Monitoring MaxDB Server

eG Innovations Product Documentation

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Total Performance Visibility

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Chapter 1: Introduction

MySQL MaxDB is a mature and reliable database system that effortlessly handles heavy-duty transactions related to OLTP. As MaxDB embeds special capabilities to handle all SAP applications, in-depth monitoring of MaxDB is necessary to ensure the continuous availability and good health of the SAP environment. eG Enterprise offers 100% web-based monitoring of every layer of MaxDB server. This model determine what metrics are collected, how often, how the results of the monitoring are interpreted to provide proactive alerts, and how the metrics are correlated to determine where the root-cause of problems lie.

Chapter 2: How to Monitor MaxDB Using eG Enterprise?

eG Enterprise is capable of monitoring the MaxDB in both agent based and agentless manners. An eG agent connects to a database on the MaxDB server as a *SYSDBA*, access certain key system tables on the database, and pull out critical performance statistics pertaining to the MaxDB server from the system tables. To enable the eG agent to establish the database connection and perform metrics collection, the agent needs to be configured with the **SAP MaxDB JDBC Driver**and the **DBM** and **Loader Java classes**. The procedure for achieving these requirements are explained in the following sections.

2.1 Pre-requisites for Monitoring MaxDB

Upon successful installation of the MaxDB server, you can find the JDBC driver and the Java classes in the **sapdbc.jar** file in the <MAXDB_INSTALL_DIR>\runtime\jar\ directory. To make this file available to the eG agent, follow the steps below:

- Login to the MaxDB server, and navigate to the following directory:

  <MAXDB_INSTALL_DIR>\runtime\jar\

  For Example: C:\sapdb\programs\runtime\jar

  To know the correct install path of the MaxDB server, run the following command from the prompt:

  dbmcli dbm_getpath InstallationPath

- Next, copy the **sapdbc.jar** file in that directory to the <EG_AGENT_INSTALL_DIR>\lib directory of the eG agent that is monitoring MaxDB.
- Finally, restart the eG agent.

The sections to come will discuss each of the top 4 layers of Figure 3.1 in more detail. The other layers have been dealt with extensively in the *Monitoring Unix and Windows Servers* document.

2.2 Configuring the Max DB Server

Before attempting to monitor the Max DB server, do the following:

- Connect to the URL: http://dev.mysql.com/downloads/maxdb/7.6.00.html
- Scroll down the page that appears next to view a section titled, **MaxDB by MySQL - - SAP ABAP INSTANCE Certified**.
- In that section, click on the hyperlink representing the latest version of MaxDB.
- Scroll down the page that appears next to view the list of downloads available for the latest version. From the list, download the jdbc Driver Binary to the local host.
- A file named **sapdbc-<version>.jar** gets downloaded.
- Next, copy the **sapdbc-<version>.jar** file to the /opt/egurkha/lib directory.
- Once copied, rename the **sapdbc-<version>.jar** file to **sapdbc.jar**.
- Restart the eG agent.

Once all the pre-requisites are kept in place, proceed to monitor the MaxDB server. The broad steps for monitoring MaxDB using eG Enterprise are as follows:

- Managing the MaxDB Server
- Configuring the tests

2.3 Managing the MaxDB Server

The MaxDB server cannot be automatically discovered by eG Enterprise. This implies that you will have to manually add the server into the eG Enterprise system to manage it. Follow the steps below to achieve the same:

1. Login to the eG administrative interface.
2. Follow the Components -> Add/Modify menu sequence in the **Infrastructure** tile of the **Admin** menu.
3. In the **COMPONENT** page that appears next, select *Max DB* as the **Component type**. Then, click the **Add New Component** button. This will invoke Figure 2.1.

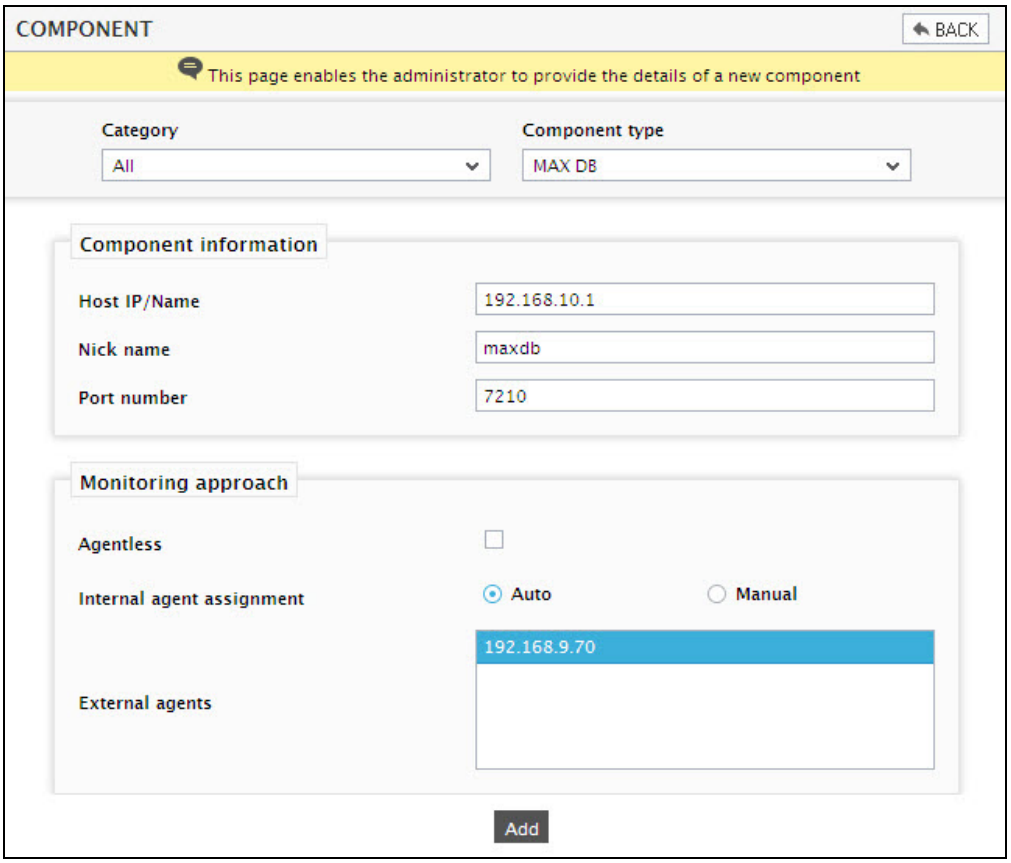

Figure 2.1: Adding a Max DB server

4. Specify the **Host IP** and the **Nick name** of the Max DB server in Figure 2.1.
5. The **Port number** will be set as 7210 by default. If the MaxDB server is listening on a different port in your environment, then override this default setting.
6. Finally, click the **Add** button to register the changes.

2.4 Configuring the tests

1. When you attempt to sign out, a list of unconfigured tests will appear as shown in 2.3.

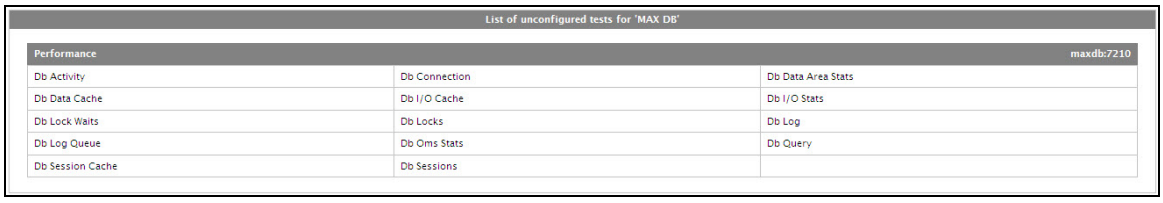

Figure 2.2: The list of unconfigured tests for the Max DB server

2. Click on any test in the list of unconfigured tests to configure. To know how to configure the tests, refer to **Monitoring MaxDB** chapter.
3. Finally, signout of the eG administrative interface.

Chapter 3: Monitoring MaxDB

eG Enterprise suite offers a specialized monitoring model (see Figure 3.1) for the MaxDB server using which the following queries can be effectively answered:

- Is a connection to the database available?
- Is the OMS heap been excessively utilized?
- Is there enough free space in the data area for permanent data, or is the temporary data occupying a large portion of it?
- Have locks been held for too long a time? Are deadlocks and lock collisions kept at a minimum?
- Is the log area been used excessively, or are log backups carried out frequently?
- What type of QUERY statements are most often executed on the database? How long does the database server take to execute a simple load query?
- Are many transaction rollbacks happening?
- Does the server handle all I/O requests to it promptly, or are there too many requests pending processing?
- Are all caches adequately sized? Are there excessive cache misses?

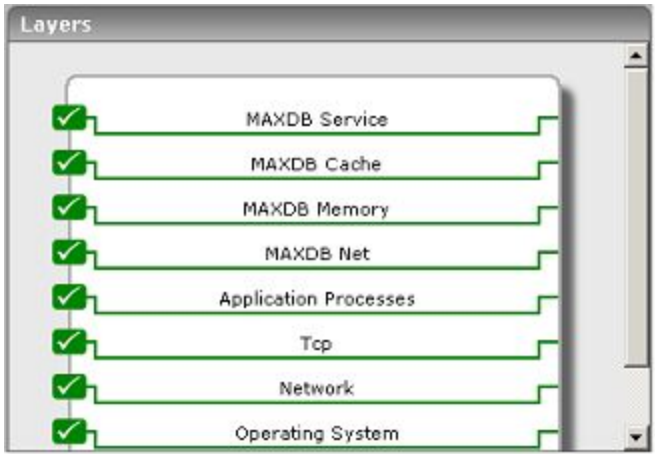

Figure 3.1: Layer model of a MaxDB server

Each layer of the MaxDB model of Figure 3.1 above executes a wide variety of tests on the server to assess its health. Typically, these tests connect to a database on the MaxDB server as a SYSDBA, access certain key system tables on the database, and pull out critical performance statistics

pertaining to the MaxDB server from the system tables. To enable the eG agent to establish the database connection and perform metrics collection, the agent needs to be configured with the **SAP MaxDB JDBC Driver** and the **DBM** and **Loader Java classes**. Section **2.1** and Section **2.2** describe how to achieve the same.

3.1 The MAXDB Net Layer

Using the Db Connection test associated with it (see Figure 3.2), the **MaxDB Net** layer measures the availability and responsiveness of the MaxDB server.

Figure 3.2: The test associated with the MAXDB Net layer

3.1.1 Db Connection Test

The Db Connection test measures the availability and responsiveness of the MaxDB server. For this test to run, make sure that the sapdbc.jar file (see page is copied to the /opt/egurkha/lib directory of the external agent host.

Target of the test : A MaxDB server

Agent deploying the test : An external agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.

Parameter	Description
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Database availability	Indicates whether the database connection is available or not.	Percent	The value 100 indicates availability, the value 0 indicates non-availability.
Response time	Indicates the time taken to execute a simple load database query.	Secs	A sudden increase in response time is indicative of a bottleneck at the database server.

3.2 The MAXDB Memory Layer

The tests associated with the **MAXDB Memory** layer help determine the following:

- Whether the data area has been adequately sized or not
- Whether the locking mechanism is functioning smoothly on the database server
- Whether log queues are overloaded with log entries
- Whether adequate memory is available in the log area
- How well the SAP liveCache manages objects

Figure 3.3: The tests associated with the MAXDB Memory layer

3.2.1 Db Data Area Stats Test

All data volumes in a database instance are known collectively as the data area. The data area contains, amongst other things, the application data, the database catalog and the undo log entries of the database instance. This test monitors the usage of the data area.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Usable size	Indicates the data area that is currently available for data.	MB	There must also always be sufficient space in the data area to hold all the data that is created during database operations. Therefore, ideally, this value should be high.
Used size	Indicates the memory in data area that is currently used for data.	MB	
Data area usage	Indicates the percentage of memory in the data area that is actually used for data.	Percent	Ideally, this value should not be very high.
Data on volume	Indicates the amount of data that has been written to the data area, currently.	MB	
Data not on volume	Indicates the amount of permanent data that has to be written to the data area at the next savepoint.	MB	Pagers (which are tasks in the user kernel thread) write the data from the data cache to the data area for each savepoint. If a lot of data was changed and the pagers would have to write many pages at the next savepoint, then the pagers write data from the data cache to the data area before the next savepoint.
Permanent size used	Indicates the data area that is currently used for permanent data.	MB	
Temporary size used	Indicates the data area that is currently used for temporary data.	MB	A large proportion of temporary data indicates large amounts of (buffer) result sets. If the value of this measure is high, then find the statement that is causing large amounts of (buffer) result sets to be created, and check the access strategies for this statement.

3.2.2 Db Locks Test

Multiple transactions can access the same database object, such as a table, at the same time. To isolate the transactions from one another, the database system sets locks for database objects. The Db Locks test monitors the locking activity on MaxDB.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurement	Description	Measurement Unit	Interpretation
Num locks	Indicates the number of locks currently in the database.	Number	A consistent increase in the value of this measure indicates a contention for locks.
Transaction holding locks	Indicates the number of transactions to which locks have been assigned, currently.	Number	
Transaction request locks	Indicates the number of	Number	

Measurement	Description	Measurement Unit	Interpretation
	transactions requesting locks in the last measurement period.		
Num oms locks	Indicates the number of OMS locks currently in the database.	Number	
Deadlock rate	Indicates the rate of deadlocks.	Deadlocks/Sec	A deadlock may arise due to various situations including bad design of queries and deficient coding practices. A deadlock is a situation where both/all the lock requestors are in a mutual or a multi-way tie. Any deadlocks are detrimental to database application performance.
Collision rate	Indicates the rate of lock collisions.	Collisions/Sec	A lock collision occurs when tasks running in different threads attempt to access a global storage area in parallel. The synchronization required for this often leads to an increased collision rate. Generally, the risk of collision rises with the number of processors used (MAXCPU general database parameter). In multiprocessor systems, you should therefore check whether the database system can fulfill the needs of the applications with fewer CPUs. If high collision rates occur in multiprocessor central systems (database system and application running on the same computer), check whether the computer's CPU is overloaded, and whether the database threads are blocked by other applications. In this case, the database threads that contain user tasks should receive REAL TIME PRIORITY from the operating system. To avoid operating

Measurement	Description	Measurement Unit	Interpretation
			system blocks however, the value of MAXCPU must be at least one lower than the number of actual CPUs. If the high collision rates occur in the DATAn, SPLITn or TREEn regions, increase the values of both the general database parameter CACHE_SIZE and the special database parameters _DATA_CACHE_RGNS and _ TREE_RGNS. If the high collision rates occur in the TRACE or BUFWRTR regions, then activate the database trace temporarily for troubleshooting only. **Note:** One exception to this in liveCache instances is high collision rates in the OMSVDIR and CNSTVIEW regions. This is normal for certain actions, such as a simultaneous CIF queue transfer.
Escalation rate	Indicates the rate of escalations.	Escalations/Sec	Escalations show the total number of rows locked by a single user session. If more than a certain percentage of the rows of a table are locked by a single user session, then the database system locks the entire table. You can specify the maximum number of possible row locks in the lock list in the general database parameter MAXLOCKS. The database system attempts to convert the row lock to a table lock if a task holds more than 0.1*MAXLOCKS row locks in a table. If too many escalations occur, increase the parameter value. Whether escalations lead to problems depends strongly on the application in

Measurement	Description	Measurement Unit	Interpretation
			question. If escalations occur, check the application to see whether you can split any change transactions that lock a lot of rows into several individual transactions.
Row locks	Indicates the rate of row locks.	Locks/Sec	A consistent increase in the value of this measure could indicate a probable escalation.
Table locks	Indicates the rate of table locks.	Locks/Sec	
Request timeouts	Indicates the rate at which lock requests exceeded the timeout value.	Timeouts/Sec	If the value of this measure is high, you might want to reset the REQUEST_TIMEOUT value.

3.2.3 Db Lock Waits Test

This test reports the number of requests that are awaiting locks.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every lock type operational on the MaxDB server being monitored.

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.

Parameter	Description
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Lock waits	Indicates the number of lock waits currently in the database.	Number	Lock waits can be caused by transactions that take too long to execute. Long wait times can also occur when various applications want to lock the same object.

3.2.4 Db Log Queue Test

The log queue is the main memory area, in which redo log entries from the transactions are stored. The Db Log Queue test monitors the usage of the log queue.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every log queue on the MaxDB server being monitored.

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.

Parameter	Description
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Queue max used	Indicates the maximum number of transactions written to the log queue.	Number	
Log entries inserted	Indicates the number of log entries inserted into the queue in the last measurement period.	Number	
Queue overflow	Indicates the number of wait situations that arose due to log queue overflows in the last measurement period.	Number	If the log queue becomes full before log pages are written to the log area, then a log queue overflow occurs. If the value of this measure keeps increasing, you might want to consider altering the log queue size by resetting the LOG_IO_QUEUE parameter.
Group commits	Indicates the number of log pages whose writing was waited for by more than one transaction, in the last measurement period.	Number	
Log queue transactions	Indicates the number of transactions waiting to write in the log queue in the last measurement period.	Number	
Max waits per page	Indicates the maximum number of transactions that simultaneously waited for the same page to be written.	Number	A high value of this measure could cause undue delays in transaction execution.
Physical write rate	Indicates the rate at which log pages were written to the log area.	Writes/Sec	

3.2.5 Db Log Test

All log volumes in a database instance are known collectively as the log area. The database system writes the redo log entries of transactions in the log segments of the log area. Redo log entries are needed, amongst other things, for restoring a consistent database instance state after a restart or a system breakdown. The **Db Log** test monitors the usage of the log area.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Total log memory	Indicates the current size of the log area.	MB	
Log memory used	Indicates the size of the log area currently utilized.	MB	If the value of this measure grows dangerously close to the value of the *Total log memory* measure, it indicates that the log area is fast

Measurement	Description	Measurement Unit	Interpretation
			becoming full. This indicates a probable problem condition, as a full log area causes the database to shut down. To avoid this, it is recommended that you carry out log backups at regular intervals, because the database system cannot overwrite the segments in the log area until after a successful log backup.
Percentage of log area used	Indicates the percentage of the log area utilized.	Percent	If the value of this measure grows dangerously close to 100%, it indicates that the log area is fast becoming full. This indicates a probable problem condition, as a full log area causes the database to shut down. To avoid this, it is recommended that you carry out log backups at regular intervals, because the database system cannot overwrite the segments in the log area until after a successful log backup.
Transaction rate	Indicates the rate of transactions to the log area.	Trans/Sec	
Write transaction rate	Indicates the rate of write transactions to the log area.	Trans/Sec	
Percentage of write transactions	Indicates the percentage of write transactions to the log area.	Percent	This measure is a good indicator of the level of activity on the log area.
Log queues	Indicates the current number of log queues.	Number	
Queue size	Indicates the size of the log queue.	MB	

3.2.6 Db Oms Stats Test

Object management system (OMS) is a type of data management. Only SAP liveCache database instances use OMS. SAP liveCache is an enhancement of the MaxDB relational database system. In SAP liveCache, the actual data structures and data streams (such as networks and relationships) can be mapped more easily and effectively. A large part of the data in a SAP liveCache database instance is managed in objects. This object data is called OMS data. OMS data is managed in containers that are assigned to precisely one persistent C++ class of the object type, and is edited in the OMS intermediate layer. The OMS data pages are in the data cache. The Db Oms Stats test measures how well the SAP liveCache manages objects using OMS.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every liveCache object on the MaxDB server being monitored.

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Heap used	Indicates the liveCache memory that is been used currently.	MB	The memory requirements in the OMS heap are very high for the running DB procedures. If the memory utilization in the OMS heap reaches 100% of its limit, there is the risk of errors in the DB procedures (Out of Memory Exceptions), or that OMS version data is swapped from the OMS heap to the global data cache (OMS version is unloaded). It is recommended that you configure the general database parameter CACHE_SIZE and the liveCache parameter OMS_HEAP_ LIMIT in such a way that it prevents swapping at the operating system level and errors in DB procedures.
Reserved size	Indicates the memory managed by the allocator.	MB	
Memory allocation rate	Indicates the number of memory allocations per second.	Allocations/Sec	A higher rate indicates higher and faster memory utilization.
Memory release rate	Indicates the number of memory releases per second.	Releases/Sec	
Spinlock rate	When a requested lock is not available, then the process will spin and try again to acquire the lock. This is known as a Spinlock. This measure indicates the number of attempts that were made per second to acquire a spinlock.	Attempts/Sec	A consistent increase in this rate indicates that some locks have been held for too long a time.
Collision rate	Indicates the rate at which attempts to get a spinlock	Collisions/Sec	

Measurement	Description	Measurement Unit	Interpretation
	failed.		
Spinloop rate	Indicates the rate at which attempts were made to acquire a spinlock without prior release of the CPU.	Attempts/Sec	
Yieldloop rate	Indicates the rate at which attempts were made to acquire a spinlock after prior release of the CPU.	Attempts/Sec	
Errors rate	Indicates the rate at which errors were detected and automatically corrected.	Errors/Sec	

3.3 The MAXDB Cache Layer

The utilization of the data cache and the I/O buffer cache is monitored using the tests mapped to the **MAXDB Cache** layer (see Figure 3.4).

Figure 3.4: The tests associated with the MAXDB Cache layer

3.3.1 Db Data Cache Test

The Db Data Cache test monitors the usage of the data cache on MaxDB. The data cache contains the last read- or write-accessed pages of the data volumes. It is shared by all simultaneously active users.

Target of the test : A MaxDB server

Agent deploying the test : An external agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Data cache hit ratio	Indicates the percentage of successful accesses to the data cache.	Percent	A high hit rate of at least 98% is recommended for the data cache. If the hit rate is low, consider changing the size of the data cache.
Cache usable size	Indicates the current size of the data cache.	MB	The size of the data cache has the following effect on the performance of the database system: • A large data cache makes a high hit rate possible. • If the data cache is too large for a small main memory, this can lead to operating system swapping with a very high level of I/O activity.

Measurement	Description	Measurement Unit	Interpretation
			However, since the data cache is dynamically dimensioned by the database system, you cannot configure the size of the data cache directly, but can only influence it implicitly by configuring the I/O buffer cache. The database system takes the pages required for the data cache from the I/O buffer cache. If the other I/O buffer cache user, the converter, grows in size, the database system decreases the size of the data cache, if necessary.
Cache used size	Indicates the currently utilized portion of the data cache.	MB	If converter cache or catalog cache run out of space, the data cache is used; so, it is recommended that you increase the overall cache size.
Percent of data cache used	Indicates the percentage of the cache that is utilized.	Percent	If converter cache or catalog cache run out of space, the data cache is used; so, it is recommended that you increase the overall cache size.
Oms data size	Indicates the size of the data cache that is currently used for storing OMS data.	MB	Since the data in an SAP liveCache database instance consists mainly of OMS data, you should configure the data cache for SAP liveCache database instances to be large enough to store all the OMS data, if possible.
History data size	Indicates the size of the data cache required for consistent reads and transactions management.	MB	
SQL data size	Indicates the size of the data cache not required either for OMS data or consistent reads and transaction management.	MB	

3.3.2 Db I/O Cache Test

The Db I/O Cache test monitors the I/O Buffer Cache on the MaxDB server. The database system uses the I/O buffer cache to manage all of the main memory that is available for I/O operations. The converter and the data cache are the most important main memory consumers that the database system manages in the I/O buffer cache. The converter is where the database system keeps information about which logical page number is saved at what physical position (MaxDB block address). When the database system fails to find a page number in the data cache, it searches for the page number in the converter and uses this to calculate the physical position of the data page in the data volumes. If the converter grows while the database is running, and requires more pages, the database system gives it more pages from the I/O buffer cache. If no more pages are available there, data is displaced from the data cache and made available to the converter.

Target of the test : A MaxDB server

Agent deploying the test : An external agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Total I/O cache size	Indicates the current size of the I/O buffer cache.	MB	
Data cache size	Indicates the portion of the I/O buffer cache that is currently utilized by the data cache.	MB	A high value of this measure is imperative to ensure a high data cache hit rate. If the value of this measure is very low, it is recommended that you reset the *CACHE_SIZE* parameter.
Percent data cache	Indicates the percentage of the I/O buffer cache used by the data cache.	Percent	A high value of this measure is imperative to ensure a high data cache hit rate. If the value of this measure is very low, it is recommended that you reset the *CACHE_SIZE* parameter.
Converter size	Indicates the space in the I/O buffer cache currently used by the converter.	MB	
Percent converter size	Indicates the percentage of the I/O buffer cache used by the converter.	Percent	If the value of this measure falls, data is displaced from the data cache and made available to the converter.
IO mgmt size	Indicates the current size of the I/O management.	MB	
File directory size	Indicates the space currently used by the file directories.	MB	
Restart record size	Indicates the space currently used by restart records that store all information that the database system requires to restart the database instance.	MB	
Block allocator size	Indicates the amount of memory currently used by block allocators.	MB	
Unused size	Indicates the free space in	MB	Ideally, this value should be high. A

Measurement	Description	Measurement Unit	Interpretation
	the I/O buffer cache.		very low value of this measure indicates the need to reset the *CACHE_SIZE*.

3.4 The MAXDB Service Layer

Using the tests associated with the **MAXDB Service** layer (see Figure 3.5), you can monitor the following:

- How well the database session caches are utilized
- The SQL statements and transactions executing on the MaxDB server
- The request processing capability of the MaxDB server
- The different types of queries that are executed on the server
- The active sessions on the database server

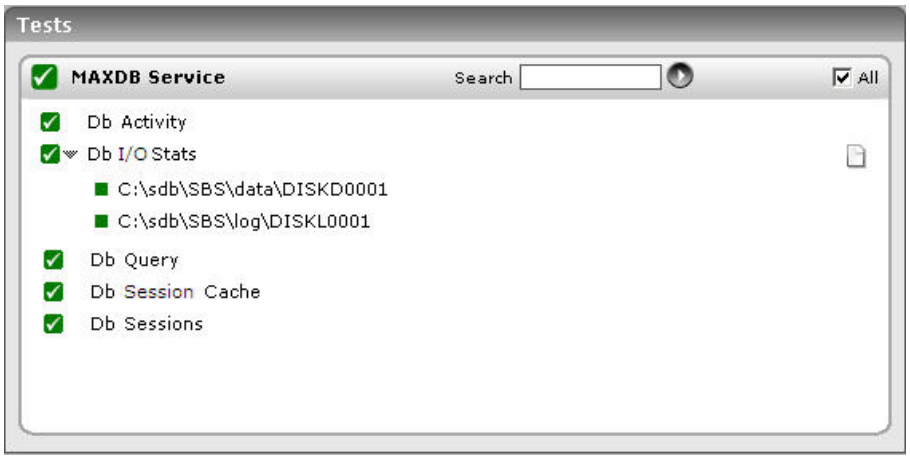

Figure 3.5: The tests associated with the MAXDB Service

3.4.1 Db Session Cache Test

This test reveals whether the database session cache has been effectively utilized or not.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.
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
Cache hits	Indicates the percentage of total database sessions that were accessed from the cache.	Percent	If the value of this measure is over 85%, it is a sign of good health. Values lesser than 85% might warrant a change in the cache size using the CAT_CACHE_SUPPLY parameter. The detailed diagnosis of this

Measurement	Description	Measurement Unit	Interpretation
			measure, if enabled, provides a list of session IDs, the number of attempts made to access each session, the number of times every listed session was successfully accessed from the cache, and the hit rate.

3.4.2 Db Activity Test

A transaction is a sequence of SQL statements that are handled by the database system as a unit, in the sense that any modifications made to the database by the SQL statements are either all reflected in the state of the database, or else none of the database modifications are retained. Among other things, the transaction management functions of a database system make sure that parallel transactions from multiple database sessions are processed correctly, and that they deliver the same results as if the transactions were processed sequentially. The Db Activity test reports statistics pertaining to the transactions executing on MaxDB.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Sql command rate	Indicates the rate at which SQL statements were executed.	Commands/Sec	
Sql parsing rate	Indicates the rate at which SQL statements were parsed.	Parses/Sec	
Parsed sql execution rate	Indicates the rate at which parsed SQL statements were executed.	Executions/Sec	A high level of parse activity when the database is running can indicate a missing statement cache implementation in your application, or a deactivated parse info cache in the JDBC interface. A high level of parse activity is normal when programs or program components are started for the first time.
Transaction commits	Indicates the rate at which transactions were committed.	Commits/Sec	
Transaction rollbacks	Indicates the rate at which transactions were rolled back.	Rollbacks/Sec	Ideally, there should be few user rollbacks happening, since rollbacks are costly operations on the database.
Rollbacks	Indicates the percentage of rollbacks.	Percent	Ideally, there should be few user rollbacks happening, since rollbacks are costly operations on the database.
Memory sort rate	Indicates the rate at which sorting operations were performed on the main memory to build indexes.	Sorts/Sec	
Table scans	Indicates the rate of table scans.	Scans/Sec	A high value of table scans is an indicator that the queries do not use indexes at all or use indexes with low selectivity.
Index scan rate	Indicates the rate of index scans.	Scans/Sec	

3.4.3 Db I/O Stats Test

This test indicates how efficiently MaxDB handles read/write requests to the database.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

Outputs of the test : One set of results for every data volume and log volume on the MaxDB server being monitored.

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Database read rate	Indicates the rate at which database reads were performed.	Reads/Sec	
Page read operations	Indicates the rate at which page reads were performed.	Pages/Sec	
Database read time	Indicates the time taken by the database to perform	Secs	A high value of this measure indicates a reading bottleneck.

Measurement	Description	Measurement Unit	Interpretation
	read operations in the last measurement period.		
Database write rate	Indicates the rate at which data is written to the database.	Writes/Sec	
Page write operations	Indicates the rate at which page writes were performed.	Pages/Sec	
Database write time	Indicates the time taken by the database to perform write operations in the last measurement period.	Secs	A high value of this measure indicates a writing bottleneck.
Pending I/O operations	Indicates the number of IO operations still to be completed.	Number	If the value of this measure keeps increasing, it is indicative of a processing bottleneck.

3.4.4 Db Query Test

A QUERY statement specifies a result table that can be ordered. This test monitors the different types of QUERY statements that are executed on the MaxDB database.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.

Parameter	Description
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Create statements	Indicates the number of CREATE statements that were executed in the last measurement period.	Number	
Alter statements	Indicates the number of ALTER statements that were executed in the last measurement period.	Number	
Drop statements	Indicates the number of DROP statements that were executed in the last measurement period.	Number	
Insert statements	Indicates the number of INSERT statements that were executed in the last measurement period.	Number	
Insert row statements	Indicates the number of rows inserted in the last measurement period.	Number	
Update statements	Indicates the number of UPDATE statements that were executed in the last measurement period.	Number	
Update row statements	Indicates the number of rows that were updated in the last measurement period.	Number	

Measurement	Description	Measurement Unit	Interpretation
Delete statements	Indicates the number of DELETE statements that were executed in the last measurement period.	Number	
Delete row statements	Indicates the number of rows that were deleted in the last measurement period.	Number	

3.4.5 Db Sessions Test

To work with a database instance, to make data queries or to manage the database instance, you have to open a database session. This can happen as follows:

- The user logs on to the database instance with a user name and password, thus opening a database session. Later, the database session is terminated explicitly by the user or closed implicitly when the timeout value is exceeded.
- A database tool implicitly opens a database session and then closes it again later.

This test reveals the level of activity on the MaxDB server by reporting the number of active database sessions.

Target of the test : A MaxDB server

Agent deploying the test : An internal agent

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

Configurable parameters for the test

Parameter	Description
Test Period	How often should the test be executed.
Host	The host name of the server for which the test is to be configured.
Port	The port number to which the server is listening.
DatabaseName	The test connects to a database on MaxDB and extracts performance statistics from the system tables in the database. Therefore, provide the name of a database in the DatabaseName text box.

Parameter	Description
Username	Since users with the *SYSDBA* privilege alone are allowed access to system tables, specify the name of such a user against Username.
Password	Provide the Password that corresponds to the specified Username.
Confirm Password	Confirm the password by retyping it here.

Measurements made by the test

Measurement	Description	Measurement Unit	Interpretation
Number of sessions	Indicates the number of currently active database sessions.	Number	This measure is a good indicator of the workload on the database server.

About eG Innovations

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

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

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