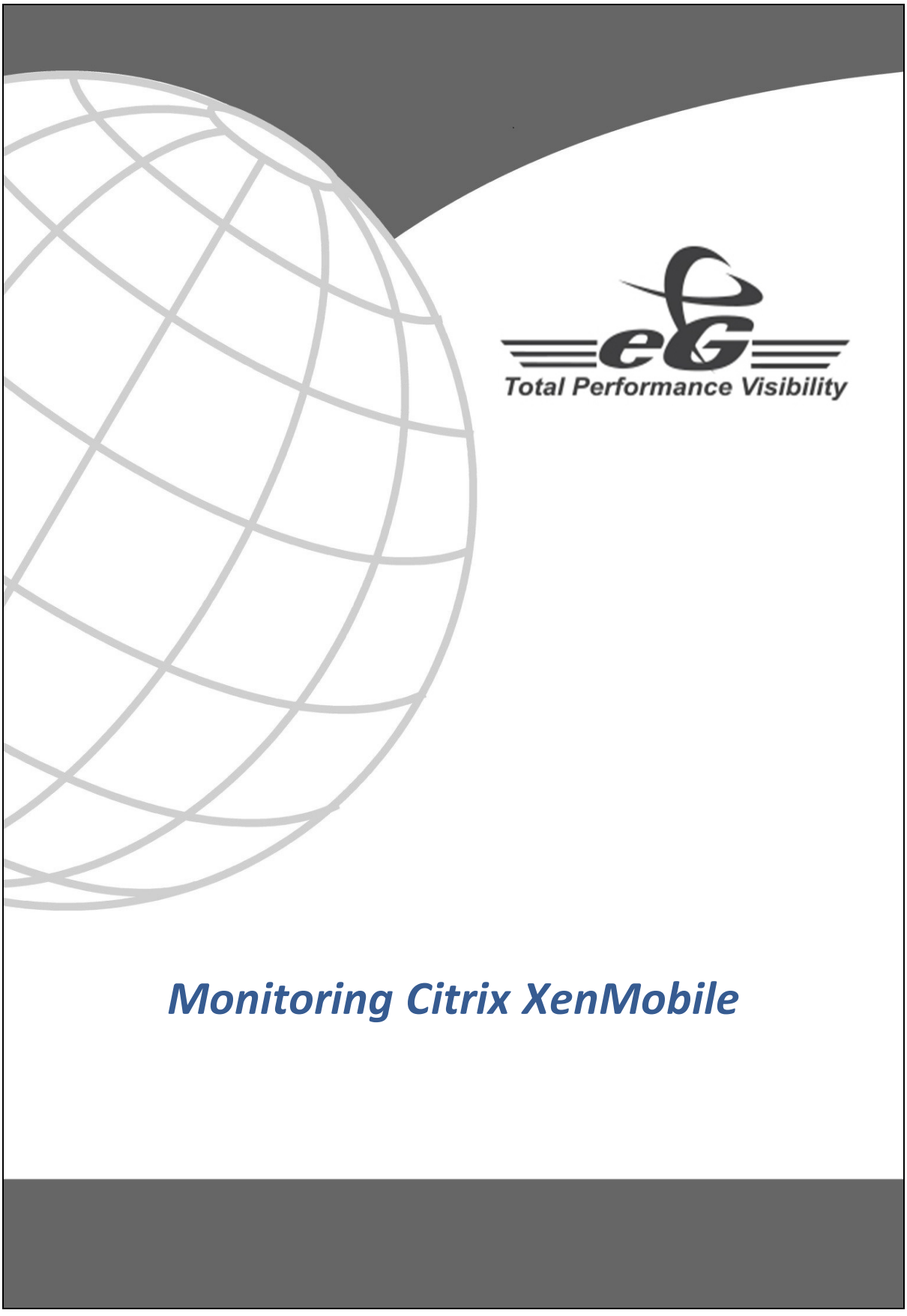

Monitoring Citrix XenMobile

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1

Introduction

Citrix XenMobile is an enterprise mobility management solution that provides administrators with mobile device management (MDM), mobile application management (MAM) and online file-sharing capabilities. To deliver these services to end-users, the XenMobile software suite includes a wide range of components - the Citrix Netscaler that authenticates remote user sessions to the app store and ensures secure access, the XenMobile 10 virtual appliance which integrates the App Controller and the XenMobile MDM to serve a single purpose of storing the applications and data sources that can be accessed by users as well as protecting the corporate network from mobile threats by applying configured mobile usage policies on devices, and the Citrix ShareFile that enables efficient data sharing and synchronization across users.

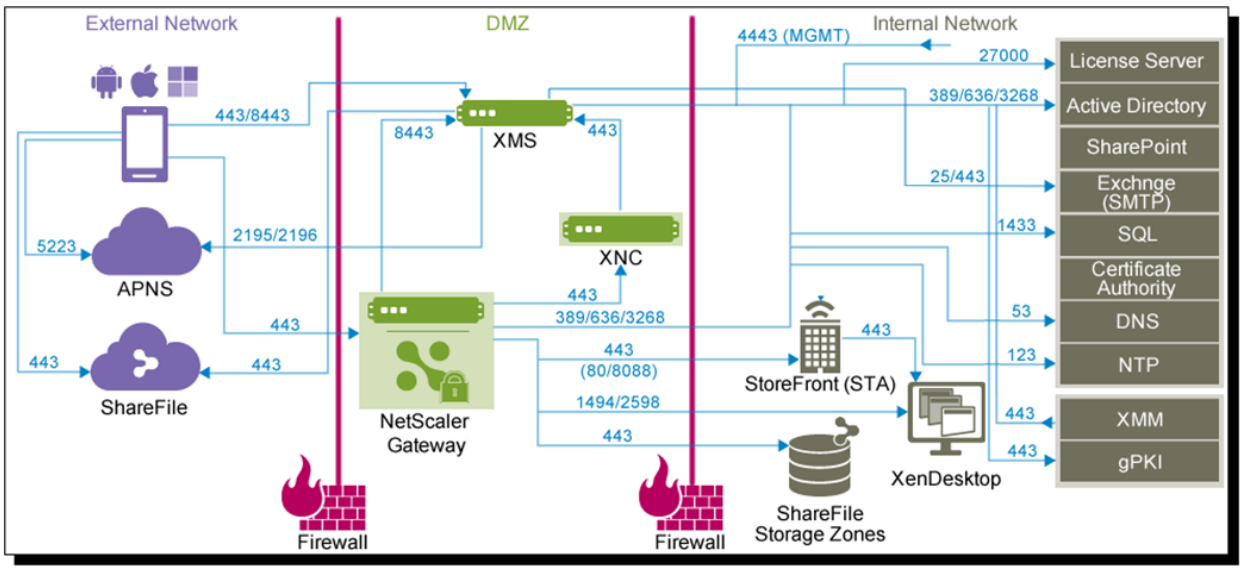


Figure 1.1: The Citrix XenMobile Architecture

eG Enterprise Suite provides specialized monitors for each of the core components of the Citrix XenMobile service – namely, the Citrix XenMobile server, the Citrix ShareFile, and the Citrix Storage zones. These out-of-the-box monitors periodically check and report the availability, responsiveness, and overall health of each of these components, and thus reveals how the Citrix XenMobile service as a whole is performing.

This document details how eG monitors the Citrix XenMobile server and what metrics it collects from it.

2

Administering the eG Manager to monitor the Citrix XenMobile

1. Log into the eG administrative interface.
2. eG Enterprise cannot automatically discover Citrix XenMobile. You need to manually add the server using the **COMPONENTS** page (see Figure 2.1) that appears when the Infrastructure -> Components -> Add/Modify menu sequence is followed. Remember that components manually added are managed automatically.

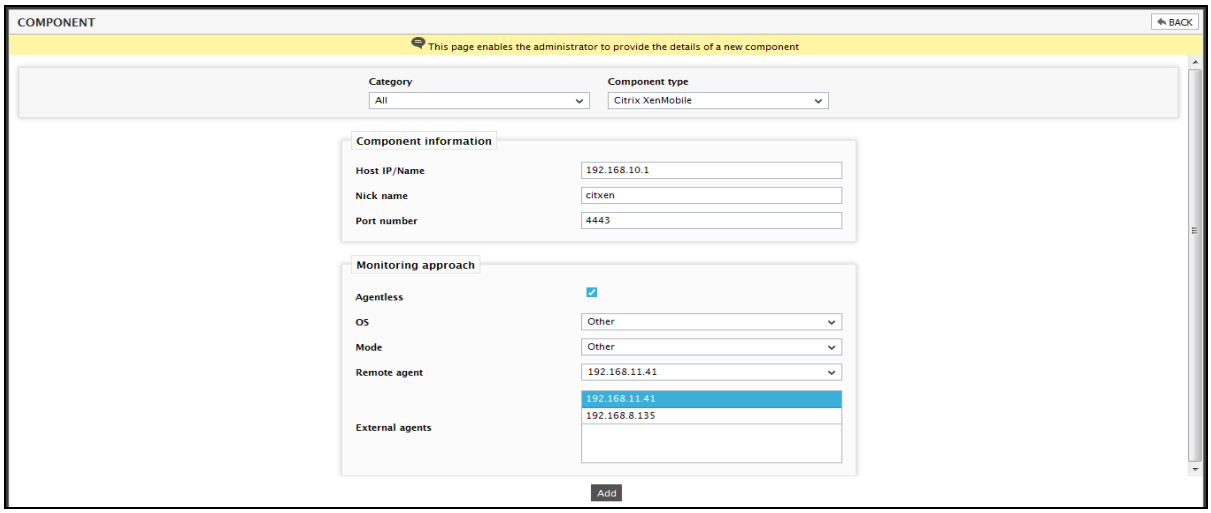


Figure 2.1: Adding a Citrix XenMobile

3. Specify the **Host IP** and the **Nick name** of the Citrix XenMobile in Figure 2.1. Then click the **Add** button to register the changes.
4. When you attempt to sign out, a list of unconfigured tests will appear as shown in Figure 2.2.

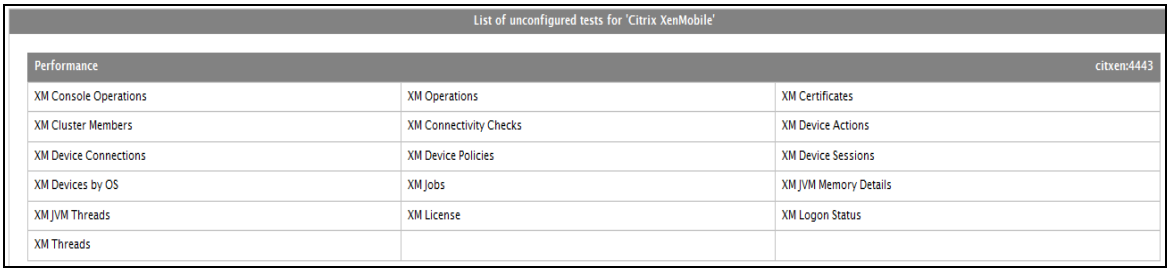


Figure 2.2: List of Unconfigured tests to be configured for the Citrix XenMobile

5. Click on the **XM Certificates** test to configure it. To know how to configure the test, click here.

6. Once the **XM Certificates** test is configured, signout of the eG administrative interface. This time you will be prompted to configure the **XM Console Operations** test and the **XM Operations** test.
7. Click on the **XM Console Operations** test to configure it. To know how to configure the test, click here.
8. Finally, signout of the eG administrative interface.

3

Monitoring Citrix XenMobile

The Citrix XenMobile server is a unified solution that possesses the capabilities of both the Citrix XenMobile MDM and Citrix App Controller. Besides providing role-based management, configuration and security of corporate and user-owned devices, XenMobile server also helps in delivering access to web, SaaS, Android, and iOS apps, as well as integrated ShareFile data and documents. Using this tool/appliance, IT can manage mobile devices, set mobile policies and compliance rules, gain visibility to the mobile network, provide control over mobile apps and data, and shield the network from mobile threats. IT can blacklist or whitelist apps, detect devices that are jail broken or out of compliance and block their ActiveSync email access and do a full or selective wipe of a device that is lost, stolen or out of compliance. This implies that the non-availability of the XenMobile server, even for a few minutes, or a temporary slowdown in its operations, can have grave consequences! Without the XenMobile server, mobile devices will not be able to register with XenMobile; registered devices will not be able to download latest policies. In addition, users will not be able to access SaaS, mobile applications, or ShareFile. This in turn can expose the environment to serious mobile threats – for instance, access by unauthorized devices and usage of blacklisted applications will go undetected; confidential information may travel beyond authorized boundaries increasing the possibilities of abuse. To keep such intrusions at bay and to ensure a secure mobile experience for users, enhanced user productivity, administrators need to keep an eye on the availability and overall health of the XenMobile server, proactively detect potential problem conditions, and initiate measures to avert them.

To enable administrators to achieve this, eG Enterprise provides the *Citrix XenMobile* monitoring model.

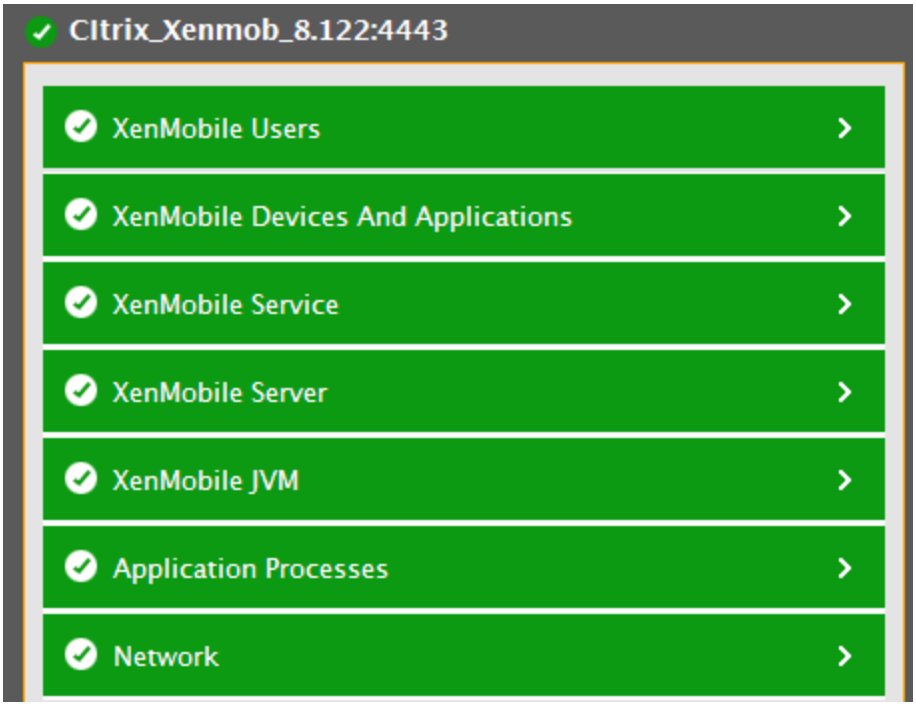


Figure 3.1: The layer model of the Citrix XenMobile server

Each layer of this monitoring model is mapped to a wide variety of tests that that use either/both of the following mechanisms to pull out performance statistics related to the XenMobile server:

- The eG tests uses the **HTTPS Client** to hit the URL of the XenMobile Web Console and pulls out a host of performance information, and/or;
- The eG tests parse a Syslog file created on the remote Syslog server used by XenMobile for collecting metrics.

To use these mechanisms, the following pre-requisites need to be fulfilled:

- The eG agent should be deployed on the Syslog server that hosts the Syslog file used for metrics collection.
- The eG agent has to be configured with the credentials of a user to XenMobile who is vested with 'Administrator' privileges.

Using the metrics collected from the Citrix XenMobile server, administrators can ascertain the following:

- Is the XenMobile server available over the network?
- Are any JVM threads being blocked? Exactly, which thread is blocking and which line of code could have caused the block?
- Has the XenMobile server experienced any error events recently? What type of errors are these?
- Does the XenMobile server have adequate user/device licenses?
- Are scheduled jobs running as per schedule on XenMobile?
- What is the current device load on XenMobile? Does the thread pool have adequate threads to handle this load?
- How many devices are currently managed by XenMobile?
- Which of these devices host blacklisted applications?
- Do all managed devices contain all required applications? Which applications are missing on which devices?
- Has XenMobile detected any jail-broken, perimeter-breaching, out-of-compliant, or passcode non-compliant devices? If so, which devices are they?
- Has XenMobile triggered any automated actions on any device? Which of these actions are still pending on these devices and why?
- Which devices are currently disconnected from XenMobile?
- Have any deployments failed?
- Is any SSL certificate installed on XenMobile nearing expiry? If so, which one is it?
- Are there any issues logging into XenMobile?
- What is the current state of each cluster task and how long does it take for a task to complete?
- Which is current state of each XenMobile cluster node?

The sections that follow will take you on a layer-by-layer tour of the *Citrix XenMobile* monitoring model. However, since the tests associated with the **Network** and **Application Processes** layers have been already

dealt with in detail in the *Monitoring Unix and Windows Servers* document, this chapter will focus on the other layers only.

3.1 The XenMobile JVM Layer

Erratic usage of the JVM memory heap, blocked JVM threads, unusually long execution of queries in the hibernate cache and resource-intensive JVM threads can adversely impact the performance of the XenMobile server that overlays the JVM. To capture such JVM-related abnormalities proactively, administrators can use the tests mapped to the **XenMobile JVM** layer.

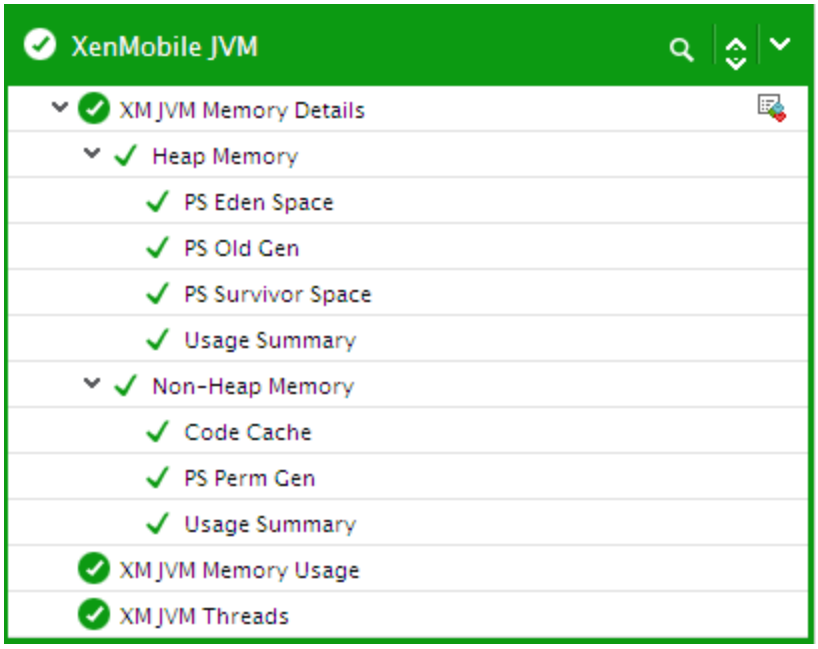


Figure 3.2: Figure 2.2: The tests mapped to the XenMobile JVM layer

3.1.1 XM JVM Memory Details Test

This test monitors every memory type on the XenMobile JVM and reports how efficiently the JVM utilizes the memory resources of each type.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for every *Memory Type:Memory Pool* of XenMobile JVM that is being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.

4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Initial usage:	Indicates the initial amount of memory allocated to this memory pool for memory management at startup.	MB	
Initial peak usage:	Indicates the upper limit usage of the initial memory by this memory pool since startup of the JVM or since the peak was reset.	MB	
Initial collection usage:	Indicates the amount of initial memory that was utilized by this memory pool after the completion of the last garbage collection.	MB	
Current usage:	Indicates the amount of memory that is currently utilized by this memory pool.	MB	It includes the memory occupied by all objects, including both reachable and unreachable objects. Ideally, the value of this measure should be low. A high value or a consistent increase in the value could indicate gradual erosion of memory resources. In such a situation, you can take the help of the detailed diagnosis of this measure (if enabled), to figure out which class is using up memory excessively.
Current peak usage:	Indicates the upper limit	MB	

Measurement	Description	Measurement Unit	Interpretation
	usage of the memory that is currently utilized by this memory pool.		
Current Collection usage:	Indicates the amount of used memory that was currently utilized by this memory pool after the completion of the last garbage collection.	MB	
Committed memory:	Indicates the amount of memory that is guaranteed to be available for use by this memory pool.	MB	The amount of Committed memory may change over time. The Java virtual machine may release memory to the system and committed memory could be less than the amount of memory initially allocated at startup. Committed will always be greater than or equal to used memory.
Committed peak usage:	Indicates the upper limit usage of the memory that is guaranteed to be available for use by this memory pool.	MB	
Committed collection usage:	Indicates the amount of committed memory that is guaranteed to be available for use by this memory pool after the completion of the last garbage collection.	MB	
Max used:	Indicates the maximum amount of memory that can be used for memory management by this memory pool.	MB	This is the difference between Committed memory and Current usage. Ideally, the value of this measure should be high.
Max peak usage:	Indicates the upper limit of	MB	

Measurement	Description	Measurement Unit	Interpretation
	the maximum memory that can be used for memory management by this memory pool.		
Max collection usage:	Indicates the amount of maximum memory that can be used for memory management by this memory pool after the completion of the last garbage collection.	MB	
Initial Memory:	Indicates the total amount of memory initially allocated to the memory pools of this memory type at startup.	MB	This measure is applicable only to the Usage Summary descriptor.
Used Memory:	Indicates the total amount of memory currently utilized by the memory pools of this memory type.	MB	This measure is applicable only to the Usage Summary descriptor. Ideally, the value of this measure should be low. A high value or a consistent increase in the value could indicate gradual erosion of memory resources. In such a situation, you can take the help of the detailed diagnosis of this measure (if enabled), to figure out which class is using up memory excessively.
Committed memory:	Indicates the amount of memory that is guaranteed to be available for use by the memory pools of this memory type.	MB	This measure is applicable only to the Usage Summary descriptor.
Free memory:	Indicates the total amount of memory currently available for use by the	MB	This measure is applicable only to the Usage Summary descriptor. Ideally, the value of this measure

Measurement	Description	Measurement Unit	Interpretation
	memory pools of this memory type.		should be high.
Maximum memory:	Indicates the maximum amount of memory that can be used for memory management by the memory pools of this memory type.	MB	This measure is applicable only to the Usage Summary descriptor.
Used percentage:	Indicates the percentage of memory utilized by the memory pools of this memory type.	Percent	This measure is applicable only to the Usage Summary descriptor. Ideally, the value of this measure should be low. A very high value of this measure could indicate excessive memory consumption by the JVM, which in turn, could warrant further investigation. In such a situation, you can take the help of the detailed diagnosis of this measure (if enabled), to figure out which class is using up memory excessively.

3.1.2 XM JVM Threads Test

This test reports the status of threads running in the XenMobile JVM. Using this test, you can figure out the resource hungry threads and also the threads that are sparsely utilized.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for the target XenMobile server that is being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.

5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Is Contention monitoring enabled?:	Indicates whether/not contention monitoring is enabled.		Some Java virtual machines may support thread contention monitoring. When thread contention monitoring is enabled, the accumulated elapsed time that the thread has blocked for synchronization or waited for notification will be collected and returned in the ThreadInfo object. The values that this measure reports and their corresponding numeric values are listed in the table below: **Measure Value** / **Numeric Value**: Yes / 1; No / 0 **Note:**

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td></td><td></td><td></td><td>By default, this measure reports the Measure Values discussed in the table above. However, the graph of this measure is indicated using the numeric equivalents only.</td></tr>
<tr><td>Is CPU time enabled?:</td><td>Indicates whether/not the CPU time measuring is enabled.</td><td></td><td>A Java virtual machine implementation may support measuring the CPU time for the current thread, for any thread, or for no threads.

The values that this measure reports and their corresponding numeric values are listed in the table below:
<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>Yes</td><td>1</td></tr><tr><td>No</td><td>0</td></tr></table>
Note:

By default, this measure reports the Measure Values discussed in the table above. However, the graph of this measure is indicated using the numeric equivalents only.</td></tr>
<tr><td>Peak threads:</td><td>Indicates the highest number of live threads since XenMobile JVM started.</td><td>Number</td><td></td></tr>
<tr><td>Total started threads:</td><td>Indicates the total number of threads started (including daemon, non-daemon, and terminated) during the last measurement period.</td><td>Number</td><td></td></tr>
<tr><td>Threads:</td><td>Indicates the total number of threads (including daemon and non- daemon</td><td>Number</td><td></td></tr>
</table>

Measurement	Description	Measurement Unit	Interpretation
	threads).		
Daemon threads:	Indicates the current number of live daemon threads.	Number	
Waiting threads:	Indicates the number of threads that are currently in a waiting state.	Number	A thread is said to be in a Waiting state if the thread enters a synchronized block, tries to take a lock that is already held by another thread, and hence, waits till the other thread notifies that it has released the lock. Ideally, the value of this measure should be low. A very high value could be indicative of excessive waiting activity on the JVM. You can use the detailed diagnosis of this measure, if enabled, to figure out which threads are currently in the waiting state. While waiting, the Java application program does no productive work and its ability to complete the task-at-hand is degraded. A certain amount of waiting may be acceptable for Java application programs. However, when the amount of time spent waiting becomes excessive or if the number of times that waits occur exceeds a reasonable amount, the Java application program may not be programmed correctly to take advantage of the available resources. When this happens, the delay caused by the waiting Java application programs elongates the response time experienced by an end user. An enterprise may use Java application programs to perform various functions. Delays based on abnormal degradation consume employee time and may be

Measurement	Description	Measurement Unit	Interpretation
			costly to corporations.
Runnable threads:	Indicates the current number of threads in a runnable state.	Number	The detailed diagnosis of this measure, if enabled, provides the name of the threads, the CPU usage by the threads, the time for which the thread was in a blocked state, waiting state, etc.
Blocked threads:	Indicates the number of threads that are currently in a blocked state.	Number	If a thread is trying to take a lock (to enter a synchronized block), but the lock is already held by another thread, then such a thread is called a blocked thread. The detailed diagnosis of this measure, if enabled, provides in-depth information related to the blocked threads.
Timed waiting threads:	Indicates the number of threads in a *TIMED_ WAITING* state.	Number	When a thread is in the *TIMED_ WAITING* state, it implies that the thread is waiting for another thread to do something, but will give up after a specified time out period. To view the details of threads in the *TIMED_ WAITING* state, use the detailed diagnosis of this measure, if enabled.

3.1.3 XM JVM Memory Usage Test

This test monitors the memory on the XenMobile JVM and reports how efficiently the JVM utilizes the memory resources.

This test is disabled by default. To enable the test, follow the Agents -> Tests -> Enable/Disable menu sequence in the eG administrative interface, pick *Citrix XenMobile* as the **Component type**, select *Performance* as the **Test type**, choose this test from the list of **DISABLED TESTS** list, and click on the **<** button.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for the target XenMobile server that is being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Maximum memory:	Indicates the maximum amount of memory allocated for the JVM.	MB	
Used memory:	Indicates the amount of memory currently used.	MB	It includes the memory occupied by all objects, including both reachable and unreachable objects. Ideally, the value of this measure should be low. A high value or a consistent increase in the value could indicate gradual erosion of memory resources.
Used percentage:	Indicates the percentage of used memory.	Percent	Ideally, the value of this measure should be low. A very high value of this measure could indicate excessive memory consumption by the JVM, which in turn, could warrant further investigation.
Committed memory:	Indicates the amount of memory that is guaranteed to be available for use by the JVM.	MB	
Time taken for garbage collection:	Indicates the time taken by the garbage collector for	Secs	Ideally, the value of this measure should

Measurement	Description	Measurement Unit	Interpretation
	collecting unused memory.		be low. This is because, the garbage collection (GC) activity tends to suspend the operations of the application until such time that GC ends. Longer the GC time, longer it would take for the application to resume its functions. To minimize the impact of GC on application performance, it is best to ensure that GC activity does not take too long to complete.

3.1.4 XM Hibernate Cache Test

Hibernate is a high-performance Object/Relational persistence and query service which is licensed under the open source GNU Lesser General Public License (LGPL). Hibernate not only takes care of the mapping from Java classes to database tables (and from Java data types to SQL data types), but also provides data query and retrieval facilities. Hibernate provides 3 types of caching.

Session Cache or First Level Cache

The session cache caches object i.e. entity, within the current session. It is enabled by default in Hibernate. Objects in the session cache reside in the same memory location.

Second Level Cache

The second level cache, an optional cache is responsible for caching objects across sessions. When this is turned on, objects will be first searched in cache and if they are not found, a database query will be fired. Second level cache will be used when the objects are loaded using their primary key. This includes fetching of associations. In case of second level cache the objects are constructed and hence all of them will reside in different memory locations.

Query Cache

Query Cache is used to cache the results of a query. By default, the query cache is optional. When the query cache is turned on, the results of the query are stored against the combination of query and parameters. Every time the query is fired the cache manager checks for the combination of parameters and query. If the results are found in the cache they are returned otherwise a database transaction is initiated.

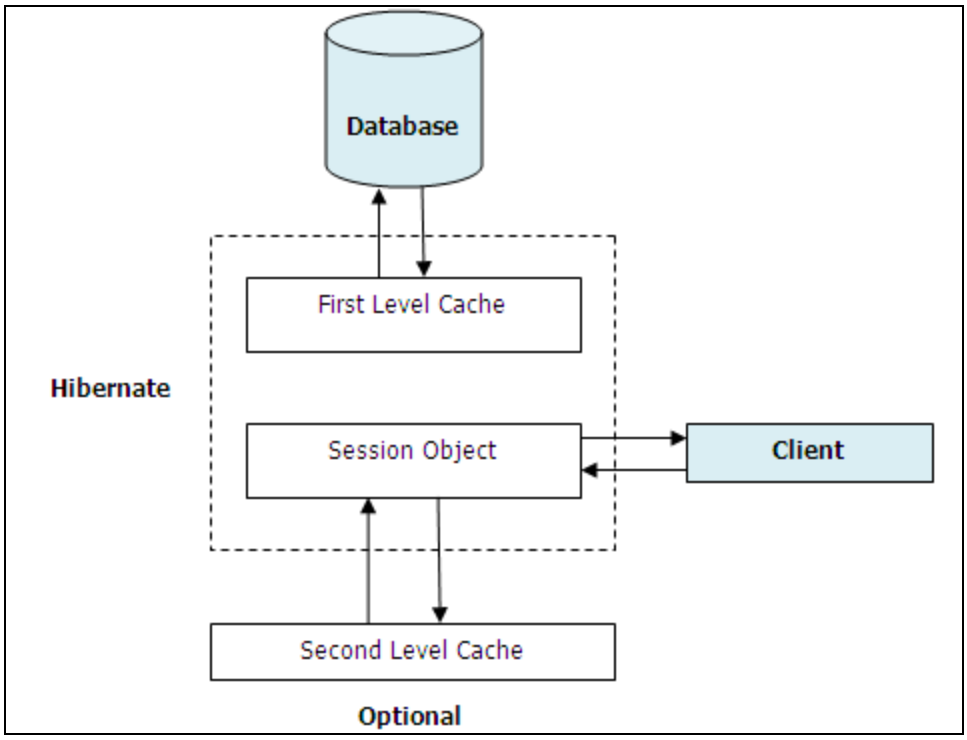


Figure 3.3: The overview of the Hibernate Cache

Hibernate Caching functionality is designed to reduce the amount of necessary database access. When the objects are cached they reside in memory. You have the flexibility to limit the usage of memory and store the items in disk storage.

Whenever a hibernate session tries to load an entity, the first level cache is searched for the cached copy of the entity. The first level cache returns the result to the session if the cached entity is found. If the first level cache does not possess the entity, the second level cache is searched for that entity. If the entity is found in the second level cache, then the entity is served from it. If not, a query is executed to retrieve the entity. If the query under execution has previously cached results, then the result of the query is retrieved from the query cache and the cached entity identifiers are used to access the second level cache. If the query was not executed earlier, a query is fired to the database. Once the entity is returned as a response, it is stored in both first level cache and the second level cache before being returned as a response. If any changes were made directly to the database, then the second level cache needs to be updated with the modified entities. If the second level cache is not updated for a prolonged time period, then the queries served by the cache may contain obsolete entities. In the XenMobile environment, this may cause old policies and application lists to be pushed to the user devices, which in turn may pose a serious security thread to the mobile data. Also, if the cache is not sized adequately, it may not be able to hold many entities, resulting in a high ratio of cache misses. This will in turn increase direct database accesses, which in itself is a performance spoiler! Moreover, query execution may also take longer than normal, impacting user experience with the XenMobile server. To avoid such unpleasant eventualities, administrators should constantly monitor the usage and overall performance of the Hibernate cache. This is where the **XM Hibernate Cache** test helps.

This test tracks the requests to cache and notifies administrators if a large number of requests were not serviced by the cache. This test also points you to the queries that took too long to execute, thus enabling administrators to nail the root-cause of any slowness that may be experienced by XenMobile users. This way, this test provides you with effective pointers to optimize cache usage and enhance the performance of the XenMobile server.

This test is disabled by default. To enable the test, follow the Agents -> Tests -> Enable/Disable menu sequence in the eG administrative interface, pick *Citrix XenMobile* as the **Component type**, select *Performance* as the **Test type**, choose this test from the list of **DISABLED TESTS** list, and click on the **<** button.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for every *category* of Hibernate cache in XenMobile that is being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

This test will report the following metrics for the *Collections* descriptor:

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Loads:	Indicates the number of times the collections were loaded.	Number	The detailed diagnosis of this measure if enabled, lists the name of the each collection and the number of times each collection was loaded.
Fetches:	Indicates the number of times the collections were fetched.	Number	The detailed diagnosis of this measure if enabled, lists the name of the collection and the number of times each collection was fetched.
Recreates:	Indicates the number of times the collections were recreated.	Number	The detailed diagnosis of this measure if enabled, lists the name of each collection and the number of times each collection was recreated.
Updates:	Indicates the number of times the collections were updated.	Number	The detailed diagnosis of this measure if enabled, lists the name of the collection and the number of times each collection was updated.
Removes:	Indicates the number of times the collections were removed.	Number	The detailed diagnosis of this measure if enabled, lists the name of each collection and the number of times each collection was removed.

The detailed diagnosis of the *Loads* measure if enabled, lists the name of the each collection and the number of times each collection was loaded.

Details of load count

CATEGORY NAME	LOAD COUNT
Jun 11, 2015 15:34:15	
com.sparus.nps.om.impl.ProvisioningImpl.osFamilies	3
com.sparus.nps.om.impl.DeviceImpl.deviceUserPrincipals	120
com.sparus.nps.om.impl.DeviceImpl.softwareInventory	120
com.sparus.nps.om.impl.DeviceImpl.managedSoftwareInventory	120
com.citrix.xms.entities.AccessGateway.agCallbacks	2
com.sparus.nps.om.impl.DeviceImpl.certificates	120
com.sparus.nps.om.impl.DeviceImpl.properties	120
com.sparus.nps.om.impl.DeviceImpl.longProperties	120

Figure 3.4: The detailed diagnosis of the *Loads* measure.

The detailed diagnosis of the *Fetches* measure if enabled, lists the name of the collection and the number of times each collection was fetched.

Details Of fetch count

CATEGORY NAME	FETCH COUNT
Jun 11, 2015 15:10:38	
com.citrix.xms.entities.Account.stores	1
com.sparus.nps.om.impl.DeviceImpl.deviceUserPrincipals	60
com.sparus.nps.om.impl.DeviceImpl.softwareInventory	62
com.sparus.nps.om.impl.DeviceImpl.managedSoftwareInventory	60
com.citrix.xms.entities.AccessGateway.agCallbacks	3
com.sparus.nps.om.impl.DeviceImpl.certificates	60
com.sparus.nps.om.impl.DeviceImpl.properties	62
com.sparus.nps.om.impl.DeviceImpl.longProperties	60

Figure 3.5: The detailed diagnosis of the *Fetches* measure

The detailed diagnosis of the *Recreates* measure if enabled, lists the name of each collection and the number of times each collection was recreated.

Details of recreate count

CATEGORY NAME	RECREATE COUNT
Jun 11, 2015 12:49:01	
com.sparus.nps.om.impl.DeviceCertificateImpl.contents	1

Figure 3.6: The detailed diagnosis of the *Recreates* measure

The detailed diagnosis of the *Updates* measure if enabled, lists the name of the collection and the number of times each collection was updated.

Details of update count

CATEGORY NAME	UPDATE COUNT
Jun 11, 2015 11:48:07	
com.sparus.nps.om.impl.ContainerPackage.children	2

Figure 3.7: The detailed diagnosis of the *Updates* measure

The detailed diagnosis of the *Removes* measure if enabled, lists the name of each collection and the number of times each collection was removed.

Details of remove count

CATEGORY NAME	REMOVE COUNT
Jun 09, 2015 19:51:29	
com.citrix.cg.pojo.vo.AppVO.categories	1

Figure 3.8: The detailed diagnosis of the *Removes* measure

This test will report the following metrics for the *Entities* descriptor:

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Loads:	Indicates the number of times the entities were loaded.	Number	The detailed diagnosis of this measure if enabled, lists the name of each entity and the number of times each entity was loaded.
Fetches:	Indicates the number of times the entities were fetched.	Number	The detailed diagnosis of this measure if enabled, lists the name of each entity and the number of times each entity was fetched.
Updates:	Indicates the number of times the entities were updated.	Number	The detailed diagnosis of this measure if enable, lists the name of the entity and the number of times each entity was updated.
Inserts:	Indicates the number of entity inserts.	Number	The detailed diagnosis of this measure if enabled, lists the name of the entity and the number of times each entity was inserted.
Deletes:	Indicates the number of times the entities were deleted.	Number	The detailed diagnosis of this measure if enabled, lists the nale of the entity and the number of times each entity was deleted.

This test will report the following metrics for the *Queries* descriptor:

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Cache hits:	Indicates the number of queries that were successfully retrieved from the queries cache.	Number	A high value is desired for this measure. The detailed diagnosis of this measure if enabled, lists the query and the number of times each query was successfully retrieved.

Measurement	Description	Measurement Unit	Interpretation
Cache hits:	Cache misses: Indicates the number of queries that were not available in the queries cache.	Number	The detailed diagnosis of this measure if enabled, lists the queries and the number of times each query was not available in the cache.
Cache puts:	Indicates the number of cacheable queries put in the queries cache.	Number	The detailed diagnosis of this measure if enabled, lists the queries and the number of times cacheable queries were put in the cache.
Execution average time:	Indicates the average time taken to execute the queries in the queries cache.	Seconds	A low value is desired for this measure. The detailed diagnosis of this measure if enabled, lists the name of the query and the time taken to execute the query.
Executions:	Indicates the total number of queries executed from the queries cache.	Number	The detailed diagnosis of this measure if enabled, lists each query that was executed and number of times each query was executed.
Max Execution time:	Indicates the maximum time taken to execute a query in the queries cache i.e., the time taken to execute the slowest recorded query.	Seconds	A sudden/gradual increase in the value of this measure is a cause of concern. When a query takes too long to execute, the subsequent queries should wait for a longer time thus resulting in delayed execution of the queries. When the execution of the queries take too longer than usual, or when a query is being executed indefinitely, then it may directly impact the performance of the XenMobile server which when left unattended may impact the overall performance of the target environment resulting in poor end user experience. The detailed diagnosis of this measure if enabled, lists each query that was executed and the maximum time taken

Measurement	Description	Measurement Unit	Interpretation
			for execution.
Min Execution time:	Indicates the minimum time taken to execute a query in the queries cache i.e., the time taken to execute the fastest recorded query.	Seconds	The detailed diagnosis of this measure if enabled, lists each query and the minimum time taken for executing each query.
Min Execution time:	Execution rows: Indicates the number of rows returned by the queries cache after execution of the queries.	Number	The detailed diagnosis of this measure if enabled, lists each query and the number of rows that were returned after execution.

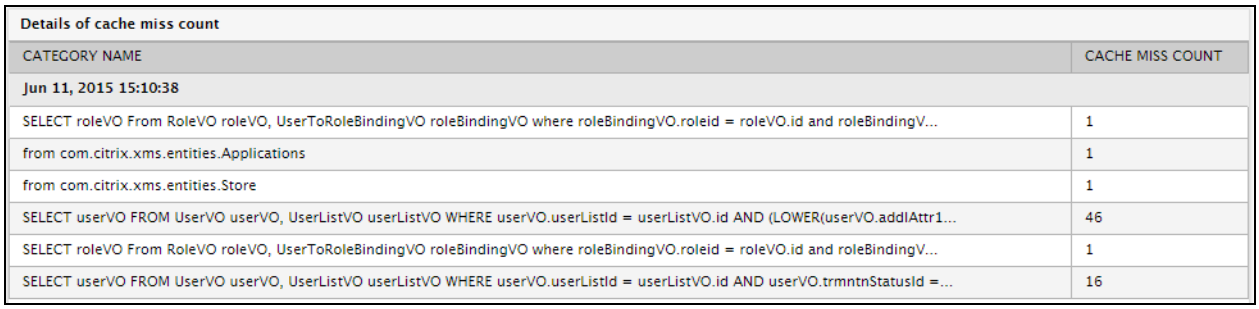
The detailed diagnosis of the *Cache hits* measure if enabled, lists the query and the number of times each query was successfully retrieved.

Details of cache hit count

CATEGORY NAME	CACHE HIT COUNT
Jun 11, 2015 15:10:38	
from com.citrix.xms.entities.LicensingServer	3168
SELECT roleVO From RoleVO roleVO, UserToRoleBindingVO roleBindingVO where roleBindingVO.roleid = roleVO.id and roleBindingV...	2757
SELECT roleVO From RoleVO roleVO, UserToRoleBindingVO roleBindingVO where roleBindingVO.roleid = roleVO.id and roleBindingV...	24
from com.citrix.xms.entities.Applications	62
from com.citrix.xms.entities.Store	98
SELECT userVO FROM UserVO userVO, UserListVO userListVO WHERE userVO.userListId = userListVO.id AND (LOWER(userVO.addlAttr1...	19681
SELECT roleVO From RoleVO roleVO, UserToRoleBindingVO roleBindingVO where roleBindingVO.roleid = roleVO.id and roleBindingV...	8890
SELECT userVO FROM UserVO userVO, UserListVO userListVO WHERE userVO.userListId = userListVO.id AND userVO.trmntnStatusId =...	8634

Figure 3.9: The detailed diagnosis of the *Cache hits* measure

The detailed diagnosis of the *Cache misses* measure if enabled, lists the queries and the number of times each query was not available in the cache.

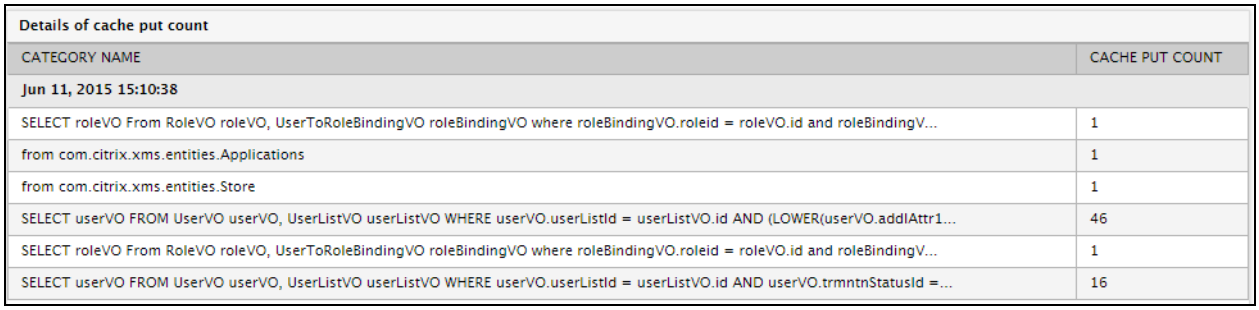


Details of cache miss count

CATEGORY NAME	CACHE MISS COUNT
Jun 11, 2015 15:10:38	
SELECT roleVO From RoleVO roleVO, UserToRoleBindingVO roleBindingVO where roleBindingVO.roleid = roleVO.id and roleBindingV...	1
from com.citrix.xms.entities.Applications	1
from com.citrix.xms.entities.Store	1
SELECT userVO FROM UserVO userVO, UserListVO userListVO WHERE userVO.userListId = userListVO.id AND (LOWER(userVO.addlAttr1...	46
SELECT roleVO From RoleVO roleVO, UserToRoleBindingVO roleBindingVO where roleBindingVO.roleid = roleVO.id and roleBindingV...	1
SELECT userVO FROM UserVO userVO, UserListVO userListVO WHERE userVO.userListId = userListVO.id AND userVO.trmntnStatusId =...	16

Figure 3.10: The detailed diagnosis of the *Cache misses* measure

The detailed diagnosis of the Cache puts measure if enabled, lists the queries and the number of times cacheable queries were put in the cache.

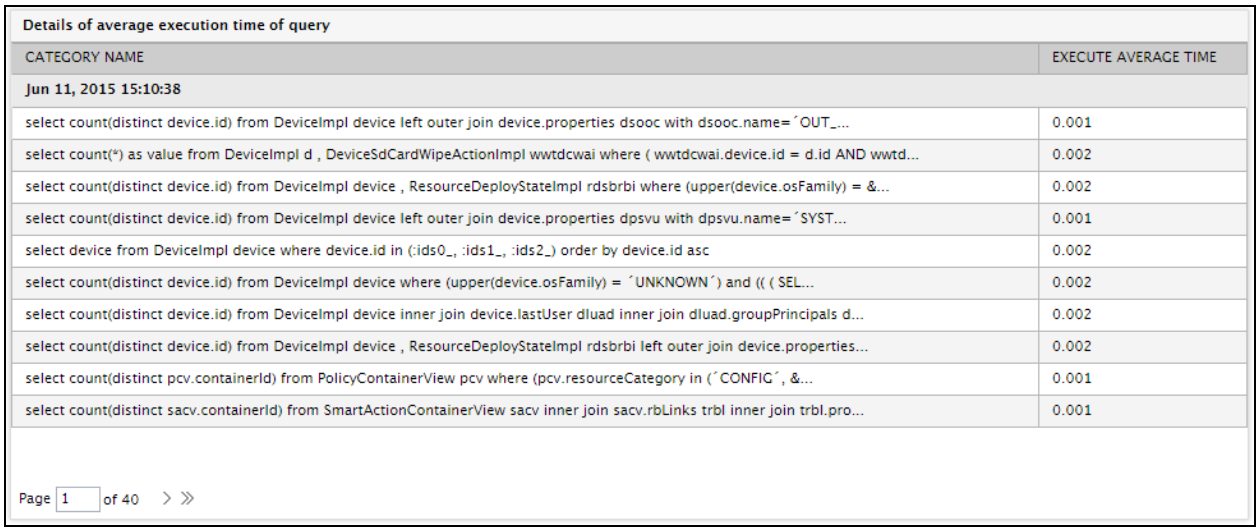


Details of cache put count

CATEGORY NAME	CACHE PUT COUNT
Jun 11, 2015 15:10:38	
SELECT roleVO From RoleVO roleVO, UserToRoleBindingVO roleBindingVO where roleBindingVO.roleid = roleVO.id and roleBindingV...	1
from com.citrix.xms.entities.Applications	1
from com.citrix.xms.entities.Store	1
SELECT userVO FROM UserVO userVO, UserListVO userListVO WHERE userVO.userListId = userListVO.id AND (LOWER(userVO.addlAttr1...	46
SELECT roleVO From RoleVO roleVO, UserToRoleBindingVO roleBindingVO where roleBindingVO.roleid = roleVO.id and roleBindingV...	1
SELECT userVO FROM UserVO userVO, UserListVO userListVO WHERE userVO.userListId = userListVO.id AND userVO.trmntnStatusId =...	16

Figure 3.11: The detailed diagnosis of the *Cache puts* measure

The detailed diagnosis of the *Execution average time* measure if enabled, lists the name of the query and the time taken to execute the query. This way, administrators may be able to identify the query that is taking too long to execute.



Details of average execution time of query

CATEGORY NAME	EXECUTE AVERAGE TIME
Jun 11, 2015 15:10:38	
select count(distinct device.id) from DeviceImpl device left outer join device.properties dsooc with dsooc.name=´OUT_...	0.001
select count(*) as value from DeviceImpl d , DeviceSdCardWipeActionImpl wwtdcwai where (wwtdcwai.device.id = d.id AND wwtd...	0.002
select count(distinct device.id) from DeviceImpl device , ResourceDeployStateImpl rdsbrbi where (upper(device.osFamily) = &...	0.002
select count(distinct device.id) from DeviceImpl device left outer join device.properties dpsvu with dpsvu.name=´SYST...	0.001
select device from DeviceImpl device where device.id in (:ids0_, :ids1_, :ids2_) order by device.id asc	0.002
select count(distinct device.id) from DeviceImpl device where (upper(device.osFamily) = ´UNKNOWN´) and (((SEL...	0.002
select count(distinct device.id) from DeviceImpl device inner join device.lastUser dluad inner join dluad.groupPrincipals d...	0.002
select count(distinct device.id) from DeviceImpl device , ResourceDeployStateImpl rdsbrbi left outer join device.properties...	0.002
select count(distinct pcv.containerId) from PolicyContainerView pcv where (pcv.resourceCategory in (´CONFIG´, &...	0.001
select count(distinct sacv.containerId) from SmartActionContainerView sacv inner join sacv.rbLinks trbl inner join trbl.pro...	0.001

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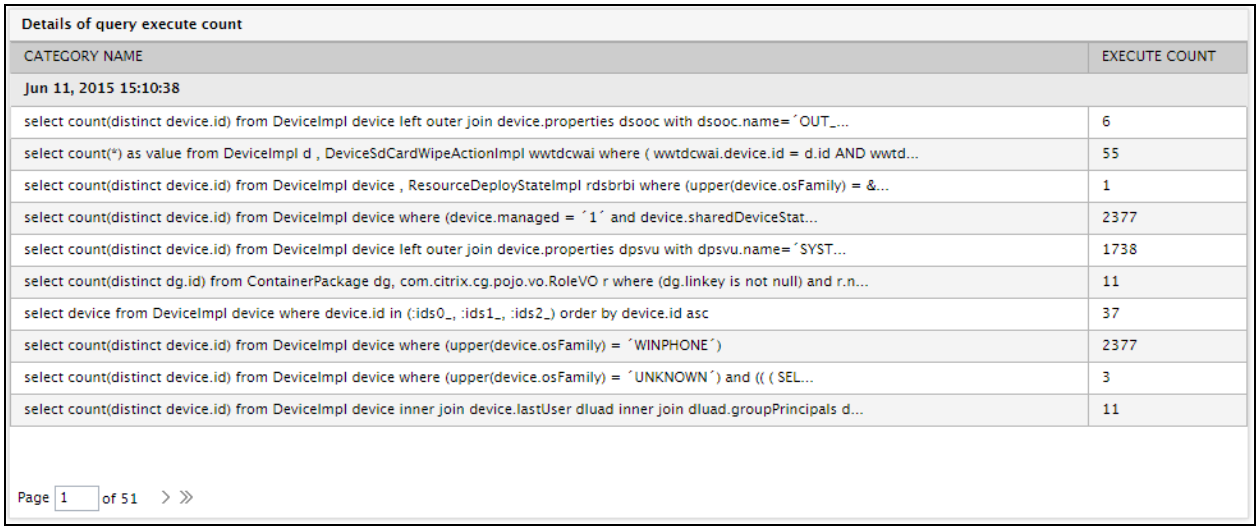
Figure 3.12: The detailed diagnosis of the *Execution average time* measure

The detailed diagnosis of the Executions measure if enabled, lists each query that was executed and number of times each query was executed.



Details of query execute count

CATEGORY NAME	EXECUTE COUNT
Jun 11, 2015 15:10:38	
select count(distinct device.id) from DeviceImpl device left outer join device.properties dsooc with dsooc.name=´OUT_...	6
select count(*) as value from DeviceImpl d , DeviceSdCardWipeActionImpl wwtdcwai where (wwtdcwai.device.id = d.id AND wwtd...	55
select count(distinct device.id) from DeviceImpl device , ResourceDeployStateImpl rdsbrbi where (upper(device.osFamily) = &...	1
select count(distinct device.id) from DeviceImpl device where (device.managed = ´1´ and device.sharedDeviceStat...	2377
select count(distinct device.id) from DeviceImpl device left outer join device.properties dpsvu with dpsvu.name=´SYST...	1738
select count(distinct dg.id) from ContainerPackage dg, com.citrix.cg.pojo.vo.RoleVO r where (dg.linkey is not null) and r.n...	11
select device from DeviceImpl device where device.id in (:ids0_, :ids1_, :ids2_) order by device.id asc	37
select count(distinct device.id) from DeviceImpl device where (upper(device.osFamily) = ´WINPHONE´)	2377
select count(distinct device.id) from DeviceImpl device where (upper(device.osFamily) = ´UNKNOWN´) and (((SEL...	3
select count(distinct device.id) from DeviceImpl device inner join device.lastUser dluad inner join dluad.groupPrincipals d...	11

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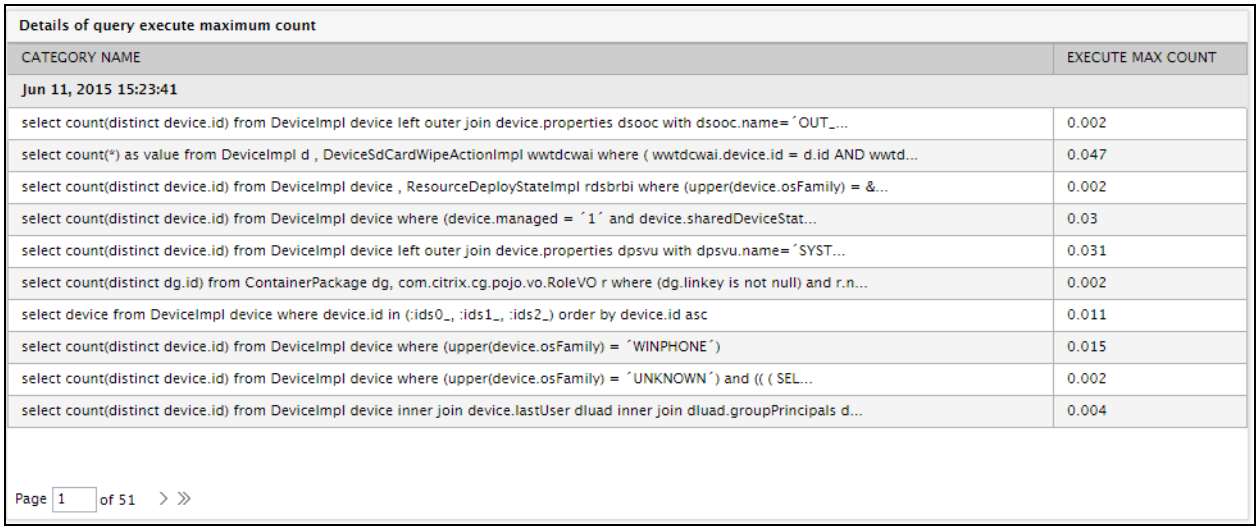
Figure 3.13: The detailed diagnosis of the *Executions* measure

The detailed diagnosis of the *Max Execution time* measure if enabled, lists each query that was executed and the maximum time taken for execution.



Details of query execute maximum count

CATEGORY NAME	EXECUTE MAX COUNT
Jun 11, 2015 15:23:41	
select count(distinct device.id) from DeviceImpl device left outer join device.properties dsooc with dsooc.name=´OUT_...	0.002
select count(*) as value from DeviceImpl d , DeviceSdCardWipeActionImpl wwtdcwai where (wwtdcwai.device.id = d.id AND wwtd...	0.047
select count(distinct device.id) from DeviceImpl device , ResourceDeployStateImpl rdsbrbi where (upper(device.osFamily) = &...	0.002
select count(distinct device.id) from DeviceImpl device where (device.managed = ´1´ and device.sharedDeviceStat...	0.03
select count(distinct device.id) from DeviceImpl device left outer join device.properties dpsvu with dpsvu.name=´SYST...	0.031
select count(distinct dg.id) from ContainerPackage dg, com.citrix.cg.pojo.vo.RoleVO r where (dg.linkey is not null) and r.n...	0.002
select device from DeviceImpl device where device.id in (:ids0_, :ids1_, :ids2_) order by device.id asc	0.011
select count(distinct device.id) from DeviceImpl device where (upper(device.osFamily) = ´WINPHONE´)	0.015
select count(distinct device.id) from DeviceImpl device where (upper(device.osFamily) = ´UNKNOWN´) and (((SEL...	0.002
select count(distinct device.id) from DeviceImpl device inner join device.lastUser dluad inner join dluad.groupPrincipals d...	0.004

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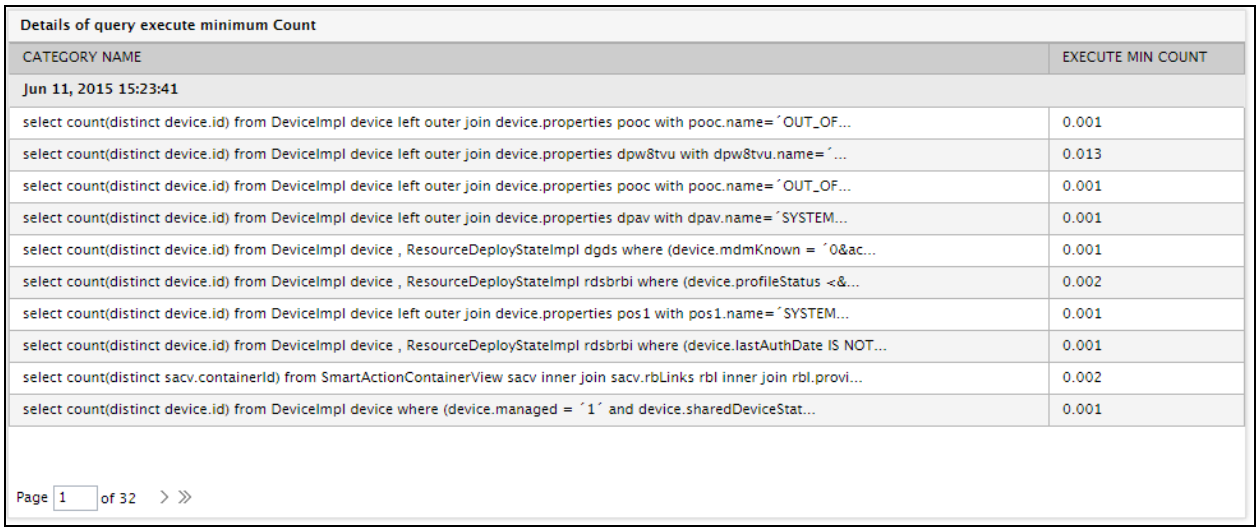
Figure 3.14: The detailed diagnosis of the *Max Execution time* measure

The detailed diagnosis of the *Min Execution time* measure if enabled, lists each query and the minimum time taken for executing each query.



Details of query execute minimum Count

CATEGORY NAME	EXECUTE MIN COUNT
Jun 11, 2015 15:23:41	
select count(distinct device.id) from DeviceImpl device left outer join device.properties pooc with pooc.name=´OUT_OF...	0.001
select count(distinct device.id) from DeviceImpl device left outer join device.properties dpw8tvu with dpw8tvu.name=´...	0.013
select count(distinct device.id) from DeviceImpl device left outer join device.properties pooc with pooc.name=´OUT_OF...	0.001
select count(distinct device.id) from DeviceImpl device left outer join device.properties dpav with dpav.name=´SYSTEM...	0.001
select count(distinct device.id) from DeviceImpl device , ResourceDeployStateImpl dgds where (device.mdmKnown = ´0&ac...	0.001
select count(distinct device.id) from DeviceImpl device , ResourceDeployStateImpl rdsbrbi where (device.profileStatus <&...	0.002
select count(distinct device.id) from DeviceImpl device left outer join device.properties pos1 with pos1.name=´SYSTEM...	0.001
select count(distinct device.id) from DeviceImpl device , ResourceDeployStateImpl rdsbrbi where (device.lastAuthDate IS NOT...	0.001
select count(distinct sacv.containerId) from SmartActionContainerView sacv inner join sacv.rbLinks rbl inner join rbl.provi...	0.002
select count(distinct device.id) from DeviceImpl device where (device.managed = ´1´ and device.sharedDeviceStat...	0.001

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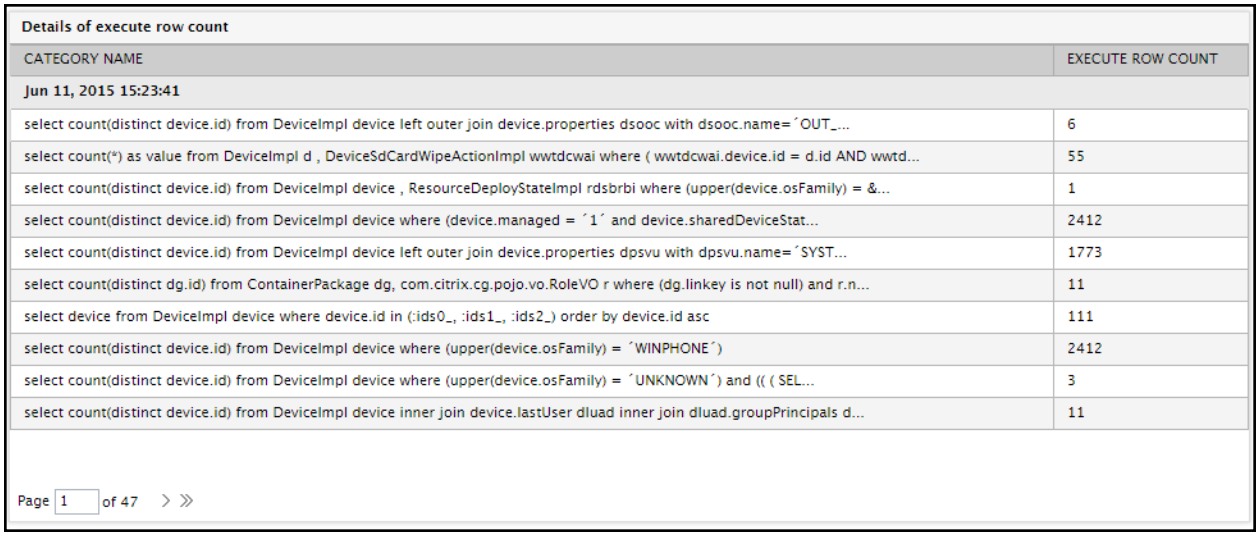
Figure 3.15: The detailed diagnosis of the *Min Execution time* measure

The detailed diagnosis of the *Execution rows* measure if enabled, lists each query and the number of rows that were returned after execution.



Details of execute row count

CATEGORY NAME	EXECUTE ROW COUNT
Jun 11, 2015 15:23:41	
select count(distinct device.id) from DeviceImpl device left outer join device.properties dsooc with dsooc.name=´OUT_...	6
select count(*) as value from DeviceImpl d , DeviceSdCardWipeActionImpl wwtdcwai where (wwtdcwai.device.id = d.id AND wwtd...	55
select count(distinct device.id) from DeviceImpl device , ResourceDeployStateImpl rdsbrbi where (upper(device.osFamily) = &...	1
select count(distinct device.id) from DeviceImpl device where (device.managed = ´1´ and device.sharedDeviceStat...	2412
select count(distinct device.id) from DeviceImpl device left outer join device.properties dpsvu with dpsvu.name=´SYST...	1773
select count(distinct dg.id) from ContainerPackage dg, com.citrix.cg.pojo.vo.RoleVO r where (dg.linkey is not null) and r.n...	11
select device from DeviceImpl device where device.id in (:ids0_, :ids1_, :ids2_) order by device.id asc	111
select count(distinct device.id) from DeviceImpl device where (upper(device.osFamily) = ´WINPHONE´)	2412
select count(distinct device.id) from DeviceImpl device where (upper(device.osFamily) = ´UNKNOWN´) and (((SEL...	3
select count(distinct device.id) from DeviceImpl device inner join device.lastUser dluad inner join dluad.groupPrincipals d...	11

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Figure 3.16: The detailed diagnosis of the *Execution rows* measure

This test will report the following metrics for the *Second Level* descriptor:

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Cache hits:	Indicates the number of cacheable	Number	A high value is desired for this measure.

Measurement	Description	Measurement Unit	Interpretation
	entities/collections that were successfully retrieved from the second level cache.		The detailed diagnosis of this measure if enabled, lists the name of the cacheable entities/collections and the number of times the entities/collections were successfully retrieved.
Cache misses:	Indicates the number of cacheable entities/collections that were not available in the second level cache.	Number	The detailed diagnosis of this measure if enabled, lists the name of the cacheable entities/collections and the number of times the entities/collections were not available in the cache.
Cache puts:	Indicates the number of cacheable entities/collections put in the second level cache.	Number	The detailed diagnosis of this measure if enabled, lists the name of the cacheable entities/collections and the number of times the entities/collections were put in the cache.
Elements in memory:	Indicates the number of cacheable entities/collections stored in the memory of the second level cache.	Number	The detailed diagnosis of this measure if enabled, lists the cacheable entities/collections and the number of times each entity/collection was stored in the memory.
Elements in disk:	Indicates the number of cacheable entities/collections stored on the disk of the second level cache.	Number	The detailed diagnosis of this measure if enabled, lists the cacheable entities/collections and the number of times each entity/collection was stored in the disk.
Size in memory:	Indicates the total size of the cacheable entities in the memory of the second level cache.	MB	The detailed diagnosis of this measure if enabled, lists the name of the entity and the size of the entity in the memory of the cache.

The detailed diagnosis of the *Cache hits* measure if enabled, lists the name of the cacheable entities/collections and the number of times the entities/collections were successfully retrieved.

Details of cache hit count	
CATEGORY NAME	CACHE HIT COUNT
Jun 16, 2015 15:26:10	
com.sparus.com.citrix.cg.pojo.vo.AppVO	7
com.sparus.com.citrix.cg.pojo.vo.RoleVO	2396
com.sparus.com.citrix.xms.entities.LicensingServer	8
com.sparus.com.citrix.cg.pojo.vo.PNAServerVO	1
com.sparus.org.hibernate.cache.StandardQueryCache	171781
com.sparus.org.apache.jetspeed.security.om.impl.UserPropertyImpl	38
com.sparus.com.citrix.xms.entities.Store	1
com.sparus.com.citrix.cg.pojo.vo.UserSubscriptionsVO	13
com.sparus.com.citrix.cg.pojo.vo.UserListVO	10333
com.sparus.security	110755

Figure 3.17: Figure 2.17: The detailed diagnosis of the *Cache hits* measure

The detailed diagnosis of the *Cache misses* measure if enabled, lists the name of the cacheable entities/collections and the number of times the entities/collections were not available in the cache.

Details of cache miss count	
CATEGORY NAME	CACHE MISS COUNT
Jun 16, 2015 15:26:10	
com.sparus.org.hibernate.cache.StandardQueryCache	19820
com.sparus.com.citrix.xms.entities.StaticContent	10
com.sparus.security	17625
com.sparus.com.citrix.xms.entities.AppPkgInfo	4
com.sparus.com.citrix.xms.entities.Applications.appSettingses	4

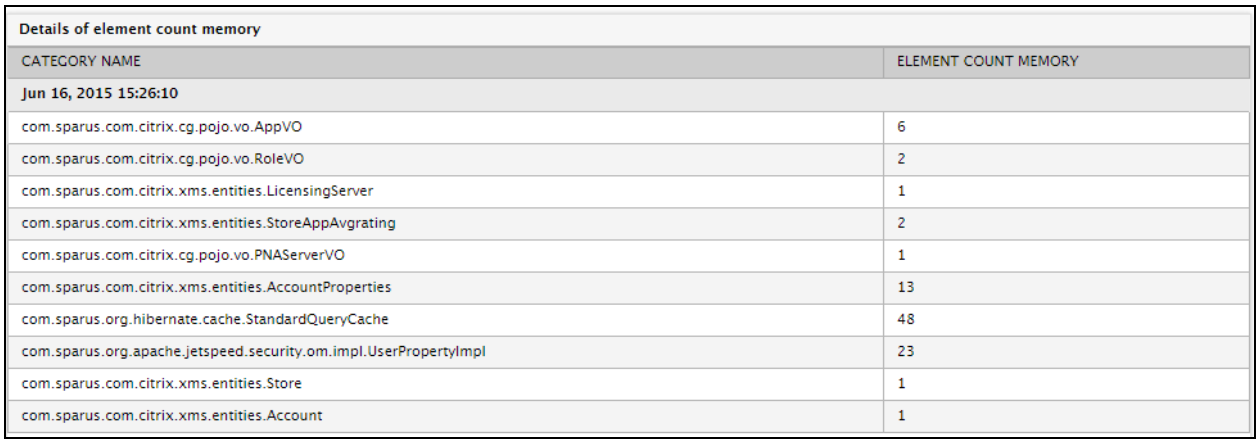
Figure 3.18: The detailed diagnosis of the *Cache misses* measure

The detailed diagnosis of the *Cache puts* measure if enabled, lists the name of the cacheable entities/collections and the number of times the entities/collections were put in the cache.

Details of cache put count	
CATEGORY NAME	CACHE PUT COUNT
Jun 16, 2015 15:26:10	
com.sparus.com.citrix.cg.pojo.vo.AppVO	23
com.sparus.com.citrix.cg.pojo.vo.RoleVO	3
com.sparus.com.citrix.xms.entities.LicensingServer	1335
com.sparus.com.citrix.xms.entities.StoreAppAvgrating	2
com.sparus.com.citrix.cg.pojo.vo.PNAServerVO	1
com.sparus.com.citrix.xms.entities.AccountProperties	13
com.sparus.org.hibernate.cache.StandardQueryCache	19817
com.sparus.org.apache.jetspeed.security.om.impl.UserPropertyImpl	41346
com.sparus.com.citrix.xms.entities.Store	2
com.sparus.com.citrix.xms.entities.Account	2

Figure 3.19: The detailed diagnosis of the *Cache puts* measure

The detailed diagnosis of the *Elements im memory* measure if enabled, lists the cacheable entities/collections and the number of times each entity/collection was stored in the memory.



Details of element count memory

CATEGORY NAME	ELEMENT COUNT MEMORY
Jun 16, 2015 15:26:10	
com.sparus.com.citrix.cg.pojo.vo.AppVO	6
com.sparus.com.citrix.cg.pojo.vo.RoleVO	2
com.sparus.com.citrix.xms.entities.LicensingServer	1
com.sparus.com.citrix.xms.entities.StoreAppAvgrating	2
com.sparus.com.citrix.cg.pojo.vo.PNAServerVO	1
com.sparus.com.citrix.xms.entities.AccountProperties	13
com.sparus.org.hibernate.cache.StandardQueryCache	48
com.sparus.org.apache.jetspeed.security.om.impl.UserPropertyImpl	23
com.sparus.com.citrix.xms.entities.Store	1
com.sparus.com.citrix.xms.entities.Account	1

Figure 3.20: The detailed diagnosis of the *Elements in memory* measure

This test will report the following metrics for the *Summary* descriptor:

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Connects:	Indicates the total number of JDBC connections requested by the sessions.	Number	
Flushes:	Indicates the total number of flushes executed by the sessions (either explicit or implicit).	Number	
Close statements:	Indicates the number of prepared statements that were released.	Number	A high value for this measure may result in a lot of additional queries which may hinder the performance of the Hibernate cache.
Session opens:	Indicates the number of sessions that were opened.	Number	
Session closes:	Indicates the number of sessions that were closed.	Number	
Transactions:	Indicates the total number of transactions.	Number	

Measurement	Description	Measurement Unit	Interpretation
Successful transactions:	Indicates the number of transactions that were successful.	Number	
Optimistic failures:	Indicates the number of optimistic lock exceptions.	Number	
Prepare statements:	Indicates the number of prepared statements acquired.	Number	A high value for this measure may result in a lot of additional queries which may hinder the performance of the Hibernate cache.
Query executions:	Indicates the number of times the queries have been executed for this cache type.	Number	
Query execution max time:	Indicates the time taken to execute the slowest recorded query.	Millisecs	A low value is desired for this measure. If there is a sudden/gradual increase in the value of this measure, then it indicates a performance bottleneck which may be due to connectivity issues in the database or unnecessary execution of additional queries by the statements. The detailed diagnosis of this measure if enabled, lists the name of each query and the maximum time taken to execute the query.

3.2 The XenMobile Server Layer

Using the tests mapped to this layer, administrators can understand:

- The connection status of XenMobile
- License usage and requirements
- Adequacy of XenMobile threads

- Status of each task on the XenMobile cluster and time elapsed since the task was last updated
- Status of each XenMobile cluster node

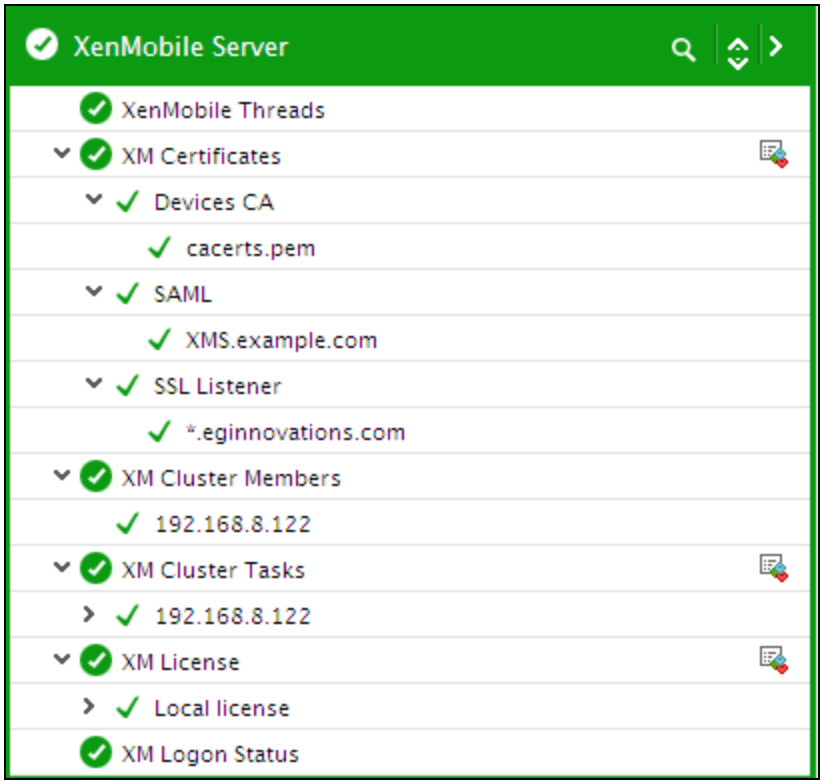


Figure 3.21: The tests mapped to the XenMobile Server layer

3.2.1 XM Certificates Test

In XenMobile, certificates are used to create secure connections and authenticate users.

By default, XenMobile comes with a self-signed Secure Sockets Layer (SSL) certificate that is generated during installation to secure the communication flows to the server. Citrix recommends you replace the SSL certificate with a trusted SSL certificate from a well-known certificate authority (CA). XenMobile requires a certificate from the Apple Push Notification service (APNs). XenMobile also uses its own Public Key Infrastructure (PKI) service or obtains certificates from the CA for client certificates.

The following table shows the certificate format and type for each XenMobile component:

XenMobile component	Certificate format	Required certificate type
NetScaler Gateway	PEM (BSAE64) PFX (PKCS#12)	SSL, Root NetScaler Gateway converts PFX to PEM automatically.
XenMobile server	PEM or PFX (PKCS#12)	SSL, SAML, APNs XenMobile also generates a full PKI during

XenMobile component	Certificate format	Required certificate type
		the installation process.
StoreFront	PFX (PKCS#12)	SSL, Root

All Citrix products support wildcard and Subject Alternative Name (SAN) certificates. For most deployments, you only need two wildcard or (SAN) certificates.

For NetScaler Gateway and the XenMobile server, Citrix recommends obtaining server certificates from a public CA, such as Verisign, DigiCert, or Thawte. You can create a Certificate Signing Request (CSR) from the NetScaler Gateway or the XenMobile configuration utility. After you create the CSR, you submit it to the CA for signing. When the CA returns the signed certificate, you can install the certificate on NetScaler Gateway or XenMobile.

NetScaler Gateway supports the use of client certificates for authentication. Users logging on to NetScaler Gateway can also be authenticated based on the attributes of the client certificate that is presented to the virtual server. Client certificate authentication can also be used with another authentication type, such as LDAP or RADIUS, to provide two-factor authentication.

To authenticate users based on the client-side certificate attributes, client authentication should be enabled on the virtual server and the client certificate should be requested. You must bind a root certificate to the virtual server on NetScaler Gateway.

When users log on to NetScaler Gateway, after authentication, the user name information is extracted from the specified field of the certificate. Typically, this field is Subject:CN. If the user name is extracted successfully, the user is then authenticated. If the user does not provide a valid certificate during the Secure Sockets Layer (SSL) handshake or if the user name extraction fails, authentication fails.

You can authenticate users based on the client certificate by setting the default authentication type to use the client certificate. You can also create a certificate action that defines what is to be done during the authentication based on a client SSL certificate.

The XenMobile Public Key Infrastructure (PKI) integration feature allows you to manage the distribution and life cycle of security certificates used on your devices.

XenMobile creates an internal PKI for device authentication during the installation process.

External PKIs can also be used to issue certificates to devices to be used in configuration policies or for client authentication to NetScaler Gateway.

The main feature of the PKI system is the *PKI entity*. A PKI entity models a back-end component for PKI operations. That component is part of your corporate infrastructure, such as a Microsoft, RSA, Entrust, Symantex, or OpenTrust PKI. The PKI entity handles the back-end certificate issuance and revocation. The PKI entity is the authoritative source for the certificate's status. The XenMobile configuration will normally contain exactly one PKI entity per back-end PKI component.

The second feature of the PKI system is the *credential provider*. A credential provider is a particular configuration of certificate issuance and life cycle. The credential provider controls things like the certificate format (subject, key, algorithms) and the conditions for its renewal or revocation, if any. The credential providers delegate operations to the PKI entities. In other words, although credential providers control when

and with what data PKI operations are undertaken, PKI entities control how those operations are performed. The XenMobile configuration normally contains many credential providers per PKI entity.

If an active certificate suddenly expires, applications will no longer be able to communicate with XenMobile and vice-versa. To avoid this, administrators should proactively identify certificates nearing expiry and renew the certificates. This is where the **XM Certificates** test helps. This test captures the expiry date of all active certificates, computes how long each active certificate will remain valid, and proactively alerts administrators if any certificate is nearing expiry.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for every active SSL certificate installed on XenMobile

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT** – The port at which the **HOST** listens. By default, this is *4443*.
4. **REPORT ONLY ACTIVE CERTIFICATES** – By default, this flag is set to **Yes**, indicating that this test reports the validity of active certificates only. To ensure that the test reports the validity of all certificates, set this flag to **No**.
5. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
6. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
7. **SSL** – Indicate whether/not XenMobile is SSL-enabled. By default, this flag is set to **Yes**.
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td>Status:</td><td>Indicates the current status of this SSL certificate.</td><td></td><td>The values that this measure reports and their corresponding numeric values are listed in the table below:<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>Valid</td><td>1</td></tr><tr><td>Invalid</td><td>0</td></tr></table>Note:
By default, this measure reports the Measure Values discussed in the table above. However, in the graph of this measure, the status of the certificate is indicated using the numeric equivalents only.</td></tr>
<tr><td>Valid upto:</td><td>Indicates how long this certificate will remain valid.</td><td>Days</td><td>A high value is desired for this measure. A very low value indicates that the certificate is about to expire very soon. You may want to consider renewing the certificate before this eventuality strikes.
Use the detailed diagnosis of this measure to know the exact date on which the certificate will expire.</td></tr>
</table>

3.2.2 XM Cluster Tasks Test

When a XenMobile cluster is healthy, the tasks executed on the XenMobile cluster will be completed on a swift pace thus providing an optimal cluster performance! Whenever there is a lag in the performance of the cluster, administrators may start wondering the real reason behind such a lag – is it due to too many pending tasks? or it is due to the time duration that had elapsed since the task was last updated? The **XM Cluster Tasks** test helps in answering these questions!

This test monitors the tasks that are executing on each XenMobile cluster and reports the current status of the tasks and the time that elapsed since the last update of the tasks.

This test is disabled by default. To enable the test, follow the Agents -> Tests -> Enable/Disable menu sequence in the eG administrative interface, pick *Citrix XenMobile* as the **Component type**, select *Performance* as the **Test type**, choose this test from the list of **DISABLED TESTS** list, and click on the **<** button.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each task executing on each XenMobile cluster node being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Status:	Indicates the current status of this task.		The values that this measure reports and their corresponding numeric values are listed in the table below: **Measure Value** / **Numeric Value** Completed – 1 Pending – 0 **Note:** By default, this measure reports the **Measure Value**s discussed in the table above. However, in the graph of this measure, the status of this task is indicated using the numeric equivalents only.
Time since last update:	Indicates the time duration that had elapsed since this task was last updated.	Hours	

3.2.3 XM Cluster Members Test

XenMobile 10 integrates XenMobile 9 Device Manager and App Controller. In earlier versions of XenMobile, you configure Device Manager as a cluster and App Controller as a high availability pair. High availability is not applicable to XenMobile 10. Based on the Cluster nodes in your environment, you configure new XenMobile VMs which are later joined to the same XenMobile database while configuring the cluster. Since the high availability feature is not available in XenMobile, administrators may need to constantly track the status of each node to ensure that the XenMobile server is active. The **XM Cluster Members** test helps administrators achieve this! This test monitors the current status of each cluster node in the XenMobile cluster and proactively alerts administrators when a cluster node is not active. This way, administrators may figure out the discrepancies in the cluster node before any serious issues crop up.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each node in XenMobile cluster

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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.
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

<table>
<tr><th>Measurement</th><th>Description</th><th>Measurement Unit</th><th>Interpretation</th></tr>
<tr><td>Status:</td><td>Indicates the current status of this node.</td><td></td><td>The values that this measure reports and their corresponding numeric values are listed in the table below:
<table><tr><th>Measure Value</th><th>Numeric Value</th></tr><tr><td>Active</td><td>1</td></tr><tr><td>Dead</td><td>0</td></tr></table>Note:
By default, this measure reports the Measure Values discussed in the table above. However, in the graph of this measure, the status of this node is indicated using the numeric equivalents only.
The detailed diagnosis of this measure if enabled, lists the role, the first instance of status check and the next status check date/time.</td></tr>
</table>

3.2.4 XM License Test

To track and control every device/user connecting to the corporate network, XenMobile should ideally possess a license per user/device. If adequate licenses are not available, then new users and devices will go unmanaged by XenMobile, thus increasing the risk of unauthorized accesses. Likewise, if the license is not renewed in time, administrators will not be able to use the services of XenMobile continuously, which will again expose the corporate network to malicious attacks. To avoid this, administrators can use the **XM License** test. This test tracks the license usage of XenMobile and also determines when the license of each type is likely to expire. In the process, it reports the following:

- Is the XenMobile server running out of licenses? If so, administrators can quickly arrange to purchase additional licenses to deal with the additional user/device load on their network.
- Is the license up for renewal? If so, administrators can work towards extending the license so that XenMobile continues to manage devices/users.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each *License type:Product category* of the target XenMobile server being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT** – The port at which the **HOST** listens. By default, this is *4443*.
4. **SHOW ONLY ACTIVE LICENSES** – By default, this flag is set to **Yes**, indicating that this test reports the validity of active licenses only. To ensure that the test reports the validity of all licenses, set this flag to **No**.
5. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
6. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
7. **SSL** – Indicate whether/not XenMobile is SSL-enabled. By default, this flag is set to **Yes**.
8. **DETAILED DIAGNOSIS** - To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional deta;iled 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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Licenses used:	Indicates the number of licenses of this product category that are currently in use.	Number	
Licenses purchased:	Indicates the total number of licenses of this product category that are held by XenMobile.	Number	

Measurement	Description	Measurement Unit	Interpretation
Percentage of licenses used:	Indicates the percentage of licenses of this product category that are utilized.	Percent	A value close to 100% indicates that the XenMobile server is rapidly running out of licenses. In this case, to ensure the uninterrupted usage of XenMobile, you will have to purchase additional licenses.
License expires in:	Indicates the number of days by which the license of this product category will expire.	Days	A very low value for this measure indicates that the license is nearing expiry. You may have to request for a license extension if you want to continue using the XenMobile server.
Grace period left:	Indicates the number of days after which the trial license for this product category will expire.	Days	This measure will appear only if XenMobile is running on a trial license.

3.2.5 XM Logon Status Test

Frequent login failures and inexplicable delays when accessing the XenMobile server can have an adverse impact on a user's experience with XenMobile. To capture such failures/delays proactively and isolate their root-cause, administrators can use the **XM Logon Status** test. At configured intervals, this test emulates a user logging into XenMobile. In the process, the test captures every step of the user login and reports the time taken at each step. This way, unusual slowness in logging in can be captured and where the login process was delayed can be determined – when connecting to XenMobile? Or when authenticating?

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

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

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.

6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Connection status:	Indicates whether/not the user could connect to XenMobile.		The values that this measure reports and their corresponding numeric values are listed in the table below: **Measure Value** / **Numeric Value** Success – 1 Failed – 0 **Note:** By default, this measure reports the Measure Values discussed in the table above. However, in the graph of this measure, the status of the connection is indicated using the numeric equivalents only.
Time taken to connect:	Indicates the time taken to connect to XenMobile.	Secs	A low value is desired for this measure. A high value indicates a connection bottleneck.
Authentication status:	Indicates whether/not the login credentials of the user were successfully authenticated.		The values that this measure reports and their corresponding numeric values are listed in the table below: **Measure Value** / **Numeric Value** Success – 1 Failed – 0 **Note:** By default, this measure reports the **Measure Value**s discussed in the table

Measurement	Description	Measurement Unit	Interpretation
			above. However, in the graph of this measure, the status of the authentication is indicated using the numeric equivalents only.
Time taken to authenticate:	Indicates the time taken to authenticate the user login.	Secs	A high value for this measure could indicate an authentication delay.
Time taken to login:	Indicates the total time taken to login to XenMobile.	Secs	A high value indicates a login delay. In this case, you can compare the value of the Time taken to connect and Time taken to authenticate measures to know where the login was bottlenecked.

3.2.6 XM Device Connections Test

This test reports the total number of connections established to each cluster node of the XenMobile server.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each XenMobile cluster node that is being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT** – The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not XenMobile is SSL-enabled. By default, this flag is set to **Yes**.
7. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Total connections:	Indicates the total number of connections to this cluster node.	Number	This measure is a good indicator of the load on the cluster node. The detailed diagnosis of this measure if enabled, lists the Device ID and the time at which the device was last connected.

The detailed diagnosis of the *Total connections* measure.

Details of device connections

DEVICE ID	LAST CONNECTED
Jun 10, 2015 16:31:37	
89749564	14/05/2015 10:34:56
89749564	14/05/2015 10:34:56

Figure 3.22: The detailed diagnosis of the Total connections measure

3.2.7 XenMobile Threads Test

How many requests a XenMobile can process depends upon the number of threads it has been configured with. Without adequate threads, the XenMobile server may not be able to service all requests, thus resulting in delays in request processing, long pending request queues, and degraded XenMobile performance. To avoid such anomalies, administrators will have to track the usage of threads by the XenMobile server, proactively detect a probable contention for threads, and accordingly decide whether/not to increase the size of the thread pool. To achieve this, administrators can take the help of the **XenMobile Threads** test. This test indisscates the maximum number of threads the XenMobile server can spawn, reports the percentage of threads currently in use, measures the length of the outstanding request queues on the XDM server, and thus reveals whether/not the XenMobile server needs to be configured with more threads to handle its current task load and to shorten the request queue. In addition, the test alerts administrators to any increase in the number of threads with errors.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for the XenMobile MDM server being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT** - The port at which the **HOST** listens. By default, this is *4443*.
4. **LOGIN URL** – This refers to the URL of the login page of the XenMobile Device Manager console. By default, eG Enterprise auto-discovers this URL. This is why, the **LOGIN URL** is set to *none* by default.
5. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
6. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
7. **SSL** – Indicate whether/not XenMobile is SSL-enabled. By default, this flag is set to **No**.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Min threads:	Indicates the minimum number of threads that should be available.	Number	
Max threads:	Indicates the maximum number of threads that the server can spawn.	Number	
Pool increment:	Indicates the number of threads by which the pool size has been increased since the last measurement period.	Number	A significant increase in the value of this measure is indicative of an increase in the load on XenMobile.
Current threads:	Indicates the number of threads currently active.	Number	This is a good indicator of the current load on XenMobile.
Waiting threads:	Indicates the number of threads that are waiting currently.	Number	
Active Threads:	Indicates the number of	Number	

Measurement	Description	Measurement Unit	Interpretation
	threads that are currently active.		
Percentage of active threads:	Indicates the percentage of threads that are currently active.	Percent	If the value of this measure is close to 100%, it could indicate that XenMobile is about to utilize its entire thread pool. Under such circumstances, you can consider increasing the maximum number of threads that your XenMobile can spawn.
Task count:	Indicates the number of tasks currently running on the server.	Number	
Queue length:	Indicates the current length of the request queue.	Number	
Working queue length:	Indicates the current length of the working queue.	Number	
Total queue size:	Indicates the total number of items in queue since the last measurement period.	Number	A consistent increase in the value of this measure could indicate a processing bottleneck on the XenMobile server. Check the value of the Percentage of active threads measure for the server to determine whether the lack of sufficient threads in the XenMobile's thread pool is the reason for the bottleneck. If so, you may want to increase the 'maximum threads' setting for the XenMobile server.
Ran count:	Indicates the number of threads that ran during the last measurement period.	Number	
Errors:	Indicates the number of threads with errors during	Number	Ideally, the value of this measure should be 0 at all times.

Measurement	Description	Measurement Unit	Interpretation
	the last measurement period.		
Cancels:	Indicates the number of threads that were canceled during the last measurement period.	Number	
Packets:	Indicates the number of packets processed during the last measurement period.	Number	

3.3 The XenMobile Service Layer

With the help of this layer, administrators can track the status of the scheduled jobs and quickly identify the number and nature of jobs that failed or were cancelled. In addition, this layer helps you track the status of each connection to the XenMobile server.

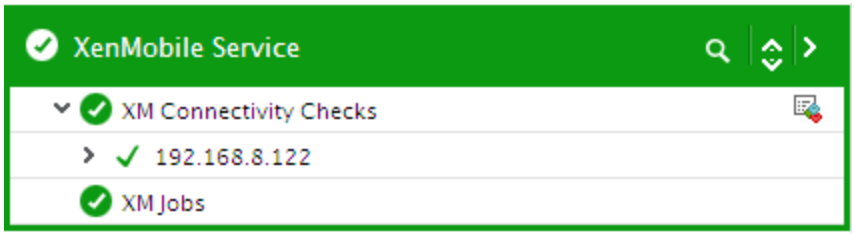


Figure 3.23: The tests mapped to the XenMobile Service layer

3.3.1 XM Operations Test

If a user complains that his/her transactions with XenMobile are failing, administrators may first want to know which steps of the user interactions are failing often. The **XM Operations** test provides administrators with this useful information. This test scans the Syslog file for the type of operations users performed on XenMobile. For every operation so discovered, this test then reports the number of times that operation succeeded and the number of times it failed. This way, the test highlights those operations that failed very often and caused the user experience with the XenMobile to suffer.

For this test to run and report metrics, XenMobile should be configured to create a Syslog file in a remote Syslog server, where the details and status of all user interactions with the XenMobile will be logged. To configure the Syslog server where this Syslog file should be created, do the following:

1. Connect to the XenMobile management console from your browser using the URL: <http://XenMobile host:port>.
2. Login to the XenMobile as an *administrator*.
3. Figure 3.24 will then appear. Click the **More** option in Figure 3.24.

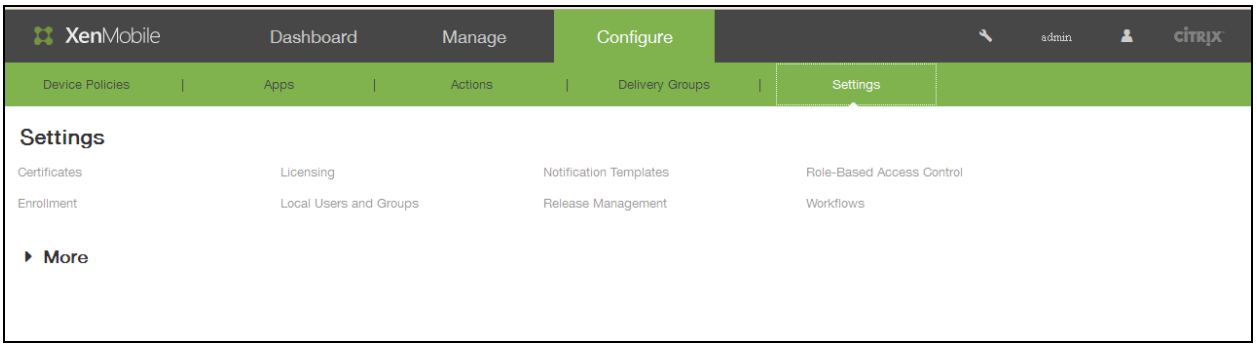


Figure 3.24: The XenMobile management console

4. Next, scroll down the **Settings** page of Figure 3.25 until the **SysLog** option becomes visible. Then, click the **SysLog** option.

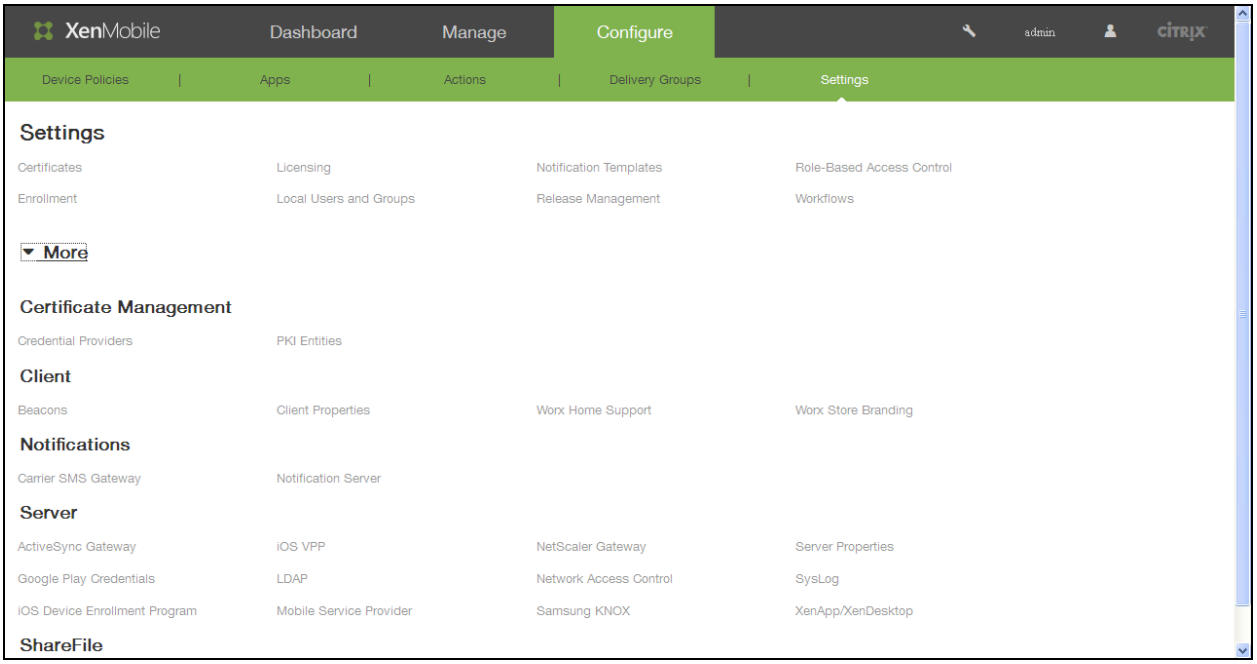


Figure 3.25: Figuring out the SysLog option

5. This will bring up a **SysLog** page in the right panel, where you can configure a remote Syslog server and enable Syslog file creation on the server.

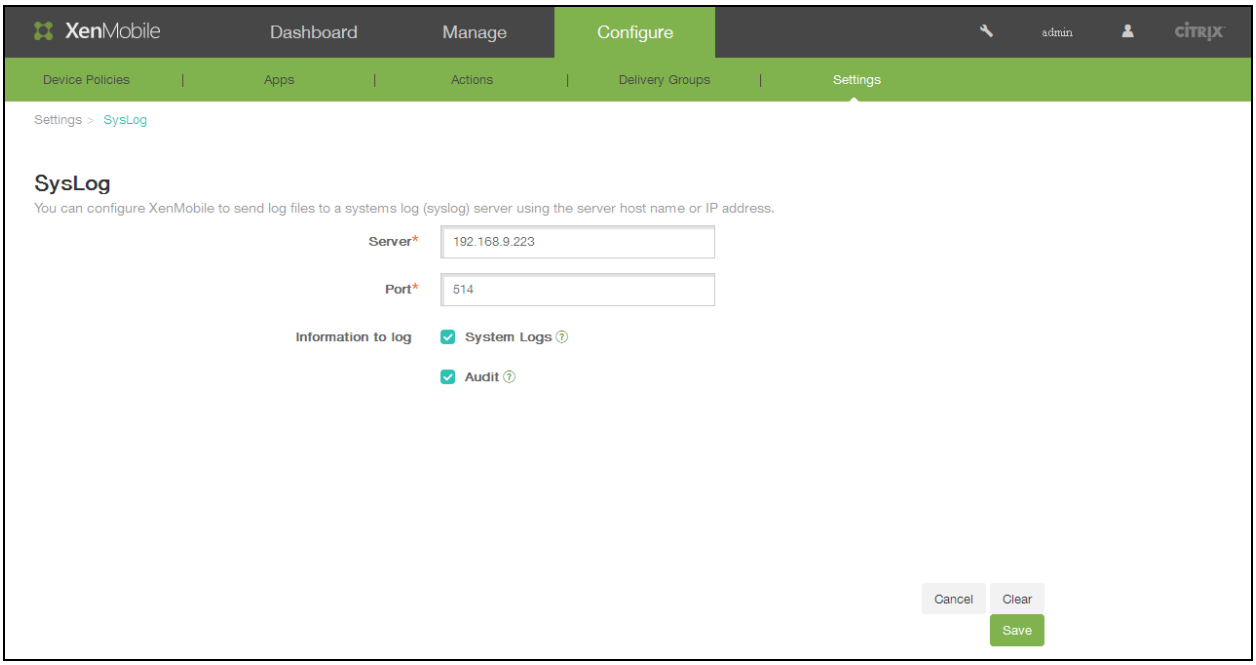


Figure 3.26: Configuring the Syslog server where the Syslog file is to be created

6. To configure a new Syslog server, enter the IP address of the Syslog server in the **Server** text box of Figure 3.26.
7. Enter the **Port** at which the Syslog server listens.
8. Then, indicate what details should be logged in the Syslog file that will be created in the specified Syslog server. For the eG tests to work, at least the **Audit** check box should be selected.
9. Click the **Save** button in Figure 3.26 to register the changes.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for every operation users performed on the XenMobile

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT** – The port at which the **HOST** listens. By default, this is *4443*.
4. **LOG FILE PATH** – This test reports metrics by parsing a Syslog file. Specify the full path to the Syslog file here. To know how to configure the Syslog server where the XenMobile will be creating this file, refer to page Section of this document.
5. **SEARCH STRING** – By default, the Syslog file may contain information relating to a number of servers that are inter linked with the target Xenmobile. In order to obtain the metrics of the target XenMobile alone, specify the hostname or the IP address of the target XenMobile server for which the logs are to

be read from the syslog file, in the **SEARCH STRING** text box. Using this search string the information in the Syslog file may be parsed and metrics may be collected.

6. **SEARCH STRING INDEX** – Here, specify the cursor position after which the eG agent should search for the specified **SEARCH STRING** (or the position upto which the eG agent should ignore while searching for the specified **SEARCH STRING**) in the syslog file. For example, if the specified search string appears in the syslog file at the 17th position, then you may need to specify the **SEARCH STRING INDEX** as 16.
7. **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**.
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Successful operations:	Indicates the number of times this operation succeeded.	Number	A high value is desired for this measure. Use the detailed diagnosis of this measure to view the names of the users who succeeded in performing an operation, when they performed the operation, and the client/receiver each user used for this purpose.
Failed operations:	Indicates the number of times this operation failed.	Number	A very low value is desired for this measure. Use the detailed diagnosis of this

Measurement	Description	Measurement Unit	Interpretation
			measure to view the names of the users who failed to perform a particular operation, when they tried to perform that operation, and the client/receiver each user used for this purpose.

The detailed diagnosis of the *Successful operations* measure.

Details of successful operations

DATE TIME	USER NAME	DEVICE ID	CLIENT IP	APPLICATION NAME	CLIENT/RECEIVER	DETAILS
Jun 10, 2015 17:05:30						
2015-06-10T05:50:31	john@c-on.com	355886053440726	192.168.8.241	-	Mozilla/5.0 (Windows NT 6.2; WOW64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/38.0.2125.111 Safari/537.36	{source:DEPLOYMENT_FEATURE,deviceUser:john@c-on.com,deviceIMEI:355886053440726}

Figure 3.27: The detailed diagnosis of the Successful operations measure

3.3.2 XM Console Operations Test

In large environments multiple XenMobile administrators may be present to overlook the user interaction with the XenMobile. In such environments, it may be difficult for an administrator to keep a constant vigil on the operations performed by other administrators. The **XM Console Operations** test provides administrators with the knowledge of all the operations performed by all the administrators in the target XenMobile environment. This test scans the XenMobile Syslog file for the type of operations administrators performed on the XenMobile. For every operation so discovered, this test then reports the number of times that operation succeeded and the number of times it failed. This way, administrators can figure out the exact reason for those operations that failed very often.

For this test to run and report metrics, the XenMobile server should be configured to create a Syslog file in a remote Syslog server, where the details and status of all user interactions with the XenMobile server will be logged. To know how to configure a remote Syslog server for the use of the XenMobile server, refer to Page Section of this document.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for every operation users performed on XenMobile

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.

3. **PORT** – The port at which the **HOST** listens. By default, this is *4443*.
4. **LOG FILE PATH** – This test reports metrics by parsing a Syslog file. Specify the full path to the Syslog file here. To know how to configure the Syslog server where the XenMobile will be creating this file, refer to page Section of this document.
5. **SEARCH STRING** – By default, the Syslog file may contain information relating to a number of servers that are inter linked with the target XenMobile. In order to obtain the metrics of the target XenMobile alone, specify the hostname or the IP address of the target XenMobile server for which the logs are to be read from the syslog file, in the **SEARCH STRING** text box. Using this search string the information in the Syslog file may be parsed and metrics may be collected.
6. **SEARCH STRING INDEX** – Here, specify the cursor position after which the eG agent should search for the specified **SEARCH STRING** (or the position upto which the eG agent should ignore while searching for the specified **SEARCH STRING**) in the syslog file. For example, if the specified **SEARCH STRING** appears in the syslog file at the 17th position, then you may need to specify the **SEARCH STRING INDEX** as 16.
7. **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.
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Successful operations:	Indicates the number of times this operation succeeded.	Number	A high value is desired for this measure. Use the detailed diagnosis of this measure to view the names of the users who succeeded in performing an

Measurement	Description	Measurement Unit	Interpretation
			operation, when they performed the operation, and the client/receiver each user used for this purpose.
Failed operations:	Indicates the number of times this operation failed.	Number	A very low value is desired for this measure. Use the detailed diagnosis of this measure to view the names of the users who failed to perform a particular operation, when they tried to perform that operation, and the client/receiver each user used for this purpose.

3.3.3 XM Jobs Test

To ensure optimal performance of the XenMobile server, administrators can schedule the automatic execution of certain critical tasks in the background - say, cleanup operations, download operations, etc. Periodically, administrators should check whether these tasks are executing as per schedule, identify failed tasks, investigate the reasons for the failure and fix them, so that such job failures do not adversely impact the performance of the XenMobile server. The **XM Jobs** test helps administrators rapidly capture job failures and promptly initiate remedial action.

With the help of this test, administrators can track the status of their scheduled jobs and quickly identify the number and nature of jobs that failed or were cancelled.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for the target XenMobile server being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.

7. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Descrption	Measurement Unit	Interpretation
Repeating jobs:	Indicates the number of jobs that keep repeating.	Number	Use the detailed diagnosis of this measure to identify the jobs that keep repeating.
Total jobs:	Indicates the total number of jobs that were scheduled.	Number	
Running jobs:	Indicates the number of jobs that are running currently.	Number	Use the detailed diagnosis of this measure to know which jobs are running currently.
Cancel requested jobs:	Indicates the number of jobs for which cancellation has been requested.	Number	Use the detailed diagnosis of this measure to know for which jobs cancellation has been requested.
Cancelled jobs:	Indicates the number of jobs that have been cancelled.	Number	Use the detailed diagnosis of this measure to know which jobs were cancelled.
Recently ran jobs:	Indicates the number of jobs that ran during the last measurement period.	Number	
Recently failed jobs:	Indicates the number of jobs	Number	Ideally, the value of this measure

Measurement	Descrption	Measurement Unit	Interpretation
	that failed during the last measurement period.		should be 0. If this measure reports a non- zero value, use the detailed diagnosis of this measure to know which jobs failed.
Last executed jobs:	Indicates the number of jobs that were executed during the last measurement period.	Number	Use the detailed diagnosis of this measure to know which jobs executed during the last measurement period.

The detailed diagnosis of the *Repeating jobs* measure lists the jobs that keep repeating. Using these detailed metrics, administrators can figure out how often the job is configured to repeat, when the job executed last, and how long the job ran when it last executed. From these metrics, administrators can determine whether/not the job ran as per schedule, and if it did, whether job execution took longer than usual. Delays in repeating jobs can thus be detected.

Details of repeating jobs

STATE DATE	TASK	DELAY AMOUNT	DELAY UNIT	PRIORITY	REPEAT DELAY AMOUNT
Jun 10, 2015 18:03:19					
04/10/15 21:24:33	Repeating jobs	8769	66	1	12
04/10/15 21:24:33	Repeating jobs	8769	66	1	12

Figure 3.28: The detailed diagnosis of the repeating jobs measure

3.3.4 XM Connectivity Checks Test

For a XenMobile to function properly and send instructions to the devices in the mobile environment, administrators may need to continuously track the status of the connection established between XenMobile and various other servers/applications. To perform such checks at periodic intervals, you can use the **XM Connectivity Checks** test.

This test monitors the status of each connection to XenMobile in a XenMobile cluster and promptly alerts administrators whenever the connection is down.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each cluster:connection to the target XenMobile server being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed

2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **CLUSTER IP ADDRESSES** – Here, specify a comma-separated list of IP addresses of the XenMobile clusters that are to be monitored.
7. **CLUSTER USERNAMES** – Specify a comma-separated list of users who are entitled to access the XenMobile clusters.
8. **CLUSTER PASSWORDS** – Specify a comma-separated list of passwords corresponding to the **CLUSTER USERNAMES**.
9. **CONFIRM PASSWORD**–Confirm the **CLUSTER PASSWORDS** by retyping it here.
10. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
11. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Status:	Indicates the current status of this connection to the XenMobile.		The values that this measure reports and their corresponding numeric values are listed in the table below: Measure Value / Numeric Value Up / 1 Down / 0 **Note:**

Measurement	Description	Measurement Unit	Interpretation
			By default, this measure reports the **Measure Value**s discussed in the table above. However, in the graph of this measure, the status of each connection is indicated using the numeric equivalents only.

3.4 The XenMobile Devices and Applications Layer

This layer monitors devices connecting to Citrix XenMobile and sheds light on those devices that:

- Host blacklisted applications;
- Do not comply with policy settings;
- Are inactive/disconnected from XenMobile

In addition, the layer captures failed delivery group deployments and also devices on which configured actions are still pending.

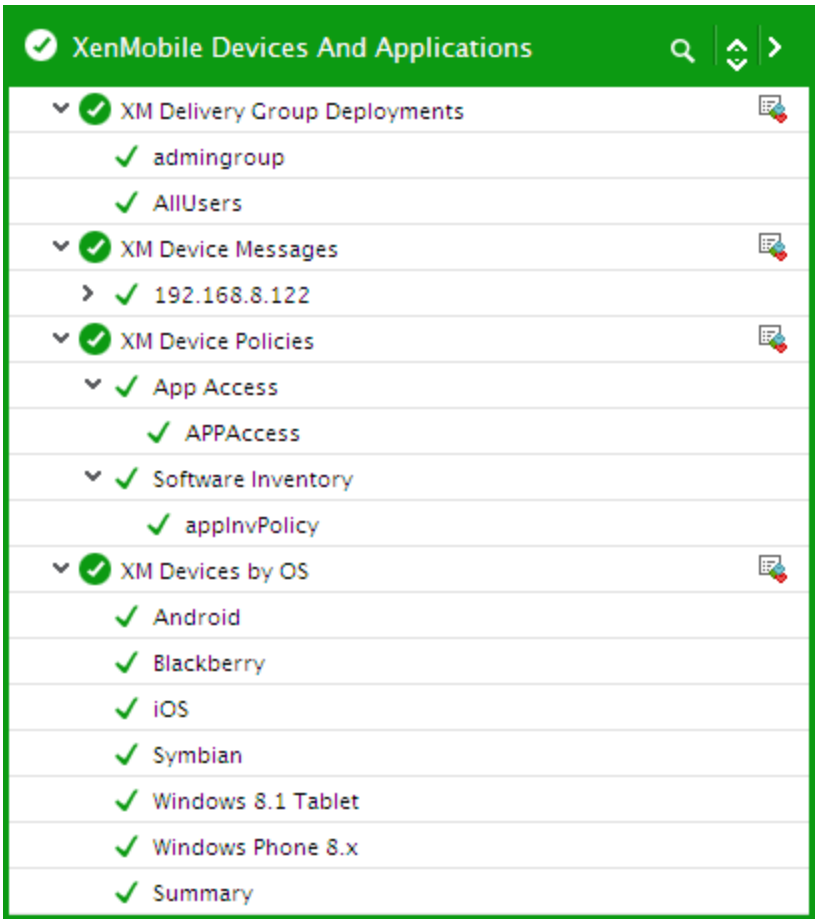


Figure 3.29: The tests mapped to the XenMobile Devices and Applications layer

3.4.1 XM Devices by OS Test

This test auto-discovers the device operating systems that are currently connected to the corporate network, and for each operating system so discovered, it reports the following:

- Devices that are currently managed/unmanaged by the server;
- Devices that are currently active/inactive;
- Devices that are either bound by or have violated one/more of the policies defined on the server.

In the process, the test exposes the potential threats to the corporate network and also indicates whether usage policies need to be fine-tuned to avoid false alarms. These performance results also lead administrators to those devices that need to be brought under the management purview of the XenMobile server.

XenMobile is capable of identifying mobile devices with blacklisted applications and those without the suggested list of applications. By hitting the XenMobile host URL using the HTTPS Client, this test pulls out the number and names of these devices from the XenMobile, reports it per mobile operating system in use in the environment, and thus provides administrators with useful inputs for fine-tuning existing device management policies or creating new device management policies using XenMobile.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each mobile operating system connecting to the corporate network

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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.**
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Inactive devices:	Indicates the number of devices using this mobile OS that are currently inactive.	Number	Use the detailed diagnosis of this measure to know which devices are inactive.
Unmanaged activesync devices:	Indicates the number of devices using this mobile	Number	Use the detailed diagnosis of this measure to know which devices with

Measurement	Description	Measurement Unit	Interpretation
	OS with ActiveSync configuration that are currently unmanaged.		ActiveSync configuration that are currently unmanaged.
Jailbroken devices:	Indicates the number of devices using this mobile OS that are jailbroken.	Number	A device is said to be a jailbroken device if a user breaks the iOS user agreement and warranty in order to install unauthorized software on his/her device. Use the detailed diagnosis of this measure to know which devices are jailbroken devices.
Passcode non-compliant devices:	Indicates the number of devices using this mobile OS that have violated the passcode policies set.	Number	Use the detailed diagnosis of this measure to know which devices are currently passcode non-compliant.
Non- compliant devices:	Indicates the number of out-of-compliant devices using this mobile OS.	Number	Use the detailed diagnosis of this measure to know which devices are currently out-of-compliant.
Devices newly enrolled:	Indicates the number of devices using this mobile OS that enrolled with the device manager since the last measurement period.	Number	Use the detailed diagnosis of this measure to know which devices enrolled newly.
Corporate owned devices:	Indicates the number of devices of this type that are owned by the company.	Number	Use the detailed diagnosis of this measure to know which devices are owned by the company.
Employee owned devices:	Indicates the number of devices using this mobile OS that are owned by employees.	Number	Use the detailed diagnosis of this measure to know which devices are owned by the employees.
Geo-fenced devices:	Indicates the number of devices using this mobile	Number	A geo-fence setting specifies the radius within which a device should be used

Measurement	Description	Measurement Unit	Interpretation
	OS that are bound by a geo-fence.		and the latitude and longitude of usage. Use the detailed diagnosis of this measure to know which devices are bound by this geo-fence.
Managed devices:	Indicates the number of devices using this mobile OS that are currently managed by the server.	Number	Use the detailed diagnosis of this measure to know which devices are currently managed by the server.
Unmanaged devices:	Indicates the number of devices using this mobile OS that are currently unmanaged by the server.	Number	Use the detailed diagnosis of this measure to know which devices are currently unmanaged by the server.
Devices with battery life less than 25%:	Indicates the number of devices using this mobile OS with battery life less than 25%.	Number	Use the detailed diagnosis of this measure to know which devices have a very low battery life.
Percentage of managed devices:	Indicates the percentage of devices using this mobile OS that are currently managed by the XenMobile MDM server.	Percent	
Total devices:	Indicates the total number of devices using this mobile OS connecting to the corporate network.	Number	This includes managed and unmanaged devices.
Ownership unknown devices	Indicates the number of devices using this mobile OS whose ownership was unknown.	Number	The count of this measure will increase if the user does not provide ownership related details while managing the device with the XenMobile.

The detailed diagnosis of the *Inactive devices* measure lists the model of the device, the OS name, the OS version and the user using the device. Using the detailed diagnosis, administrators can figure out the total number of days the device had been inactive and examine the reason for the same.

Details of Inactive devices

SERIAL NO	MODEL	OS NAME	OS VERSION	OS BUILD	LAST USER	FIRST CONNECTION TIME	LAST AUTHENTICATION TIME	INACTIVE FOR(DAYS)	WIPE ENABLED?	SDCARD WIPE ENABLED?
Jun 08, 2015 04:44:08										
33478234892389289	LG-F70	Android	5.0.1	8a48941	riya@tmarks.com	04/10/15 21:24:33	05/29/15 14:13:45	10	Yes	No

Figure 3.30: The detailed diagnosis of the Inactive Devices measure

The detailed diagnosis of the *Devices with battery life less than 25%* measure lists the model of the device which has a battery life of less than 25%, the OS name, the OS version and the user using the device. Using the detailed diagnosis, administrators can figure out the number of devices that are running out of battery soon.

Details of devices with battery life less than 25%

SERIAL NO	MODEL	OS NAME	OS VERSION	OS BUILD	LAST USER	FIRST CONNECTION TIME	LAST AUTHENTICATION TIME	INACTIVE FOR(DAYS)	WIPE ENABLED?	SDCARD WIPE ENABLED?	BATTERY PERCENT
Jun 08, 2015 04:44:08											
352595065622279	Samsung Core	Android	4.3.1	GT-I8262CWAINU	rick@tmarks.com	04/10/15 21:24:33	06/07/15 14:13:45	15	Yes	No	18
45345375452099474	LG-D410	Android	3	LRX22G.A1425182538	daniel@tmarks.com	04/10/15 21:24:33	06/07/15 14:13:45	0	Yes	No	12
23899239323423233	Samsung-s5570	Android	4.4	S5570XWKTZ	ray@tmarks.com	04/10/15 21:24:33	06/07/15 14:13:45	0	Yes	No	17
54325534892254810	Galaxy_A7	Android	5.0.1	GT-I5578UTUJFSET23	martin@tmarks.com	04/10/15 21:24:33	06/07/15 14:13:45	0	Yes	No	20
54584387543942898	Samsung-galaxyj1	Android	5	GT-I7547GDTGD	tony@tmarks	04/10/15 21:24:33	06/07/15 14:13:45	0	Yes	No	22
785678569084812	Galaxy-Tab 3V	Android	3.2	GT-I8262CWAINU	jack@tmarks.com	04/10/15 21:24:33	06/07/15 14:13:45	0	Yes	No	21

Figure 3.31: The detailed diagnosis of the Devices with battery life less than 25% measure

3.4.2 XM Device Policies Test

You can configure how XenMobile works with your devices by creating policies. Although many policies are common to all devices, each device has a set of policies specific to its operating system. By hitting the XenMobile host URL using the HTTPS Client, the **XM Device Policies** test pulls out the number of device policy deployments that were successful and the deployments that failed. In addition, this test also reports the number of deployments that are currently pending. Using this test, administrators can figure out the real cause for the failure of the device policy deployment and rectify the same before security violations occur on the target XenMobile environment.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each *Policy type:Policy name* created on the target XenMobile connecting to the corporate network

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed

2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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.
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Pending deployments:	Indicates the number of deployments still pending for this device policy.	Number	A consistent increase in the value of this measure is a cause for concern, as it could indicate a bottleneck in the device policy deployment that could be slowing down the deployment process.
Successful deployments:	Indicates the number of successful deployments of this device policy.	Number	
Failed deployments:	Indicates the number of failed deployments of this device policy.	Number	Use the detailed diagnosis of this measure to know the details of failed deployments.

The detailed diagnosis of the *Failed deployments* measure lists the model of the device, the OS name, the OS version and the user using the device. Using the detailed diagnosis, administrators can figure out the devices on which the device policy deployments failed.

Details of failed policy deployments

SERIAL NO	MODEL	OS NAME	OS VERSION	OS BUILD	FIRST CONNECTION TIME	LAST AUTHENTICATION TIME	INACTIVE FOR(DAYS)	WIPE ENABLED?	SDCARD WIPE ENABLED?
Jun 08, 2015 05:30:20									
39845948594388484	iOS 4.0	iOS	5.0.2	8A306	04/10/15 21:24:33	06/07/15 14:59:57	0	Yes	No
72384934892999234	IOS-4.2.1	iOS	4.2.1	8A754891	04/10/15 21:24:33	06/07/15 14:59:57	0	Yes	No

Figure 3.32: The detailed diagnosis of the Failed deployments measure

3.4.3 XM Delivery Group Deployments Test

Delivery groups specify the category of users to whose devices you deploy combinations of policies, apps, and actions. Inclusion in a delivery group is usually based on users' characteristics, such as company, country, department, office address, title, and so on. Delivery groups give you greater control over which user gets what resources and when they get them. You can deploy a delivery group to everyone or to a more narrowly defined group of users.

Deploying to a delivery group means sending a push notification to all users with iOS, Windows Phone 8.1, and Windows 8.1 tablet devices who belong to the delivery group to reconnect to XenMobile, so that you can reevaluate the devices and deploy apps, policies, and actions; users with other platform devices receive the resources immediately if they are already connected or, based on their scheduling policy, the next time they connect.

In a target XenMobile environment, there may be multiple delivery groups to which deployments need to be carried out on a regular basis. Whenever a new delivery group is created and users are added to the delivery group, administrators are required to deploy the policies, apps and actions associated with the delivery group to all users within the group. When a delivery group deployment fails, the users in that particular group may not be able to download the latest version of the policies, apps and actions which may render them to still use the obsolete ones. This may pose a serious security threat to the XenMobile environment. Also, when there is an unusual delay in deploying the policies, apps and actions in a particular delivery group, users registering for the first time in the delivery group may be frustrated owing to poor experience with the connectivity of the XenMobile server. To avoid such unpleasant experience for both the user as well the administrators, it is better to know the exact success/failure of each deployment. The **XM Delivery Group Deployments** test help administrators in this regard.

By hitting the XenMobile host URL using the HTTPS Client, the **XM Delivery Group Deployments** test pulls out the number of deployments that were successful and the deployments that failed for each delivery group. In addition, this test also reports the number of deployments that are currently pending. Using this test, administrators can figure out the real cause for the failure of the deployments in the delivery group and rectify the same before security violations occur on the target XenMobile environment.

This test is disabled by default. To enable the test, follow the Agents -> Tests -> Enable/Disable menu sequence in the eG administrative interface, pick *Citrix XenMobile* as the **Component type**, select *Performance* as the **Test type**, choose this test from the list of disabled tests list, and click on the **<** button.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each delivery group in the target XenMobile server

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT** - The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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.
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Pending deployments:	Indicates the number of deployments still pending	Number	A consistent increase in the value of this measure is a cause for concern, as

Measurement	Description	Measurement Unit	Interpretation
	for this delivery group.		it could indicate a bottleneck in the delivery group deployment that could be slowing down the deployment process.
Successful deployments:	Indicates the number of successful deployments of this delivery group.	Number	
Failed deployments:	Indicates the number of failed deployments of this delivery group.	Number	Use the detailed diagnosis of this measure to know the details of failed deployments.

The detailed diagnosis of the *Pending deployments* measure lists the serial number of the device, the model of the device, the OS name, the OS version and the last time the device was authenticated over the network. Using the detailed diagnosis, administrators can figure out the devices on which the delivery group deployments are still pending.

Details of failed policy deployments

SERIAL NO	MODEL	OS NAME	OS VERSION	OS BUILD	FIRST CONNECTION TIME	LAST AUTHENTICATION TIME	INACTIVE FOR(DAYS)	WIPE ENABLED?	SDCARD WIPE ENABLED?
Jun 08, 2015 05:30:20									
39845948594388484	iOS 4.0	iOS	5.0.2	8A306	04/10/15 21:24:33	06/07/15 14:59:57	0	Yes	No
72384934892999234	IOS-4.2.1	iOS	4.2.1	8A754891	04/10/15 21:24:33	06/07/15 14:59:57	0	Yes	No

Figure 3.33: The detailed diagnosis of the Failed deployments measure

3.4.4 XM Device Actions Test

Administrators can configure automated actions on the Device Manager, using which the device manager can perform actions based on user or device properties, events, or the existence of applications on devices.

For example, you can configure the following Automated Actions:

- You can automatically notify users whose iOS or Android devices is jailbroken or rooted that they are in violation of company policy and that the device will be selectively wiped if the device is not brought into compliance.
- You can automatically enforce a geo-fencing policy whereby if a user's device leaves a defined geographical perimeter, the device is blocked from accessing your organization's email, is selectively wiped, or is revoked.

- You can alert users automatically when mobile devices are roaming domestically or internationally and that they may be charged extra for the service.
- You can wipe a user's device automatically when the user leaves the company, and can disable the user's Active Directory account, so that the user can no longer access your organization's data.
- You can place a user's device into an Out Of Compliance state automatically if the user installs a blacklisted app, and you can send the user a notification informing them that they have broken the organization's mobile app policy.

To understand the workload imposed by these actions on XenMobile, measure the efficiency of XenMobile in performing these actions, and proactively isolate bottlenecks in the execution of these actions, administrators should use the **XM Device Actions** test. This test tracks the automated actions triggered on the XenMobile server, reports the number of devices on which each action was completed and the number of devices on which each action failed. In addition, this test points you to the number of devices on which each action was still pending thus leading you to figure out the probable bottlenecks in the execution of the actions.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for each automated action configured on the target XenMobile that is to be monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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.
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Completed actions:	Indicates the number of devices on which this action was completed.	Number	The detailed diagnosis of this measure if enabled lists the devices on which the action was completed
Pending actions:	Indicates the number of devices on which this action was still pending.	Number	A steady increase in the value of this measure could indicate that the server is taking too long to process the requests that are sent to perform each action. The detailed diagnosis of this measure if enabled, lists the devices on which the action was still pending.
Failed actions:	Indicates the number of devices on which this action failed to materialize.	Number	The detailed diagnosis of this measure if enabled, lists the devices on which the action failed to materialize.

The detailed diagnosis of the *Completed actions* measure lists the serial number of the device, the model of the device, the OS name, the OS version, the time at which the action was performed and the last time the device was authenticated over the network.

Details of completed actions

SERIAL NO	MODEL	OS NAME	OS VERSION	OS BUILD	ACTION PERFORMED TIME	FIRST CONNECTION TIME	LAST AUTHENTICATION TIME	INACTIVE FOR(DAYS)	WIPE ENABLED?	SDCARD WIPE ENABLED?
Jun 08, 2015 06:27:51										
352595065622279	Samsung Core	Android	4.3.1	GT-I8262CWAINU	13/04/2015 15:04:21	04/10/15 21:24:33	06/07/15 15:57:28	0	Yes	No
39845948594388484	iOS 4.0	iOS	5.0.2	8A306	13/04/2015 15:04:21	04/10/15 21:24:33	06/07/15 15:57:28	0	Yes	No
789461189415456	Nokia-C7	Symbian	Nokia Belle	LRX22G.A1425182538	13/04/2015 15:04:21	04/10/15 21:24:33	06/07/15 15:57:28	0	Yes	No

Figure 3.34: The detailed diagnosis of the Completed actions measure

3.4.5 XM Device Sessions Test

At any given point in time, for each session state, administrators should be able to tell the number and names of devices connected to the XenMobile server, as this is not only a good measure of the current session load of the XenMobile server, but also points to the devices that are in that particular session state for a prolonged time. The **XM Device Sessions** test helps you in this regard. For each auto-discovered session state, this test indicates the current load on the XenMobile server by reporting the count of devices currently connected to the XenMobile server. The device IDs are also revealed as part of detailed diagnosis.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for the each session state of the XenMobile server being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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.
8. **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
Number of devices:	Indicates the number of devices that are currently in this session state.	Number	This measure is a good indicator of the current session load on the server.

The detailed diagnosis of the *Number of devices* measure indicates which devices are currently connected to the server.

Details of device

USERS	DEVICE ID	SERIAL NUMBER	CONNECTION DETAILS
Jun 10, 2015 15:11:09			
karthikg@citrix.eginnovations.com	16	357642051721239	connection since Wed Jun 10 02:30:35 PDT 2015 alwaysOn: false pingDelay: -1s closed: false wipeQueued: false overflow: false flow: 0 HTTP out: 1580 max HTTP: false platform: ANDROID Logger: EWSession connectedCount=1 resumeExpectedCount=1 resumeRequestedCount=0 pingCount=0 timeoutCount=0 sendAuthMsgCount=0 sendServicePacketCount=10 Resume size: 10 pkts; 854 bytes Priority queue: 0 Tunnel: service tunnel -- toNPC: 0 Pending provisioning #0 Waiting flushables: 1 Waiting callback for service 5: NPC File Flushable: Ask CRC32 #0 appControlPolicyConfiguration_empty.xml PendingCommandGroup #1 PendingCommandGroup: Ask CRC32 #0 apkPullList.xml

Figure 3.35: The detailed diagnosis of the Number of devices measure

3.4.6 XM Device Messages Test

In large corporate environments, it is not possible for the administrator to keep track of all the actions issued to the devices on the network. In a multiple administrator environment, it is even more difficult to track which administrator has issued an action to a particular device. Even if the action was completed, without an acknowledgement, administrators may not be able to identify the device on which the actions were completed and on the devices on which the action was still pending. To gain a better vision on the list of devices on which the actions were completed or the list of devices on which the actions were cancelled after issue, you can use the **XM Device Messages** test.

For each device action issued by the administrator, this test returns the numerical statistics of the new messages and cancelled messages that were received as acknowledgement.

This test is disabled by default. To enable the test, follow the Agents -> Tests -> Enable/Disable menu sequence in the eG administrative interface, pick *Citrix XenMobile* as the **Component type**, select *Performance* as the **Test type**, choose this test from the list of disabled tests list, and click on the **<** button.

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Output of the test : One set of results for each *XenMobile host:Action* on the XenMobile server bring monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.
3. **PORT -** The port at which the **HOST** listens. By default, this is *4443*.
4. **USERNAME** and **PASSWORD** – Specify the credentials of a XenMobile user with Administrator privileges.
5. **CONFIRM PASSWORD** – Confirm the **PASSWORD** by retyping it here.
6. **SSL** – Indicate whether/not the XenMobile server is SSL-enabled. By default, this flag is set to **Yes**.
7. **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.
8. **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:

   - Both the normal and abnormalfrequencies configured for the detailed diagnosis measures should not be 0.
   - The eG manager license should allow the detailed diagnosis capability

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
New messages:	Indicates the number of new messages received for this action during the last measurement period.	Number	The detailed diagnosis of this measure if enabled, lists the Reference ID, the status of the message and the time at which the message was created.
Canceled messages:	Indicates the number of messages received owing to cancellation of this action after being issued during the	Number	The detailed diagnosis of this measure if enabled, lists the Reference ID, the status of the message and the time at which the message was created.

Measurement	Description	Measurement Unit	Interpretation
	last measurement period.		
Other messages:	Indicates the number of messages received that were other than new and cancelled for this action during the last measurement period.	Number	The detailed diagnosis of this measure if enabled, lists the Reference ID, the status of the message and the time at which the message was created.

3.5 The XenMobile Users Layer

This layer helps the administrators to keep track on the user sessions that are connected and capture the failed login attempts.

Figure 3.36: The tests mapped to the XenMobile Users layer

3.5.1 XM User Logins Test

By tracking user sessions to the XenMobile server, the **XM User Logins** test helps administrators gauge the workload of the XenMobile appliance and quickly capture failed login attempts.

For this test to run and report metrics, the XenMobile server should be configured to create a Syslog file in a remote Syslog server, where the details and status of all user interactions with the XenMobile server will be logged. To know how to configure a remote Syslog server for the use of the XenMobile server, refer to Page Section **of this document.**

Target of the test : A Citrix XenMobile

Agent deploying the test : A remote agent

Outputs of the test : One set of results for the target XenMobile server being monitored

Configurable parameters for the test

1. **TEST PERIOD** - How often should the test be executed
2. **HOST** - The host for which the test is to be configured.

3. **PORT** – The port at which the **HOST** listens. By default, this is *4443*.
4. **LOG FILE PATH** – This test reports metrics by parsing a Syslog file. Specify the full path to the Syslog file here. To know how to configure the Syslog server where the XenMobile will be creating this file, refer to page Section of this document.
5. **SEARCH STRING** – By default, the Syslog file may contain information relating to a number of servers that are inter linked with the target XenMobile. In order to obtain the metrics of the target XenMobile alone, specify the hostname or the IP address of the target XenMobile server for which the logs are to be read from the syslog file, in the **SEARCH STRING** text box. Using this search string the information in the Syslog file may be parsed and metrics may be collected.
6. **SEARCH STRING INDEX** – Here, specify the cursor position after which the eG agent should search for the specified **SEARCH STRING**(or the position upto which the eG agent should ignore while searching for the specified **SEARCH STRING**) in the syslog file. For example, if the specified search string appears in the syslog file at the 17th position, then you may need to specify the **SEARCH STRING INDEX** as *16*.
7. **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.
8. **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 abnormalfrequencies configured for the detailed diagnosis measures should not be 0.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Connected sessions:	Indicates the total number of users currently connected to the XenMobile server.	Number	This is a good indicator of the current session load on the XenMobile server.

Measurement	Description	Measurement Unit	Interpretation
New logins:	Indicates the number of users who logged in during the last measurement period.	Number	
Percentage of new logins:	Indicates the percentage of users who logged in recently.	Percent	
Session logouts:	Indicates the number of sessions that logged out during the last measurement period.	Number	A sudden increase in the value of this measure could warrant closer scrutiny.
Failed logins:	Indicates the number of logins that failed.	Number	A low value is desired for this measure.

4

Conclusion

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

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