a Microsoft Exchange mail server from an external perspective
Target of the test	An Exchange server
Agent deploying the test	An external agent

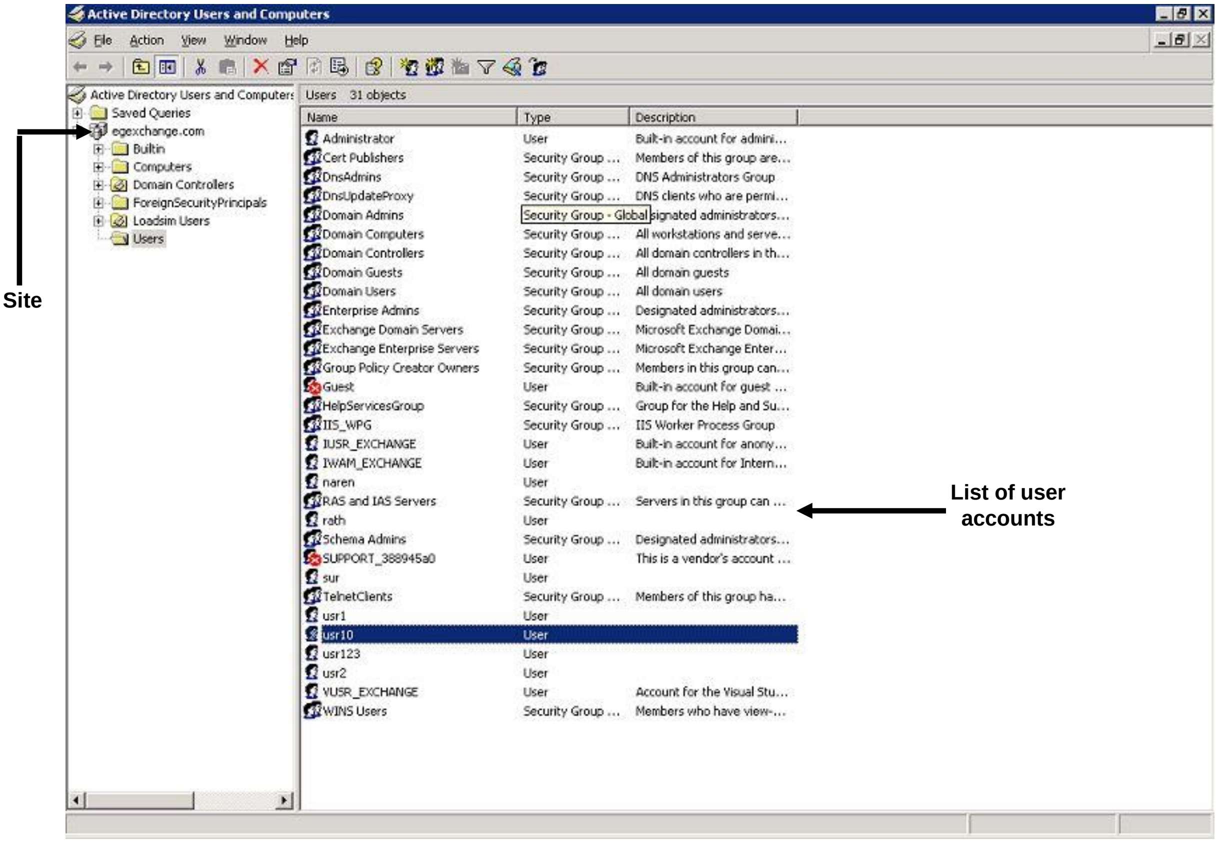
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** - The IP address of the machine where the Exchange server is installed. 3. **PORT** – The port number through which the Exchange server communicates. 4. **ISPASSIVE** – If the value chosen is **YES**, 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. 5. **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 Page 32. 6. **SMTPSERVER** - The IP address of the Exchange server being monitored; by default, the IP address of t he **HOST** is displayed here. 7. **SMTPPORT** - The port number at which the **SMTPSERVER** listens; by default, it is 25. 8. **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.		
Outputs of the test	One set of results for every Exchange server being monitored		
Measurements made by the test	**Measurement**	**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.

	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 server) of all messages received by the mail server during the last measurement period	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**.

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 3.6 will then appear. In the tree structure in the left pane of Figure 3.6, expand the node that corresponds to the **Site** on the Exchange server, and then, click on the **Users** folder within.


Active Directory Users and Computers
File Action View Window Help
Active Directory Users and Computers
Saved Queries
egexchange.com
Builtin
Computers
Domain Controllers
ForeignSecurityPrincipals
Loadsim Users
Users
Site
List of user accounts

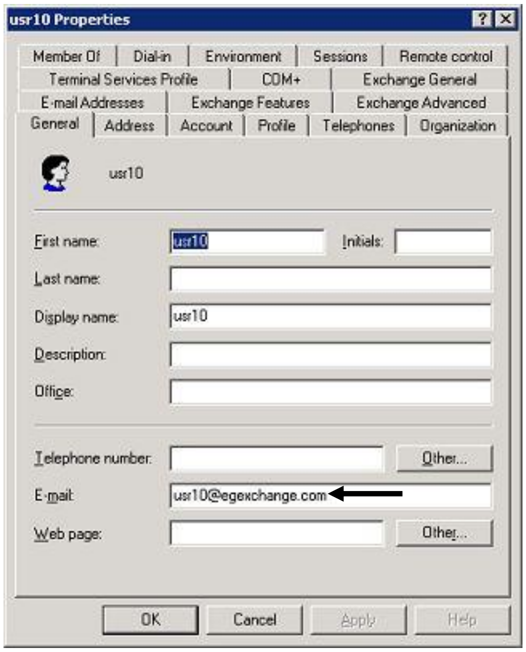
Users 31 objects

Name	Type	Description
Administrator	User	Built-in account for admini...
Cert Publishers	Security Group ...	Members of this group are...
DnsAdmins	Security Group ...	DNS Administrators Group
DnsUpdateProxy	Security Group ...	DNS clients who are permi...
Domain Admins	Security Group - Global	signated administrators...
Domain Computers	Security Group ...	All workstations and serve...
Domain Controllers	Security Group ...	All domain controllers in th...
Domain Guests	Security Group ...	All domain guests
Domain Users	Security Group ...	All domain users
Enterprise Admins	Security Group ...	Designated administrators...
Exchange Domain Servers	Security Group ...	Microsoft Exchange Domai...
Exchange Enterprise Servers	Security Group ...	Microsoft Exchange Enter...
Group Policy Creator Owners	Security Group ...	Members in this group can...
Guest	User	Built-in account for guest ...
HelpServicesGroup	Security Group ...	Group for the Help and Su...
IIS_WPG	Security Group ...	IIS Worker Process Group
IUSR_EXCHANGE	User	Built-in account for anony...
IWAM_EXCHANGE	User	Built-in account for Intern...
naren	User	
RAS and IAS Servers	Security Group ...	Servers in this group can ...
rath	User	
Schema Admins	Security Group ...	Designated administrators...
SUPPORT_388945a0	User	This is a vendor's account ...
sur	User	
TelnetClients	Security Group ...	Members of this group ha...
usr1	User	
usr10	User	
usr123	User	
usr2	User	
VUSR_EXCHANGE	User	Account for the Visual Stu...
WINS Users	Security Group ...	Members who have view-...

Figure 3.6: 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 3.7 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 3.7.



First name: usr10

Display name: usr10

E-mail: usr10@egexchange.com

Figure 3.7: 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.

Purpose	Monitors the performance of the mail scanning and virus processing sub system.		
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 host for which the test is to be configured. 3. **PORT** - The variable name of the port for which the test is to be configured. 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 the Exchange server being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**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 measurement period	Files/Sec	

	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.

Purpose	Monitors the performance of RPC activities on the Exchange server.
Target of the	An Exchange server 2003/2007

test			
Agent deploying the test	An internal agent or remote agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** –The host for which the test is to be configured. 3. **PORT** - The variable name of the port for which the test is to be configured.		
Outputs of the test	One set of results for the Exchange server being monitored		
Measurements made by the test	**Measurement**	**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/Se c	
	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 during the last measurement period.	Successes/Sec	
	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.

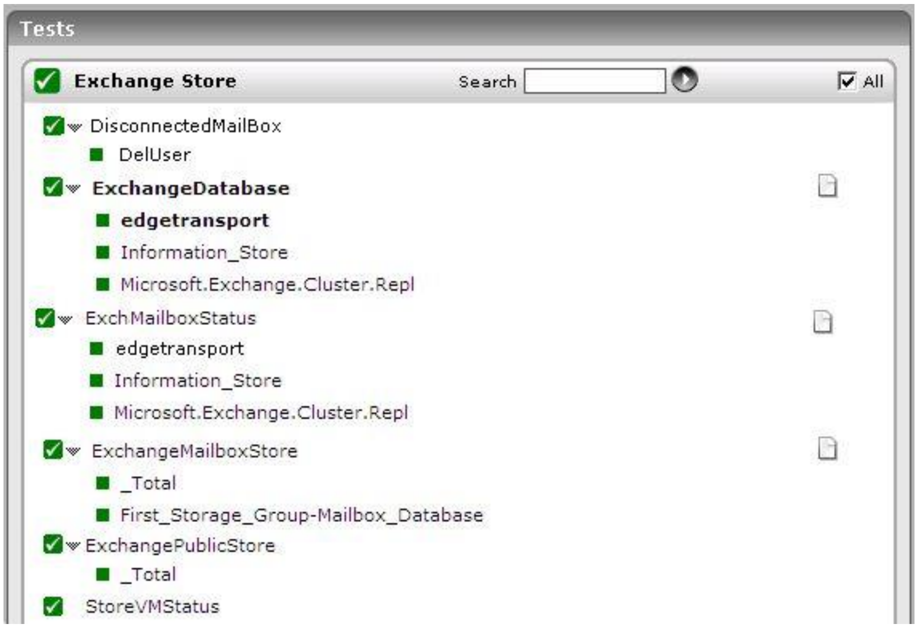


Figure 3.8: The tests associated with the Exchange Store layer

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 DisconnectedMailBox 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.

Purpose	Automatically discovers and monitors the disconnected mailboxes on an Exchange 2003 server		
Target of the test	An Exchange 2003 Server only		
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. **EXCHANGESERVERNAME** - Enter the name of the Exchange server to be monitored. 5. **DD FREQUENCY** - The **DD FREQUENCY** refers to the frequency with which detailed diagnosis measures are to be generated. 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. Typically, detailed diagnosis frequencies are set globally, using the **DIAGNOSIS CONFIGURATION** page that appears when the Configure -> Diagnosis menu sequence is followed. This global setting can be overridden at the test-level using the **DD FREQUENCY** parameter. To disable the detailed diagnosis capability for a test, you can set this parameter to 0:0. 6. **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.		
Outputs of the test	One set of results for every mailbox on the Exchange 2003 server being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**Is mailbox disconnected?:** Indicates whether the mailbox is disconnected or not.	Boolean	When the value is 1, it means that this mailbox is disconnected.
	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.

Purpose	This test monitors the performance of Exchange server database.
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**
	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 buffers are full.	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 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 XchgMailboxStore test reports statistics pertaining to the Mailbox component of the Information store.

Purpose	Measures the performance of the mailbox component of the Exchange Information Store		
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 Information store being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**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' users 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 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 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.

3.4.4 Exchange Public Store Test

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

Purpose	Measures the performance of the mailbox component of the Exchange Information Store
Target of the test	An Exchange server 2000/2003
Agent deploying the test	An internal agent

<table>
<tr><td><b>Configurable parameters for the test</b></td><td colspan="3">1. <b>TEST PERIOD</b> - How often should the test be executed
2. <b>HOST</b> - The IP address of the machine where the Exchange server is installed.
3. <b>PORT</b> – The port number through which the Exchange server communicates.
4. <b>ISPASSIVE</b> – If the value chosen is <b>YES</b>, 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.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for every Information store being monitored</td></tr>
<tr><td rowspan="6"><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td><b>Active client logons:</b>
The number of active client logons into the Information store.</td><td>Number</td><td></td></tr>
<tr><td><b>Client logons:</b>
The number of clients logging into their Information store.</td><td>Number</td><td>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.</td></tr>
<tr><td><b>Mail send queue size:</b>
The number of messages currently in the send queue of an information.</td><td>Number</td><td>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).</td></tr>
<tr><td><b>Mail received queue size:</b>
This measure shows the number of messages currently in the receiving queue of the information store.</td><td>Number</td><td>This measure is usually zero under normal conditions.
A non-zero value for this measure indicates that the SMTP service is choking up memory.</td></tr>
<tr><td><b>Mails opened:</b>
This measure indicates the rate at which the requests to open the messages are being submitted to the information store.</td><td>Msgs/Sec</td><td>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.</td></tr>
</table>

	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. The StoreVMStatus test reports statistics related to the usage of the Exchange store's virtual memory.

Purpose	This test monitors the performance of Exchange server database.		
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	**Measurement**	**Measurement Unit**	**Interpretation**

test	**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* as the **Component type**, *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.

<table>
<tr><td><b>Purpose</b></td><td colspan="3">Automatically discovers all the mailboxes on a monitored Exchange 2000/2003 server, and reports the usage of each mailbox</td></tr>
<tr><td><b>Target of the test</b></td><td colspan="3">An Exchange server 2000/2003</td></tr>
<tr><td><b>Agent deploying the test</b></td><td colspan="3">An internal agent</td></tr>
<tr><td><b>Configurable parameters for the test</b></td><td colspan="3">1. <b>TEST PERIOD</b> - How often should the test be executed
2. <b>HOST</b> - The IP address of the machine where the Exchange server is installed.
3. <b>PORT</b> – The port number through which the Exchange server communicates.
4. <b>LOGONUSER</b> - By default, a "*" is displayed here, indicating that the test automatically discovers all the mailboxes configured for all the users on the Exchange server.
5. <b>EXCHANGESERVERNAME</b> - The name of the Exchange server instance on which mailbox monitoring is to be performed.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for every mailbox configured on the specified <b>EXCHANGESERVER</b></td></tr>
<tr><td rowspan="4"><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td><b>Exchange mailbox size:</b>
Indicates the current size of this mailbox.</td><td>MB</td><td></td></tr>
<tr><td><b>Quota size:</b>
Indicates the maximum size upto which the mailbox can grow.</td><td>MB</td><td></td></tr>
<tr><td><b>Exchange mailbox usage:</b>
Indicates the percentage of mailbox space that has been utilized currently.</td><td>Percent</td><td>This is computed as <i>Mailbox_size/Quota_size*100</i>. 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.</td></tr>
</table>

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.

The ExchangeStoreGroups 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* as the **Component type**, *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.

Purpose	Periodically observes the fluctuations in the store group size and the size of the mailbox and public folder stores within
Target of the test	An Exchange server 2000/2003
Agent deploying the test	An internal agent

<table>
<tr><td><b>Configurable parameters for the test</b></td><td colspan="3">1. <b>TEST PERIOD</b> - How often should the test be executed
2. <b>HOST</b> - The IP address of the machine where the Exchange server is installed.
3. <b>PORT</b> – The port number through which the Exchange server communicates.
4. <b>EXCHANGESERVERNAME</b> - The name of the Exchange server instance on which the store group(s) to be monitored exists.
5. <b>DETAILED DIAGNOSIS</b> - 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 <b>On</b> option. To disable the capability, click on the <b>Off</b> 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.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for every store group configured on the specified <b>EXCHANGESERVER</b></td></tr>
<tr><td rowspan="2"><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td><b>Exchange mailbox store size:</b>
Indicates the current size of the mailbox stores within this store group.</td><td>MB</td><td>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 <i>Exchange mailbox store size</i> 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?</td></tr>
</table>

	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?
	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.

The **Exchange Mailbox Status** test reports the mount status of every mailbox database in an Exchange server.

Purpose	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

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** - The IP address of the machine configured with the Mailbox server role. 3. **PORT** – The port number through which the Mailbox server communicates. The default is 691. 4. **XCHGEXTENSIONSHELLPATH** – Specify the full path to the Exchange management shell. By default, this will be *none*.		
Outputs of the test	One set of results for every Mailbox database being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

<table>
<tr>
<td>test</td>
<td><b>Mount status of mailbox:</b>
Indicates the mount status of this mailbox database.</td>
<td></td>
<td>If the value of this measure is <i>Mounted</i>, it indicates that the database is mounted. The value <i>Dismounted</i>, 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>
<b>Note:</b>
By default, this measure reports the value <i>Mounted</i> or <i>Dismounted</i> to indicate the mount status of a mailbox. The graph of this measure however, represents the mount status using the numeric equivalents – <i>0</i> or <i>100</i>.
An unmounted database can render critical data inaccessible to users. Commonly, mounting issues may occur owing to one/more of the following reasons:
<ul>
<li>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 the database will not mount.</li>
<li>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.</li>
</ul>
</td>
</tr>
</table>

			▪ 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 TcpPortStatus 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 Generic Servers* document.

Chapter

4

Monitoring MS Exchange Server 5.5

Microsoft Exchange Server 5.5 is a client-server messaging system. Exchange Server 5.5 offers a transparent connection to existing networks and mail servers. It provides users with an innovative electronic mail system, online forms etc.

Microsoft Exchange Server 5.5 is the primary mail server for the Windows NT Server operating system. The OS allows the server to take advantage of the platform's reliability, scalability and multitasking capabilities. For example, Windows NT Server multitasking capability allows Microsoft Exchange Server to simultaneously update directory information, transfer information to a client, and route information to other servers and foreign systems.

The server-side components perform actions that the client-side components request, such as looking up names in the directory, sending messages, and storing information in private and public folders. These components often reside on a dedicated computer where Microsoft Exchange Server is installed.

The server-side components are:

- Directory
- Information store
- Message transfer agent (MTA)
- System attendant

This means that, for the client-server interaction to function smoothly, each of these components should operate without a glitch. Issues with the internal health of these components can affect the responsiveness of the mail server, causing user dissatisfaction. By constantly monitoring the internal operations of the mail servers, such problems can be averted.

Like the *Exchange* server model, eG Enterprise suite offers a specialized *Exchange 5.5* monitoring model (see Figure 4.1) for the MS Exchange Server 5.5. The tests associated with this model continuously checks whether the core components of the MS Exchange server 5.5 are operating to peak capacity or no, and promptly alert administrators to potential performance issues.

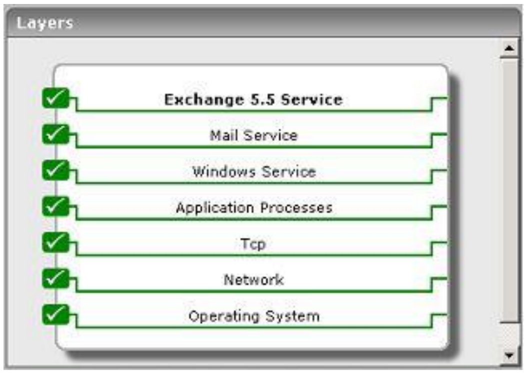


Figure 4.1: Layers of MS Exchange Server 5.5

The **Network**, **Tcp**, **Application Processes**, and **Windows Service** layers have already been discussed in the *Monitoring Unix and Windows Servers* document. The **Mail Service** layer too has been dealt with elaborately in the *Monitoring Generic Mail Servers* chapter of this document. The sections to come therefore, will elaborate on the **Exchange 5.5 Service** layer only.

4.1 The Exchange 5.5 Service Layer

This layer monitors the various components that are responsible for enabling the Exchange service, such as the Exchange server database, Exchange server cache. More details about the Exchange Server 5.5 activities are available in the following sections. The tests that map to this layer are depicted by Figure 4.2 below:

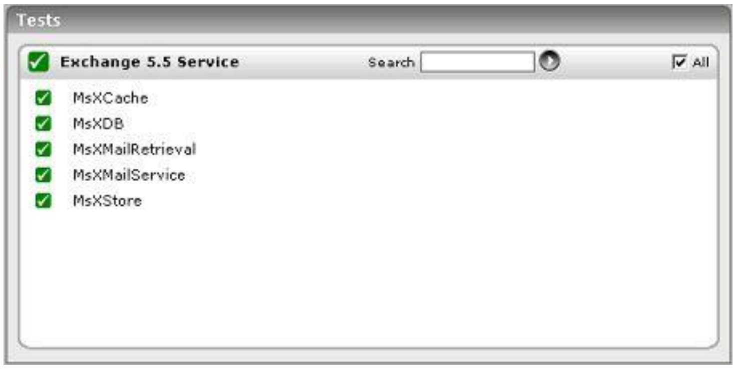


Figure 4.2: Tests mapping to the Xchange55_Service layer

4.1.1 MsXCache Test

This test monitors the performance of Exchange Server Directory, the server-side core component.

The Microsoft Exchange Server directory contains objects that are the principal means for applications to find and access services, mailboxes, recipients, public folders, and other addressable objects within the messaging system.

The directory consists of two components:

- Directory database
- Directory service agent.

The directory database stores directory information like recipients, distribution lists, servers, and messaging infrastructure. The directory service agent manipulates the information in the directory database and handles directory requests from applications and services.

Purpose	This test monitors the performance of Exchange Server 5.5 Directory Cache.		
Target of the test	An MS Exchange Server 5.5		
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 5.5 is installed. 3. **PORT** – The port number through which the Exchange Server 5.5 communicates. The default port number is 25.		
Outputs of the test	One set of results for every Exchange Server 5.5 being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Cache hit ratio: This measure indicates the percentage of database requests that were fulfilled by the Exchange directory cache without causing a Input/Output operation.	Percent	A zero value for this measure may indicate that the Exchange Server 5.5 is not performing any activity on the Exchange directory or no operations are happening on the Exchange Server 5.5 itself. A non-zero value indicates that the directory service has found the required objects in the directory cache thereby reducing the access. A high value for this measure ensures better performance of the Exchange Server 5.5.

4.1.2 MsXDBTest

This test monitors the performance of Exchange Server Database. The information store is key to database management in Exchange Server. This server-side component is responsible for storing data, such as e-mail messages in user mailboxes and information in public folders. The information store is actually two separate databases. The private information store database, called Priv.eb and Public information store, called Pub.ebd.

The private information store manages data in user mailboxes. The public information store manages data in public folders.

Microsoft Exchange Server relies on an embedded database engine that lays out the structure of the disk for Exchange Server and manages memory. The Exchange database engine caches the disk in memory by swapping 4 KB chunks of data, called pages, in and out of memory. The engine updates the pages in memory and takes care of writing new or updated pages back to the disk. The database engine commits a transaction only when it can guarantee that the data is durable and protected from crashes or other failures. The database engine will only successfully commit data when it is sure it has flushed that data from memory to the transaction log file on disk.

Purpose	This test monitors the performance of Exchange Server 5.5 Database.		
Target of the test	An Exchange Server 5.5		
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 5.5 is installed. 3. **PORT** – The port number through which the Exchange Server 5.5 communicates. The default port number is 25.		
Outputs of the test	One set of results for every Exchange Server 5.5 being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Database cache hit ratio: This measure shows the percentage of database requests that were fulfilled by the information store cache without incurring disk input/output activity.	Percent	A significantly low value indicates that the Exchange Server 5.5 is not having enough free memory. Increasing the memory 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 5.5 is not having enough free memory. Increasing the memory may solve this problem.
	Log record waiting rate: This measure shows the number of log records that cannot be added to the log buffers because the log buffers are full.	Recrds/Sec	This measure should be as close to zero as possible. If it is not, it might indicate that the size of the log buffer might be a bottleneck. Increasing the memory may solve this problem.
	Log threads waiting: 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 log buffer might be a bottleneck. Increasing the memory may solve this problem.

4.1.3 MsXMailRetrieval Test

This test monitors the performance of Post Office Protocol version 3 (POP3) and Internet Messaging Access Protocol (IMAP).

POP3 is an Internet protocol that allows a POP3 client to download e-mail from the messaging server like Exchange Server 5.5. This protocol works well for computers that are unable to maintain a continuous connection to a messaging server. Microsoft Exchange Server implements this protocol as a process of the information store.

Internet Messaging Access Protocol (IMAP) 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. Like POP3, IMAP4 also runs as a process of the information store.

Purpose	This test monitors the usage of POP3 and IMAP protocols via an Exchange Server 5.5		
Target of the test	An Exchange Server 5.5		
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 5.5 is installed. 3. **PORT** – The port number through which the Exchange Server 5.5 communicates. The default port number is 25.		
Outputs of the test	One set of results for every Exchange Server 5.5 being monitored		
Measurements made by the test	**Measurement**	**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 5.5. This measure helps the administrator in planning or upgrading the following parameters: • Server's memory requirements • Control of unnecessary traffic on the mail server • 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 5.5. This measure helps the administrator in planning or upgrading the following parameters: • Server's memory requirements • Control of unnecessary traffic on the mail server • Server's processing capabilities
	Current POP3 waits: This measure shows the number of outstanding requests from POP3 clients.	Number	A high value for this measure indicates that either Exchange Server 5.5 is down or Exchange Server is overloaded with jobs.
	Current IMAP waits: This measure shows the number of outstanding requests from IMAP clients.	Number	A high value for this measure indicates that either the Exchange Server 5.5 is down or Exchange Server is overloaded with jobs.

4.1.4 MsXMailService Test

The MsXMailService test reports general statistics pertaining to the MS Exchange Server 5.5.

Purpose	Reports general statistics pertaining to the MS Exchange Server 5.5		
Target of the test	An Exchange Server 5.5		
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 5.5 is installed. 3. **PORT** – The port number through which the Exchange Server 5.5 communicates. The default port number is 25.		
Outputs of the test	One set of results for every Exchange Server 5.5 being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**

	Inbound queue size: The number of messages received from the Internet destined for this MS Exchange Server	Number	This metric checks the inbound side of the MS Exchange server. A consistently high queue size could indicate that the server is not able to cope with the incoming traffic.
	Outbound queue size: The number of messages from this MS Exchange Server, that are queued to be delivered to the Internet	Number	Typically, the outbound queue length should be short.
	MTS in queue: The number of messages awaiting final delivery in this MS Exchange Server	Number	
	MTS out queue: The number of messages waiting to be converted to Internet Mail format	Number	
	Incoming connections: The number of current SMTP connections to the Internet Mail Service (IMS) established by other SMTP hosts	Number	
	Outgoing connections: The number of current SMTP connections the Internet Mail Service has established to other SMTP hosts	Number	
	Failed connections: The current number of SMTP connection attempts made by the InternetMail Service to other hosts, that have failed	Number	A lot of failures can occur if the Exchange server is not able to connect to remote server(s) over the Internet
	Rejected connections: The current number of SMTP connections from other hosts that the Internet Mail Service has rejected	Number	There may be many reasons why an Exchange server can reject connections from other hosts. eg., based on access control specifications, if the remote host's DNS name cannot be resolved.

	Incoming messages: The current number of Internet messages delivered into MS Exchange Server	Number	
	Outgoing messages: The current number of outbound messages delivered to their destinations		

4.1.5 MsXStore Test

This test monitors the performance of Exchange Server information store, a server-side component. The information store makes it possible for users to send mail and use public folders. The information store performs the following tasks:

- Stores public folders in the public information store.
- Stores user's messages in the private information store.
- Maintains storage.
- Delivers messages addressed to users on the same server as the sender.
- Forwards messages addressed to recipients on other servers and systems to the message transfer agent (MTA) to deliver.

Purpose	This test monitors the performance of the information store in Exchange Server 5.5.		
Target of the test	An Exchange Server 5.5		
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 5.5 is installed. 3. **PORT** – The port number through which the Exchange Server 5.5 communicates. The default port number is 25.		
Outputs of the test	One set of results for every Exchange Server 5.5 being monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**Current users:** This measure shows the actual number of users (not connections) currently using the information store.	Number	This measure is a good indicator of user activity in the Exchange 5.5 Server. This information can be used by the administrator for planning the capacity of the mail server.
	Mail send queue size: This measure indicates 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 size: 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.
	Mail sent rate: This measure indicates the rate at which messages are being sent to other storage providers via the Message Transfer Agent (MTA). MTA is a component of Microsoft Exchange Server that sends and distributes information between Microsoft Exchange Server systems or between Microsoft Exchange Server and a foreign system. Each MTA is associated with one information store.	Msgs/Min	A high value over a period for this measure indicates the one of the following: • Microsoft Exchange MTA service is down • Microsoft Exchange MTA service is choking up memory • The Exchange Server 5.5 is overloaded.
	Mail opens: This measure indicates the rate at which the requests, to open the messages are being submitted to the private 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 Server 5.5 is overloaded.
	Folder opens: This measure indicates the rate at which requests, to open the folders are being submitted to the public information store.	Reqs/Sec	This measure is another good indicator of user activity on the mail folders.

	Avg mail delivery time: This measure indicates the average time between the submission of a message to the information store and the submission to the MTA 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 mail local 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.

4.1.6 MsXMail 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. Note that Microsoft Mail account needs to be configured in the Exchange server in order to run this test. 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 **Component type**, *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:

- The eG external agent that is executing the MsXMail test, should be installed on a Windows NT server/client in the same domain as the Exchange 5.5 server.
- The administrator configuring the test should ensure that the mailbox being used in the test, exists on the Exchange 5.5 server.
- The eGurkhaAgent service should run using the account information of the user whose mailbox has been configured for the MsXMail test.

Purpose	Monitors the availability and performance of a Microsoft Exchange mail server from an external perspective
Target of the test	An MS Exchange 5.5 Server

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 5.5 Server is installed. 3. **PORT** – The port number through which the Exchange 5.5 Server communicates. The default port number is 25. 4. **XCHGMAILBOX** - Specify the user name or the user ID of a user mail box available on the Exchange server that is to be used for this test. 5. **XCHGSITENAME** - The name of the site in the Exchange server to which the mailbox belongs 6. **XCHGORGNAME** - The name of the organization in the Exchange server to which the specified site belongs		
Outputs of the test	One set of results for every Exchange 5.5 Server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Ability to send mails: 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.
	Time to send mails: 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.
	Ability to receive mails: 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 this value 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 server) of all messages received by the mail server during the last measurement period	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**.

To know the site and organization on which the mailbox configured for the test exists, use the Microsoft Exchange Administrator console. This console can be opened using the menu sequence: Start -> Programs -> Microsoft Exchange -> Microsoft Exchange Administrator. A sample Administrator Window has been given below.

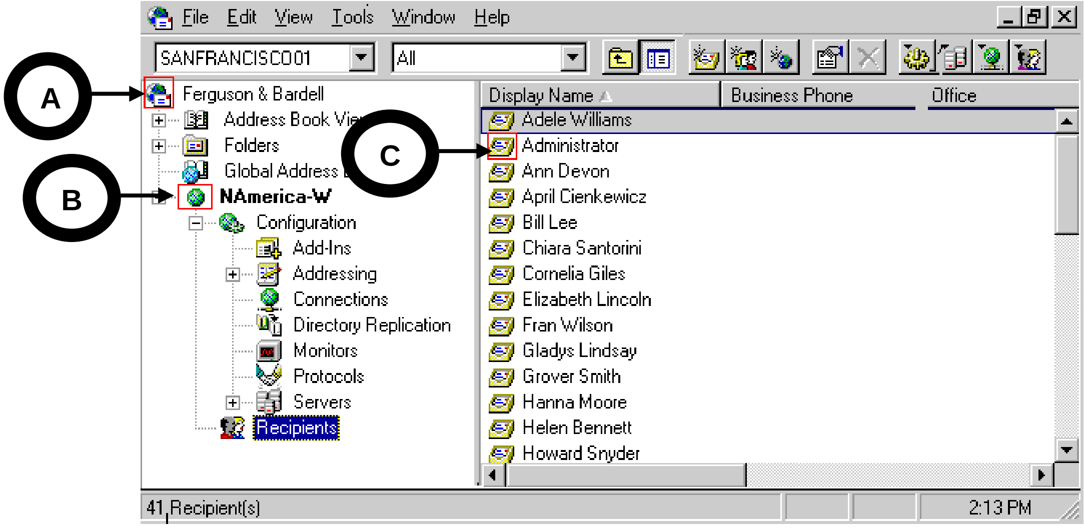


Figure 4.3: The Exchange Administrator window

A The icon marked **A** represents an organization in the Exchange server. The text following the icon is the name of the organization. In our illustration, this is *Ferguson & Bardell*. An organization is the root or starting point of Microsoft Exchange server directory objects.

B The icon marked **B** represents a site. The text following this icon is the name of the site. In our illustration, the site name is *NAmerica-W*. A site is nothing but a group of one or more Exchange server computers connected to the same local area network (LAN). An organization can consist of multiple sites.

C The icon marked **C** represents a mail box within an Exchange server. The text following the icon is the name of the mailbox. In our illustration, *Administrator* is the name of a mailbox under the *NAmerica-W* site. A mailbox is a private repository for email and other information. To view the complete list of mail boxes within a site, click on the **Recipients** sub-node under that site in the left pane of the Administrator window.

Note:

Apart from Processes test, a TcpPortStatus test also executes on the **Application Processes** layer of the Exchange Server 5.5. For more details about the TCP Port Status test, refer to the *Monitoring Generic Servers* document.

Chapter

5

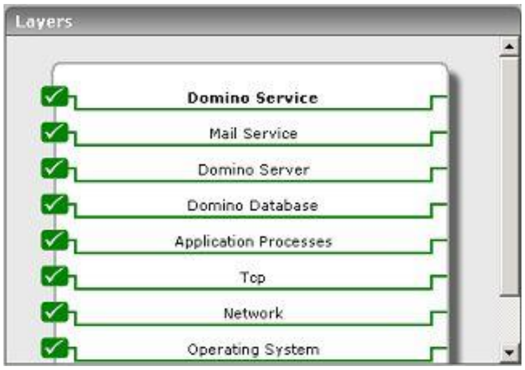
Monitoring Lotus Domino Mail Servers

The Domino server family is an integrated messaging and Web application software platform. The Lotus Domino mail server is a powerful messaging server for corporate intranets and the Internet. Its integrated services deliver reliability, superior administration capabilities, and good performance for an organization.

To ensure that such a popular mail server always serves corporates to the best of its ability, the critical internal processes of the server are to be monitored constantly for both availability and overall effectiveness. These processes include:

- Agent Manager
- HTTP
- SMTP
- Server
- POP3
- Router
- Database Replicator
- IMAP server

The *Domino Mail* server monitoring model (see Figure 5.1) that eG Enterprise offers, periodically verifies the health of the services and processes that are integral to the normal functioning of the mail server, and alerts administrators even when the smallest of issues surface.



Layers

Domino Service
Mail Service
Domino Server
Domino Database
Application Processes
Tcp
Network
Operating System

Figure 5.1: Layer model for a Lotus Domino mail server

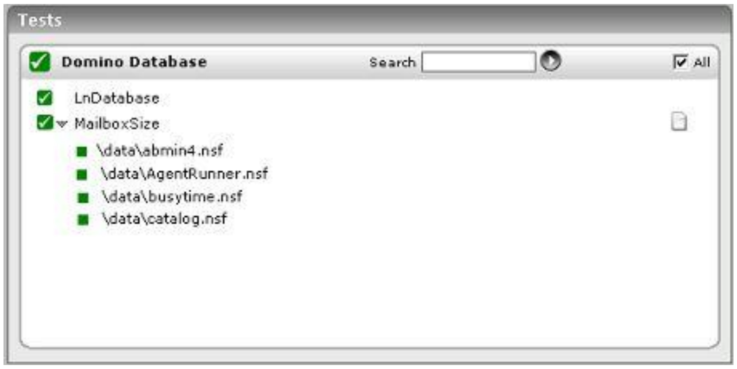
The **Operating System**, **Network**, **Tcp**, and **Application Processes** layers of Figure 5.1 have been explained adequately in the *Monitoring Unix and Windows Servers* document. The **Mail Service** layer's significance can be ascertained from the *Monitoring Generic Mail Servers* chapter in this document. This chapter therefore will discuss only the **Domino Database**, **Domino Server**, and **Domino Service** layers.

Note:

An eG agent uses the SNMP Management Information Base (MIB) of the Domino mail server to monitor it. Hence, for the eG agent to monitor the Domino Mail server, it is essential to install the Lotus Notes' SNMP agent. Before installing the SNMP agent, the SNMP service on the corresponding operating system should be enabled. Please refer to the Domino mail server reference manuals for detailed instructions.

5.1 The Domino Database Layer

The Domino mail server database is one of the most important components. A Domino database is a single file containing multiple documents. A document in Domino database can be compared to records in a conventional database, but a Domino document is more sophisticated than a typical database record, containing rich text, pictures, objects, and many other types of information. This layer tracks the health of the Domino database with the help of the LnDatabase test shown in Figure 5.2.



Tests

✓ Domino Database

✓ LnDatabase
✓ MailboxSize
- \data\abmin4.nsf
- \data\AgentRunner.nsf
- \data\busytime.nsf
- \data\catalog.nsf

Figure 5.2: Tests mapping to the Domino Database layer

5.1.1 Lotus Notes Database Test

This test reports database related metrics of the Lotus Domino server.

Purpose	Reports database related metrics of the Lotus Domino server
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** – The port at which the **HOST** listens 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. The default is 161. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. The default is public. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 6. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 7. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 8. **ENCRYPTPASSWORD** – Specify the encryption password here. 9. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	10. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for database files on the mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Buffer control pool size: Indicates the size of the buffer control pool.	MB	
	Buffer control pool used: Indicates the number of bytes used in the buffer control pool.	MB	The value 0 may indicate that the measure's value is too large to be passed via snmp.
	Buffer pool allocated: Indicates the number of bytes allocated from the buffer pool.	MB	
	Buffer pool max: Indicates the maximum size of the buffer pool.	MB	
	Buffer pool used: Indicates the number of buffers used from the buffer pool.	MB	
	NSF pool size: Indicates the size of the NSF Pool.	KB	The NSF Buffer Pool is a section of memory dedicated to buffering I/O transfers between the NIF (Notes Index Facility) indexing functions and disk storage. By changing the size of NSF Buffer Pool you can control the size of the memory section used for this buffering. The NSF Buffer Pool is the only Domino memory pool that is configurable by the user. Therefore, while setting the NSF buffer pool size, you need to consider the number of users, the size and number of views, and the number of databases.
	NSF pool used: Indicates the amount of space used in the NSF pool.	KB	If the value of this measure decreases consistently, it indicates a steady erosion of space in the NSF pool. Resize the NSF pool, so that more memory is available for indexing or buffering I/O transfers.

	Buffer pool percent reads: Indicates the percentage of buffer pool reads.	Percent	
	Buffer pool reads: Indicates the number of buffer pool reads.	Number	
	Buffer pool writes: Indicates the number of buffer pool writes.	Number	
	Current cache entries: Indicates the number of databases currently in the cache.	Number	Administrators should monitor this number to see whether it approaches the NSF_DBCACHE_MAXENTRIES setting. If it does, it indicates that the cache is under pressure. If this situation recurs, the administrator should increase the setting for NSF_DBCACHE_MAXENTRIES.
	Database cache hits: Indicates the number of times an lnDBCacheInitialDbOpen is satisfied by finding a database in the cache.	Number	
	Database cache initial opens: The number of times a user/server opened a database that was not already being used by another user/server	Number	By comparing this number to Db_cache_hits, administrators can gauge the effectiveness of the caching activity.
	Database cache hit ratio: Indicates the percentage of hits to opens.	Percent	A high 'hits-to-opens' ratio indicates the database cache is working effectively, since most users are opening databases in the cache without having to wait for the usual time required by an initial (non-cache) open. If the ratio is low (in other words, more users are having to wait for databases not in the cache to open), the administrator can increase the NSF_DBCACHE_MAXENTRIES settings.

	Database cache max entries: Indicates the number of times a database is not placed into the cache.	Number	
	Database cache rejections: Indicates the number of times a database is not placed into the cache.	Number	A database might not be placed into the cache when it is closed because InDBCacheCurrentEntries equals or exceeds InDBCacheMaxEntries * 1.5. This number should stay low. If it begins to rise, you should increase the NSF_DbCache_Maxentries settings.

5.1.2 Mailbox Size Test

The MailboxSizeTest reports the size of the individual Domino database files.

Purpose	Reports the size of the individual Domino database files		
Target of the test	A Domino mail server		
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 host for which the test is to be configured. 3. **PORT** – The port number of the Domino mail server. 4. **LOTUSHOME** – The install directory of Lotus Notes.		
Outputs of the test	One set of results for every database file on the mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Databases size: Indicates the size of this Domino database file.	MB	

5.1.3 Domino Database Test

This test tracks various statistics pertaining to the Domino database. This test is disabled by default and has been retained only to ensure backward compatibility with previous versions of the eG Enterprise suite.

Purpose	To measure statistics pertaining to the Domino database
Target of the	A Domino mail server

test	
Agent deploying the test	An internal agent

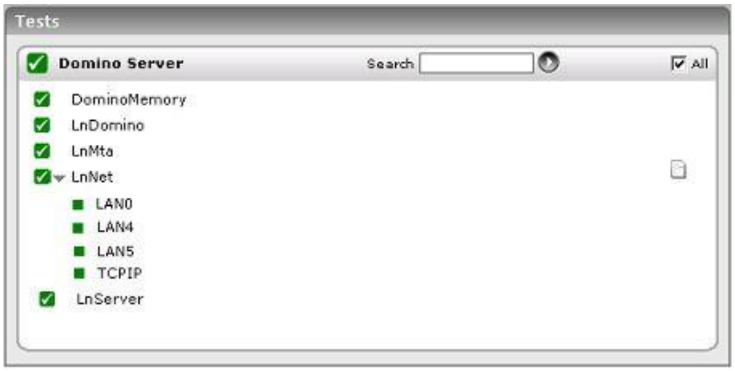
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** –The host for which the test is to be configured. 3. **PORT** - The variable name of the port for which the test is to be configured. 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for every mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current cache entries: Indicates the number of databases currently in the cache.	Number	Administrators should monitor this measure to see whether it approaches the *NSF_DBCACHE_MAXENTRIES* setting in **`NOTES.ini`** file. If it does, this indicates that the cache is under pressure. If this situation occurs frequently, the administrator should increase the setting for *NSF_DBCACHE_MAXENTRIES*.
	Cache hit ratio: This value indicates the percentage of pages found in the cache without having to read from disk.	Percent	A high value for this measure indicates that the database cache is working effectively, as most users are opening databases in the cache without having to wait for the usual time required by an initial (non-cache) open. A low value for this measure indicates that more users are waiting to open a database that is not in the cache. The Administrator can increase the *NSF_DBCACHE_MAXENTRIES* settings to prevent this situation.
	Max cache entries: The number of databases that the server can currently hold in its cache at a time.	Number	This measure shows the maximum cache_curr_entries configured for this server.

5.2 The Domino Server Layer

The tests associated with this layer monitor:

- The MTA service of the Domino mail server
- The session-handling capacity of the server
- The memory usage by the server
- The data traffic to and from each of the key ports on the server
- The availability and request-processing ability of the server



☑ Domino Server

- ☑ DominoMemory
- ☑ LnDomino
- ☑ LnMta
- ☑ LnNet
  - LAN0
  - LAN4
  - LAN5
  - TCPIP
- ☑ LnServer

Figure 5.3: Tests mapping to the Domino Server layer

5.2.1 Lotus Notes MTA Test

The Lotus Notes MTA Test monitors the MTA (Mail Transfer Agent) service of the Domino mail server.

Purpose	Monitors the MTA (Mail Transfer Agent) service of the Domino mail server
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** – The port at which the **HOST** listens 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. The default is 161. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. The default is public. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for the Domino mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Dead messages: Indicates the number of dead mail messages.	Number	
	Pending recipients: Indicates the number of recipients waiting for mails.	Number	
	Waiting messages: Indicates the number of messages that are in the process of being routed.	Number	
	Mail transfer failure: Indicates the number of messages that the MTA could not transfer.	Number	
	Data transferred: Indicates the amount of data transferred outbound / into any of the mail boxes by this MTA.	KB	
	Transferred messages: Indicates the total number of messages transferred outbound / into any of the mail boxes by this MTA.	Number	

5.2.2 Lotus Domino Test

The Lotus Domino test monitors how well the Lotus Domino mail server handles client sessions.

Purpose	Monitors how well the Lotus Domino mail server handles client sessions
Target of the test	A Domino mail server
Agent deploying the	An internal agent

test	

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** –The host for which the test is to be configured. 3. **PORT** – The port at which the **HOST** listens 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. The default is 161. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. The default is public. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for the Domino mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current threads: Indicates the number of Domino threads available to service requests.	Number	
	Peak active threads: Indicates the high watermark of active threads.	Number	
	Peak current threads: Indicates the high watermark of current threads.	Number	
	Request last minute: Indicates the number of Domino requests that came in the last minute.	Number	
	Request last 5min: Indicates the number of Domino requests that were received in the last 5 minutes.	Number	
	Request last hour: Indicates the number of Domino requests that were received in the last 1 hour.	Number	
	Requests handled: Indicates the number of Domino requests that are currently been handled by the Domino mail server.	Number	
	Database cache hit rate: Indicates the Domino database cache hit rate.	Hits/Sec	

5.2.3 Lotus Notes Network Test

This test reports statistics related to the network traffic handled by the Domino ports.

Purpose	Reports statistics related to the network traffic handled by the Domino ports
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** – The port at which the **HOST** listens 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. The default is 161. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. The default is public. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for every Domino port		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Data received: Indicates the total data received (in KB).	KB	
	Data sent: Indicates the total kb sent.	KB	
	Inbound sessions: Indicates the number of inbound sessions established.	Number	
	Outbound sessions: Indicates the number of outbound sessions established.	Number	
	Dropped sessions: Indicates the number of sessions dropped due to low network resources.	Number	
	Concurrent session limit: Indicates the current limit on the number of concurrent sessions allowed.	Number	

5.2.4 Lotus Notes Server Test

The LnServer test reports key statistics pertaining to the Domino mail server.

Purpose	Reports key statistics pertaining to the Domino mail server
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** – The port at which the **HOST** listens 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. The default is 161. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. The default is public. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for the Domino mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Availability: Indicates the availability of the Domino mail server.	Percent	Each server in a cluster periodically determines its own workload based on the response time of the requests the server has processed recently. The workload is expressed as a number from 0 to 100, where 0 indicates a heavily loaded server and 100 indicates a lightly loaded server. This number is called the server availability index. As response times increase, the server availability index decreases. The server availability index is approximately equal to the percentage of the total server capacity that is still available. For example, if the server availability index is 65, you still have approximately 65% of the capacity of your server available. Although the servers in your enterprise may vary in power and resources, the server availability index represents the same thing on each server -- the amount of total availability of that server that is still available
	Server worker threads: Indicates the maximum number of concurrent transactions to create.	Number	
	Current users: Indicates the number of users who have currently opened sessions with the server.	Number	
	Dropped sessions: Indicates the number of sessions dropped from the server.	Number	

	Transaction rate: Indicates the rate at which transactions occur on the server.	Trans/Min	
	Transactions completed: Indicates the number of transactions that have been completed.	Number	
	Closed old sessions: Indicates the number of sessions that were dropped because of too many concurrent users.	Number	

5.2.5 Domino Memory Test

This test tracks statistics pertaining to the memory usage of the Domino mail server.

Purpose	To measure statistics pertaining to the memory usage of the Domino mail server
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** - The variable name of the port for which the test is to be configured. 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for the Domino mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Total memory allocated: Indicates the total memory that has been allocated to the processes and shared memory.	MB	This measure shows the memory requirement of the Domino mail server. This can be used to see the relative amount of memory being used compared to the total memory available on the server. For effective performance, this measure depends on the database file size and the number of CPUs on the machine.
	Memory allocation for process: This measure shows the total memory allocated for the Domino processes.	MB	For effective performance, this measure depends on the database file size and the number of CPUs on the machine.
	Shared memory allocation: Indicates the total shared memory allocated.	MB	This measure shows the shared memory allocated for Domino. For effective performance, this measure depends on the database file size and the number of CPUs on the machine.

5.3 The Domino Service Layer

This layer tracks the health of the key Domino services using the tests depicted in Figure 5.4.

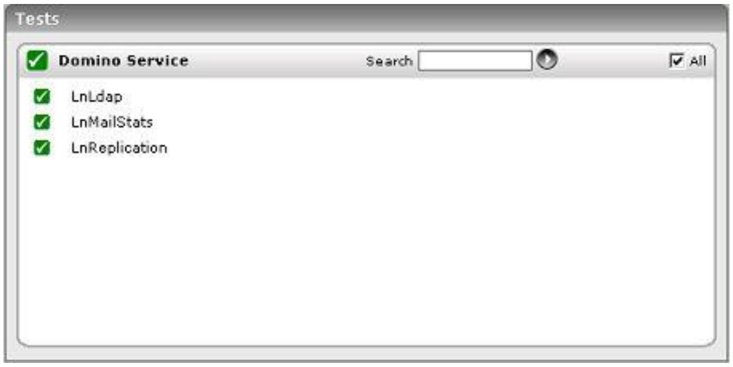


Figure 5.4: Tests mapping to the Domino Service layer

5.3.1 Lotus Notes Mail Test

This test reports the delivery statistics related to the Domino mail server.

Purpose	Reports the delivery statistics related to the Domino mail server
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** – The port at which the **HOST** listens 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. The default is 161. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. The default is public. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for the Domino mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Average mail delivery time: Indicates the average time taken for mail delivery.	Secs	
	Max delivery time: Indicates the maximum time taken for mail delivery.	Secs	
	Data transferred: Indicates the total size of all mail messages delivered during the last measurement period.	KB	
	Mail routing failures: Indicates the number of mail routing failures that happened during the last measurement period.	Number	
	Mails delivered: Indicates the number of messages received by the router during the last measurement period.	Number	
	Mail deliveries: Indicates the count of actual mail items delivered during the last measurement period.	Number	The value of this measure may be different from the value of the *Mails delivered* measure, as the latter counts individual messages.
	Waiting mails: Indicates the outgoing mail messages currently in MAIL.BOX waiting for transfer.	Number	

	Waiting mail recipients: Indicates the number of pending mail messages awaiting local delivery.	Number	
	Waiting DNS resolutions: Indicates the number of mail messages in MAIL.BOX waiting for DNS resolutions.	Number	A large value for this metric indicates problems in the DNS server or in the mail server to DNS server communication.
	Transferred mails: Indicates the number of messages that he router has attempted to transfer during the last measurement period.	Number	
	Mail transfer failures: Indicates the number of messages the router is unable to transfer during the last measurement period.	Number	
	Mails routed: Indicates the number of mail messages the router routed during the last measurement period.	Number	
	Dead mails: Indicates the number of dead (undeliverable) messages currently in MAIL.BOX.	Number	
	Mails on hold: Indicates the number of mail messages in the message queue that are on hold currently.		
	Mails pending: Indicates the number of mail messages pending currently.	Number	

	Mails routed via nrpc: Indicates the number of mail messages moved from MAIL.BOX via NRPC during the last measurement period.	Number	
	Mails routed via smtp: Indicates the number of mail messages moved from MAIL.BOX via SMTP during the last measurement period.	Number	
	Average mail size delivered: Indicates the average size of delivered mails.	KB	

5.3.2 Lotus Notes LDAP Test

This test reports statistics pertaining to the LDAP sessions with the Domino mail server.

Purpose	Reports statistics pertaining to the LDAP sessions with the Domino mail server
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** – The port at which the **HOST** listens 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. The default is 161. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. The default is public. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for the Domino mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Sessions queue size: Indicates the number of incoming sessions awaiting processing in the LDAP Listener work queue.	Number	
	Active LDAP sessions: Indicates the current number of LDAP server tasks.	Number	
	Sessions data received: Indicates the data received by this LDAP server.	MB	
	Sessions data sent: Indicates the data sent by this LDAP server.	MB	
	Sessions busy threads: Indicates the number of LDAP server tasks currently running.	Number	
	Sessions idle threads: Indicates the number of LDAP server tasks currently idle.	Number	
	Total sessions: Indicates the total number of LDAP server tasks.	Number	

5.3.3 Lotus Notes Calendar Test

This test reports metrics related to the Calendar service of the Lotus Domino 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 *Domino Mail* as the **Component type**, *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.

Purpose	Reports metrics related to the Calendar service of the Lotus Domino server
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** – The port at which the **HOST** listens 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB. The default is 161. 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. The default is public. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for the Domino mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Total appts resources: Indicates the total number of scheduled appointment and resource reservations.	Number	
	Total users resources: Indicates the total number of resources that have been reserved, and the number of users with scheduled appointments.	Number	
	Total sched appts: Indicates the total number of scheduled appointments.	Number	
	Total reservations: Indicates the total number of reservations for resources.	Number	
	Total resources: Indicates the total number of resources that have been reserved.	Number	
	Total users: Indicates the total number of users who have scheduled appointments.	Number	

5.3.4 NRPC Test

The Nrpc test reports whether a Notes client is able to connect to the Lotus Domino mail server, and also measures the responsiveness of the mail 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 *Domino mail* as the **Component type**, *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.

Purpose	Reports metrics related to the Calendar service of the Lotus Domino server		
Target of the test	A Domino mail server		
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 host for which the test is to be configured. 3. **PORT** – The port number to which the server being configured listens. 4. **HTTPPORT** – The port of the Domino HTTP server. 5. **USERNAME** – The user name using which the test needs to connect to the Domino mail server. 6. **PASSWORD** – The password of the specified **USERNAME**. 7. **CONFIRM PASSWORD** – Confirm the password by retyping it here.		
Outputs of the test	One set of results for the Domino mail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	NRPC availability: Indicates whether the Notes client is able to connect to the Domino server via the Domino router.	Percent	While the value 100 indicates that a connection has been established, 0 indicates a lack of connectivity.
	NRPC response time: Indicates the time taken by the Domino mail server to respond to requests from clients.	Secs	

Note:

This test will report measures only if the following are in place:

- The Domino HTTP Server should be running.
- The DIIOP task of the Domino mail server should have been started.
- The **NCSO.jar** file available in the **<LOTUSNOTES_INSTALL_DIR>\Domino\Data\domino\java** directory should be copied to the <**EG_INSTALL_DIR>\lib** directory.

5.3.5 Domino NRPC Test

This test monitors the availability and performance of the Lotus Domino mail server from an external perspective. The test mimics the mail client activity by using the Domino Notes Remote Procedure Call (NRPC) protocol for sending and receiving mails. To enable the test, go to the **ENABLE / DISABLE TESTS** page using the menu sequence : Agents -> Tests -> Enable/Disable, pick *Domino mail* as the **Component type**, *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.

<table>
<tr><td><b>Purpose</b></td><td colspan="3">Monitors the availability and performance of the Lotus Domino mail server from an external perspective</td></tr>
<tr><td><b>Target of the test</b></td><td colspan="3">A Lotus Domino Mail server</td></tr>
<tr><td><b>Agent deploying the test</b></td><td colspan="3">An internal agent</td></tr>
<tr><td><b>Configurable parameters for the test</b></td><td colspan="3">1. <b>TEST PERIOD</b> - How often should the test be executed
2. <b>HOST</b> - The IP address of the machine where the Domino server is installed.
3. <b>PORT</b> – The port number through which the Domino mail server communicates
4. <b>USER</b> - The user name of the sender on the mail server
5. <b>PASSWORD</b> - The password that corresponds to the specified sender
6. <b>CONFIRMPASSWORD</b> - Confirm the password by retyping it here.
7. <b>NOTESHOME</b> - Specify the full path to the Lotus mail client. For eg., d:/Lotus.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for every Lotus Domino mail server being monitored</td></tr>
<tr><td rowspan="4"><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td><b>Ability to send mails:</b>
Indicates the availability of the mail server for receiving the mails sent by the test.</td><td>Percent</td><td>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.</td></tr>
<tr><td><b>Sent messages:</b>
Indicates the number of messages sent to the mail server.</td><td>Number</td><td>A value of –1 indicates that the mail server may be down or the configuration information may be incorrect.</td></tr>
<tr><td><b>Time to send mails:</b>
Indicates time taken to send a mail from to the mail server.</td><td>Secs</td><td>A high value of this measure could indicate high network traffic or that the mail server is busy.</td></tr>
</table>

	Ability to receive mails: Indicates the availability of the mail 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 mail 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 mail 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
	Time to receive mail: 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 round-trip 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 Roundtrip_time may be indicative of a problem with the mail service. Possible reasons could include queuing failures, disk space being full, etc.
	Max round-trip time: The high water mark of the round trip time (the time lapse between transmission and reception of a message by the server) of all messages received by the mail server during the last measurement period.	Mins	If the value of the Rcvd_msgs measure is 1, then the value of the Max_roundtrip_time measure will be the same as the Avg_roundtrip_time.

Note:

1. Notes client must be installed on the system where this test will be executed.
2. This test will execute only on Windows environments.
3. The **lcppn22.dll** is required by the user to run the DominoNrpc test. To download this dll, do the following:
   a. Connect to the URL:

      http://www14.software.ibm.com/webapp/download/preconfig.jsp?id=2004-06-07+07%3A42%3A38.563764R&S_TACT=104AH%20W42&S_CMP=&s=

   b. Download the **Lotus Notes C++ API Toolkit** in the URL to a location in your local disk.

   c. An executable file (**.exe**) gets downloaded, which when executed, creates a **notescpp** directory in the specified location.

   d. Also, an **lcppn22.dll** gets created within this **notescpp** directory.

   e. Copy this **lcppn22.dll** to the **<LOTUS_NOTES_INSTALL_DIR>\notes** directory.

Note:

- The eG external agent that is executing the Domino NRPC test, should be installed on a Windows NT/2000/2003 system that is in the same domain as the Lotus Domino mail server. The Lotus Domino mail client should also be installed on this system for the DominoNrpcTest to work.
- While deciding on a mailbox to be used for configuring the test, the administrator should first check whether the mailbox exists on the Domino server.

5.3.6 Domino Mail Stats Test

This test, executed by an internal agent, tracks statistics pertaining to the services of the Domino mail server. This test is disabled by default, and has been retained only to ensure backward compatibility with previous versions of the eG Enterprise suite.

Purpose	To measure statistics pertaining to services of Domino mail server
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** - The variable name of the port for which the test is to be configured. 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	15. **TIMEOUT** – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.		
Outputs of the test	One set of results for every database being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Delivered mails: Indicates the number of mails received by the router during the last measurement period.	Number	This measure is indicative of the throughput of the server. If this number is high, the mail server is processing high volume of mails. A low value indicates a lower throughput.
	Dead mails: The number of dead (undeliverable) mail messages during the last measurement period.	Number	A high value of this measure indicates a problem in delivering mails. This value should be preferably zero.
	Waiting mails: Number of mail messages currently waiting to be routed.	Number	A high value over a long period of time indicates a problem in delivering mails. This value should be preferably low. A high value of this measure over a period of time may lead to dead mails and poor performance of the server.
	Avg mail delivery time: Indicates the average time for mail delivery in seconds.	Secs	A high value of this measure shows inefficiency of the server. Desirably, this value should be low. Administrators can compare this value with Cache_hit_ratio. If the value of Cache_hit_ratio is found to be low, there may be a problem due to improper database.
	Mail transfer failures: Indicates the number of mail messages that the router was unable to transfer during the last measurement period.	Number	This value should be low or preferably zero. A high value indicates poor performance of the server or incorrect addresses.
	Mails waiting local delivery: Number of mails currently waiting to be delivered to the users.	Number	A relatively high value of this measure may indicate that there is a problem in the local network or name resolution.

5.3.7 Domino Network Test

This test, executed by an internal agent, tracks statistics pertaining to the network traffic through the Domino mail server network ports. This test is disabled by default, and has been retained only to ensure backward compatibility with previous versions of the eG Enterprise suite.

Purpose	To measure the statistics pertaining to the network traffic through Domino mail server network ports
Target of the test	A Domino mail server
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 host for which the test is to be configured. 3. **PORT** - The variable name of the port for which the test is to be configured. 4. **SNMPPORT** – The port number on which the mail server is exposing the SNMP MIB 5. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 6. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the mail server. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 7. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 8. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 9. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 10. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 11. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 12. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 13. **ENCRYPTPASSWORD** – Specify the encryption password here. 14. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

<table>
<tr><td></td><td colspan="3">15. <b>TIMEOUT</b> – Specify the duration (in seconds) beyond which the SNMP query issues by this test should time out. The default period is 10 seconds.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for every Domino mail server being monitored</td></tr>
<tr><td rowspan="7"><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td><b>Data traffic in:</b> Indicates the rate at which the data is being received by the port specified in the info.</td><td>KB/Sec</td><td>This measure indicates the throughput of data on a particular port.</td></tr>
<tr><td><b>Data traffic out:</b> Indicates the rate at which the data is being sent from the port specified in the info.</td><td>KB/Sec</td><td>This measure indicates the throughput of data on a particular port.</td></tr>
<tr><td><b>Inbound sessions:</b> Indicates the number of inbound sessions established on the port.</td><td>Sessions/Sec</td><td>This measure can be used with dropped session rate. If this measure is high and sessions are being dropped then concurrent session limit can be increased.</td></tr>
<tr><td><b>Outbound sessions:</b> The number of outbound sessions established on the port specified in the info.</td><td>Sessions/Sec</td><td>This measure can be used with dropped session rate. If this measure is high and sessions are being dropped then concurrent session limit can be increased.</td></tr>
<tr><td><b>Dropped sessions:</b> Indicates the number of sessions that have been dropped due to low network resources.</td><td>Sessions/Sec</td><td>If this value is continuously high administrators can think of increasing the concurrent_sessions_limit</td></tr>
<tr><td><b>Concurrent sessions:</b> Indicates the limit on the number of concurrent sessions on the port specified in the info.</td><td>Number</td><td>This measure gives an idea about the maximum limit of the inbound and outbound sessions.</td></tr>
</table>

Chapter
6

Monitoring Qmail Servers

Qmail is a simple message transfer agent. It is meant as a replacement for the entire sendmail-binmail system on typical Internet-connected UNIX hosts. It offers POP3, and support for mail retrieval.

Just like other mail servers, eG Enterprise offers an exclusive model for monitoring a *Qmail* server as well.

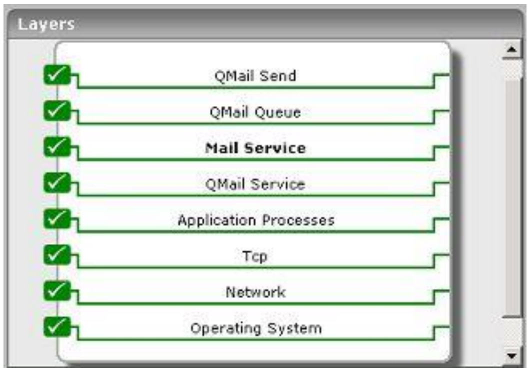


Figure 6.1: The layer model of a Qmail server

The tests mapped to every layer of Figure 6.1 extract critical statistics using which administrators can guage the efficiency of the mail server.

The bottom 4 layers of the Figure 6.1 have already been discussed in the *Monitoring Unix and Windows Servers* document. The **Mail Service** layer, finds a place in Chapter 2 of this document itself. Hence, the sections to come delve deep into the **Qmail Service**, **Qmail Queue**, and the **Qmail Send** layers only.

Note:

For the Qmail tests to work effectively, ensure that the following are in place:

- The following packages should be installed along with Qmail:
  - netqmail-1.05
  - daemontools-0.76
  - ucspi-tcp-0.88

  A detailed Qmail installation procedure is available in the following URL: **www.lifewithqmail.org**.
- All executable files (under **/package/admin/daemontools-0.76/command**) related to the qmail admin services should have links under **/usr/local/bin**.
- The executable file **svstat** (in the **/usr/local/bin** directory) must be given special executable permission using the command: **chmod u+s svstat**. Only a **super-user** can execute this command.
- The eG agent user should be added to the **qmail** group.

6.1 The QMail Service Layer

The test associated with this layer report the availability of the services configured for the Qmail MTA.

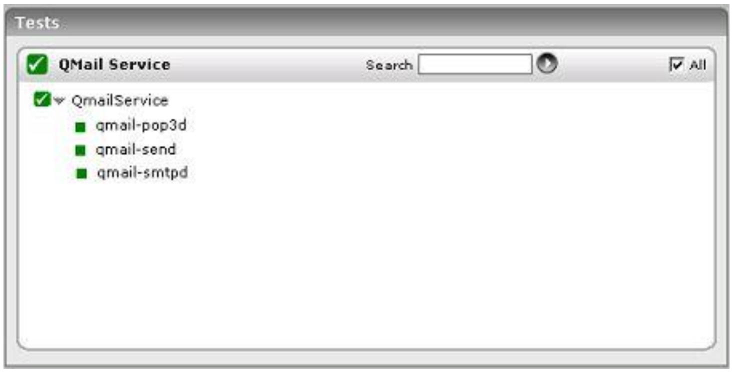


Figure 6.2: The tests associated with the QMail Service layer

6.1.1 Qmail Service Test

The Qmail Service test checks the availability of the services running for the Qmail MTA.

Purpose	Checks the availability of the services running for the Qmail MTA
Target of the test	A Qmail server
Agent	An internal agent

deploying the test			
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** –The host on which the Qmail server is executing 3. **PORT** - The port at which the Qmail server listens		
Outputs of the test	One set of results for every Qmail service being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Availability: Checks the availability of the service.	Percent	A value of 100 indicates that the specified service has been configured and is currently executing. A value of 0 for this measure indicates that the specified service has been configured on the server but is not running at this time.
	Service downtime: The time that has elapsed since the service has been stopped.	Secs	A value of 0 indicates that the service is normal . A value more than 0 indicates that the service has not been running for some time.

6.2 The QMail Queue Layer

The test associated with this layer reveals the number of messages in queue, and thus indicates the speed with which the Qmail server processes messages.

Figure 6.3: The test associated with the QmailQueueTest

6.2.1 Qmail Queues Test

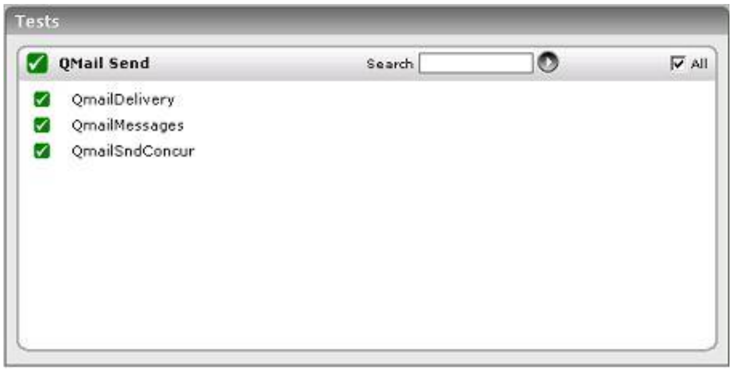
This test monitors the performance of the queues in the Qmail server.

Purpose	Monitors the performance of the queues in the Qmail server

Target of the test	A Qmail server		
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 host on which the Qmail server is executing 3. **PORT** - The port at which the Qmail server listens 4. **QMAILDIR** – Specify the complete path to the Qmail install directory. For example, */var/qmail*.		
Outputs of the test	One set of results for every Qmail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Queue messages: The total number of messages in queue.	Number	A very high value indicates that Qmail is unable to process the messages faster. A value zero indicates that no messages are in queue to process.
	Not preprocess messages: The number of messages that were not pre-processed.	Number	A high value indicates that the qmail-send service is not running. A value of zero indicates that all the messages have been processed.
	Queue size: The total queue size.	KB	A very high value indicates that Qmail is unable to process the messages faster. A value zero indicates that no messages are in queue to process.

6.3 The QMail Send Layer

The tests associated with this layer monitor the performance of the Qmail-send service.



Tests

☑ QMail Send Search ☑ All

☑ QmailDelivery

☑ QmailMessages

☑ QmailSndConcur

Figure 6.4: The tests associated with the QMail Send layer

6.3.1 Qmail Delivery Test

This test tracks key statistics pertaining to the delivery status of messages.

Purpose	Monitors the performance of the mail delivery by a Qmail server		
Target of the test	A Qmail server		
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 host on which the Qmail server is executing 3. **PORT** - The port at which the Qmail server listens 4. **LOGDIR** – This test parses the qmail log files to extract the required measures. Therefore, in the **LOGDIR** text box here, specify the complete path to the qmail log directory, which stores the log files. For example, */var/log/qmail*.		
Outputs of the test	One set of results for every Qmail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Delivery attempts: The number of delivery attempts during the last measurement period.	Number	
	Success deliveries: The number of successful deliveries during the last measurement period.	Number	
	Failures: The number of delivery attempts that failed	Number	
	Deferrals: The number of delivery attempts that were deferred.	Number	
	Remote success: The number of remote successful deliveries.	Number	
	Local success: The number of local successful deliveries.	Number	

	Rate of mail delivery: The rate at which the delivery attempts were made.	Operations/Sec	
	Rate of success: The rate at which messages were successfully delivered.	Operations/Sec	

6.3.2 Qmail Messages Test

This test returns message-centric performance metrics.

Purpose	Returns message-centric performance metrics for a Qmail server		
Target of the test	A Qmail server		
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 host for which the test is to be configured 3. **PORT** - The port at which the specified **HOST** listens 4. **LOGDIR** – This test parses the qmail log files to extract the required measures. Therefore, in the **LOGDIR** text box here, specify the complete path to the qmail log directory, which stores the log files. For example, */var/log/qmail*.		
Outputs of the test	One set of results for every Qmail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Messages transferred: The number of messages transferred.	Number	
	Data transferred: Data transferred by the mail server during the last measurement period.	KB	
	Bounce messages: The number of bounced messages.	Number	

	Thrown away messages: The number of messages that were discarded because they bounced thrice.	Number	
	Transfer rate: The rate at which bytes were transferred.	KB/Sec	

6.3.3 Qmail Snd Concur Test

This test tracks the concurrency checks for local and remote messages.

Purpose	Tracks the concurrency checks for local and remote messages		
Target of the test	A Qmail server		
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 host on which the Qmail server is executing 3. **PORT** - The port at which the Qmail server listens 4. **LOGDIR** – This test parses the qmail log files to extract the required measures. Therefore, in the **LOGDIR** text box here, specify the complete path to the qmail log directory, which stores the log files. For example, */var/log/qmail*.		
Outputs of the test	One set of results for every Qmail server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Local concurrency: The maximum number of concurrent local deliveries.	Number	
	Remote concurrency: The maximum number of concurrent remote deliveries.	Number	
	Percent local: The percentage of local concurrent messages that were delivered.	Percent	

	Percent remote: The percentage of remote concurrent messages that were delivered.	Percent	

Note:

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

Chapter

7

Monitoring the Exchange Messaging Service

Exchange IM (Instant Messenger), provided within Exchange 2000, gives users the ability to communicate with one another in an immediate, interactive environment that conveys presence and status information. To ensure hassle-free and prompt communication between users in an environment, the effectiveness of this service should be periodically checked.

The eG Enterprise model for the *Exchange Messaging* service (see Figure 7.1) monitors the IM service at frequent intervals, and alerts administrators if its functioning is faulty – say, if too many requests to the service or responses from the service fail for no palpable reason, or, it too many messages are in queue awaiting delivery.

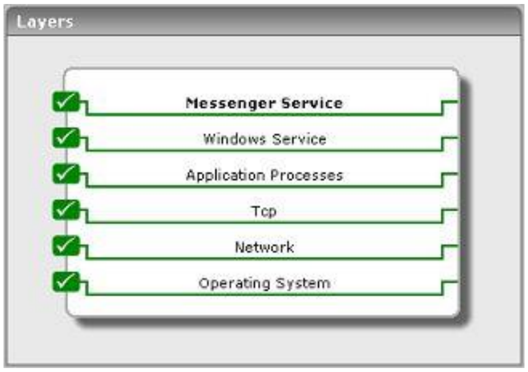


Figure 7.1: Layer model of the Exchange Messaging service

The sections to come discuss the **Messenger Service** alone, as all other layers and related tests have been discussed either in this document itself or in other documents.

7.1 The Messenger Service Layer

This layer monitors the *Exchange Messaging* service, and reports key metrics related to the user activity on the server.

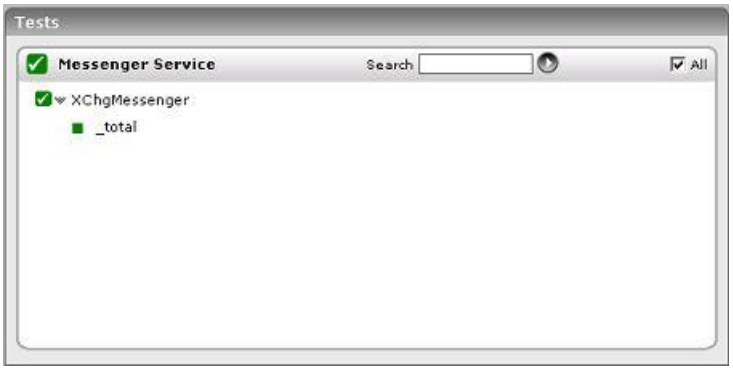


Figure 7.2: The test associated with the Messenger Service layer

7.1.1 Exchange Messenger Test

This test monitors the Instant Messenger of an Exchange 2000 server, and reports key metrics related to the user activity on the server.

Purpose	Monitors the Instant messaging service of an Exchange 2000 server		
Target of the test	An Instant Messenger Virtual Server		
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/host name of the Exchange 2000 server hosting the Instant Messaging Service 3. **PORT** - The port number of the Instant Messenger Virtual Server		
Outputs of the test	One set of results for an Instant Messenger Virtual Server being monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current users online: Indicates the number of users currently online.	Number	A high value of this measure is indicative of the excessive usage of the instant messaging service.
	Current subscriptions: Indicates the number of subscriptions currently active.	Number	

	Number of messages queued: Indicates the number of messages queued in the instant messenger	Number	
	Current polling requests: Indicates the number of polling requests currently active	Number	
	Failed requests: Indicates the average number of requests which have failed per second, including those rejected due to server load	Reqs/Sec	
	Failed responses: Indicates the average number of responses that could not be sent, per second	Reqs/Sec	
	Input requests: Indicates the average number of requests received over the network per second	Reqs/Sec	
	Input notifies: Indicates the average number of NOTIFY requests serviced per second	Notify/Sec	
	Input subscribes: Indicates the average number of SUBSCRIBE requests serviced per second	Subscribes/Sec	
	Input unsubscribes: Indicates the average number of UNSUBSCRIBE requests serviced per second	Unsubscribes/Sec	

	Output notifies: Indicates the average number of NOTIFY requests issued per second.	Notify/Sec	
	Output requests: Indicates the average number of requests sent across the network per second.	Reqs/Sec	

Chapter

8

Externally Monitoring Mail Servers

The generic *Mail* server offered by eG Enterprise requires that an agent be deployed on the mail server being monitored, so that the critical processes running on the mail server host, their resource utilization, and other OS-level metrics are extracted from within the host. However, in some environments, administrators might not have access to mail servers for installing agents; yet, they might be interested in knowing whether the mail server is available / not, and how well it processes mails. To enable such administrators to extract only external metrics such as availability and responsiveness, the eG Enterprise suite prescribes the *External Mail* model (see Figure 8.1). To use this model, an external agent would suffice. This agent employs native application-level protocols to determine the overall network health, mail server availability, and how quickly the server processes mails.

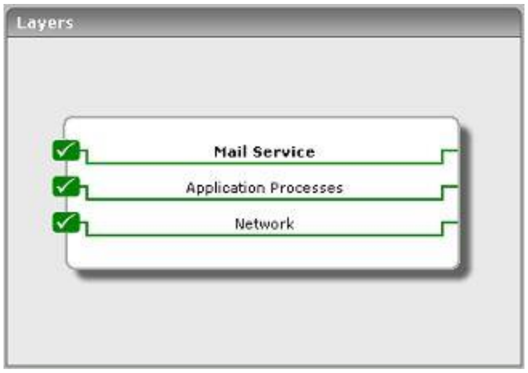


Figure 8.1: Layer model of the External Mail server

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 Chapter 2 of this document. For details regarding the other tests mapped to this layer, please refer to the *Monitoring Unix and Windows Servers* document.

Chapter

9

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 9.1). 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.

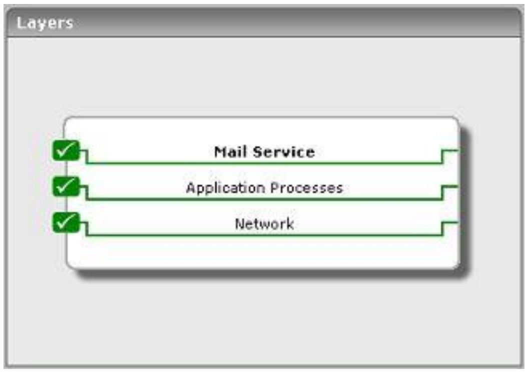


Figure 9.1: Layer model of the Exchange Server

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 Chapter 2 of this document. For details regarding the other tests mapped to this layer, please refer to the *Monitoring Unix and Windows Servers* document.

Chapter

10

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 Chapter 7 of the *eG User Manual*.

The layer model used by the eG Enterprise suite to monitor the Exchange cluster service is given below (see Figure 10.1)

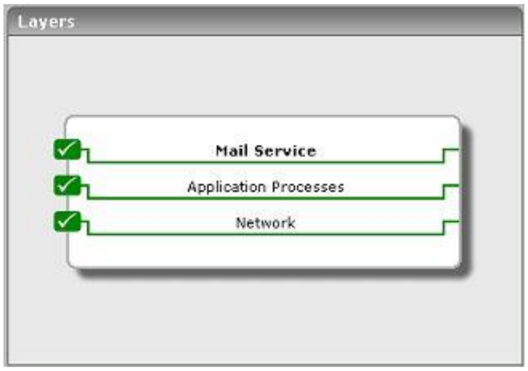


Figure 10.1: Layer model of the Exchange Cluster service

The following section will deal with the first layer of Figure 10.1 only.

10.1 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.

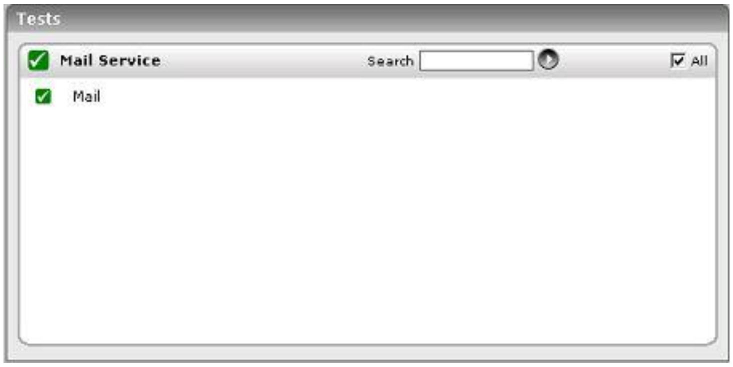


Figure 10.2: Tests mapping to the Mail Service layer

Chapter

11

Monitoring the IronPort AsyncOS Mail Server

All IronPort appliances are built from the ground up and are powered by IronPort's unique AsyncOS™ operating system for high performance and high security. Designed to meet the inbound and outbound needs of the world's largest email infrastructures, IronPort appliances contain advanced mail delivery features such as robust queue management, bounce handling and connection management.

If any of these features malfunction, it can overwhelm the email infrastructure with numerous mails, and can even make it vulnerable to virus/spam attacks. In order to avoid such adversites, it is essential to continuously monitor the health of the Ironport appliance.

eG Enterprise embeds a 100% web-based *IromPort AsyncOS Mail* monitoring model that monitors the critical hardware and services offered by the IronPort appliance, so that abnormalities are captured early and remedied promptly.

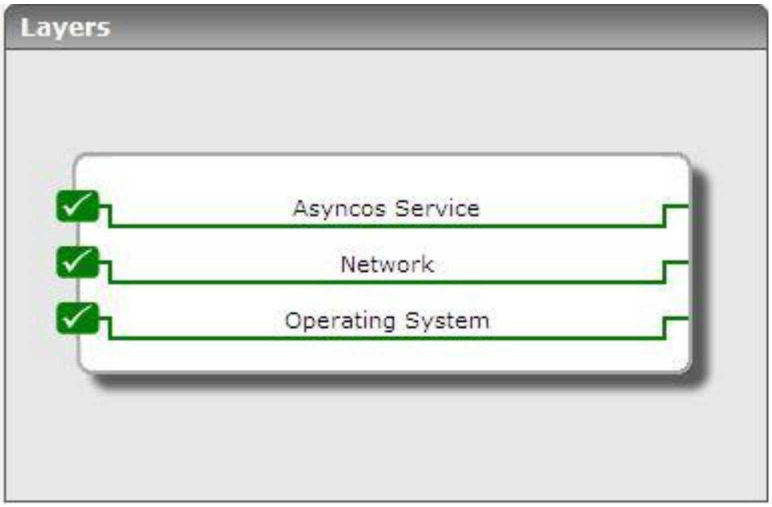


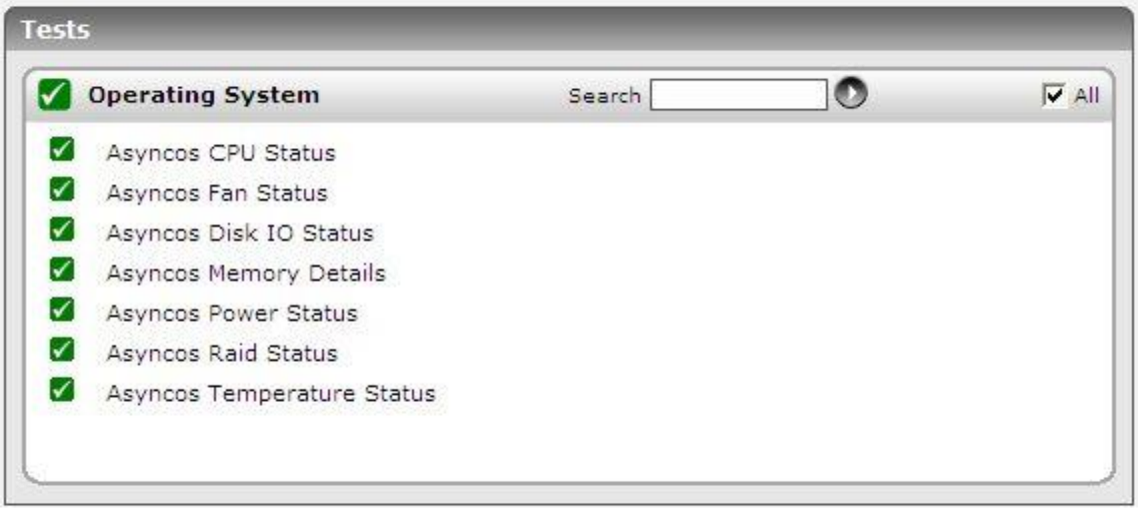
Figure 11.1: Layer model of the IronPort AsyncOS Mail server

Each layer of Figure 11.1 is mapped to a series of tests that reports a wealth of performance metrics related to the appliance. These metrics can provide accurate answers for the following performance queries:

- Is there a CPU bottleneck on the appliance?
- Is the fan on the appliance running abnormally fast?
- Is there a memory shortage on the appliance?
- Is the power supply to the appliance faulty?
- Has there been a RAID failure?
- Is the temperature of the appliance very high?
- Are too many requests to the DNS server outstanding?
- Is the email queue full?
- Are there enough email threads to perform mail transfer?

11.1 The Operating System Layer

The tests mapped to this layer can proactively alert administrators to the potential failure of critical AsyncOS hardware such as fans, processors, power supply, memory partitions, and temperature sensors.



Tests

☑ Operating System Search ☑ All

☑ Asyncos CPU Status
☑ Asyncos Fan Status
☑ Asyncos Disk IO Status
☑ Asyncos Memory Details
☑ Asyncos Power Status
☑ Asyncos Raid Status
☑ Asyncos Temperature Status

Figure 11.2: The tests mapped to the Operating System layer

11.1.1 Asyncos CPU Status Test

This test reveals how efficiently the IronPort appliance uses the CPU resources available to it.

Purpose	Reveals how efficiently the Ironport appliance uses the CPU resources available to it.
Target of the test	An IronPort AsyncOS Mail server

Agent deploying the test	External/remote agent

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** – The IP address of the Cisco Router.
3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161.
4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear.
6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter.
7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**.
8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here.
9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options:
   - **MD5** – Message Digest Algorithm
   - **SHA** – Secure Hash Algorithm
10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option.
11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types:
    - **DES** – Data Encryption Standard
    - **AES** – Advanced Encryption Standard
12. **ENCRYPTPASSWORD** – Specify the encryption password here.
13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	14. **TIMEOUT** - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the **TIMEOUT** text box. The default is 10 seconds.		
Outputs of the test	One set of results for the appliance being monitored.		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	CPU utilization: Total percentage CPU utilization of the appliance.	Percent	A very high value could indicate a CPU bottleneck at the appliance.

11.1.2 Asyncos Fan Status Test

This test reports the speed of the fans on the IronPort appliance.

Purpose	Reports the speed of the fans on the IronPort appliance
Target of the test	An IronPort AsyncOS Mail server
Agent deploying the test	External/remote agent

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** – The IP address of the Cisco Router.
3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161.
4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear.
6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter.
7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**.
8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here.
9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options:

   - **MD5** – Message Digest Algorithm
   - **SHA** – Secure Hash Algorithm
10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option.
11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types:

    - **DES** – Data Encryption Standard
    - **AES** – Advanced Encryption Standard
12. **ENCRYPTPASSWORD** – Specify the encryption password here.
13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	14. **TIMEOUT** - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the **TIMEOUT** text box. The default is 10 seconds.		
Outputs of the test	One set of results for the appliance being monitored.		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Speed: Indicates the speed of the fan.	Rpm	An unusually high or low value could indicate a problem.

11.1.3 Asyncos Disk I/O Status Test

This test reports the percentage of disk I/O utilized by the appliance.

Purpose	Reports the percentage of disk I/O utilized by the appliance
Target of the test	An IronPort AsyncOS Mail server
Agent deploying the test	External/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The IP address of the Cisco Router. 3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161. 4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 12. **ENCRYPTPASSWORD** – Specify the encryption password here. 13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	14. **TIMEOUT** - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the **TIMEOUT** text box. The default is 10 seconds.		
Outputs of the test	One set of results for the appliance being monitored.		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Disk io utilization: Indicates the percentage of disk I/O utilized.	Percent	

11.1.4 Asyncos Memory Details Test

This test reports the usage and status of memory resources on the appliance.

Purpose	Reports the usage and status of memory resources on the appliance
Target of the test	An IronPort AsyncOS Mail server
Agent deploying the test	External/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The IP address of the Cisco Router. 3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161. 4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 12. **ENCRYPTPASSWORD** – Specify the encryption password here. 13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

<table>
<tr><td></td><td colspan="3">14. <b>TIMEOUT</b> - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the <b>TIMEOUT</b> text box. The default is 10 seconds.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for the appliance being monitored.</td></tr>
<tr><td><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td></td><td><b>Memory utilization:</b>
Indicates the percentage of memory utilized by the appliance.</td><td>Percent</td><td>A high value could indicate a memory bottleneck</td></tr>
<tr><td></td><td><b>Availability:</b>
Indicates the memory availability status of the mail transfer process.</td><td></td><td>If memory is full, then this measure will report the value <i>Memory full</i>. If sufficient memory resources are not available, then, this measure will report the value <i>Memory shortage</i>. If sufficient memory resources are available, then, this measure will report the value <i>Memory available</i>.
The numeric values that correspond to the status values discussed above are as follows:
<table>
<tr><th>State</th><th>Numeric Value</th></tr>
<tr><td>Memory Available</td><td>1</td></tr>
<tr><td>Memory Shortage</td><td>2</td></tr>
<tr><td>Memory Full</td><td>3</td></tr>
</table>
<b>Note:</b>
By default, this measure reports the values <i>Memory full</i>, <i>Memory available</i> and <i>Memory shortage</i> to indicate the memory availability status. The graph of this measure however, represents the status using the numeric equivalents - <i>1</i> to <i>3</i>.</td></tr>
</table>

11.1.5 Asyncos Power Status Test

This test indicates the status of the power supply to the appliance.

Purpose	Indicates the status of the power supply to the appliance
Target of the	An IronPort AsyncOS Mail server

test	
Agent deploying the test	External/remote agent

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** – The IP address of the Cisco Router.
3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161.
4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear.
6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter.
7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**.
8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here.
9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options:
    - **MD5** – Message Digest Algorithm
    - **SHA** – Secure Hash Algorithm
10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option.
11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types:
    - **DES** – Data Encryption Standard
    - **AES** – Advanced Encryption Standard
12. **ENCRYPTPASSWORD** – Specify the encryption password here.
13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

<table>
<tr><td></td><td colspan="3">14. <b>TIMEOUT</b> - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the <b>TIMEOUT</b> text box. The default is 10 seconds.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for the appliance being monitored.</td></tr>
<tr><td rowspan="2"><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td><b>Availability:</b>
Indicates the current of the power supply to the appliance.</td><td></td><td>The states reported by this measure and the numeric values that correspond to each state are discussed in the table below:
<table>
<tr><th>State</th><th>Numeric Value</th></tr>
<tr><td>powerSupplyNotInstalled</td><td>1</td></tr>
<tr><td>powerSupplyHealthy</td><td>2</td></tr>
<tr><td>powerSupplyNoAC</td><td>3</td></tr>
<tr><td>powerSupplyFaulty</td><td>4</td></tr>
</table>
<b>Note:</b>
By default, this measure reports the <b>States</b> listed in the table above to indicate the power supply status. The graph of this measure however, represents the status using the numeric equivalents - <i>1</i> to <i>4</i></td></tr>
</table>

11.1.6 Asyncos Raid Status Test

This test reports the RAID status.

Purpose	Reports the RAID status
Target of the test	An IronPort AsyncOS Mail server
Agent deploying the test	External/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The IP address of the Cisco Router. 3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161. 4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 12. **ENCRYPTPASSWORD** – Specify the encryption password here. 13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

<table>
<tr><td></td><td colspan="3">14. <b>TIMEOUT</b> - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the <b>TIMEOUT</b> text box. The default is 10 seconds.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for the appliance being monitored.</td></tr>
<tr><td rowspan="2"><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td><b>Raid State:</b>
Indicates the current status of the RAID.</td><td></td><td>The states reported by this measure and the numeric values that correspond to each state are discussed in the table below:
<table>
<tr><th>State</th><th>Numeric Value</th></tr>
<tr><td>Drive Healthy</td><td>1</td></tr>
<tr><td>Drive Failure</td><td>2</td></tr>
<tr><td>Drive Rebuild</td><td>3</td></tr>
</table>
<b>Note:</b>
By default, this measure reports the <b>States</b> listed in the table above to indicate the RAID status. The graph of this measure however, represents the status using the numeric equivalents - <i>1</i> to <i>3</i>.</td></tr>
</table>

11.1.7 Asyncos Temperature Status Test

This test reports the current temperature of the appliance.

Purpose	Reports the current temperature of the appliance
Target of the test	An IronPort AsyncOS Mail server
Agent deploying the test	External/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The IP address of the Cisco Router. 3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161. 4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 12. **ENCRYPTPASSWORD** – Specify the encryption password here. 13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	14. **TIMEOUT** - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the **TIMEOUT** text box. The default is 10 seconds.		
Outputs of the test	One set of results for the appliance being monitored.		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Current temperature: Indicates the current temperature of the appliance.	Celsius	A high value could be indicative of a problem, and may hence require further investigation.

11.2 The Network Layer

The test mapped to this layer reveals whether/not the appliance is available over the network, and how good/bad the network connection is.

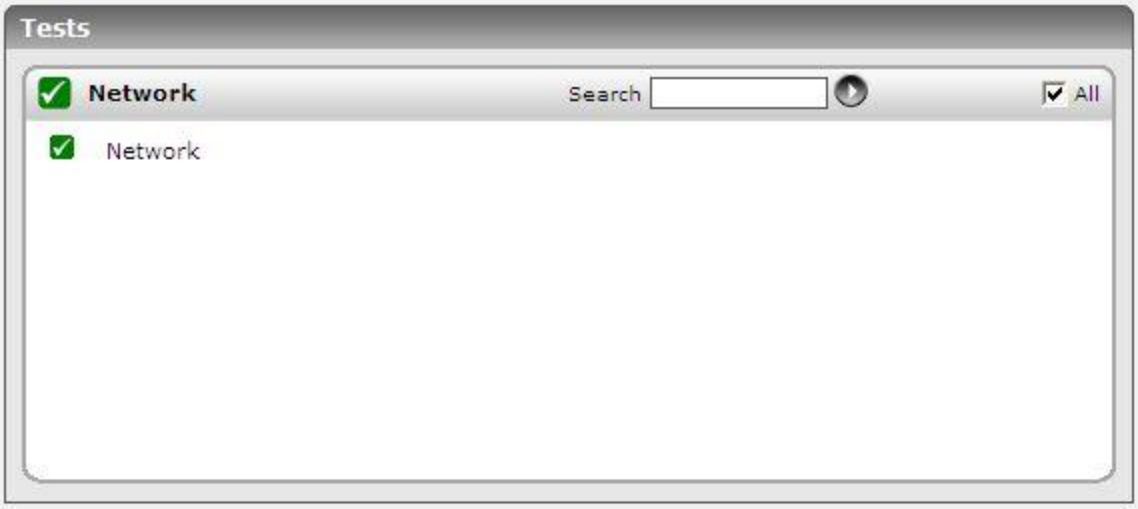
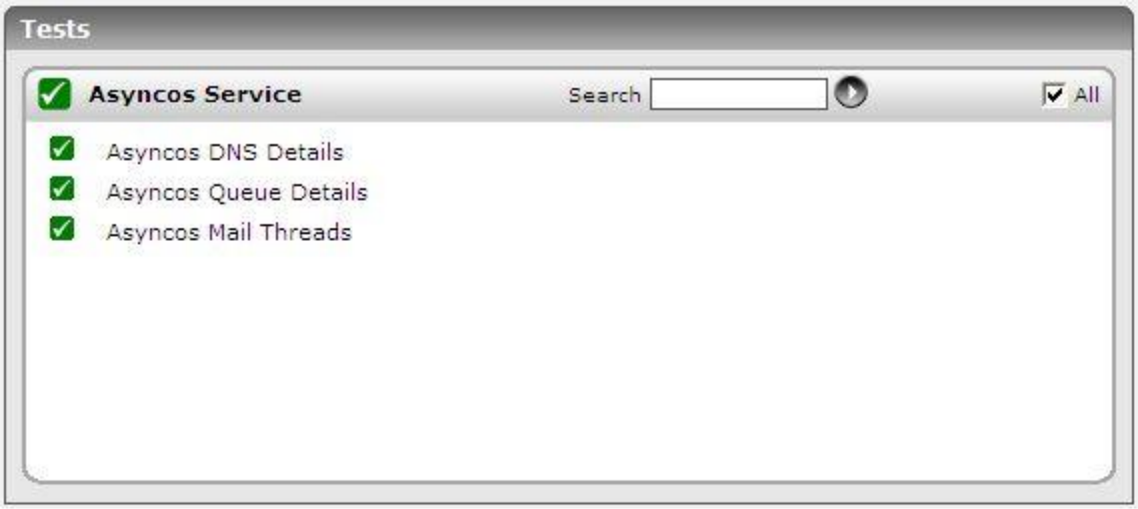


Figure 11.3: The test mapped to this layer

Since the test mapped to this layer has already been discussed in the *Monitoring Unix and Windows Servers* document, let us proceed to the next layer.

11.3 The Asyncos Service Layer

Using the tests mapped to this layer, you can quickly capture issues with the DNS server, the email queue, and mail thread usage.



☑ Asyncos DNS Details
☑ Asyncos Queue Details
☑ Asyncos Mail Threads

Figure 11.4: The tests mapped to the Asyncos Service layer

11.3.1 Asyncos DNS Details Test

This test reveals whether/not the DNS server was able to service all host name resolution requests it received, so that administrators can determine whether issues with the DNS server had contributed to many mails being undelivered by the appliance.

Purpose	Reveals whether/not the DNS server was able to service all host name resolution requests it received, so that administrators can determine whether issues with the DNS server had contributed to many mails being undelivered by the appliance
Target of the test	An IronPort AsyncOS Mail server
Agent deploying the test	External/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The IP address of the Cisco Router. 3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161. 4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 12. **ENCRYPTPASSWORD** – Specify the encryption password here. 13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	14. **TIMEOUT** - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the **TIMEOUT** text box. The default is 10 seconds.		
Outputs of the test	One set of results for the appliance being monitored.		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Outstanding dns requests: Indicates the number of DNS requests that have been sent but for which no reply has been received yet.	Number	A high value could indicate a bottleneck with the DNS server.
	Pending dns requests: Indicates the number of DNS requests that have not been sent to the DNS server.	Number	

11.3.2 Asyncos Queue Details Test

This test monitors the usage of the email queue by the IronPort appliance.

Purpose	Monitors the usage of the email queue by the IronPort appliance
Target of the test	An IronPort AsyncOS Mail server
Agent deploying the test	External/remote agent

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** – The IP address of the Cisco Router.
3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161.
4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list.
5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear.
6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter.
7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**.
8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here.
9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options:

   - **MD5** – Message Digest Algorithm
   - **SHA** – Secure Hash Algorithm
10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option.
11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types:

    - **DES** – Data Encryption Standard
    - **AES** – Advanced Encryption Standard
12. **ENCRYPTPASSWORD** – Specify the encryption password here.
13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

<table>
<tr><td></td><td colspan="3">14. <b>TIMEOUT</b> - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the <b>TIMEOUT</b> text box. The default is 10 seconds.</td></tr>
<tr><td><b>Outputs of the test</b></td><td colspan="3">One set of results for the appliance being monitored.</td></tr>
<tr><td><b>Measurements made by the test</b></td><td><b>Measurement</b></td><td><b>Measurement Unit</b></td><td><b>Interpretation</b></td></tr>
<tr><td></td><td><b>Queue utilization:</b>
Indicates the percentage of the email queue that is being utilized.</td><td>Percent</td><td>A high value is typically indicative of a large number of undelivered emails. If left unchecked, it can overwhelm the email service, thereby significantly degrading its overall performance.</td></tr>
<tr><td></td><td><b>Availability:</b>
Indicates the current state of the email queue.</td><td></td><td>The states reported by this measure and the numeric values that correspond to each state are discussed in the table below:
<table>
<tr><th>State</th><th>Numeric Value</th></tr>
<tr><td>QueueSpace Available</td><td>1</td></tr>
<tr><td>QueueSpace Shortage</td><td>2</td></tr>
<tr><td>Queue Full</td><td>3</td></tr>
</table>
<b>Note:</b>
By default, this measure reports the <b>States</b> listed in the table above to indicate the email queue status. The graph of this measure however, represents the status using the numeric equivalents - <i>1</i> to <i>3</i>.</td></tr>
</table>

11.3.3 Asyncos Mail Threads Test

This test reports the number of mail threads in use and the count of open sockets on the appliance.

Purpose	Reports the number of mail threads in use and the count of open sockets on the appliance
Target of the test	An IronPort AsyncOS Mail server
Agent deploying the test	External/remote agent

Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST** – The IP address of the Cisco Router. 3. **SNMPPORT** - The port number through which the Cisco router exposes its SNMP MIB. The default value is 161. 4. **SNMPVERSION** – By default, the eG agent supports SNMP version 1. Accordingly, the default selection in the **SNMPVERSION** list is **v1**. However, if a different SNMP framework is in use in your environment, say SNMP **v2** or **v3**, then select the corresponding option from this list. 5. **SNMPCOMMUNITY** – The SNMP community name that the test uses to communicate with the Cisco router. This parameter is specific to SNMP **v1** and **v2** only. Therefore, if the **SNMPVERSION** chosen is **v3**, then this parameter will not appear. 6. **USERNAME** – This parameter appears only when **v3** is selected as the **SNMPVERSION**. SNMP version 3 (SNMPv3) is an extensible SNMP Framework which supplements the SNMPv2 Framework, by additionally supporting message security, access control, and remote SNMP configuration capabilities. To extract performance statistics from the MIB using the highly secure SNMP v3 protocol, the eG agent has to be configured with the required access privileges – in other words, the eG agent should connect to the MIB using the credentials of a user with access permissions to be MIB. Therefore, specify the name of such a user against the **USERNAME** parameter. 7. **AUTHPASS** – Specify the password that corresponds to the above-mentioned **USERNAME**. This parameter once again appears only if the **SNMPVERSION** selected is **v3**. 8. **CONFIRM PASSWORD** – Confirm the **AUTHPASS** by retyping it here. 9. **AUTHTYPE** – This parameter too appears only if **v3** is selected as the **SNMPVERSION**. From the **AUTHTYPE** list box, choose the authentication algorithm using which SNMP v3 converts the specified **USERNAME** and **PASSWORD** into a 32-bit format to ensure security of SNMP transactions. You can choose between the following options: ➢ **MD5** – Message Digest Algorithm ➢ **SHA** – Secure Hash Algorithm 10. **ENCRYPTFLAG** – This flag appears only when **v3** is selected as the **SNMPVERSION**. By default, the eG agent does not encrypt SNMP requests. Accordingly, the **ENCRYPTFLAG** is set to **NO** by default. To ensure that SNMP requests sent by the eG agent are encrypted, select the **YES** option. 11. **ENCRYPTTYPE** – If the **ENCRYPTFLAG** is set to **YES**, then you will have to mention the encryption type by selecting an option from the **ENCRYPTTYPE** list. SNMP v3 supports the following encryption types: ➢ **DES** – Data Encryption Standard ➢ **AES** – Advanced Encryption Standard 12. **ENCRYPTPASSWORD** – Specify the encryption password here. 13. **CONFIRM PASSWORD** – Confirm the encryption password by retyping it here.

	14. **TIMEOUT** - Specify the duration (in seconds) within which the SNMP query executed by this test should time out in the **TIMEOUT** text box. The default is 10 seconds.		
Outputs of the test	One set of results for the appliance being monitored.		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	Open socket count: Indicates the number of open sockets or files.	Number	
	Mail thread count: Indicates the number of threads that perform tasks related to mail transfer.	Number	

Chapter

12

Conclusion

This document has described in detail the monitoring paradigm used and the measurement capabilities of the eG Enterprise suite of products with respect to **mail servers**. For details of how to administer and use the eG Enterprise suite of products, refer to the user manuals.

We will be adding new measurement capabilities into the future versions of the eG Enterprise suite. If you can identify new capabilities that you would like us to incorporate in the eG Enterprise suite of products, please contact support@eginnovations.com. We look forward to your support and cooperation. Any feedback regarding this manual or any other aspects of the eG Enterprise suite can be forwarded to feedback@eginnovations.com.