

MONyog White Paper

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1. Executive Summary

The MySQL database is rapidly becoming the de-facto choice for traditional enterprises as well as pioneering Web 2.0 companies. Webyog has been consistently delivering powerful tools exclusively on the MySQL platform for the last 5 years.

While the adoption rate of MySQL continues to grow in momentum, it poses some unique challenges for traditional DBAs and the companies they work for. Some of these challenges are:

- Finding problem SQL
- Analyzing MySQL performance data collected over a period of time
- Ensuring availability of critical MySQL systems
- Keeping the systems well tuned
- Getting proactive alerts before problems start surfacing
- Identifying problems quickly
- Monitoring server health continuously
- Profiling queries
- Protecting critical Systems

To help DBAs meet these challenges, Webyog has created MONyog - MySQL Monitor and Advisor. Whether they are working for large companies who have deployed hundreds of MySQL servers; or for small businesses with only a handful of MySQL servers, MONyog is designed to scale DBA resources by providing a unified, informed view into the health, security, performance and availability of the entire MySQL server environment. This paper explores MONyog MySQL Monitor and Advisor in detail and explains how it can be leveraged as a “MySQL DBA in a Box”.

2. What is the MONyog - MySQL Monitor and Advisor?

MONyog MySQL Monitor and Advisor is a “MySQL DBA in a box” that helps MySQL DBAs manage more MySQL servers, tune their current MySQL servers and find and fix problems with their MySQL database applications before they can become serious problems or costly outages.

MONyog proactively monitors enterprise database environments and provides expert advice on how even those new to MySQL can tighten security, optimize performance and reduce downtime of their MySQL powered system

3. What is agent-less monitoring?

Answer this: How does your DBA feel before installing a new component on your production servers?

- a) Scared
- b) Disgusted
- c) Oh no. Not again!
- d) Are you joking?
- e) All of the above!

Unlike other Monitoring and Advisory Tools, MONyog does not force you to install “monitoring agents” on each of your MySQL hosts. Installing and maintaining monitoring agents can be a complex administration task by itself.

MONyog uses a normal MySQL connection for monitoring MySQL. To collect OS data from remote servers, MONyog use SSH for Linux and WMI for Windows. This means MONyog can collect all monitoring data by using remote connections. This is a huge advantage that sets MONyog apart from all other MySQL monitoring and advisory tools. Of course, MONyog supports SSH tunneling!

The screenshot shows a configuration form for MONyog with the following fields and options:

- MySQL settings*** (selected tab)
- SSH settings**
- Notification settings**
- Advanced settings**
- Name***: Localhost
- Tags (for grouping)**: root
Use tags to categorize your servers Ex. **Development Staging Production**
Separate multiple tags with a space.
- MySQL host***: localhost
- MySQL port***: 3306
- MySQL username**: root
- MySQL password**:
- Use SSH tunnel?**
 - Yes
 - No
 - Use SSH tunneling to connect to the MySQL server
- Next »** (top right)
- Next »** (bottom right)
- Test MySQL connection** (button)
- Save all** (button)
- Cancel** (button)

4. Is MONyog customizable?

Each of the MONyog Advisor rules allows the MySQL DBA to customize the thresholds that are acceptable for specific MySQL servers. As an example, a DBA using the supplied Advisor Rule “MySQL Key Cache has Sub-Optimal Hit Ratio” may use lower threshold values for their MySQL servers running OLTP applications, while higher thresholds may be acceptable for OLAP applications.

The *entire* application logic of MONyog is coded as JavaScript Objects that are parsed and executed by the MONyog’s embedded Javascript Runtime. These JavaScript Objects are available with MONyog in source form. This means that you can add new advisors, modify existing advisors or simply disable some of the predefined advisors shipped with MONyog.

5. Comparison between MONyog and other Monitoring Tools

| MONyog | Other Monitoring Tools |
|--|--|
| Helps you optimize my.cnf/my.ini and can identify problem SQL using slow log, general log, MySQL proxy and by sniffing the process list. | Helps you optimize my.cnf/my.ini and can identify problem SQL by only using MySQL proxy. |
| Shrink-wrapped software | Bundled with other commercial offerings. |
| Agent-less Monitoring | Agents are required to be installed on each MySQL server |
| Perpetual Licensing | Subscription Based Licensing |
| Fully customizable using JavaScript and MONyog Object Model (MOM) | Limited Customization |
| Low footprint. Embedded web-server and database | Bloatware. Forces you to install multiple agents, web-servers and language runtimes! |
| Simple Installation. Zero Maintenance | Complex Installation and Maintenance |
| Slick AJAX Interface. Real time charting without annoying page refreshes | Classic web-interface. Full web refreshes during updates |
| Identifies Deadlocks. | Cannot identify Deadlocks. |
| Monitor MySQL error log. | Cannot monitor MySQL Error log. |
| Maintaining server configuration and tracking changes made to MySQL.ini. | Does not maintain server configuration or track changes made to MySQL.ini. |
| Gives you a snapshot of Disk space used by MySQL objects. | Does not have an option to get a snapshot of disk space usage of MySQL objects. |
| User defined query that can monitor MySQL | Not available. |

6. Is MONyog cloud ready?

MONyog is by design cloud ready. It requires no agents on the server & hence can monitor MySQL instances running on cloud. One can add or remove servers in just click of a button. According to our internal benchmark reports a single instance of MONyog can monitor 500+ servers (even at 1 sec collection intervals) effortlessly. A perfect match for database-on-cloud solutions.

<http://www.webyog.com/blog/2011/01/25/is-your-mysql-monitoring-tool-cloud-ready/>

7. How MONyog helps the DBA?

MONyog is designed to help companies scale their existing MySQL DBA resources by providing a single, consolidated view in the health, security, performance and availability of all of their MySQL servers. It proactively monitors all MySQL servers using a set of predefined expert advisors, to identify and alert DBAs of problems, security vulnerabilities and tuning opportunities so they can be acted upon well in advance of a problem or outage occurring.

7.1 Finding problem SQL

MySQL currently lacks advanced query profiling tools like SQL Server's Query Profiler. While other MySQL monitoring tools provide monitoring and advisory information on various system metrics, they don't help in pinpointing the problematic queries. No amount of hardware upgrades or tuning of mysql.cnf / mysql.ini parameters can match the performance gains that can be achieved when problematic queries and identified, rewritten and/or appropriate indexes are created.

MONyog finds problem SQL by

1. Querying MySQL Proxy
2. Analysing General Query Log
3. Analysing Slow Query Log
4. Issuing SHOW PROCESSLIST at regular intervals

Additionally, the reports created by above methods can be exported as CSV. This means that you can further customize the report using a spreadsheet or by simply importing the CSV output into a MySQL table for further analysis.

7.2 Real time query monitoring and sniping

The above mentioned methods are really useful to find problem SQL in an application & tune those queries. However, using these tools to find problem is almost always a post-mortem exercise. In certain situations you may want real-time notifications for long running queries. MONyog gives you exactly that. MONyog can continuously monitor queries in real-time and send notifications (on Mail or SNMP) for queries that take more than a specified amount of time to execute. You can also specify an option to kill such queries.

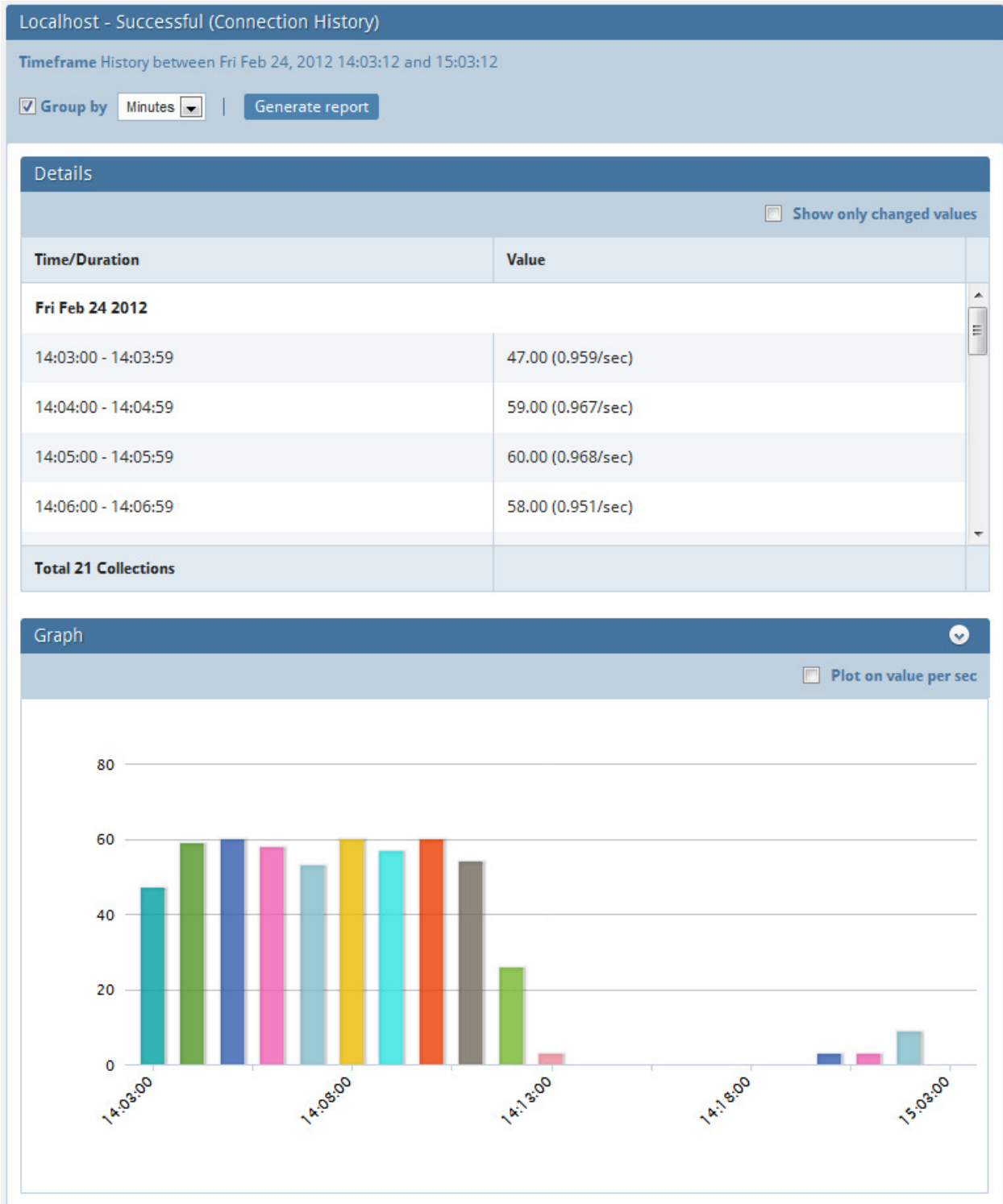
7.3 View and understand trends by analyzing historical data.

You decide yourself for how long data collected by MONyog will be stored. They are stored in a high-performance database. By analyzing historical data, you can quickly get answers to questions like:

- How many times and when MySQL went down in the last 6 months?
- Which day of the week has maximum MySQL activity?
- How many login attempts with wrong passwords were made yesterday? What was the time when those attempts were being made?

Sudden changes in performance parameters and problems (due to change of application etc.) will also be very visible immediately.

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MONyog Trend analyzer displays that, in this particular case the MySQL server load is high between 14 hours and 15 hours every day.

7.4 How fast can a DBA start monitoring MySQL servers?

The short answer is – *in less than one minute*. The unique architecture and low-footprint of MONyog enables DBAs to install and configure all components required for monitoring MySQL servers in less than 1 minute.

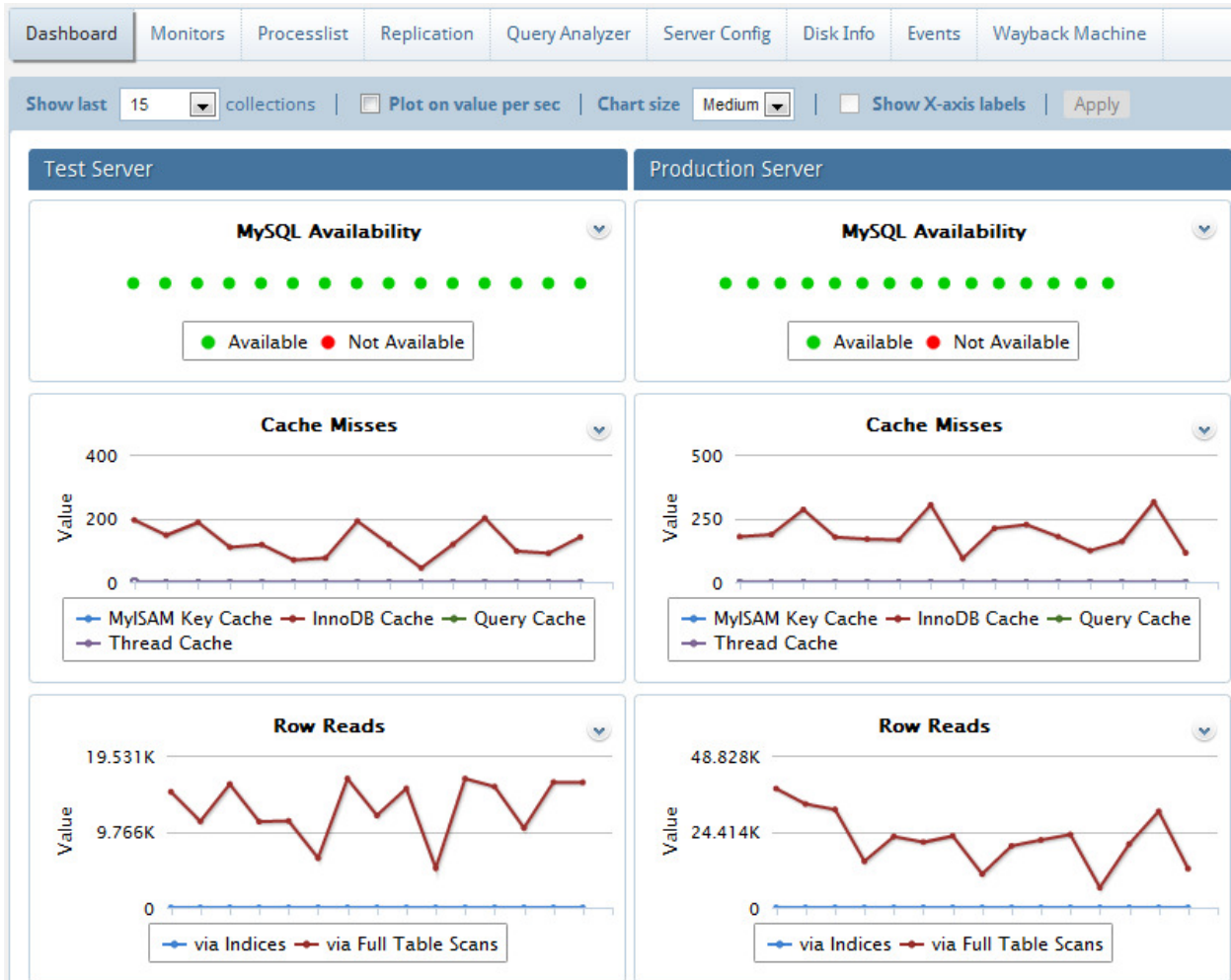
This is in sharp contrast with other Monitoring and Advisory Tools that force you to install agents, web-servers, multiple language runtimes, etc before DBAs can even start monitoring MySQL servers.

7.5 Real time Dashboard for Monitoring All MySQL Servers

One of the biggest challenges the MySQL DBA faces is managing an ever-growing number of MySQL servers and databases. Regardless of the size of the MySQL environment, each server requires specific attention when it comes to basic administration, security, performance monitoring and availability. To give the MySQL DBA a proactive advantage in all of these areas, MONyog provides the dashboard. Using the dashboard, DBAs can monitor MySQL and OS specific metrics for single or groups of servers. The dashboard is designed so DBAs can easily understand the complete security, availability, and performance picture of all their MySQL servers in one place, all from a slick AJAX interface.

Unlike other monitoring tools that use annoying page-refreshes for real time charting, MONyog uses JavaScript charts to make sure that you get “true” real time charts.

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7.6 Compare unlimited servers side-by-side

The MONyog Enterprise Dashboard shows real time charts of all important metrics that provides a consolidated view into the availability and performance of all of the MySQL servers across the enterprise. From these real-time charts the MySQL DBA can instantly tell:

- The availability status of all MySQL servers
- Important OS metrics that may be affecting MySQL
- Which MySQL servers need attention and
- Where and how they need to spend their limited time

It's not rare to find DBAs who monitor hundreds of MySQL servers. Managing large number of servers has just gotten a whole lot easier. With tagging, you can categorize your servers into logical groups, and monitor large number of servers using single instance of MONyog.

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7.7 Error Log Monitoring

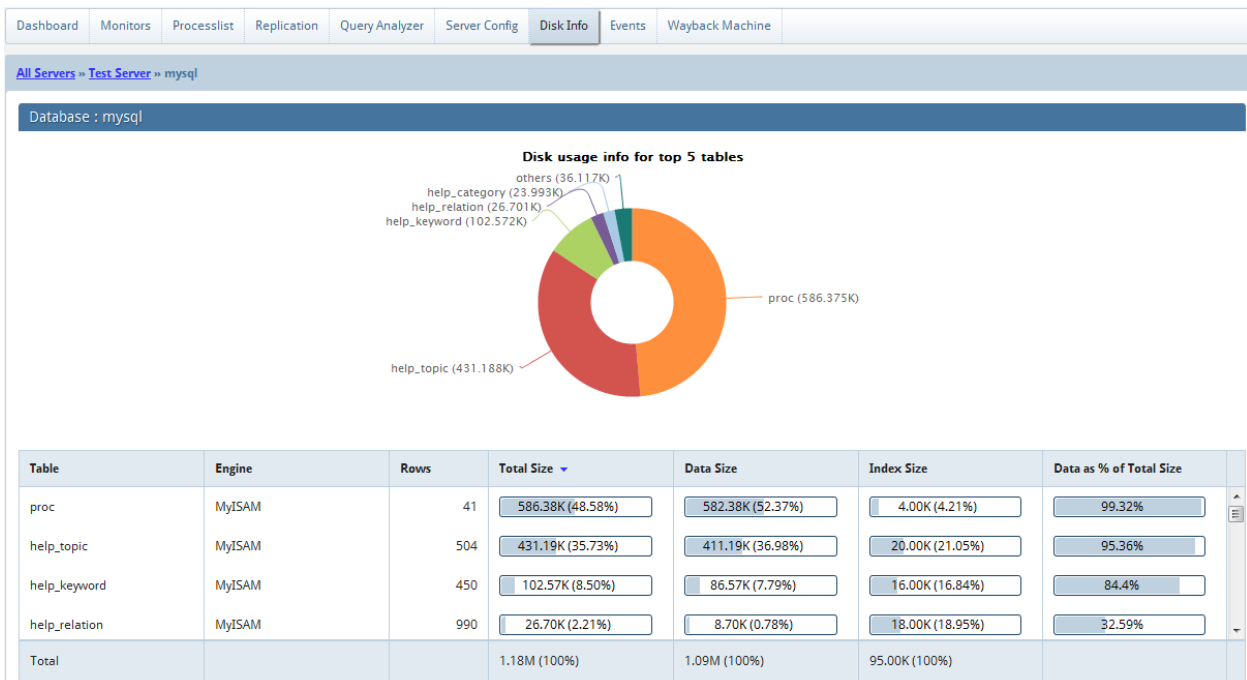
Monitoring the MySQL error log is absolutely critical for any MySQL DBA. Ignore the error log at your own peril! MONyog is the first MySQL Monitoring Tool to monitor the MySQL Error logs. MONyog can optionally send notifications over SMTP or SNMP for MySQL error log events that require attention.

7.8 Deadlock monitoring

MONyog monitors MySQL servers for deadlocks and optionally sends alerts immediately in the form of emails and(or) SNMP traps. MONyog can not only detect deadlocks but also gives information on the latest deadlock found.

7.9 Disk Info

MONyog gives you a neat Disk space usage analyzer that allows you to see which MySQL server takes up the most space. It gives a snapshot of the disk space occupied by MySQL database objects on your servers as well as a graphical chart display to quickly spot the largest databases.



7.10 Server Config

Maintaining server configuration and tracking changes to it plays a vital role in the maintenance of MySQL servers. Server Config allows you to compare MySQL configurations of multiple servers side-by-side, with all changes highlighted so that differences are visually discernible at a glance.

Server Config also allows you to track changes to your server configuration files over a period of time allowing you to have full control of what goes into those files and the impact they have on your MySQL server.

7.11 Custom SQL Objects (CSO)

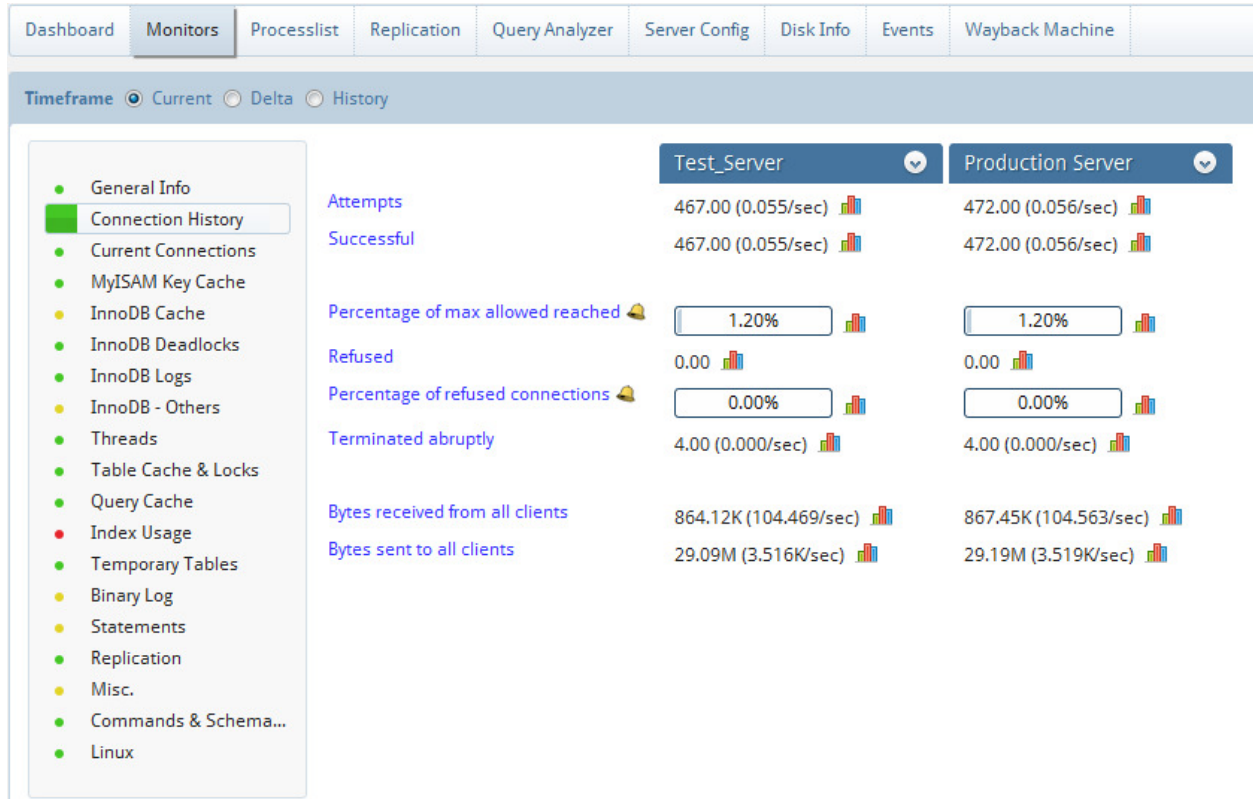
Would you like to monitor your MySQL servers by writing your own MySQL queries? All you have to do is create Custom SQL Objects (CSOs)!

CSOs return an array of MySQL rows which is exposed as a JavaScript array that may be referenced in MONyog monitors like any MONyog object.

7.12 The MONyog Advisors - Fix Problems proactively

MONyog supplies right out of the box, hundreds of Advisors that are designed to automatically examine a MySQL server's configuration, security, and performance levels, identify problems and tuning opportunities and provide the MySQL DBA with specific corrective actions.

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7.13 What are the MONyog Advisor Rules?

The MONyog Advisor Rules are a set of best practices that allow DBAs to implement new MySQL servers with confidence and to proactively manage the dynamic nature of all of their MySQL servers over time.

The MONyog Advisor Rules do this by monitoring all MySQL servers and notifying the DBA with specific instructions on how to proactively address found exceptions to align with the best practices.

7.14 MONyog Advisor Rules - Productivity through Automation

MONyog makes MySQL DBAs more productive by allowing them to automate each of the MySQL Advisor Rules for unattended, around the clock operations. This helps minimize human errors, improves overall productivity and lowers the total cost of associated with managing MySQL.

7.15 How do a DBA receive proactive alerts?

For all the Advisors, Advisor Rule violations trigger notification events that can be sent via SMTP and/or SNMP notifications. MONyog also provides expert advice on the specific problem that has been reported.

MONyog has a smart concept called “Delayed alert notifications”. This makes sure that alerts are not sent for insignificant events. It can be defined that a problem must have existed for a number of sample intervals continuously (in a row) for an alert to be sent. A global setting for each server is available from GUI.

8. Conclusion

Serving as a “MySQL DBA in a box”, MONyog proactively monitors all of the MySQL servers across the enterprise, and empowers the DBA to address specific problems and tuning opportunities before problems start surfacing. The combination of enterprise visibility, proactive monitoring and expert advice and guidance in problem identification and resolution makes MONyog the perfect addition for managing and tuning MySQL servers.*