MySQL

ORACLE

MySQL Enterprise Monitor

Monitoring & Performance Tools for DBAs

Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decision. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Agenda: MySQL Enterprise Monitor

- MySQL Customers
- Overview & Architecture
- Installation & Configuration
- Features & Benefits
- Questions
- Appendix
- Additional Info

Industry Leaders Rely on MySQL

Big Fish

Application

Big Fish Games is a global leader in the online games industry and distributes more games worldwide than any other online site.

Key Business Benefit

MySQL Query Analyzer provides a consolidated view of query activities and execution details, and has enabled Big Fish Games to quickly identify poorly running queries and tackle the root causes directly in the SQL code.

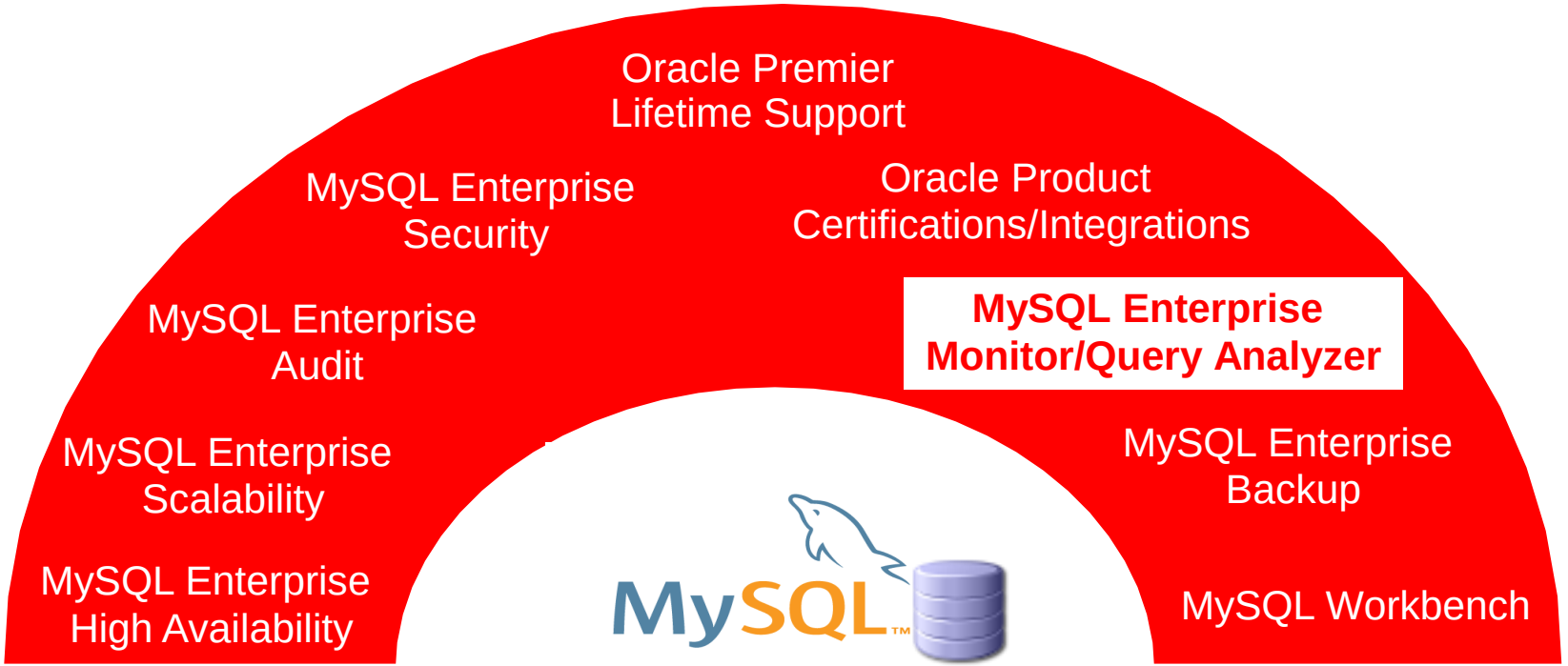
Why MySQL?

"With the MySQL Query Analyzer, we were able to identify and analyze problematic SQL code, and triple our database performance. More importantly, we were able to accomplish this in three days, rather than taking weeks."

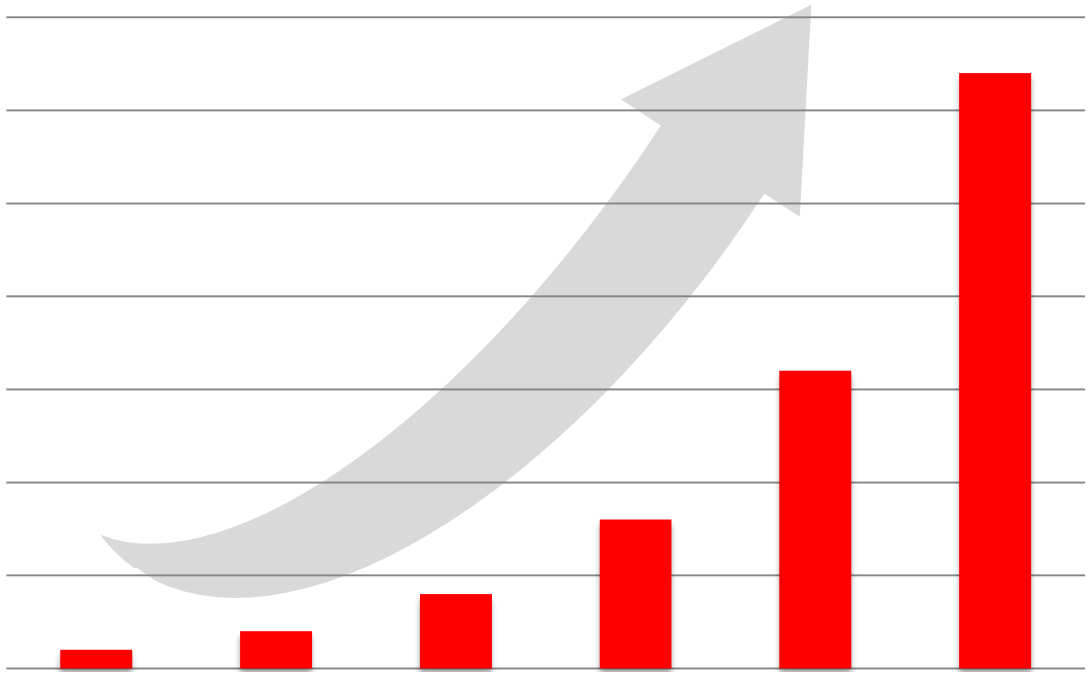
Keith Souhrada
Software Development Engineer
Big Fish Games

MySQL Enterprise Edition

Highest Levels of Security, Performance, and Availability



Database Application Growth



Situation

- 2.1 Billion Internet Users
- 40% Data Growth/Year
- $1 Trillion eCommerce
- 600 New Videos/Minute
- 58 Million Tweets/Day

Requirements

- Performance
- Scale-out
- Automation

MySQL DBA Checklist

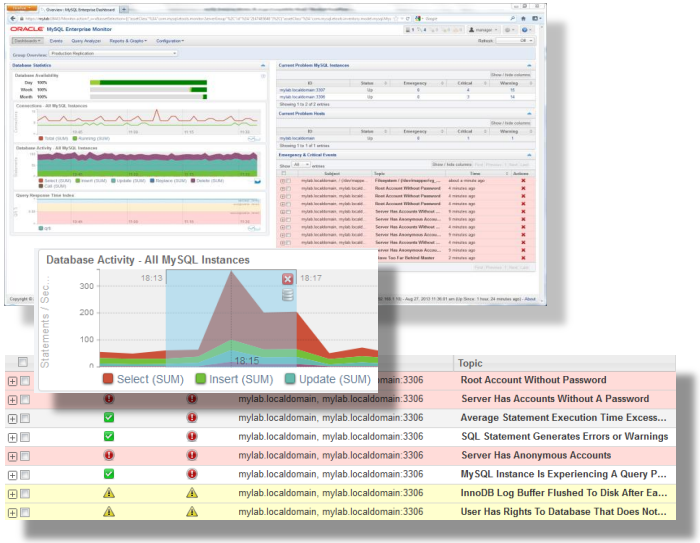
1. Ensure your production databases are available ✔
2. Monitor MySQL performance throughout the day ✔
3. Verify that MySQL replication is working properly ✔
4. Confirm that backups have completed successfully ✔
5. Monitor disk space to ensure MySQL won't run out of space ✔
6. Regularly monitor and identify blocking issues ✔
7. Verify there have been no changes to database schema ✔
8. Check OS metrics for unusual events ✔
9. Check for security vulnerabilities ✔
10. Monitor and analyze memory usage ✔

MySQL DBA Challenges

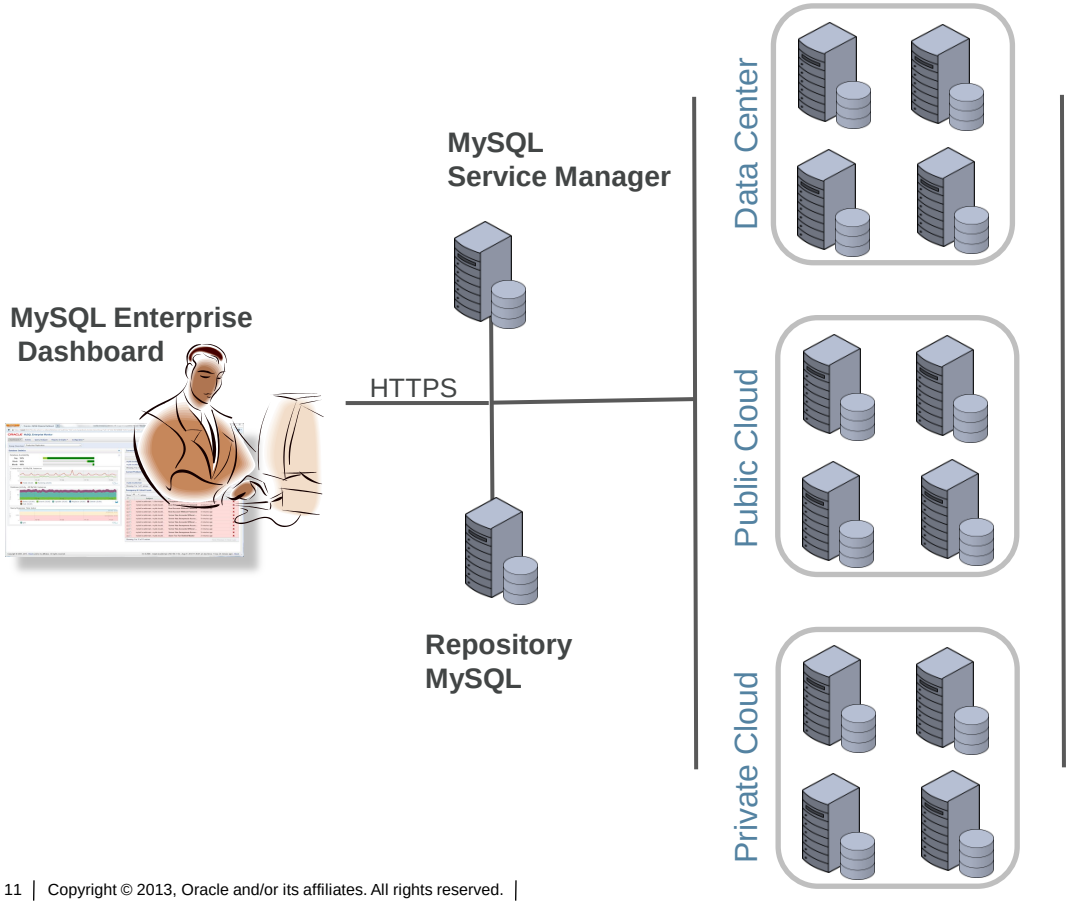
- “The database is slow. What needs tuning?”
- “What are my most expensive queries?”
- “Are indexes optimized?”
- “Is replication lag a problem?”
- “Did my last backup succeed?”
- “When will my disk fill up?”
- “When will I need more hardware to scale-out?”
- “Has my database schema changed?”
- “Are there security vulnerabilities that I need to be concerned about?”

MySQL Enterprise Monitor

- Real-time MySQL performance and availability monitoring
- Visually find & fix problem queries
- Disk monitoring for capacity planning
- Cloud friendly architecture (no agents)
- Start monitoring MySQL in 10 minutes
- Remote agent option provides OS monitoring



Cloud-friendly Architecture



MySQL

- Provides MySQL related metrics
- MySQL Query Analyzer collects data using Performance Schema

Service Manager

- Collects all MySQL related metrics
- Collects all OS/Host related metrics

Repository

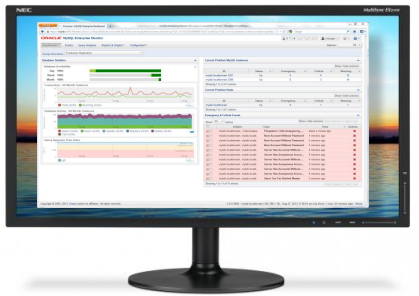
- Stores historical MySQL data

Agent (optional)

- Only for OS/Host metrics
- Not required for DB metrics

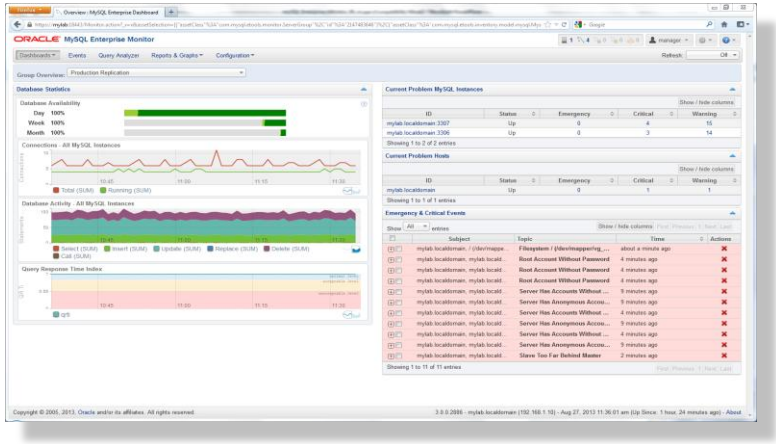
Installation & Configuration

- **Install the Service Manager**
  - shell> ./mysqlmonitor-3.0.X.XXXX-…-installer.bin
- **Up and Running in 10 minutes**
  - Auto-discovery of MySQL servers
  - Advisors are pre-configured
  - Advisors are pre-scheduled
- **Customization**
  - Centralized configuration dashboard
  - Advisors
  - Event Handling
  - Preferences, global settings, users, and logs



MySQL Enterprise Dashboard

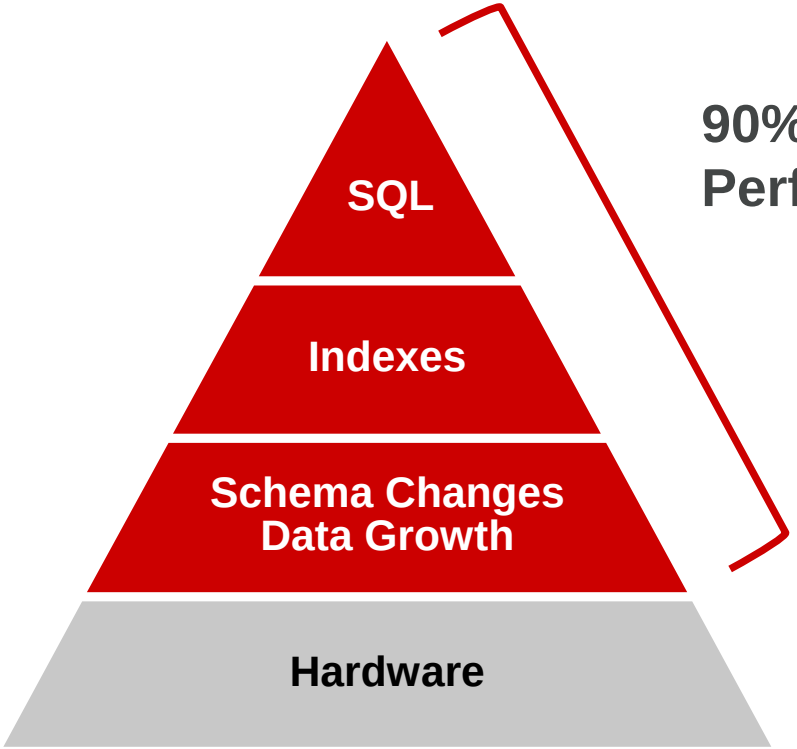
- SLA monitoring
- Real-time performance monitoring
- Alerts & notifications
- MySQL best practice advisors



"The MySQL Enterprise Monitor is an absolute must for any DBA who takes his work seriously."

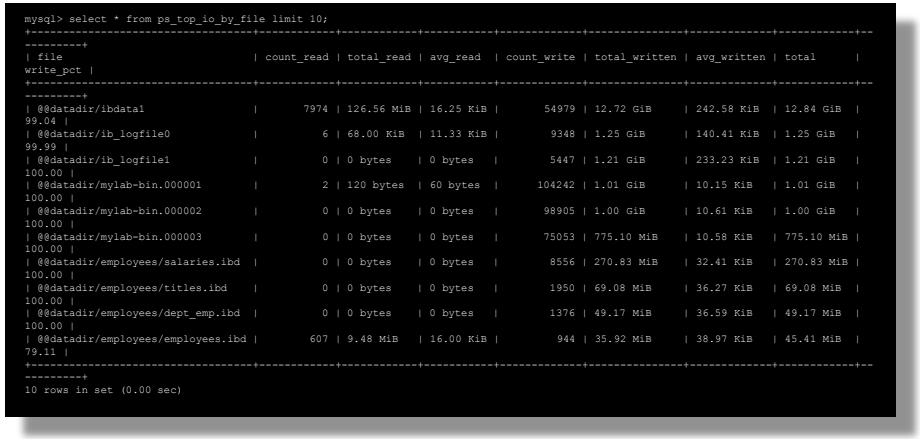
- Adrian Baumann, System Specialist
Federal Office of Information Technology & Telecommunications

Source of Database Performance Problems



MySQL Performance Schema

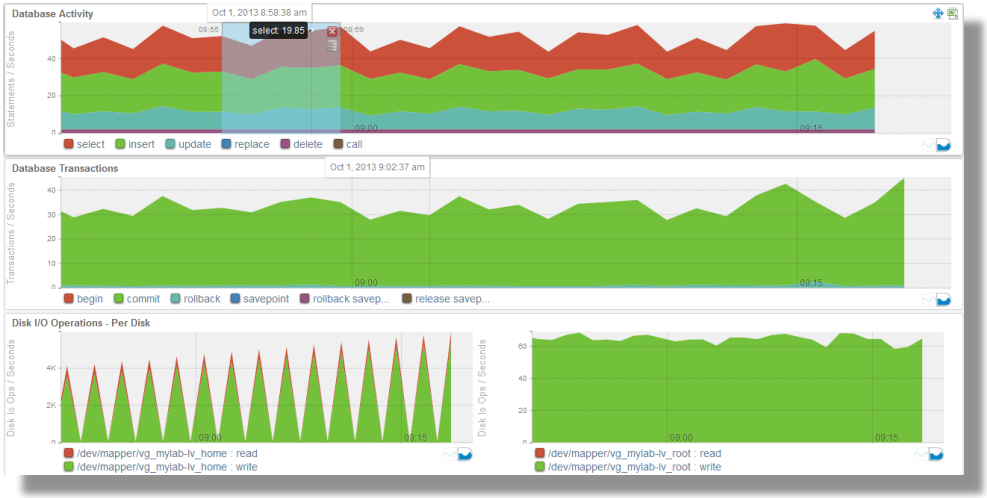
- Identify performance bottlenecks
- Identify problematic queries
- Get real time insight into locks
- See exactly what is happening within MySQL
- Get real time insight into MySQL internals
- Get real time insight into query executions



```
mysql> select * from ps_top_io_by_file limit 10;
+-----------------------------------+------------+------------+-----------+-------------+---------------+-------------+------------+-----------
--------+
| file                              | count_read | total_read | avg_read  | count_write | total_written | avg_written | total      |
write_pct |
+-----------------------------------+------------+------------+-----------+-------------+---------------+-------------+------------+-----------
--------+
| @@datadir/ibdata1                 |       7974 | 126.56 MiB | 16.25 KiB |       54979 | 12.72 GiB     | 242.58 KiB  | 12.84 GiB  |
99.04 |
| @@datadir/ib_logfile0             |          6 | 68.00 KiB  | 11.33 KiB |        9348 | 1.25 GiB      | 140.41 KiB  | 1.25 GiB   |
99.99 |
| @@datadir/ib_logfile1             |          0 | 0 bytes    | 0 bytes   |        5447 | 1.21 GiB      | 233.23 KiB  | 1.21 GiB   |
100.00 |
| @@datadir/mylab-bin.000001        |          2 | 120 bytes  | 60 bytes  |      104242 | 1.01 GiB      | 10.15 KiB   | 1.01 GiB   |
100.00 |
| @@datadir/mylab-bin.000002        |          0 | 0 bytes    | 0 bytes   |       98905 | 1.00 GiB      | 10.61 KiB   | 1.00 GiB   |
100.00 |
| @@datadir/mylab-bin.000003        |          0 | 0 bytes    | 0 bytes   |       75053 | 775.10 MiB    | 10.58 KiB   | 775.10 MiB |
100.00 |
| @@datadir/employees/salaries.ibd  |          0 | 0 bytes    | 0 bytes   |        8556 | 270.83 MiB    | 32.41 KiB   | 270.83 MiB |
100.00 |
| @@datadir/employees/titles.ibd    |          0 | 0 bytes    | 0 bytes   |        1950 | 69.08 MiB     | 36.27 KiB   | 69.08 MiB  |
100.00 |
| @@datadir/employees/dept_emp.ibd  |          0 | 0 bytes    | 0 bytes   |        1376 | 49.17 MiB     | 36.59 KiB   | 49.17 MiB  |
100.00 |
| @@datadir/employees/employees.ibd |        607 | 9.48 MiB   | 16.00 KiB |         944 | 35.92 MiB     | 38.97 KiB   | 45.41 MiB  |
79.11 |
+-----------------------------------+------------+------------+-----------+-------------+---------------+-------------+------------+-----------
--------+
10 rows in set (0.00 sec)
```

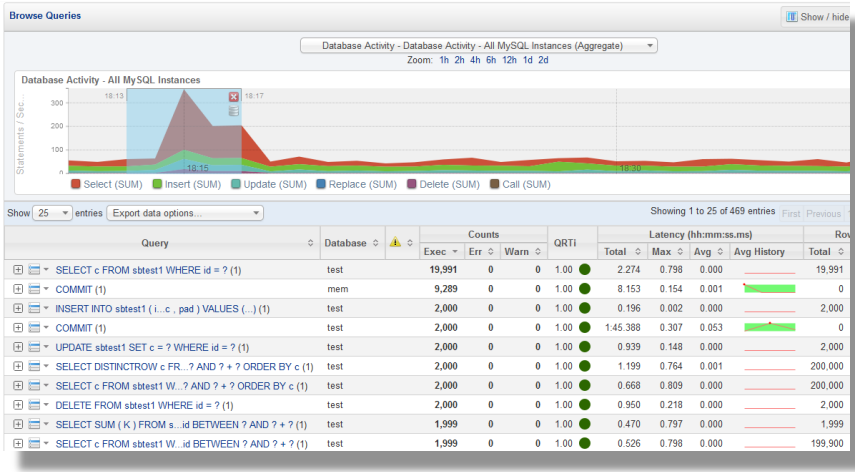
Performance Monitoring

- Monitor MySQL performance
- Monitor OS performance
- Monitor query performance
- Advice on index usage
- Alerts on performance problems



MySQL Query Analyzer

- **Real-time query performance**
- **Visual correlation graphs**
- **Find & fix expensive queries**
- **Detailed query statistics**
- **Query Response Time index (QRTi)**



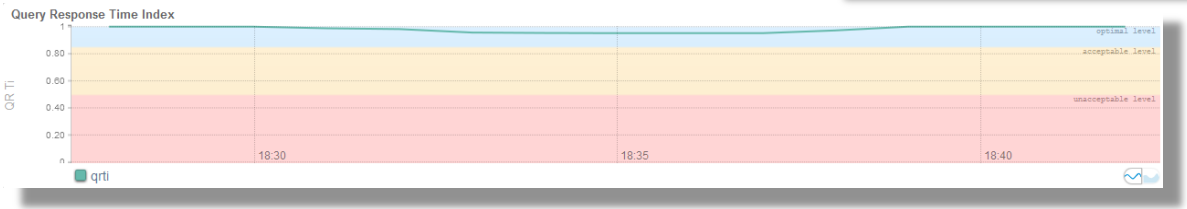
"With the MySQL Query Analyzer, we were able to identify and analyze problematic SQL code, and triple our database performance. More importantly, we were able to accomplish this in three days, rather than taking weeks."

Keith Souhrada
Software Development Engineer
Big Fish Games

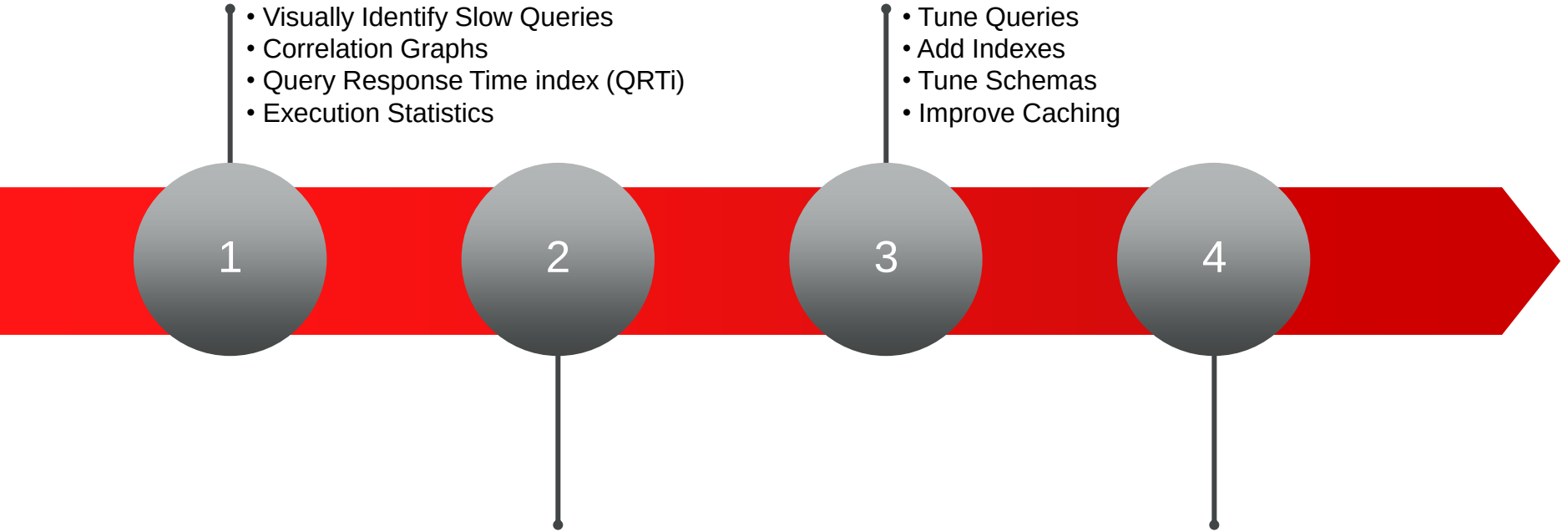
Query Response Time Index (QRTi)

- “Quality of Service” (QoS) measurement for each query
- QoS measurement for a server, group, or every instance
- Single metric for query performance

Query	Database	Counts			QRTi
		Exec	Err	Warn	
INSERT INTO sbtest1 (i...c , pad) VALUES (...)	test	161,133	0	0	1.00
INSERT INTO sbtest1 (k...LUES (...) /* , ... */	test	20	0	0	0.50
SELECT SUM (K) FROM s...id BETWEEN ? AND ? + ?	test	161,156	0	0	1.00
SELECT DISTINCTROW c FR...? AND ? + ? ORDER BY c	test	161,160	0	0	1.00
CREATE INDEX k_1 ON sbtest1 (k)	test	1	0	0	0.00
SELECT c FROM sbtest1 W...? AND ? + ? ORDER BY c	test	161,157	0	0	1.00
BEGIN	test	161,139	0	0	1.00
CREATE TABLE sbtest1 (... = innodb MAX_ROWS = ?	test	1	0	0	0.50
COMMIT	test	161,091	0	0	0.69
DROP TABLE sbtest1	test	1	0	0	0.50



Solving Query Performance Problems

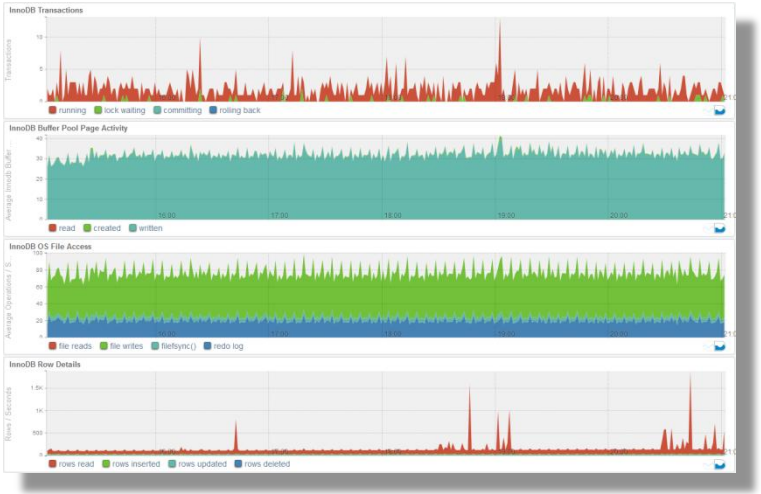


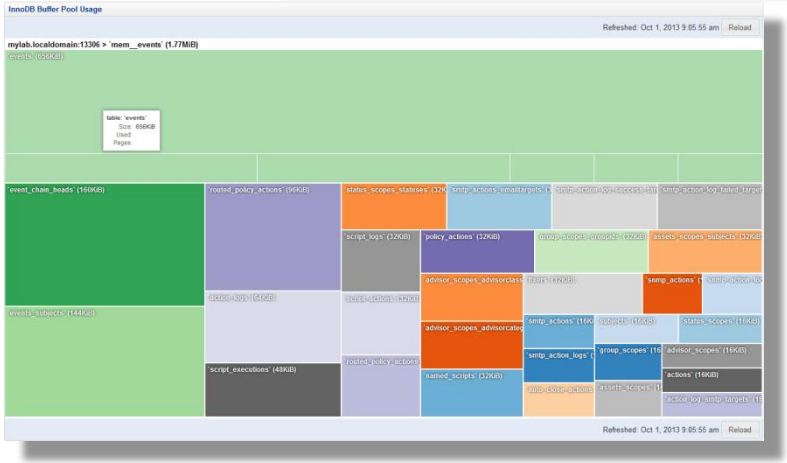
Advantages of Query Analyzer
over Slow Query Log

- See query execution statistics
- Trace the query origination back to the application source code
- View the overall query performance over time
- See when the query was first introduced
- See the explain plan
- Focus on queries specific to a particular host and time period
- View query executions correlated with other performance graphs

InnoDB Monitoring

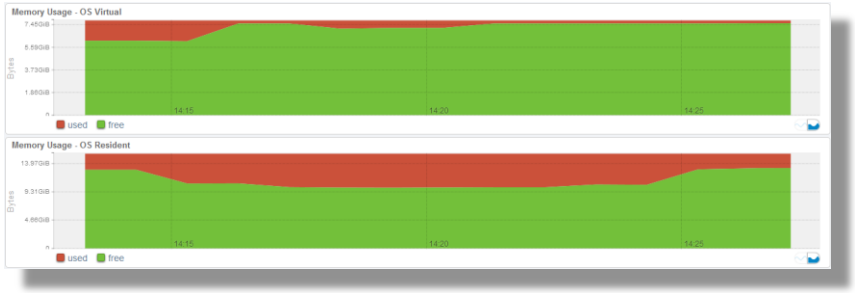
- Monitor key performance metrics
- Stay on top of locking issues
- Get configuration advice
- Examine buffer pool usage

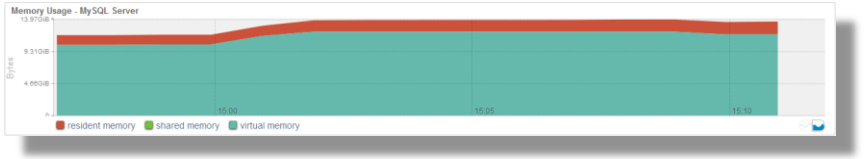




Memory Usage Monitoring

- Monitor OS memory usage
- Monitor MySQL memory usage
- Advice on configuration
- Alerts on memory usage





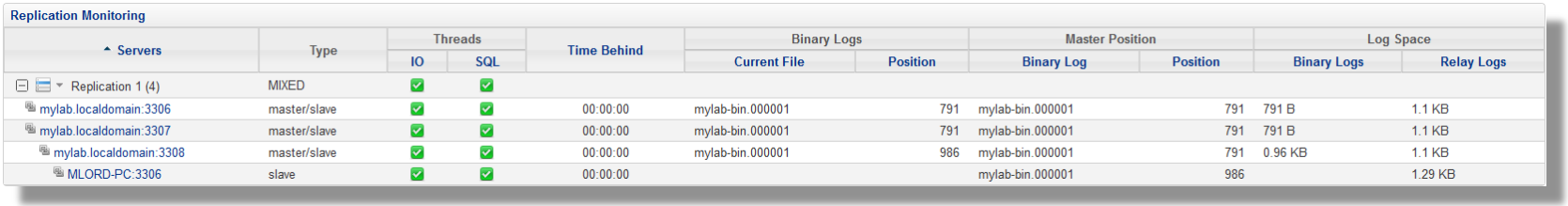
Replication Monitoring

- **Auto-discovers replication topology**
- **Master/Slave performance monitoring**
- **Replication advisor**
- **Best practice replication advice**

"I use the MySQL Enterprise Monitor every day to monitor and keep tabs on our MySQL databases. Quick one stop shopping for keeping tabs on them."

-Wes Homer,
Sr System and Network Administrator

InsideView®



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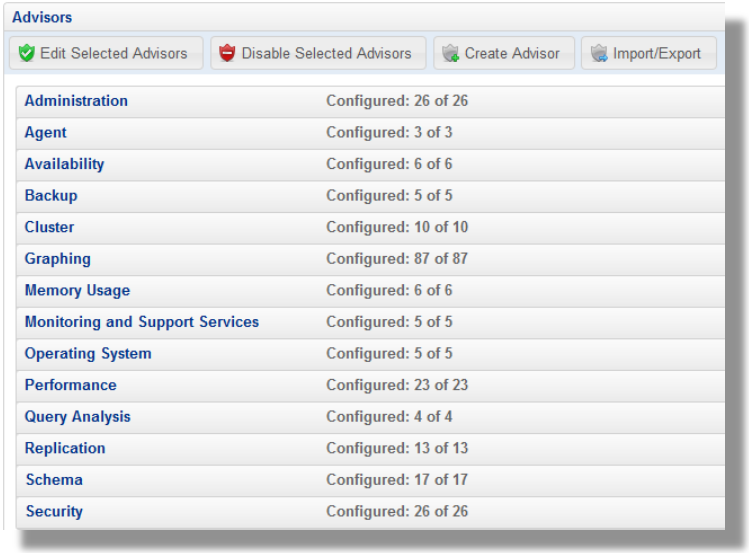
Best Practice Advisors

- Enforce MySQL best practices
- 14 Advisor categories
- 250+ Advisors
- Threshold-based alerts
  - Exponential moving averages
  - Rate change detection
- Expert problem resolution advice

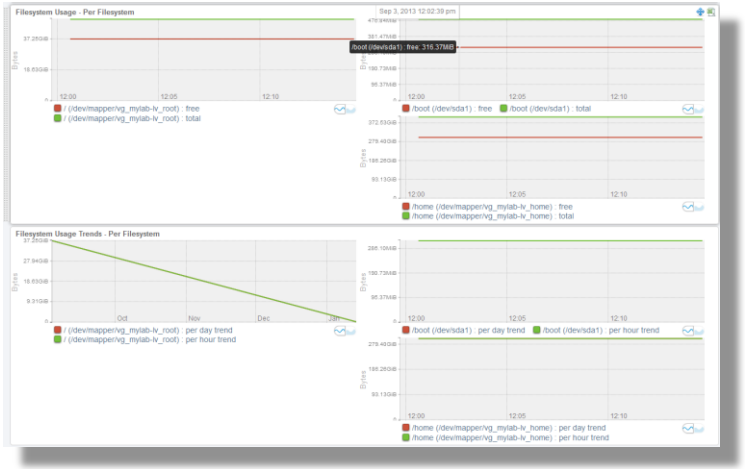


"I definitely recommend the MySQL Enterprise Monitor to DBAs who don't have a ton of MySQL experience. It makes monitoring MySQL security, performance and availability very easy to understand and to act on."

Sandi Barr
Sr. Software Engineer
Schneider Electric

Disk Monitoring

- **Capacity Planning**
- **Forecast capacity requirements**
- **Projections**
- **Trend analysis**
- **Timeseries data**

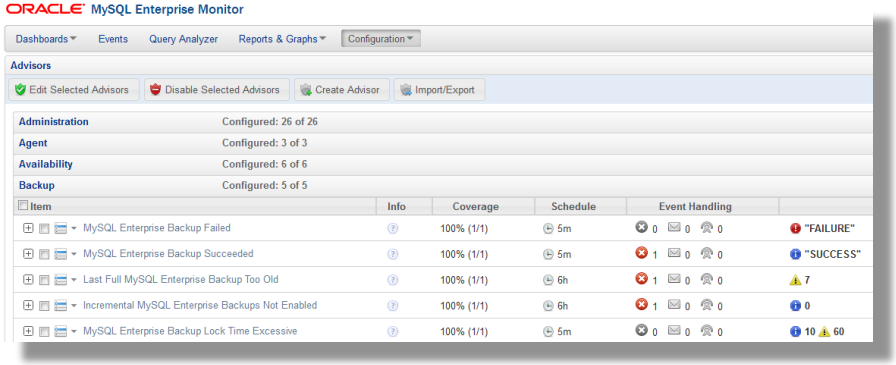


"With the monitoring dashboard and advisory rules, we can accurately predict our capacity requirements and optimize MySQL performance."

Keith Souhrada
Software Development Engineer
Big Fish Games

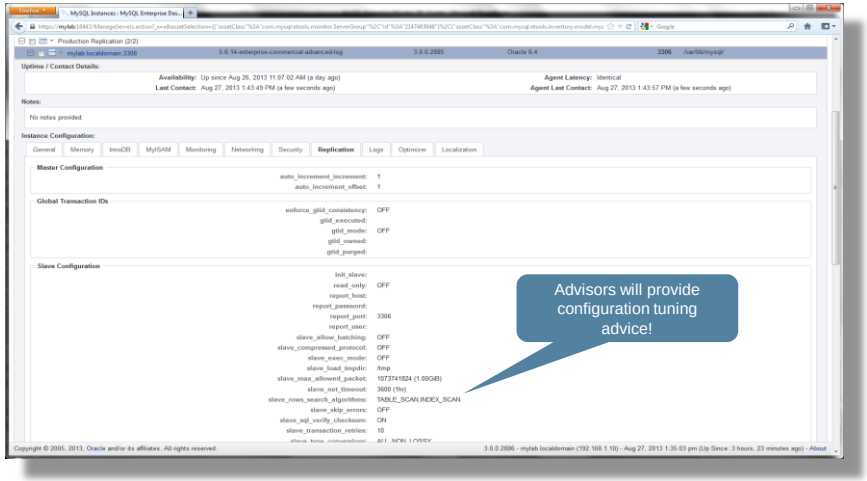
MySQL Enterprise Backup Monitoring

- **Monitor backup results**
- **Monitor backup performance**
- **Ensure backups are up to date**



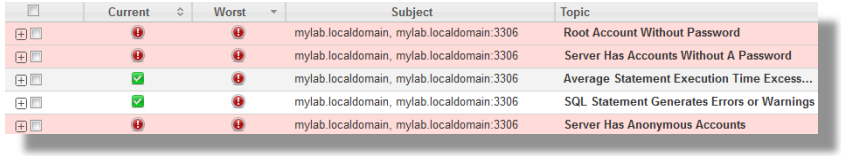
MySQL Configuration Management

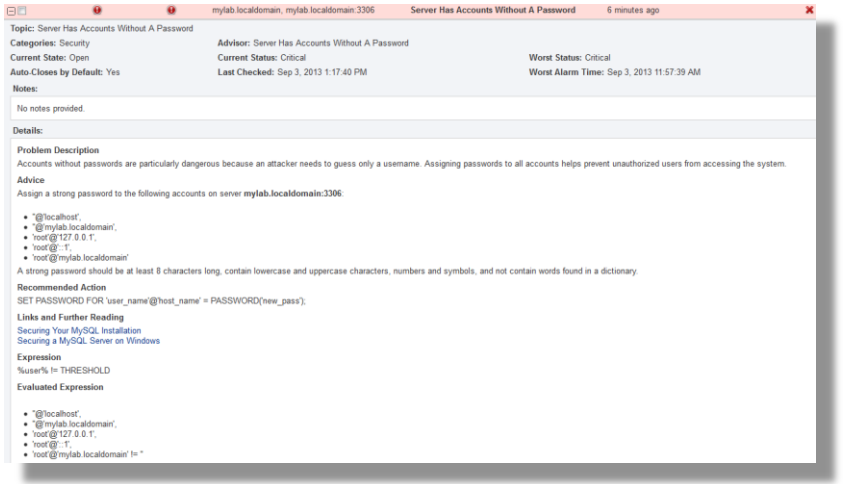
- Centralized management
- Organized by topic
- Options grouped by feature
- See host details
- See network details



Security Administration

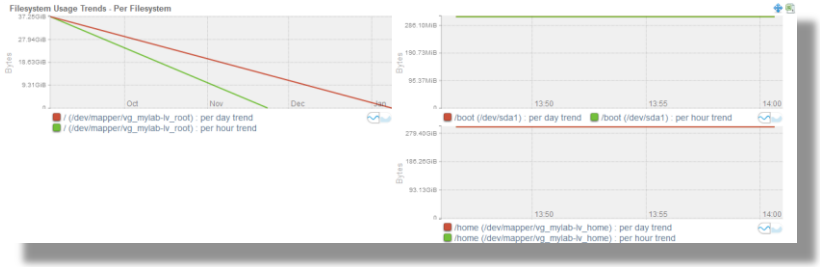
- Account management
- Know when privileges change
- Get advice on best practices
- Monitor access problems

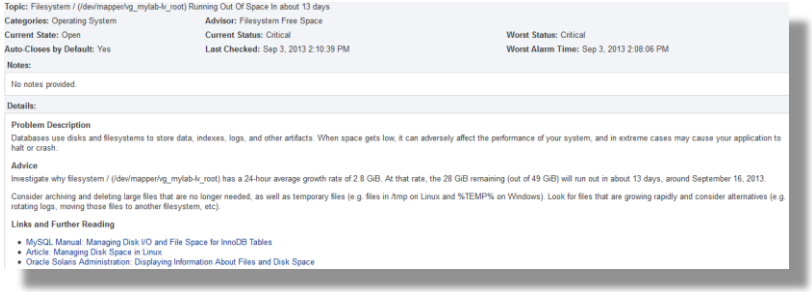




Trends & Predictive Problem Detection

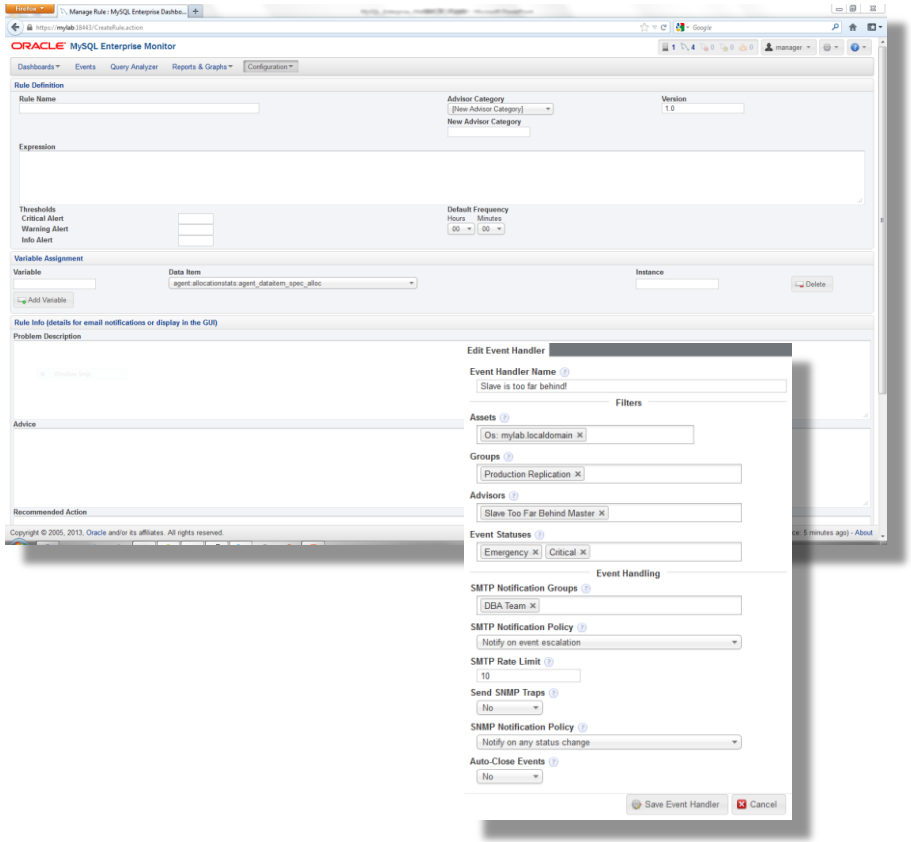
- Visual trend analysis
- Identify outliers
- Head off problems
- Handle imminent capacity issues





Customizable & Extensible

- Create custom
  - Groups
  - Advisors
  - Graphs
  - Filters
  - Event Handlers



Solving Common Performance Issues

Causes of Performance Issues	MySQL Enterprise Monitor Helps
Queries doing table scans	See these queries immediately
Excessive temporary tables on disk	See the queries generating these
CPU spikes	Find out what caused it
Disk I/O saturation	Find out what caused it
Internal locking	Get alerts when locking issues occur
Hardware problems	Get alerts for disk and network problems
Database and schema changes	Get alerts when changes are made
New queries introduced	See what queries are added and when
Poor MySQL configuration	Get advice on configuration tuning

Top 10 Performance Issues Solved

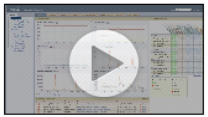
- ✔ Identify the most expensive queries
- ✔ Full table scans (no indexes)
- ✔ Excessive temporary tables
- ✔ Large and/or frequent filesorts
- ✔ CPU usage overload
- ✔ Disk I/O saturation
- ✔ Hardware problems
- ✔ Database and schema changes
- ✔ New queries introduced
- ✔ Poor MySQL configuration
- ✔ Internal locking issues

MySQL Enterprise Monitor 3.0 Demo Videos

MySQL Enterprise Edition: Demos

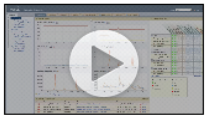
Installing MySQL Enterprise Monitor

See how you can begin monitoring your MySQL servers in under 10 minutes, using MySQL Enterprise Monitor.



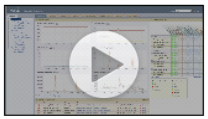
Real-time MySQL Performance & Availability Monitoring

Learn how MySQL Enterprise Monitor enables you to manage the overall performance and health of your MySQL servers.



Performance Tuning with MySQL Query Analyzer

Learn how MySQL Enterprise Monitor's Query Analyzer allows you to quickly and easily identify the root cause of query-based performance issues on any MySQL server.



Remotely Monitor MySQL in the Cloud

Using a Cloud and VM friendly design, MySQL Enterprise Monitor allows you to remotely monitor MySQL Servers in the cloud without the need for any remote agents.

MySQL Enterprise Edition

- MySQL Enterprise Backup
- MySQL Enterprise Monitor
- MySQL Enterprise HA
- MySQL Enterprise Scalability
- MySQL Enterprise Security
- MySQL Enterprise Audit
- White Papers
- Contact MySQL Sales
- Buy Now
- Demos

Download Now »

http://www.mysql.com/products/enterprise/demo.html

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Monitoring & Performance Tools for DBAs

Appendix – Proxy and Aggregator

http://dev.mysql.com/doc/mysql-monitor/3.0/en/mem-qanal-using-proxy.html

http://dev.mysql.com/doc/mysql-monitor/3.0/en/mem-qanal-using-aggregator.html

Appendix – Connector Plugins

http://dev.mysql.com/doc/mysql-monitor/3.0/en/mem-qanal-using-cj.html

http://dev.mysql.com/doc/mysql-monitor/3.0/en/mem-qanal-using-cnet.html

http://dev.mysql.com/doc/mysql-monitor/3.0/en/mem-qanal-using-cphp.html