Monitoring Microsoft Exchange Mailbox Server

eG Innovations Product Documentation

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Chapter 1: Introduction

The Mailbox server role hosts mailbox databases, which contain user's mailboxes. If you plan to host user mailboxes, public folders, or both, the Mailbox server role is required.

In Exchange server 2007/2010, the Mailbox server role integrates with the Active Directory directory service better than the mailbocx features and functionality in earlier versions of Exchange. This improved integration makes deployment and operation tasks much easier. The Mailbox server role also improves the information worker experience by providing richer calendaring functionality, resource management, and offline address book downloads.

The Mailbox server must interact directly with the following:

- Active Directory directory service server
- Hub Transport server
- Client Access server
- Unified Messaging (UM) server
- Microsoft Outlook clients
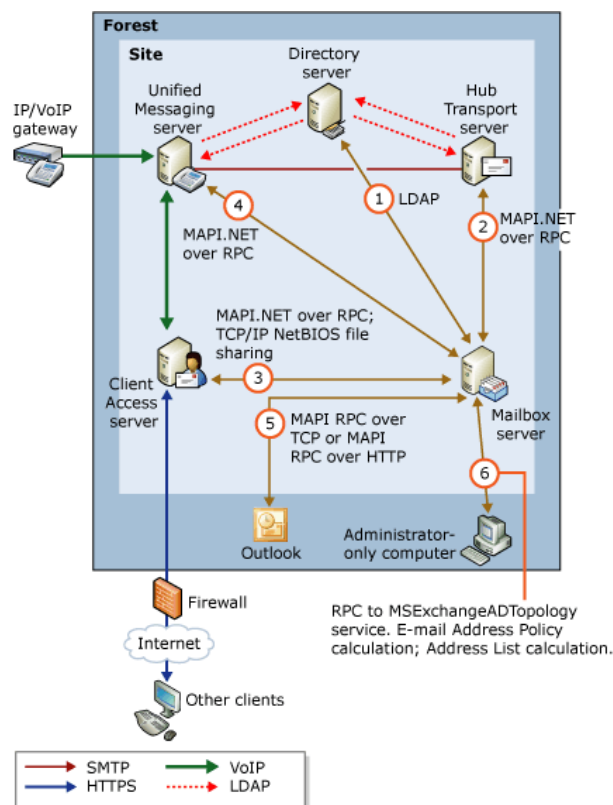
Figure 1.1: The relationship between the Mailbox server and the other server roles, clients, and the Active Directory server

Figure 1.1 shows what protocol the Mailbox server uses to communicate with each of these roles or computers. Each numbered interaction in Figure 1.1 corresponds to the following list, describing what types of information is shared between these roles and computers.

The Mailbox server accesses recipient, server, and organization configuration information from Active Directory.

The Store driver on the Hub Transport server places messages from the transport pipeline into the appropriate mailbox. The Store driver on the Hub Transport server also adds messages from the Outbox of a sender on the Mailbox server to the transport pipeline.

The Client Access server sends requests from clients to the Mailbox server, and returns data from the Mailbox server to the clients. The Client Access server also accesses offline address book files on the Mailbox server through NetBIOS file sharing. The types of data that the Client Access server sends between the client and the Mailbox server are messages, free/busy data, client profile settings, and offline address book data.

The Unified Messaging server retrieves e-mail and voice mail messages and calendar information from the Mailbox server for Outlook Voice Access. The Unified Messaging server also retrieves storage quota information from the Mailbox server.

Outlook clients that are inside your firewall can access a Mailbox server directly to send and retrieve messages. Outlook clients outside the firewall can access a Mailbox server using remote procedure call (RPC) over Hypertext Transfer Protocol (HTTP).

The administrator - only computer retrieves Active Directory topology information from the Microsoft Exchange Active Directory Topology service. It also retrieves e- mail address policy information and address list information.

We can thus conclude that the Mailbox server plays a crucial role in ensuring the uninterrupted flow of mails in an Exchange organization. Therefore, it is quiet evident that performance issues that the Mailbox server experiences can stall the delivery of emails indefinitely. If such adversities are to be avoided, the Mailbox server has to be monitored 24 x 7 for anomalies, and issues reported should be resolved quickly. This is where eG Enterprise helps administrators.

Chapter 2: How to Monitor the Microsoft Exchange 2007/2010 Server with Mailbox Server Role

eG Enterprise adopts an agent-based approach to monitoring the Microsoft Exchange 2007 /2010 server with Mailbox Server role. The agent-based approach requires that you install and configure the eG agent on the Exchange 2007/2010 host (if one of the 'integrated' Exchange 2007 or Exchange 2010 models is being used) or on the host on which the server role to be monitored exists.

This internal agent, once started, periodically runs a wide variety of tests on the Exchange 2007/2010 server/server role to extract useful performance data. Some of these tests , namely – the **Exchange Mailbox Status** test, the **Exchange Storage Group** test, and the **Exchange Queue Stats** test – require **Exchange Administrator** privileges to execute. Therefore, prior to monitoring an Exchange 2007/2010 server/server role using eG Enterprise, make sure that you configure the eG agent to run with the privileges of an **Exchange Administrator**. Then, proceed to monitor the Microsoft Exchange Mailbox Server.

The broad steps for monitoring Microsoft Exchange Mailbox Server using eG Enterprise are as follows:

- Managing the Microsoft Exchange Mailbox Server
- Configuring the tests

These steps have been discussed in this topic.

2.1 Managing the Microsoft Exchange Mailbox Server

The eG Enterprise cannot automatically discover the Microsoft Exchange Mailbox Server. This implies that you need to manually add the component for monitoring. Remember that the eG Enterprise automatically manages the components that are added manually. To manage a Exchange Mailbox Server component, do the following:

1. Log into the eG administrative interface.

2. Follow the Components -> Add/Modify menu sequence in the **Infrastructure** tile of the **Admin** menu.

3. In the **COMPONENT** page that appears next, select *Microsoft Exchange Mailbox Server* as the **Component type**. Then, click the **Add New Component** button. This will invoke 2.1.

Figure 2.1: Adding a Microsoft Exchange Mailbox Server

4. Specify the **Host IP** and the **Nick name** of the Exchange Mailbox Server in Figure 2.1.

5. The **Port number** will be set as *6001* by default. If the server is listening on a different port in your environment, then override this default setting.

6. Then, click the **Add** button to register the changes.

2.2 Configuring the tests

1. When you attempt to sign out of eG administrative interface, a list of unconfigured tests will appear as shown in Figure 2.2. This list reveals the unconfigured tests requiring manual configuration.

Figure 2.2: List of unconfigured tests for the Microsoft Exchange Mailbox Server

2. To configure the tests, click on the test names in the list of unconfigured tests. For the details on configuring the tests, refer to **Monitoring the Mailbox Servers** chapter.

3. Once all the tests are configured, signout of the eG administrative interface.

3

Chapter 3: Monitoring the Mailbox Servers

eG Enterprise provides a specialized Microsoft Exchange Mailbox model to monitor the Mailbox server inside-out and proactively report potential issues in its performance.
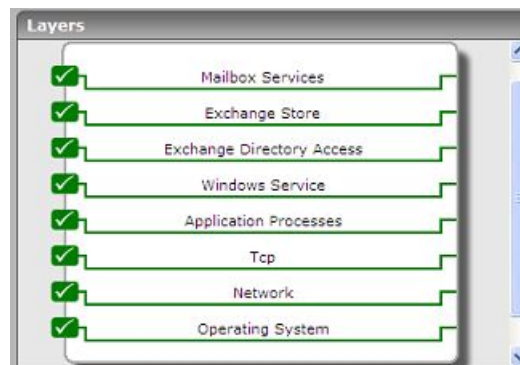
Figure 3.1: Layer model of the Microsoft Exchange Mailbox Server

Every layer of Figure 3.1 above is mapped to a wide variety of tests that run periodic checks on the health of the key components and services offered by the Mailbox server. Using the results of these health-checks, administrators can find answers to the following performance queries:

- Is the Active Directory cache adequately sized to handle requests from the mailbox server?
- Did any search requests to any domain controller fail owing to a bad network link or the non-availability of the domain controller?
- Were any LDAP fatal errors experienced while communicating with a domain controller?
- Did too many bind calls to any domain controller fail?
- Is any domain controller responding too slowly to read and search requests?
- How effectively was the database buffer pool used in serving database requests?
- Is the Exchange store experiencing a processing bottleneck? Which component of the Exchange store is responsible for this – the mailbox store or the public folder store? Are the send and receive queues of the Exchange store too long?
- How soon does the Exchange store deliver mails to local recipients?
- Is the Exchange store Virtual Memory used optimally?

- Has the mailbox of any user exhausted or is about to exhaust its storage quota? Are there too many deleted mails in these mailboxes? Would clearing the deleted mails free space in these mailboxes?

- How efficient is the Exchange Search engine? Have too many mailboxes been left to crawl on the database?

- Does Exchange Search take too long to connect to the Exchange store? Does it index documents quickly?

- Are too many events awaiting processing by the mailbox assistants?

The sections to come discuss the top 3 layers of the Mailbox server role, as all other layers have already been dealt with in the *Monitoring Unix and Windows Servers* document.

3.1 The Exchange Directory Access Layer

The Mailbox server talks to Active Directory for recipient, server, and organization configuration information. The tests mapped to the Exchange Directory Access layer monitor these interactions to bring problems to light.
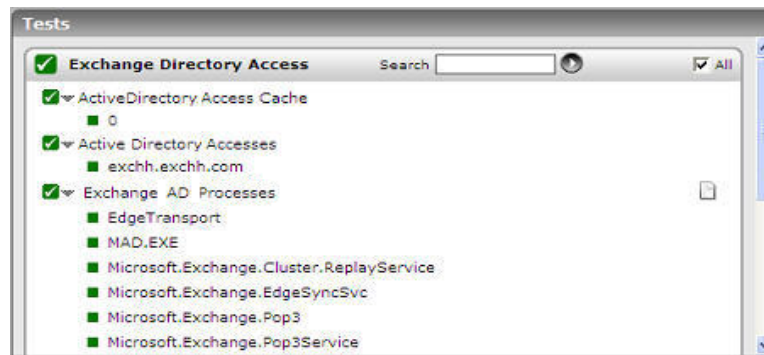
Figure 3.2: The tests mapped to the Exchange Directory Access test

Let us discuss the tests associated with this layer in detail in the following sections;

3.1.1 ActiveDirectory Access Cache Test

This test reveals whether the AD cache is being utilized effectively or not.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for the every AD cache used by the Mailbox server role being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number of the Mailbox server. By default, this is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
AD access cache hits	Indicates the rate at which requested objects were found in the cache.	Hits/Sec	
AD access cache misses	Indicates the rate at which requested objects were not found in the cache.	Misses/Sec	A high value of this measure is indicative of the ineffectiveness of the AD cache.
LDAP search rate from cache	Indicates the number of LDAP search requests issued per second.	Searches/sec	
Outstanding LDAP async notifies	Indicates the number of LDAP notification requests that are currently outstanding.	Number	
Outstanding LDAP async reads	Indicates the number of LDAP read requests that are currently outstanding.	Number	
Outstanding LDAP async searches	Indicates the number of LDAP search requests that are currently outstanding.	Number	

3.1.2 Active Directory Accesses Test

Exchange 2007/2010 uses the Active Directory directory service site topology to determine how messages are transported in the organization.

Exchange 2007/2010 is a site-aware application. Site-aware applications can determine their own Active Directory site membership and the Active Directory site membership of other servers by querying Active Directory. In Exchange 2007/2010, the Microsoft Exchange Active Directory Topology service is responsible for updating the site attribute of the Exchange server object. When an Exchange server role has to determine the Active Directory site membership of another Exchange server role, it can query Active Directory to retrieve the site name.

The Mailbox server role uses Active Directory site membership information to determine which Hub Transport servers are located in the same Active Directory site as the Mailbox servers. The Mailbox server submits messages for routing and transport to a Hub Transport server that has the same Active Directory site membership as the Mailbox server. The Hub Transport server performs recipient resolution and queries Active Directory to match an e-mail address to a recipient account. The recipient account information includes the fully qualified domain name (FQDN) of the user's Mailbox server. The FQDN is used to determine the Active Directory site of the user's Mailbox server. The Hub Transport server delivers the message to Mailbox server within its same Active Directory site, or it relays the message to another Hub Transport server for delivery to a Mailbox server that is outside the Active Directory site. If there are no Hub Transport servers in the same Active Directory site as a Mailbox server, mail cannot flow to that Mailbox server.

For processing all the Active Directory queries that are required for the aforesaid transactions, the Mailbox server role once again uses site membership to determine which domain controllers and global catalog servers to use. The Mailbox server role then binds to the identified directory servers whenever it needs to read from or write to Active Directory.

Any slowdown therefore, in the communication between the **Mailbox** server role and the marked global catalog servers / domain controllers can significantly delay the identification of the Hub Transport server that the Mailbox server needs to interact with; this in turn can cause delays in message delivery/processing. This test periodically monitors the network connection between the mailbox server role and each identified domain controller, so that communication bottlenecks are swiftly identified and resolved.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every domain controller used by the Mailbox server being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number of the Mailbox server. By default, this is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
LDAP read calls	Indicates the number of Depth 0 read calls per second that were made by the mailbox server role to this domain controller.	Calls/Sec	
LDAP search calls	Indicates the number of LDAP Depth 1 or 2 search calls per second that were made by the mailbox server role to this domain controller.	Calls/Sec	
LDAP searches timed out	Indicates the number of LDAP searches that timed out during the last minute on this domain controller.	Timeouts/min	A high value could indicate any of the following: • Loss of the network connection between the Mailbox server role and the Active Directory directory service domain controller • Non-availability of the domain controller • Critical issues with one/more Active Directory resources

Measurement	Description	Measurement Unit	Interpretation
			To resolve this error, do one or more of the following: • Verify network connectivity between the Mailbox server and the domain controllers it uses. • Ensure that the domain controllers the Mailbox server uses are up and running. • Make sure that none of the Active Directory resource are experiencing performance issues
LDAP fatal errors	Indicates the number of LDAP errors that caused the Exchange Active Directory Provider to close the LDAP connection without marking the domain controller down during the last minute.	Errors/Min	Ideally, this value should be 0.
LDAP disconnects	Indicates the number of LDAP errors that caused Exchange Active Directory Provider to mark the domain controller down during the last minute.	Disconnects/Min	
User search operations failed	Indicates the number of Exchange Active Directory Provider client's searches that failed on this domain controller during the last minute.	Failures/Min	

Measurement	Description	Measurement Unit	Interpretation
Bind failures	Indicates the number of LDAP bind calls that failed during the last minute	Failures/Min	A large number of bind call failures is a cause for concern, as it can disrupt the execution of Active Directory queries.
Long running LDAP operations	Indicates the number of LDAP operations that the mailbox server performed on this domain controller that took longer than the specified threshold per minute. (Default threshold is 15 minutes.)	Operations/Min	A high value generally indicates performance problems on the said domain controller(s) or network congestion. To resolve this, do one or more of the following: • Ensure that the quality of the network link between the Mailbox server and the domain controllers is good. • Ensure that the domain controller is not experiencing issues in internal operations. You can investigate CPU usage, as well as disk and memory bottlenecks, on your Active Directory directory service servers. • Consider using a dedicated Exchange server and a global catalog server for the expansion of dynamic distribution groups and large distribution groups.
LDAP pages retrieved	Indicates the number of additional pages retrieved from this domain controller per second.	Pages/sec	
Outstanding requests to Active Directory	Indicates the number of currently pending LDAP operations to this domain controller.	Number	A high value of this measure or a steady increase in this value is indicative of the poor query processing capability of the domain controller, and would warrant

Measurement	Description	Measurement Unit	Interpretation
			further investigation.
LDAP read time	Indicates the average time (in ms) taken to send an LDAP read request to the specified domain controller and receive a response.	Msecs	A low value is desired for this measure. A high value or a value that increases consistently is indicative of a gradual slowdown in the domain controller.
LDAP search time	Indicates the average time (in ms) to send an LDAP search request and receive a response.	Msecs	High LDAP search latencies can be caused by high remote procedure call (RPC) latencies and by increasing queues. High LDAP search latencies generally indicate one of the following problems: • Performance problem with the network connection to the domain controller. • Performance problems with the domain controller itself. To reduce the time it takes for LDAP searches, do one or more of the following: • Ensure that the network performance between the Mailbox server and the domain controllers it uses is not the bottleneck. • Monitor the Searches/sec performance counter to see if there is an unexpected surge in the number of searches the Mailbox server is requesting from the Active Directory directory service.

Measurement	Description	Measurement Unit	Interpretation
			• Ensure that this domain controller is not experiencing performance problems. You can investigate CPU usage, as well as disk and memory bottlenecks, on your Active Directory servers.

3.1.3 Exchange AD Processes Test

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

Target of the test : An Exchange server 2000/2003/2007

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine configured with the Mailbox server role.
Port	The port number through which the Mailbox server communicates. The default is *6001*.
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. **This parameter can be ignored while configuring this test for a managed "Exchange Mailbox" server**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Ldap read time	The average time that an LDAP read request from	Secs	The average value should be less than 50 milliseconds. Spikes (Maximum)

Measurement	Description	Measurement Unit	Interpretation
	the Exchange server takes to be fulfilled.		should not be higher than 100 milliseconds.
Ldap search time	The average 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.

3.1.4 Exchange Clients Test

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

This test monitors the performance of RPC activities on the Mailbox server.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The host for which the test is to be configured.
Port	The port number through which the Mailbox server communicates. The default is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
RPC attempts	The rate at which RPC calls were attempted to the Exchange server	Attempts/sec	This metric provides an indicator of the RPC workload on the server.

Measurement	Description	Measurement Unit	Interpretation
	during the last measurement period.		
RPC failures	This metric is the rate of failed RPCs to the Exchange server during the last measurement period.	Failures/Sec	Typically, this value should be low
RPC successes	The rate of successful RPC requests handled by the Exchange server during the last measurement period.	Successes/Sec	
Foreground RPC failures	This metric is the client-reported rate of failed foreground RPCs during the last measurement period.	Failures/sec	Typically, this value should be low.
Foreground RPC successes	Shows the client-reported rate of successful foreground RPCs handled by the Exchange server 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	

Measurement	Description	Measurement Unit	Interpretation
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.
RPC Failed server too busy error rate	Indicates the rate at which client RPCs failed (since the store was started) due to the server too busy ROC error.	Errors/Sec	The value of these measures should be 0 at all times. Non-zero values may indicate that RPC threads are exhausted or client throttling is occurring for clients running versions of Outlook earlier than Microsoft Office Outlook.
RPC Failed server too busy errors	Indicates the number of client RPCs that failed owing to the server too busy ROC error.	Number	
Query processor threads	Indicates the number of query processor threads that are currently running queries that are not optimized.	Number	Ideally, the value of this measure should be 0. A non-zero value is indicative of the existence of threads that are executing very slowly because they are running unoptimized/inefficient queries.
Search threads	Indicates the number of	Number	Ideally, the value of this measure

Measurement	Description	Measurement Unit	Interpretation
	search threads that are currently running queries that are not optimized.		should be 0. A non-zero value is indicative of the existence of threads that are executing very slowly because they are running unoptimized/inefficient queries.
RPC client backoff	Indicates the rate at which the server notifies the client to backoff.	Backoffs/Sec	The Exchange server allows administrators to manage end-user performance by preventing client applications, such as Outlook for example, from sending too many Remote Procedure Call [RPC] requests per second to Exchange, causing the server to suffer in terms of performance. When Exchange determines that a client is having a negative effect on the server, it will send a "back-off" request to the client telling it to delay sending any additional requests for a specified time in order to reduce the performance effect on the server. If these back-off requests are sent by the server frequently, it could indicate that the Exchange server is being bombarded with RPC requests; this is a sign of a server overload condition.

3.2 The Exchange Store Layer

The Exchange store is a storage platform that provides a single repository for managing multiple types of information in one infrastructure.

The Exchange store has several logical components that interact with each other. These components can reside on a single server, or they can be distributed across multiple servers.

- Storage groups (including recovery storage groups), which are logical containers for Exchange databases and their associated system and transaction log files.

- Mailbox databases, which contain the data, data definitions, indexes, checksums, flags, and other information that comprise mailboxes

- Public folder databases, which contain the data, data definitions, indexes, checksums, flags, and other information that comprise any public folders

Using the tests mapped to this layer, you can determine the overall health of the Exchange store and each of its key components.
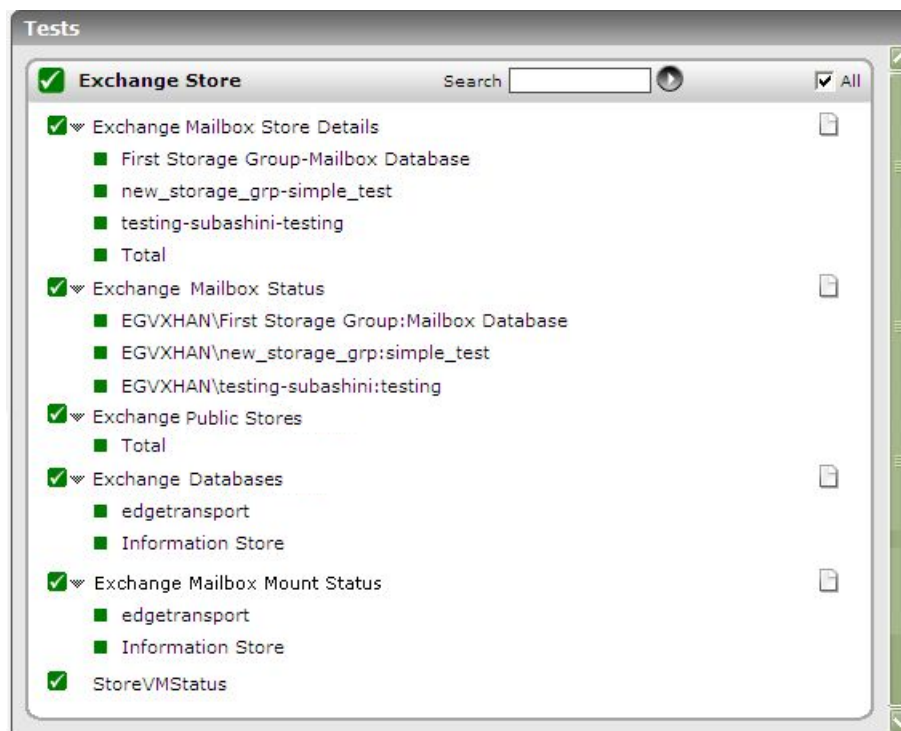
Figure 3.3: The tests associated with the Exchange Store layer

Let us discuss each test associated with this layer in detail in the following sections;

3.2.1 Exchange Database Test

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

When an Internet mail message enters into the Exchange server, the body of the message is saved in the ".stm" file, and the header information (From, To, Cc, Time Sent, and so on) is converted to Rich Text Format (RTF), and then stored in the ".edb" file. The transaction log file maintains the state and integrity of ".edb" and ".stm" files.

Target of the test : An Exchange server 2000/2003/2007

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine configured with the Mailbox server role.
Port	The port number through which the Mailbox server communicates. The default is *6001*.
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. **This parameter can be ignored while configuring this test for a managed "Exchange Mailbox" server**.

Measurements made by the test

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

Measurement	Description	Measurement Unit	Interpretation
			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.

3.2.2 Exchange Mailbox Status Test

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

This test reports the mount status of every mailbox database in an Exchange 2007 mailbox role-enabled server.

Target of the test : An Exchange server 2007 configured with the Mailbox role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine configured with the Mailbox server role.
Port	The port number through which the Mailbox server communicates. The default is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus,

Parameters	Description
	automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mount status of mailbox	Indicates the mount status of this mailbox database.	Percent	If the value of this measure is 100, it indicates that the database is mounted. The value 0, on the other hand, implies that the database is not mounted.
			• 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.
			• You can mount a database only if the Microsoft Exchange Information Store service is running. If this service is not running, then you would be unable to mount the database.
			• An Exchange mailbox database might not be able to mount if it reaches the 16-GB limit
			• If a file-level antivirus software deletes or modifies the transaction log files, then the database might not mount.

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

3.2.3 Exchange Mailbox Mounts Test

This test reports the availability and size of every mailbox database in an Exchange 2010 mailbox role-enabled server.

Target of the test : An Exchange server 2010 configured with the Mailbox role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine configured with the Mailbox server role.
Port	The port number through which the Mailbox server communicates. The default is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft

Parameters	Description
	Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
Server Name	Provide the name of the Exchange 2010 server being monitored.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mount status	Indicates the availability of this mailbox database.	Boolean	The value 1 for this measure indicates that the database is available, and the value 0 indicates that it is not.
Database size	Indicates the size of this mailbox database.	MB	

3.2.4 Exchange Mailbox Stores Test

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

- Storage Groups

- Mailboxes

- Public Folders

This test reports statistics pertaining to the Mailbox component of the Exchange store.

Target of the test : A server configured with the Mailbox role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine configured with the Mailbox server role.
Port	The port number through which the Mailbox server communicates. The default is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Active client logons	The number of clients that performed any active logons in the last ten minute interval.	Number	
Average delivery time	This measure indicates the average time between the submission of a message to the mailbox 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 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.
Categorization count	Indicates the number of categorizations that currently exist in the mailbox store.	Number	Categorizations are created when a user creates a filtered view or performs a search. When the information store must maintain an excessive number of categorizations, performance can be affected.
Client logons	The number of clients currently logged on.	Number	This measure is a good indicator of the current user activity in the Exchange Server. This information can be used by the administrator for planning the capacity of the mail server.
Local delivery rate	Indicates the rate at which mails are delivered locally.	Mails/Sec	
Messages queued for submission	The current number of submitted messages	Number	

Measurement	Description	Measurement Unit	Interpretation
	which are not yet processed by transport.		
Message delivery rate	Indicates the rate at which messages are delivered to all recipients.	Mails/Sec	
Messages 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.
Messages sent	This measure indicates the rate at which messages are sent to transport by the information store.	Msgs/Sec	
Messages submitted	Indicates the rate at which mails are submitted by clients.	Msgs/Sec	
Receive queue size	This measure shows the number of messages that are currently in the receiving queue of the information store.	Number	This measure is usually zero under normal conditions. A non-zero value for this measure indicates that the SMTP service is choking up memory.
Search task rate	Indicates the number of search tasks created per second.	Tasks/Sec	
Slow FindRow Rate	Indicates the rate at which the slower FindRow needs to be used in the mailbox store.	Finds/Sec	Higher values indicate applications are crawling or searching mailboxes, which is affecting server performance. These include desktop search engines, customer relationship management (CRM), or other third-party applications.
RPC average latency	Indicates the RPC latency averaged across all operations in the last 1024 packets.	Msec	This measure provides the best indication of whether counters with high database latencies are actually impacting Exchange health and client

Measurement	Description	Measurement Unit	Interpretation
			experience. Often, high RPC averaged latencies are associated with a high number of RPC requests, which should be less than 70 at all times. The value of this measure should not be higher than 25 msecs on an average.

3.2.5 Exchange Public Stores Test

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

Target of the test : An Exchange server 2000/2003/2007

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine configured with the Mailbox server role.
Port	The port number through which the Mailbox server communicates. The default is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Active client logons	The number of clients that performed any active in the last ten minute interval.	Number	
Average delivery time	This measure indicates the average time between the submission of a message to the public folder store	Secs	A non-zero value for this measure indicates a change in user workload. An abnormally high value for this

Measurement	Description	Measurement Unit	Interpretation
	and the delivery to all local recipients (recipients on the same server) for the last 10 messages.		measure indicates inability to deliver to one or more destinations. One of the possible reasons for this can be a network failure.
Categorization count	Indicates the number of categorizations that currently exist in the public folder store.	Number	Categorizations are created when a user creates a filtered view or performs a search. When the information store must maintain an excessive number of categorizations, performance can be affected.
Client logons	The number of clients currently logged on.	Number	This measure is a good indicator of the current user activity in the Exchange Server. This information can be used by the administrator for planning the capacity of the mail server.
Messages queued for submission	The current number of submitted messages which are not yet processed by transport.	Number	
Messages 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.
Messages delivered	Indicates the current number of messages delivered to all recipients.	Number	
Messages sent	This measure indicates the rate at which messages are sent to transport by the information store.	Msgs/Sec	
Messages submitted	Indicates the rate at which mails are submitted by clients.	Msgs/Sec	
Receive queue size	This measure shows the number of messages that	Number	This measure is usually zero under normal conditions.

Measurement	Description	Measurement Unit	Interpretation
	are currently in the receiving queue of the information.		A non-zero value for this measure indicates that the SMTP service is choking up memory.
Search task rate	Indicates the number of search tasks created per second.	Tasks/Sec	
Slow FindRow Rate	Indicates the rate at which the slower FindRow needs to be used in the mailbox store.	Finds/Sec	Higher values indicate applications are crawling or searching mailboxes, which is affecting server performance. These include desktop search engines, customer relationship management (CRM), or other third-party applications.
Replication receive queue	This measure indicates the number of replication messages waiting to be processed currently.	Number	A consistent increase in this value could indicate a bottleneck in the processing of replication messages.

3.2.6 Store VM Status Test

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

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number of the Mailbox server. By default, this is *6001*.

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

Measurements made by the test

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

3.2.7 Exchange Databases Test

The database engine used in Exchange Server is the Extensible Storage Engine (ESE). The Extensible Storage Engine (ESE) is an advanced indexed and sequential access method (ISAM) storage technology. ESE enables applications to store and retrieve data from tables using indexed or sequential cursor navigation.

The ESE database looks like a single file to Windows. Internally however, the database is a collection of 32KB pages arranged in a balanced B+ tree structure. In this database structure, all data is stored in leaves. At the root-level there are only pointers to internal pages. The internal pages contain pointers to the leaves, and the leaves are linked. ESE databases are organized into groups called instances.

Transactions to the ESE databases are processed (i.e., created) in server memory – in particular, the ESE cache, the log buffers, and the version store. The ESE cache helps reduce I/O operations. The version store is tied to the ESE cache and keeps track of transactions to the database while they are created. When transactions are created, they are stored in a particular log buffer. The log buffer represents a particular log file that belongs to a specific ESE database. Once the log buffer fills up with transactions, the entire log buffer is written to the log file, the log file is closed, and a new one is created. If a transaction fails for any reason, then the ESE database, once mounted, reads a checkpoint file to identify which log file is the checkpoint log, replays that log file, writes all completed transactions in that log file that have not already been written to the database files, and reverses any incomplete transactiions.

Typically, the performance of an ESE database instance can degrade due to a lot of factors. Ineffective cache usage, poor I/O processing, high transaction load, and improper log buffer sizing are to name a few. Since a user's experience with his/her Exchange mailbox relies upon the error-free functioning of the ESE database instances in the backend, an Exchange administrator should keep an eye on the performance of every database instance, accurately identify those instances and databases that are performing poorly, and rapidly isolate the reasons for the same, so that the road-blocks can be removed quickly and the desired performance levels can be ensured. This is where the **Exchange Databases** test helps. This test auto-discovers the ESE database instances, and reports the following for every instance:

- How well each database instance is using its cache;

- How quickly an ESE database instance processes I/O requests;

- How swiftly an ESE database instance recovers from failures;

- Whether/not the log buffers are adequately sized;

This way, this test accurately pinpoints that database instance, the performance of which is bottlenecked, leads administrators to where the bottleneck lies, and thus hastens remedial action.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each ESE database instance on the Exchange 2010 server being monitored .

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number of the Mailbox server. By default, this is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Database cache hit ratio	Indicates the percentage of database requests to this database instance that were fulfilled by the database cache without incurring disk input/output activity.	Percent	A high value is indicative of optimal cache usage, which translates into minimal or no direct disk accesses and high database performance. A low value on the other hand is indicative of poor cache usage. This in turn implies that direct disk accesses are high, thus escalating processing overheads and degrading database performance. You may want to determine the reason for the poor cache usage and fix it to make sure that database performance does not suffer too long. One of the common reasons for this anomaly is the insufficient cache size. In the absence of adequate memory, the Exchange server will not be able to provide adequate memory for caching objects, resulting in a high percentage of cache misses.
Database cache size	Indicates the amount of system memory, in megabytes (MB), used by the database cache	MB	Typically, the Exchange server reserves 25% of the total RAM for caching purposes. If the value of this measure grows closer to this

Measurement	Description	Measurement Unit	Interpretation
	manager associated with this database instance to hold commonly used information from the database files to prevent file operations.		allocated size, it could indicate that the cache would soon run out of memory. If this happens, then the cache will not be able to accommodate more frequently-referenced items. In the long run, this may result in a high rate of cache misses, which in turn can cause direct disk I/O to increase. To avoid this, consider increasing the cache size.
Database defragmentation task	Indicates the number of database defragmentation tasks currently pending for this database instance.	Number	If this measure reports a very high value, it could denote that many defragmentation tasks are yet to be executed on the database; this in turn implies that the database is still largely fragmented. This will delay data retrieval from the database. Compare the value of this measure across database instance to know which instance is the most fragmented.
Average database read latency	Indicates the amount of time this database instance took to perform a read operation.	Secs	A low value is desired for this measure. A consistent increase in this value is indicative of a bottleneck when reading from the database. Compare the value of this measure across database instances to know which instance is the slowest when reading and why.
Average database write latency	Indicates the amount of time this database instance took to perform a write operation.	Secs	A low value is desired for this measure. A consistent increase in this value is indicative of a bottleneck when writing to this database instance. Compare the value of this measure across instances to know which instance is the slowest when writing and why.

Measurement	Description	Measurement Unit	Interpretation
Average log read latency	Indicates the average time this database instance takes to read from a log file.	Secs	A high value is a cause for concern as it impacts how quickly transaction recovery is performed in the event of a transaction failure. If the transaction log file is read slowly, then it will delay the replay of the unwritten transactions and the writing of the transactions to the database file. This in turn will significantly slow down transaction recovery.
Average log write latency	Indicates the average time this database instance takes to write data from a log file.	Secs	A high value is a cause for concern as it impacts how quickly transaction recovery is performed in the event of a transaction failure. If the contents of the transaction log file are not written to the database file quickly, transaction recovery will be delayed.
Database read operations rate	Indicates the rate at which this database instance completes read operations.	Reads/Sec	A consistent drop in this value can indicate a reduction in the number of read requests. It can also indicate a reading bottleneck. In the case of the latter, compare the value of this measure across database instances to know which instance is the slowest when processing read requests.
Database write operations rate	Indicates the rate at which this database instance completes write operations.	Writes/Sec	A consistent drop in this value can indicate a reduction in the number of write requests. It can also indicate a writing bottleneck. In the case of the latter, compare the value of this measure across database instances to know which instance is the slowest when processing write requests.
Log read operations rate	Indicates the rate at which this database instance completed log file read operations.	Reads/Sec	A consistent drop in the value of this measure is indicative of a slowdown when reading from a log file.

Measurement	Description	Measurement Unit	Interpretation
Log write operations rate	Indicates the rate at which this database instance completed log write operations.	Writes/Sec	
Log record waits	Indicates the number of log records that cannot be added to the log buffers of this database instance because the log buffers are full.	Records/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 thread waits	Indicates the number of threads waiting in this database instance 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.
Transaction log files	Indicates the amount of work, expressed in terms of the number of log files, that needs to be redone or undone to the database files of this database instance if the process fails.	Number	The value of this measure should be below 500 at all times. For a healthy server, this measure should report a value between 20 and 30 for each database instance. If this measure increases continually, this indicates either a long-running transaction, (which will impact the version store), or a bottleneck involving the database disks. In this case, in the event of a failure, transaction recovery will take a considerably long time. Under such circumstances, you may want to consider decreasing the checkpoint depth, so that transactions are written to the database quickly.
Session in use	Indicates the number of sessions to this database instance that are currently open for use by client	Number	

Measurement	Description	Measurement Unit	Interpretation
	threads.		
Session used	Indicates the percentage of sessions to this database instance that are currently open for use by client threads.	Percent	A high value is desired for this measure. A very low value could indicate that too many open sessions are idle.
Database tables cache hit ratio	Indicates the percentage of tables in this database instance that were 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 may solve this problem.
Database tables opened	Indicates the number of tables in this database instance that were opened per second.	Opens/sec	
Version buckets allocated	Indicates the total number of version buckets allocated to this database instance.	Number	The "version buckets" are the message queue database transactions that are kept in memory. All changes that are made to the message queue database stay in memory until those changes can be committed to transaction log files. Factors that can increase the version buckets may be virus issues, integrity of the message queue database, or hard drive performance. The default maximum version bucket count is 16,384. If version buckets reach 70% of maximum, the server is at risk of running out of the version store.

3.3 The Mailbox Services Layer

You can use the tests associated with this layer to monitor the core services offered by a Mailbox server, such as the Exchange Search and Mailbox Assistants service, and also monitor the RPC
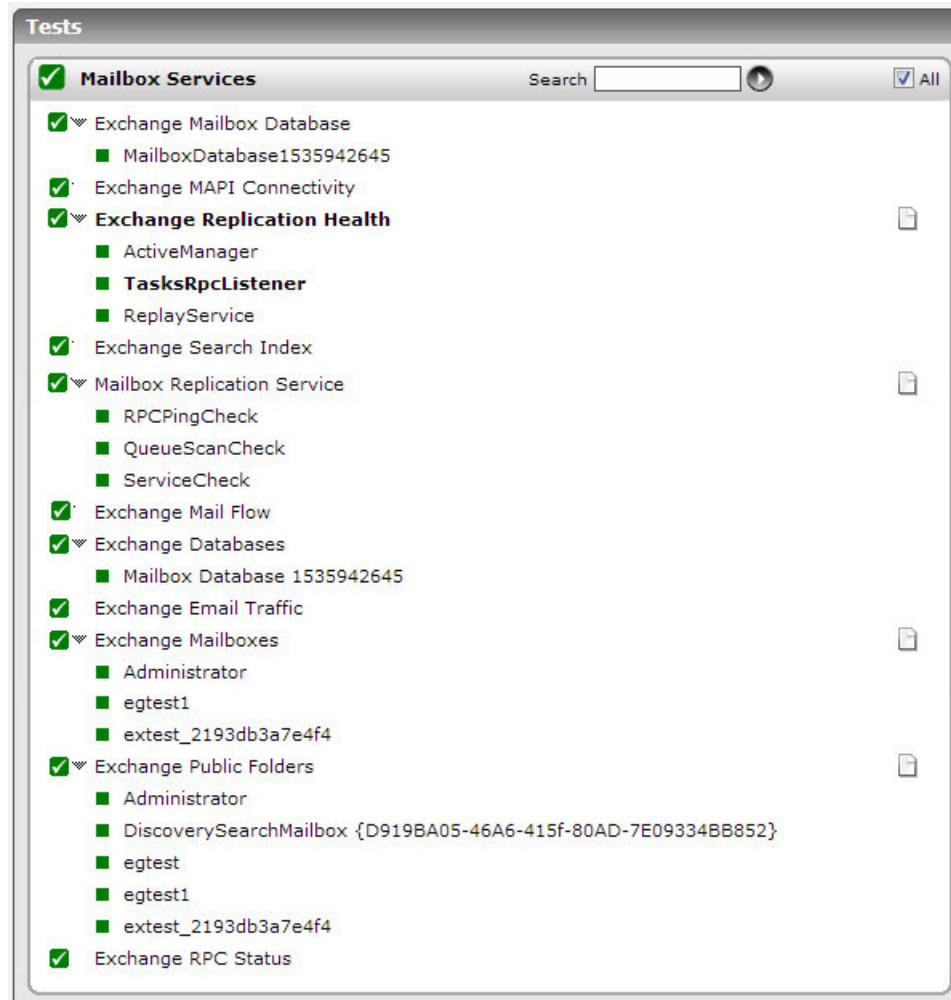
mechanisms between the Mailbox server and clients.

Figure 3.4: The tests mapped to the Mailbox Services layer

Let us discuss each test associated with this layer in detail in the following sections;

3.3.1 Exchange Public Folders Test

This test retrieves information about the public folders in the mailboxes on a server, including the number and size of items in the folder, the folder name and ID, and other information.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each monitored folder.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. By default, this is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
ServerName	Specify the name of the target Exchange server.
Folder Scope	Indicate whether the monitoring scope of this test should be restricted to important folders alone. If so, then pick the **Important** option from this list. In this case, critical folders such as inbox, outbox, deleted items, sent items and calendar details, will alone be monitored. On the other hand, to monitor all folders in a mailbox, pick the **All** option.
DD Frequency	Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against DD Frequency.
Detailed Diagnosis	To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option.

The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:

- The eG manager license should allow the detailed diagnosis capability

- Both the normal and abnormal frequencies configured for the detailed diagnosis |

Parameters	Description
	measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Items in folder	Indicates the number of items in this folder.	Number	
Folder size	Indicates the size of this folder.	KBytes	
Items in folders and subfolder	Indicates the number of items available in this folder and its subfolders.	Number	
Folder and subfolder size	Indicates the total size of the folder and its subfolders.	KBytes	

3.3.2 Exchange Mail Flow Test

This test checks whether mail can be successfully sent from and delivered to the system mailbox on a computer that has the Mailbox server role installed. This test is also used to verify whether the e-mail is sent between Mailbox servers within a defined latency threshold.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number of the Mailbox server. By default, this is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built

Parameters	Description
	on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
Target Email Address	This test sends mails to a configured mail ID to check whether the mails are successfully delivered to that ID. Specify the target email address here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mail flow latency time	Indicates the time taken to deliver a message.	Secs	A very high value for this measure could indicate delivery bottlenecks.
Mail flow result	Indicates whether the mail was successfully delivered or not.	Percent	The value 100 for this measure indicates that the mail flow is successful, and the value 0 for this measure indicates failure.

3.3.3 Exchange MAPI Connectivity Test

This test is used to verify exchange server functionality by logging on to the specified mailbox.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. By default, this is *6001*.

Parameters	Description
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
TargetMailAddress	This test emulates a MAPI connection to a configured mailbox on the Exchange server to verify the availability of the MAPI connection and the time taken to establish the same. For this emulation, the email address of a mailbox on the Exchange server is required. Provide this email address against TargetMailAddress.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Latency	Indicates the time taken to establish the MAPI connection.	MSecs	A very high value for this measure could indicate connection bottlenecks.
MAPI connectivity status	Indicates whether the MAPI connection was successfully established or not.	Percent	This measure will report 100, if connection to a mailbox is successfull; otherwise, this measure will report 0.

3.3.4 Exchange Search Index Test

This test reports whether the Exchange search is currently enabled and is indexing new e-mail messages in a timely manner.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. By default, this is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
TargetMailAddress	Provide the email address of a mailbox on the Exchange server.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Search time	Indicates the time taken to index the messages.	Secs	A very high value for this measure could indicate issues in indexing messages.
Is exchange search enabled?	Indicates whether the Exchange search is enabled or not.	Boolean	The value 1 for this measure indicates that the exchange search is enabled and value 0 indicates it is not enabled.

3.3.5 Exchange Mailbox Database Test

This test reports the size and mount status of each mailbox database on the Exchange 2007 serer, and also reveals the number of mailboxes in each database.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each mailbox database on the server monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. By default, this is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Size of mailbox database	Indicates the size of this mailbox database.	GB	
No of mailboxes in database	Indicates the number of mailboxes in this database.	Number	
Mount status of mailbox database	Indicates whether this mailbox database has been mounted or not.	Boolean	The value '1' indicates that the mailbox is currently available - i.e., has been mounted, and '0' indicates that the mailbox is not available or has not been mounted yet.

3.3.6 Exchange Mailboxes Test

This test reports critical statistics pertaining to each mailbox on an Exchange server, such as the mailbox size, the mailbox quota, the size and number of deleted items, etc., and also reveals how effectively the mailbox has been utilized.

Target of the test : A server configured with the Mailbox role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each mailbox on the server monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine configured with the Mailbox server role.
Port	The port number through which the Mailbox server communicates. The default is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
ServerName	Specify the name of the target Exchange server.
DD Frequency	Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against DD frequency.
Detailed Diagnosis	To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option.
	The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:
	• The eG manager license should allow the detailed diagnosis capability
	• Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Deleted item count	Indicates the number of deleted messages in this mailbox.	Number	
Total deleted item size	Indicates the total size of all deleted items in this mailbox.	MB	
Total items	Indicates the total number of messages in this mailbox.	Number	
Size	Indicates the total size of this mailbox.	MB	
Quota	Indicates the allocated size of this mailbox.	MB	If the mailbox Size is dangerously close to the Quota, you may want to either reset the quota or delete unnecessary messages from the mailbox to free up space. This needs to be done so that the mailbox does not violate its quota, causing mails to bounce.
Mailbox usage	Indicates the mailbox usage.	Percent	

3.3.7 Exchange Search Test

Exchange Search is a feature that enables fast searching of text in messages through the use of pre-built indexes. Exchange Search uses the Microsoft Search indexing engine, and creates the initial index by "crawling" all messages in mailboxes moved into an Exchange 2007/2010 database, and updates this index based on notifications from the information store as new messages arrive. This test summarizes the performance statistics of the Microsoft Search indexing engine for every Exchange 2007/2010 database.

Target of the test : A server configured with the Mailbox role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. The default is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mailboxes left to crawl	Indicates the number of mailboxes that are currently left to be crawled on this database.	Number	Ideally, the value of this measure should be low. A high value is indicative of an inefficient search indexing engine.
Documents to be indexed	Indicates the number of documents that are currently awaiting indexing.	Number	
Documents indexed	Indicates the number of documents that are being actively indexed in this database.	Number	
Documents successfully indexed	Indicates the number of documents that were currently indexed successfully.	Number	
Documents failed during indexing	Indicates the number of documents have not been indexed in this database since the last measurement period.	Number	A low value is desired for this measure. An unusually high value might call for further investigation.
Average latency of RPCs to the information store	Indicates the average latency of RPCs (in milliseconds) to the Exchange Information Store service.	Msecs	Typically, Exchange Search makes these RPC calls for crawling purposes for the given database. High RPC latencies are quiet obviously a cause for concern, as they can slow down crawling, and ultimately the search

Measurement	Description	Measurement Unit	Interpretation
			process.
Average document indexing time	Indicates the average (in milliseconds) of how long it takes to index documents.	Msecs	A high value of this measure could indicate an indexing bottleneck.
Is full crawl mode in use for indexing?	Indicates whether this database is going through a full crawl or not, currently.	Status	When the database is still being crawled, it has a value of 1. When the crawl is complete, the value is 0.

3.3.8 Mailbox Assistants Test

The Microsoft Exchange Mailbox Assistant service provides functionality for Calendar Attendant, Resource Booking Attendant, Out of Office Assistant, and Managed Folder Mailbox Assistant.

The Exchange Assistants can be either event-based Assistants or time-based Assistants. The event-based Assistants start to process mailboxes on the occurrence of an event, such as on a change of Out-of-Office (OOF) information in one or more mailboxes. The time-based Assistants process the mailboxes periodically. Each time-based Assistant deploys an Assistants Driver that periodically checks whether the current time is within in a specified time window. When the current time reaches the specified time window, the Assistants Driver invokes the corresponding time-based Assistant. The time-based Assistant then obtains a list of mailboxes from the database and starts to process them.

To determine whether there are any mailbox assistant-related issues, use the **Mailbox Assistants** test.

Target of the test : An Exchange server 2000/2003/2007

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the Mailbox server.

Parameters	Description
Port	The port number through which the Mailbox server communicates. The default is *6001*.
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. **This parameter can be ignored while configuring this test for a managed "Exchange Mailbox" server**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Events waiting to be processed by assistants	Indicates the current number of events in the in-memory queue waiting to be processed by the assistants.	Number	Ideally, the value of this measure should be low at all times. High values may indicate a performance bottleneck.
Events processed rate by Exchange assistants	Indicates the number of events processed per second.	Events/Sec	While sporadic dips in this value can be ignored, a consistent decrease could be a cause for concern, and may warrant a thorough investigation.
Events polled by Exchange assistants	Indicates the number of events polled per second.	Events/Sec	
Delay between polling and event creation	Indicates the current latency between when the most recent MAPI event was polled and when the event was created.	Secs	
Event queueing time - average	Indicates the average time (in seconds) that the event lives in the dispatcher queue.	Secs	Ideally, the value of this measure should be low. A very high value indicates that there are many events in queue with long waiting times. This in turn indicates a processing bottleneck.
Event processing time - average	Indicates the average time (in seconds) that the assistants took for processing events.	Secs	Ideally, the value of this measure should be low. A very high value indicates that there are many events in queue with long waiting times. This in turn indicates a processing bottleneck.

Measurement	Description	Measurement Unit	Interpretation
Queue size of event dispatchers - average	Indicates the average queue size of event dispatchers.	Number	A gradual but steady increase in the value of this measure over time, could indicate a problem with the dispatcher queue.
Mailbox processing time - average	Indicates the average processing time of mailboxes for time-based assistants.	Secs	A low value is typically desired.
Failed event dispatchers	Indicates the percentage of Event Dispatchers that are in failure mode, currently.	Percent	
Mailboxes processed	Indicates the rate at which time-based assistants processed mailboxes.	Operations/Sec	
Threads in use from the CLR thread pool	Indicates the current number of Threads used from the CLR thread pool.	Number	

3.3.9 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.

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

Target of the test : A server configured with the Mailbox role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the machine configured with the Mailbox server role.
Port	The port number through which the Mailbox server communicates. The default is *6001*.
IsPassive	If the value chosen is **Yes**, then the Exchange server under consideration is a passive server in an Exchange cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.

Measurements made by the test

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

Measurement	Description	Measurement Unit	Interpretation
	Information Store service.		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.

3.3.10 Exchange Replication Test

Cluster continuous replication (CCR) is a high availability feature of Microsoft Exchange server 2007/2010 that combines the asynchronous log shipping and replay technology built into Exchange 2007/2010 with the failover and management features provided by the Cluster service.

CCR uses the database failure recovery functionality in Exchange 2007/2010 to enable the continuous and asynchronous updating of a second copy of a database with the changes that have been made to the active copy of the database. During installation of the passive node in a CCR environment, each storage group and its database is copied from the active node to the passive node. This operation is called seeding, and it provides a baseline of the database for replication. After the initial seeding is performed, log copying and replay are performed continuously.

In a CCR environment, the replication capabilities are integrated with the Cluster service to deliver a high availability solution

Local continuous replication (LCR) is a single-server solution that uses built-in asynchronous log shipping and log replay technology to create and maintain a copy of a storage group on a second set of disks that are connected to the same server as the production storage group. The production storage group is referred to as the active copy, and the copy of the storage group maintained on the separate set of disks is referred to as the passive copy.

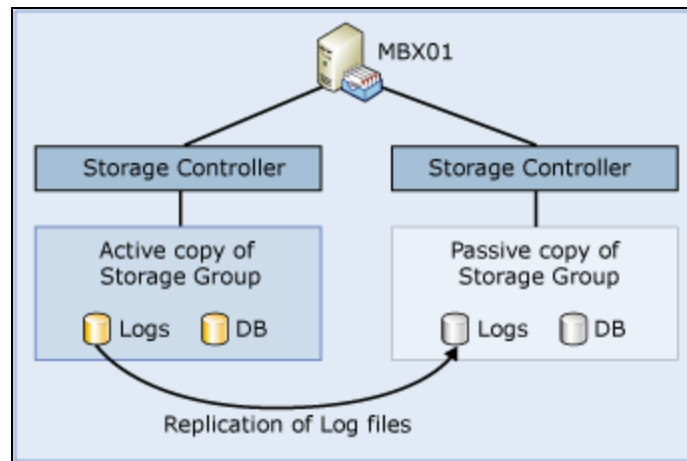The following figure illustrates a basic deployment of LCR:

Figure 3.5: A basic LCR deployment

This test monitors the health of the replication in both LCR and CCR.

Target of the test : A server configured with the Mailbox role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	The IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. The default is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Replay queue length	Indicates the number of log generations currently waiting to be replayed.	Number	
Copy queue length	Indicates the number of log files currently waiting to be copied and	Number	A high value of this measure could indicate that Exchange database copy failed. Under such circumstances, do

Measurement	Description	Measurement Unit	Interpretation
	inspected.		the following: • Remove passive DB copy • Delete DB and log files from disk • Force AD replication between AD sites • Dismount AD database • Delete all EO*.log files • Mount database • Create DB copy

3.3.11 Exchange Storage Groups Test

An Exchange storage group is a logical container for Exchange databases and their associated system and transaction log files.

This test monitors the mailboxes in a storage group to report key statistics such as the number of mailboxes that have exceeded their storage limit, the number of mails in the mailboxes, etc.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results every storage group auto-discovered from the Mailbox being monitored.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. By default, this is *6001*.

Parameters	Description
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
Detailed Diagnosis	To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option. The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled: • The eG manager license should allow the detailed diagnosis capability • Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Disconnected users	Indicates the number of users who are currently disconnected from their mailboxes in a storage group.	Number	
Users with storage limit warning status	Indicates the number of users whose mailboxes are currently reaching their storage quota and are therefore receiving the storage quota warning message.	Number	A storage quota is a storage size limit for a mailbox or a public folder. You can use the Exchange Management Console or the Exchange Management Shell to view or set the storage quotas for all of the mailboxes or public folders in a database. You can also use the Exchange Management Console or the

Measurement	Description	Measurement Unit	Interpretation
			Exchange Management Shell to set storage quotas on a per-mailbox basis, thereby overriding the storage quotas that are set at the database level. However, storage quotas for individual public folders can be viewed or set only in the Exchange Management Shell. If a mailbox size reaches or exceeds the Issue warning value that has been configured for a mailbox/database, then Exchange will automatically send a warning message to that mailbox. A non-zero value for this measure therefore, indicates that one/more mailboxes in the storage group are in danger of exceeding their storage quota. You can use the detailed diagnosis capability of this measure to identify the mailboxes that might be fast exhausting their storage quota. Based on the detailed diagnosis, you can decide whether to revise the storage quota or clear unnecessary mails from the listed mailboxes to make more space therein.
Users with storage limit prohibit status	Indicates the number of users whose mailboxes have reached their storage quota currently and hence, will not be able to send any emails.	Number	If a mailbox size reaches or exceeds the limit specified against Prohibit send at, Exchange will prevent that mailbox user from sending new messages and will display a descriptive error message. A non-zero value for this measure is a cause for concern, as it indicates that one/more users might not be able to send out critical mails from their mailboxes. Use the detailed diagnosis of this test to identify the affected users, and then decide whether to increase the Prohibit sent at limit or simply remove unnecessary mails from

Measurement	Description	Measurement Unit	Interpretation
			the users' mailboxes to make space available.
Total number of mails	Indicates the current number of e-mails in all mailboxes homed in a storage group.	Number	
Total mail size	Indicates the total size of all mailboxes homed in this storage group.	MB	
Total deleted mails	Indicates the number of deleted e-mails currently in all mailboxes homed in a storage group.	Number	
Total deleted mail size	Indicates the current size of all deleted e-mails in all mailboxes homed in a storage group.	MB	

3.3.12 Exchange Email Traffic Test

Periodic workload monitoring is imperative to evaluate the processing ability of the Exchange 2010 server and to proactively detect potential overload conditions. By continuously monitoring the email traffic to and from the Exchange server, this test turns a spotlight on the workload of the Exchange server, helps detect overload conditions, and also points you to the source of the overload – mails sent/received by users in the intranet? Or mail traffic over the internet?

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

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

Configurable parameters for the test

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

Parameters	Description
Host	Indicates the IP address of the Mailbox server.
Port	The port number of the Mailbox server. By default, this is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
DD Frequency	Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against DD frequency.
Detailed Diagnosis	To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option.
	The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:
	● The eG manager license should allow the detailed diagnosis capability
	● Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Internal mails received	Indicates the number of mails received by the Exchange server from the intranet.	Number	In the event of an overload, you can compare the value of this measure with the value of the Internal mails sent, External mails received, and

Measurement	Description	Measurement Unit	Interpretation
			External mails sent measures to determine what could have contributed to the overload – is it because of incoming or outgoing mail traffic? Is it because of the exchange of mails over the intranet or the internet? To know the email IDs that received the emails, the number of emails that each ID received, and the total size of the emails to an ID, use the detailed diagnosis of this test.
Internal mails received size	Indicates the total size of the mails received by the Exchange server from the intranet.	KB	
Internal mails sent	Indicates the number of mails sent by the Exchange server to the intranet.	Number	In the event of an overload, you can compare the value of this measure with the value of the Internal mails received, External mails received, and External mails sent measures to determine what could have contributed to the overload – is it because of incoming or outgoing mail traffic? Is it because of the exchange of mails over the intranet or the internet? To know the email IDs that sent the emails, the number of emails that each ID sent, and the total size of the emails from an ID, use the detailed diagnosis of this test.
Internal mail sent size	Indicates the total size of the mails sent by the Exchange server to the intranet.	KB	
External mails received	Indicates the number of mails received by the Exchange server from the	Number	In the event of an overload, you can compare the value of this measure with the value of the Internal mails

Measurement	Description	Measurement Unit	Interpretation
	internet.		received, Internal mails sent, and External mails sent measures to determine what could have contributed to the overload – is it because of incoming or outgoing mail traffic? Is it because of the exchange of mails over the intranet or the internet? To know the email IDs that received the emails, the number of emails that each ID received, and the total size of the emails to an ID, use the detailed diagnosis of this test.
External mail received size	Indicates the total size of the mails received by the Exchange server from the internet.	KB	
External mails sent	Indicates the number of mails sent by the Exchange server to the internet.	Number	In the event of an overload, you can compare the value of this measure with the value of the Internal mails sent, Internal mails sent, and External mails received measures to determine what could have contributed to the overload – is it because of incoming or outgoing mail traffic? Is it because of the exchange of mails over the intranet or the internet? To know the email IDs that sent the emails, the number of emails that each ID sent, and the total size of the emails from an ID, use the detailed diagnosis of this test.
External mail sent size	Indicates the total size of mails sent by the Exchange server to the internet.	KB	

Use the detailed diagnosis of the *Internal mails received* measure to know the internal email IDs that received the emails, the number of emails that each ID received, and the total size of the emails received by an ID. This way, you can quickly identify the email ID that received the maximum number of emails and that which received mails of the maximum size.
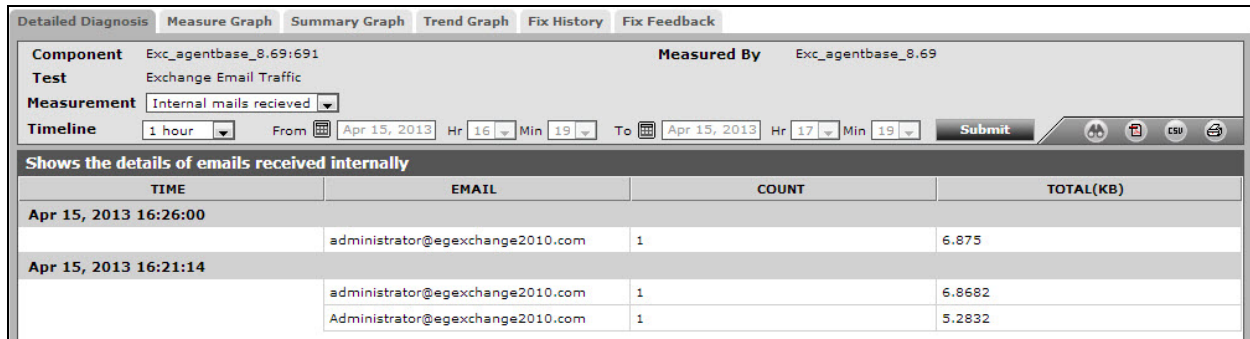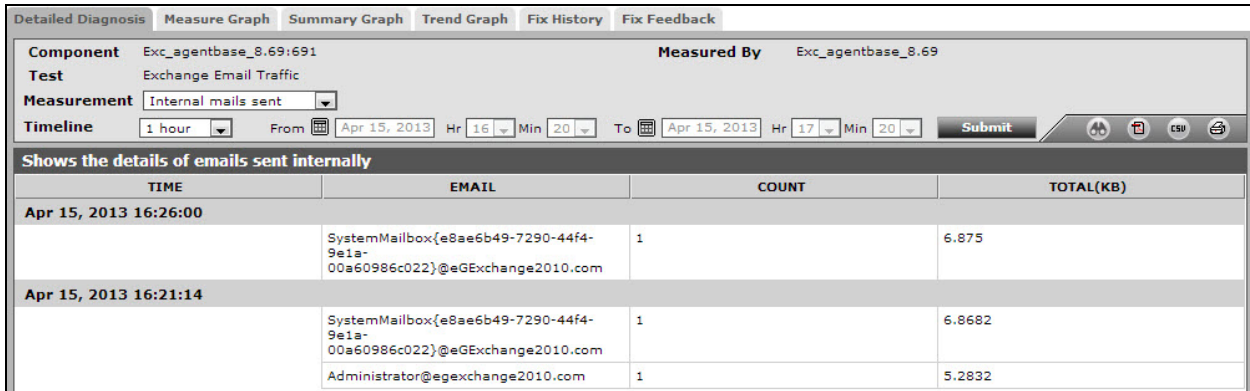

Figure 3.6: The detailed diagnosis of the Internal mails received measure

Use the detailed diagnosis of the *Internal mails sent* measure to know the internal email IDs that sent the emails, the number of emails that were sent from each ID, and the total size of the emails sent from an ID. This way, you can quickly identify the email ID that sent the maximum number of emails and that which sent mails of the maximum size.

Figure 3.7: The detailed diagnosis of the Internal mails sent measure

3.3.13 Exchange Replication Health Test

This test checks all aspects of replication and replay and reports on the health of each aspect. It is designed for the proactive monitoring of continuous replication and the continuous replication pipeline, the availability of Active Manager, and the health and status of the underlying cluster service, quorum, and network components.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each aspect of replication that is tested.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. By default, this is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
TransientEvent SuppressionWindow	This parameter specifies the number of minutes that the queue lengths can be exceeded before the queue length tests are considered to have failed. This parameter is used to reduce the number of failures due to transient load generation. By default, this parameter is set to *3* minutes.
Detailed Diagnosis	To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option.

The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:

• The eG manager license should allow the detailed diagnosis capability

• Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0. |

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mailbox replication service status	Indicates the connectivity status of this aspect of replication.		If the value of this measure is Success, it indicates that this replication aspect is in good health currently. If the value of this measure is Failure, it indicates problems in this replication aspect. The numeric values that correspond to these measure values are as follows: | Measure Value	Numeric Value
---	---
Success	1
Failure	0	 If the status reported by this measure is Failure, you can use the detailed diagnosis of this test to determine the reason for the failure. **Note:** Typically, this measure reports the **Measure Value**s listed in the table above to indicate status of each replication-related activity that is monitored. However, in the graph of this measure, the Numeric values are used to represent replication health.

If some aspect related to replication reports the status as *Failed*, you can use the detailed diagnosis of the **Exchange Replication Health** test to view the error that caused the failure.
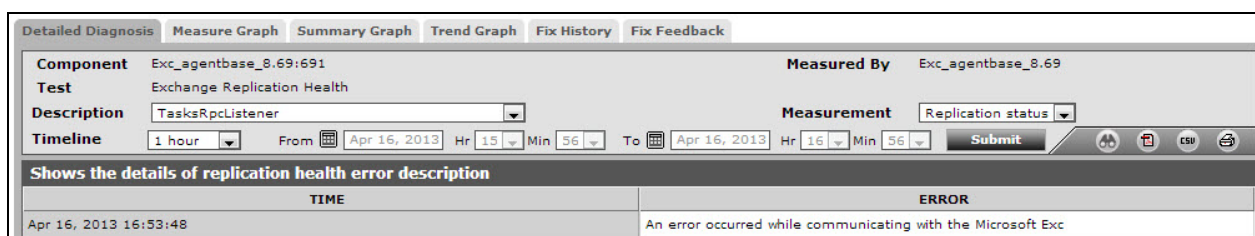

Figure 3.8: The detailed diagnosis of the Replication health test

3.3.14 Mailbox Replication Service Test

The Mailbox Replication Service (MRS), which resides on all Microsoft Exchange Server 2010 Client Access servers, is the service responsible for moving mailboxes, importing and exporting .pst files, and restoring disabled and soft-deleted mailboxes. MRS plays an integral role in migrations from Exchange 2003 or 2007 to Exchange 2010 because moving mailboxes is the only practical way to get user data into mailboxes. If you encounter errors during such migrations, you can use this test to make sure that MRS is running and that it responds to a remote procedure call (RPC) ping check.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each aspect of mailbox replication service health that is tested by this test.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. By default, this is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
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:

Parameters	Description
	• The eG manager license should allow the detailed diagnosis capability
	• Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Mailbox replication service status	Indicates the current status of this aspect of MRS health.		If the value of this measure is *True*, it indicates that this aspect is in good health currently. If the value of this measure is *False*, it indicates problems in this aspect. The numeric values that correspond to these measure values are as follows:

Measure Value	Numeric Value
True	1
False	0

If the status reported by this measure is False, you can use the detailed diagnosis of this test to determine the reason for the failure of the corresponding aspect.

Note:

Typically, this measure reports the **Measure Value**s listed in the table above to indicate the status of MRS. However, in the graph of this measure, the Numeric values are used to represent MRS health.

If the value of the *Mailbox replication service status* measure is False for any of the checks that are performed by the test, then, you can use the detailed diagnosis of this test to figure out why that check failed.
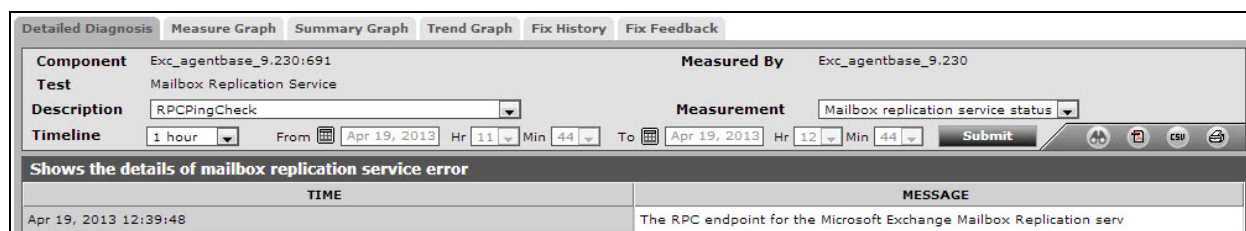
Figure 3.9: The detailed diagnosis of the Mailbox Replication Service test

3.3.15 Exchange Database Details Test

Mailbox Database can be considered a container that stores and maintains all mailboxes of the users. When administrators install Microsoft Exchange Server 2010 one Mailbox Database is automatically created which enables the Exchange Server to create mailboxes for several users. Since mailboxes constantly grow in size and number, these mailbox databases should be adequately sized. Lack of space in an exchange database can cause the mailboxes in that database to stop receiving emails! To avoid such an outcome, administrators can use this test to continuously track the space usage in each of the Exchange mailbox databases configured on the Exchange server and rapidly isolate the mailbox database that is running out of space. The test also helps administrators differentiate between actual free space and white space.

Note:

This test applies only to Exchange 2010 servers.

Target of the test : An Exchange 2010 server configured with the Mailbox role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each mailbox database on the Exchange 2010 server.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number through which the Mailbox server communicates. By default, this is *6001*.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Total drive space	Indicates the total size of this database.	GB	
Free space in drive	Indicates the amount of space lying unused in this mailbox database.	GB	A high value is desired for this measure. Note that this value does not include white space.
Disk free space in drive	Indicates the percentage of free space in this mailbox database.	Percent	Ideally, the value of this measure should be high. A low value or a consistent decrease in this value is a cause for concern, as it indicates that the space in the mailbox database is getting rapidly eroded. You can compare the value of this measure across mailbox databases to identify that database that has very low free space. If any database has less than 5% free space, it is worrysome, since this could mean that the mailbox database is experiencing a severe space crunch; this in turn can cause that mailbox to stop receiving mails. Note that this percentage does not consider the whitespace in the Exchange database.
White space	Indicates the total amount of whitepspace in this mailbox database.	GB	Exchange 2010 constantly runs an online defragmentation process, which automatically deletes content that has passed the deleted item retention period that is configured in Exchange. The free space that is created in the Exchange mailbox database as a result of this deletion is known as whitespace. When new content comes in, this whitespace will be used by Exchange 2010 before expanding the database any larger.
Total free space in	Indicates the total amount	GB	This is the total free space in the

Measurement	Description	Measurement Unit	Interpretation
drive	of space that is free in this mailbox database.		database, inclusive of the whitespace.
Total disk free space in drive	Indicates the percentage of total space in this mailbox database that is currently free.	Percent	Ideally, the value of this measure should be high. A low value or a consistent decrease in this value is a cause for concern, as it indicates that the space in the mailbox database is getting rapidly eroded. You can compare the value of this measure across mailbox databases to identify that database that has very low free space. If any database has less than 5% free space, it is worrysome, since this could mean that the mailbox database is experiencing a severe space crunch; this in turn can cause that mailbox to stop receiving mails. Note that this percentage includes the whitespace in the Exchange database.

3.3.16 Exchange ActiveSync Connectivity Test

Exchange ActiveSync lets you synchronize a mobile device with your Exchange 2010 mailbox, so that you can check your emails from your mobile phone itself! Whenever a mobile phone user complaints that he/she is unable to check or is experiencing slowness when checking emails on his/her mobile phone, Exchange administrators need to quickly determine what is causing the non-sync – is it because ActiveSync is unable to synchronize with the user's mailbox? Or is it because ActiveSync is taking too long to perform the synchronization? At which stage of the synchronization did the failure/delay occur? This test helps answer all these questions. The test periodically checks ActiveSync connectivity at every stage (a.k.a scenario) of the synchronization – eg., the Logon stage, the FolderSync stage, the Options stage, etc. - reports issues and latencies (if any) in connectivity, and leads you to the exact stage at which the failure/slowdown occurred.

Target of the test : A server configured with the Mailbox server role

Agent deploying the test : An internal agent

Outputs of the test : One set of results for each <ClientAccessServer>/ <LocalSiteNameofClientAccessServer>/ <SynchronizationStage/Scenario tested>combination.

Configurable parameters for the test

Parameters	Description
Test Period	How often should the test be executed.
Host	Indicates the IP address of the Mailbox server.
Port	The port number of the Mailbox server. By default, this is *6001*.
XchgeXtensionShellPath	The Exchange Management Shell is a command-line management interface, built on Windows PowerShell which enables you to administer every part of Microsoft Exchange. This test uses the Exchange management shell to run scripts and collect the desired performance metrics from the Exchange server. By default, the test auto-discovers the location of the Exchange management shell and thus, automatically loads the Exchange management shell snap-in (exshell.psc1) for script execution. This is why, the XchgeXtensionShellPath is set to *none* by default.
Client Access Server	Specify the fully-qualified domain name of the Client Access server.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
ActiveSync connectivity status	Indicates whether the ActiveSync connectivity check was successful or not at this stage/scenario of the synchronization.		If the value of this measure is *Success*, it indicates that the ActiveSync connectivity check was successful at this stage. If the value of this measure is *Failure*, it indicates that mailbox synchronization using ActiveSync failed at this stage. The numeric values that correspond to these measure values are as follows: 	Measure Value	Numeric Value	 |---|---| 	Success	1	 	Failure	0	 **Note:**

Measurement	Description	Measurement Unit	Interpretation
			Typically, this measure reports the **Measure Value**s listed in the table above to indicate the ActiveSync connectivity status. However, in the graph of this measure, the Numeric values are used to represent the connectivity status.
ActiveSync latency	Indicates the time taken by ActiveSync to successfully complete this stage/scenario of the synchronization.	Secs	A low value is desired for this measure. A high value indicates that this stage/scenario of the synchronization is taking too long to complete.

Compare the value of this measure across stages/scenarios to know where the maximum delay occurred. This will greatly aid troubleshooting. |

About eG Innovations

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

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

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