



Getting the most out of MySQL Enterprise Monitor 2.0

Phil Hildebrand (thePlatform)
Ryan Thiessen (Big Fish Games)
10:50am Tuesday, 04/21/2009
Business and Case Studies
Location: Ballroom E

This session will focus on how we have deployed Enterprise Monitor 2.0 in order to help get new applications and changes to production more efficiently and cleanly, as well as decreasing the time for trouble shooting difficult application SQL code issues.

Specifically, we'll be looking at:

- How Enterprise Monitor 2.0 is configured at our sites
- How and when Query Analyzer is used
- Profiling applications with Query Analyzer
- Benchmarking applications with Query Analyzer
- Troubleshooting applications with Query Analyzer
- Gotcha's and Issues

Innovation Everywhere

Who we are

- **Phil Hildebrand**

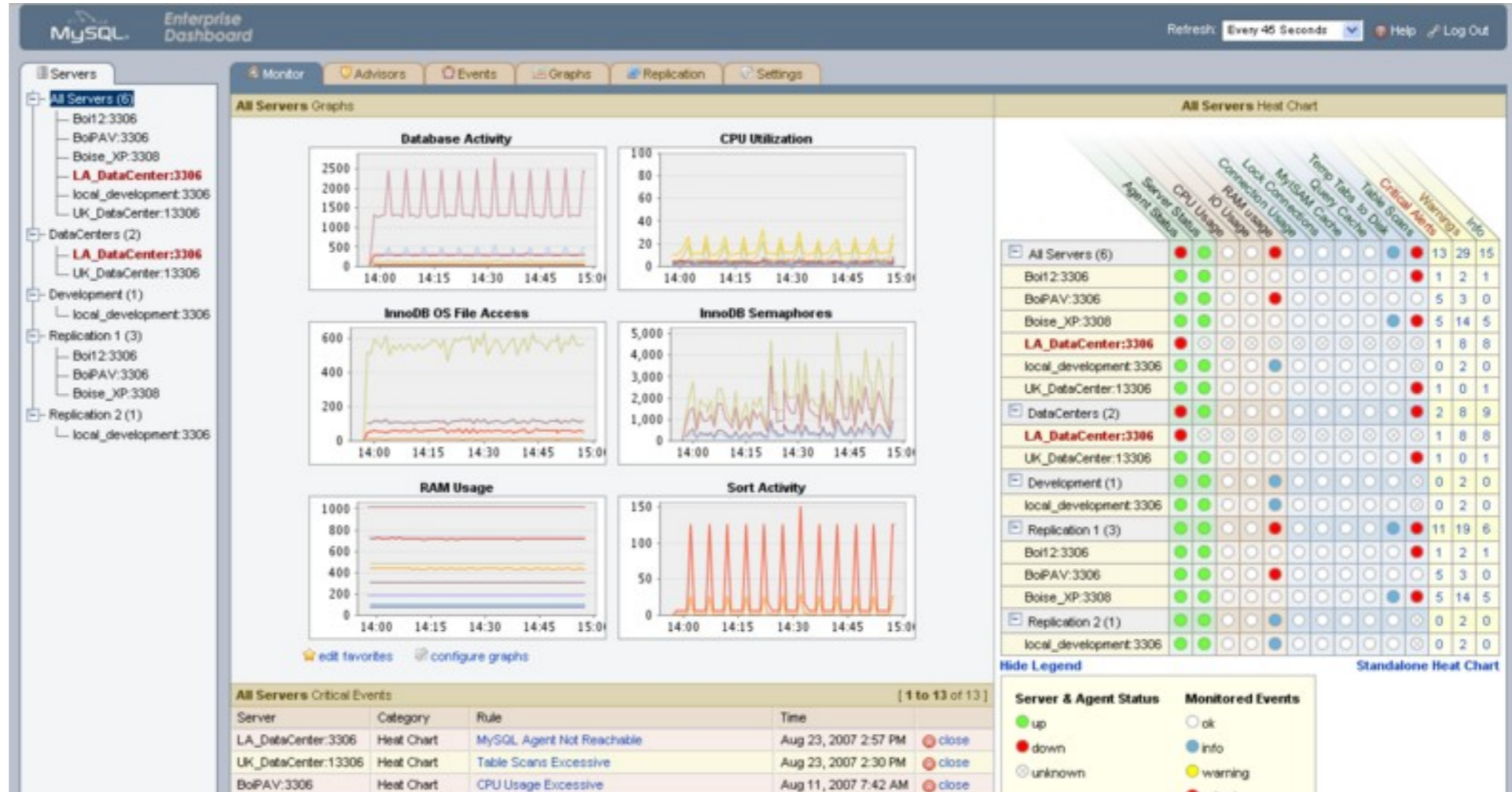
- Sr DBA, thePlatform
- 19 years experience designing, administering and scaling relational database systems
- Metadata distribution system for on-line media
- 18 months into a move of 1 TB worth of databases from SQLServer to MySQL
- Currently managing 40 MySQL databases in production

- **Ryan Thiessen**

- Lead DBA, Big Fish Games
- 10 years experience developing and administering MySQL
- Supporting a downloadable games portal and online games
- Managing 30 databases, 500G+ of application data on MySQL

Use Cases

- What is MySQL Enterprise Monitor?



- Monitor your databases
- Profile, Troubleshoot & Benchmark your systems

Deploying Enterprise Monitor

- For evaluation: keep it all on one box
- For test environment: point everything at Quan
 - at thePlatform
 - at Big Fish Games
- For production: consider availability and performance



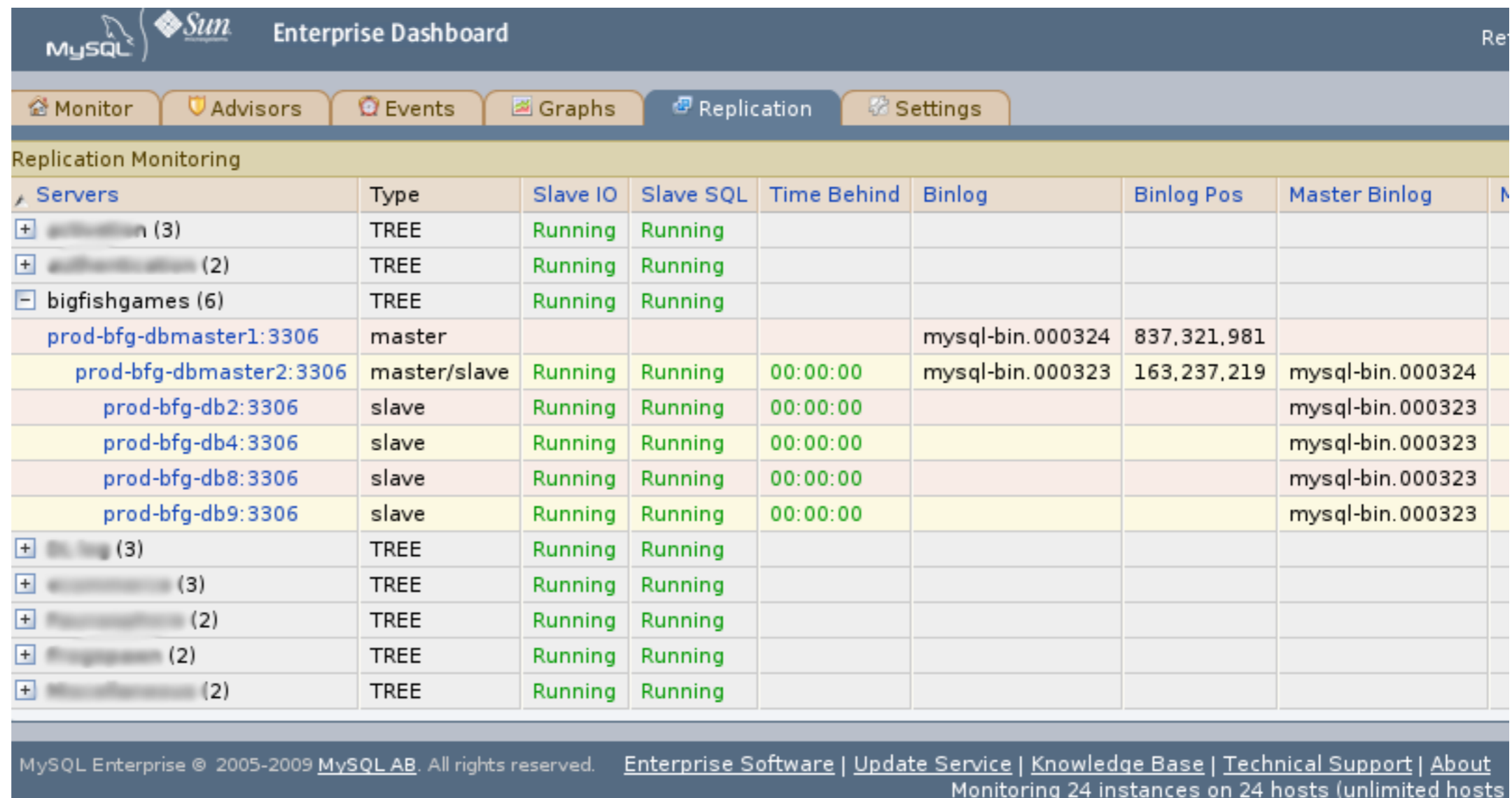
'Gotchas' with Enterprise Monitor

- Memory usage on clients
- Overloading the monitoring server with high number of agents
- Performance issues with historical data growth
- Quan agent permissions



Monitoring

- See your entire database deployment
- Automatically detects replication topology
 - at the Platform
 - at Big Fish Games



MySQL Enterprise Dashboard

Monitor Advisors Events Graphs Replication Settings

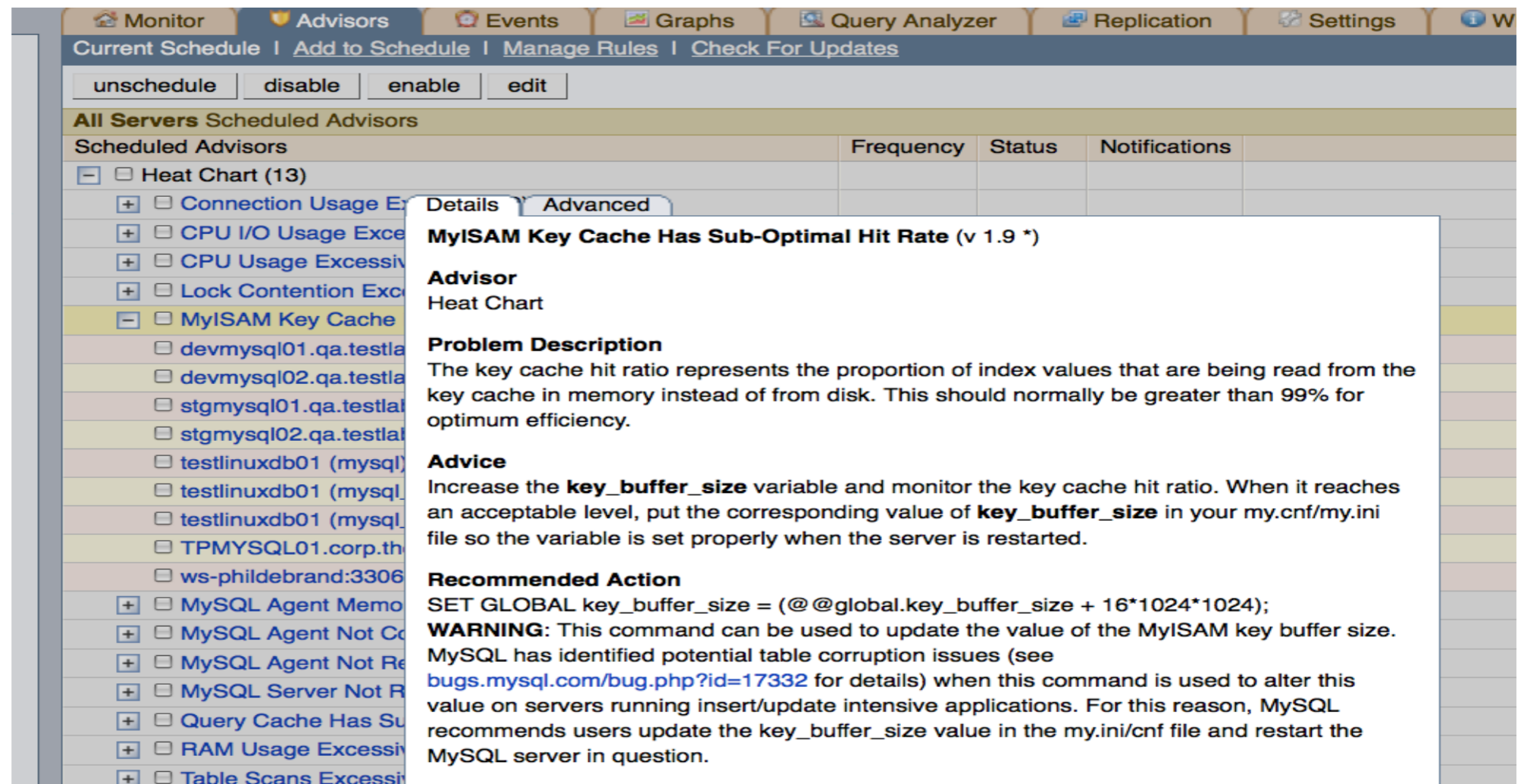
Replication Monitoring

Servers	Type	Slave IO	Slave SQL	Time Behind	Binlog	Binlog Pos	Master Binlog
+ authentication (3)	TREE	Running	Running				
+ authentication (2)	TREE	Running	Running				
- bigfishgames (6)	TREE	Running	Running				
prod-bfg-dbmaster1:3306	master				mysql-bin.000324	837,321,981	
prod-bfg-dbmaster2:3306	master/slave	Running	Running	00:00:00	mysql-bin.000323	163,237,219	mysql-bin.000324
prod-bfg-db2:3306	slave	Running	Running	00:00:00			mysql-bin.000323
prod-bfg-db4:3306	slave	Running	Running	00:00:00			mysql-bin.000323
prod-bfg-db8:3306	slave	Running	Running	00:00:00			mysql-bin.000323
prod-bfg-db9:3306	slave	Running	Running	00:00:00			mysql-bin.000323
+ bigfishgames (3)	TREE	Running	Running				
+ authentication (3)	TREE	Running	Running				
+ authentication (2)	TREE	Running	Running				
+ authentication (2)	TREE	Running	Running				
+ authentication (2)	TREE	Running	Running				

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Monitoring 24 instances on 24 hosts (unlimited hosts)

Troubleshooting Applications

- Advisors also useful for finding problems
- How effectively are you using the caches?



The screenshot displays the MySQL Enterprise Monitor interface. The top navigation bar includes tabs for Monitor, Advisors, Events, Graphs, Query Analyzer, Replication, and Settings. Below the navigation bar, there are buttons for 'unschedule', 'disable', 'enable', and 'edit'. The main content area is titled 'All Servers Scheduled Advisors' and contains a table with columns for 'Scheduled Advisors', 'Frequency', 'Status', and 'Notifications'. A list of advisors is shown, including 'Heat Chart (13)', 'Connection Usage Ex...', 'CPU I/O Usage Exce...', 'CPU Usage Excessiv...', 'Lock Contention Ex...', 'MyISAM Key Cache', and several database instances. The 'MyISAM Key Cache' advisor is highlighted, and a details window is open for it. The details window shows the following information:

MyISAM Key Cache Has Sub-Optimal Hit Rate (v 1.9 *)

Advisor
Heat Chart

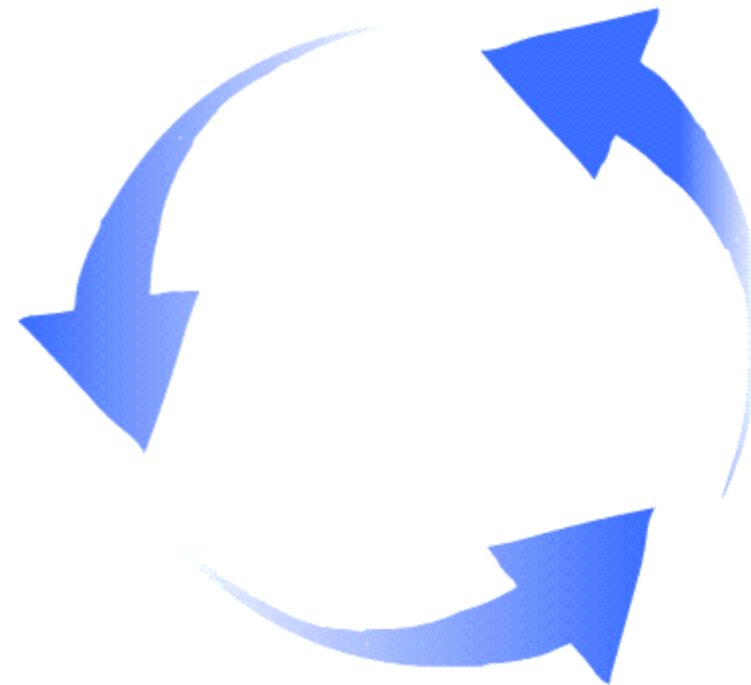
Problem Description
The key cache hit ratio represents the proportion of index values that are being read from the key cache in memory instead of from disk. This should normally be greater than 99% for optimum efficiency.

Advice
Increase the **key_buffer_size** variable and monitor the key cache hit ratio. When it reaches an acceptable level, put the corresponding value of **key_buffer_size** in your my.cnf/my.ini file so the variable is set properly when the server is restarted.

Recommended Action
SET GLOBAL key_buffer_size = (@@global.key_buffer_size + 16*1024*1024);
WARNING: This command can be used to update the value of the MyISAM key buffer size. MySQL has identified potential table corruption issues (see bugs.mysql.com/bug.php?id=17332 for details) when this command is used to alter this value on servers running insert/update intensive applications. For this reason, MySQL recommends users update the key_buffer_size value in the my.ini/cnf file and restart the MySQL server in question.

Profiling and Benchmarking

- Create a test plan
- Execute against web application
- Measure the database results in Enterprise Monitor, Query Analyzer
- Address the issues
- Run test again.



Demonstration

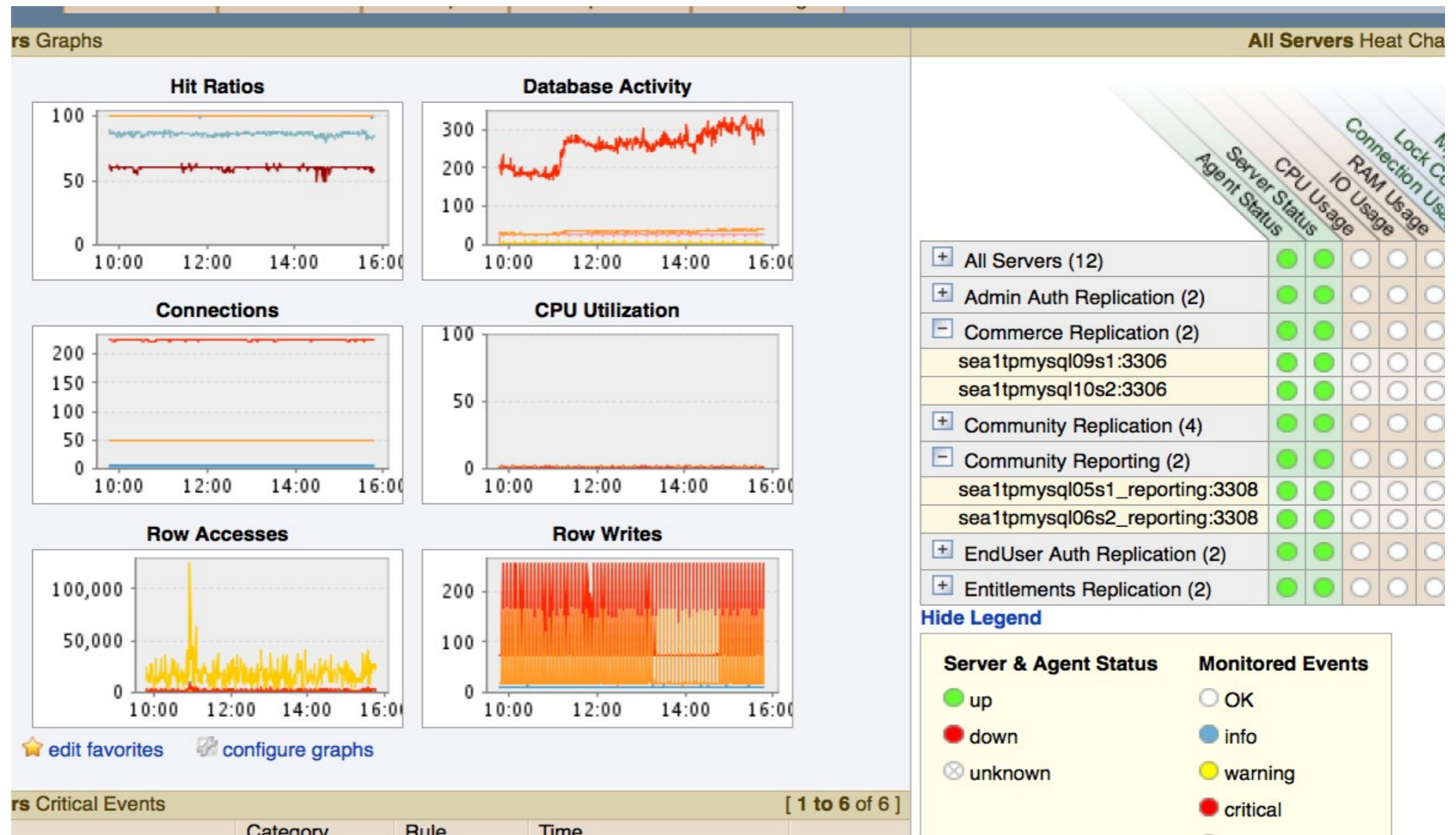
- Profile an application we've never used before
- phpBB forum software
- MySQL Enterprise tools
- Load testing software (Apache JMeter, etc)

Let's Do This



Customizing Enterprise Monitor

- Take advantage of customized views and groupings
- Take time to tune advisers and alerts for your environment



End of Slides

- Questions?



- Phil Hildebrand (phil.hildebrand@theplatform.com)
- Ryan Thiessen (ryan.thiessen@bigfishgames.com)

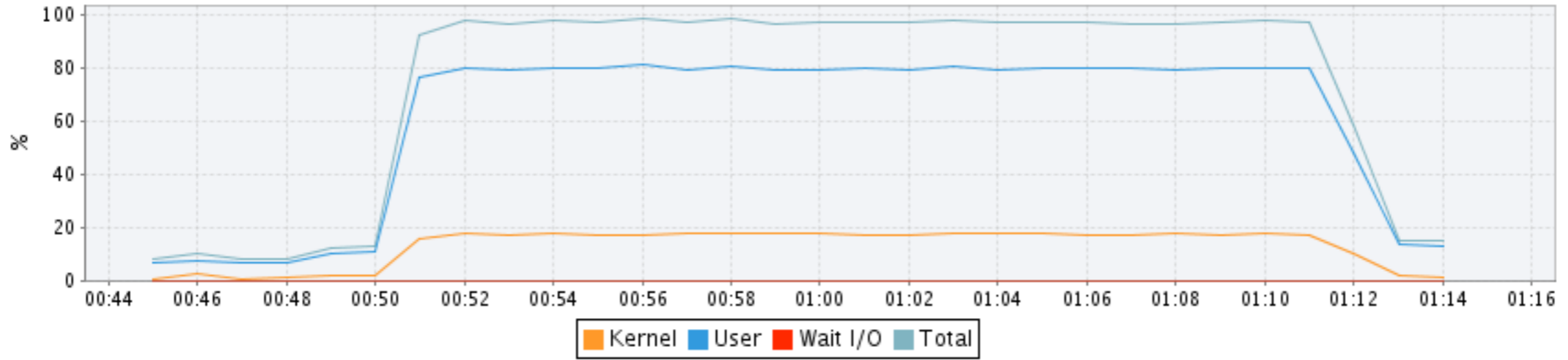
Emergency Slides!!

- In case the demo flubs due to Murphy
- Here are some screen shots
- I know, it's not the same...
- Just *imagine*

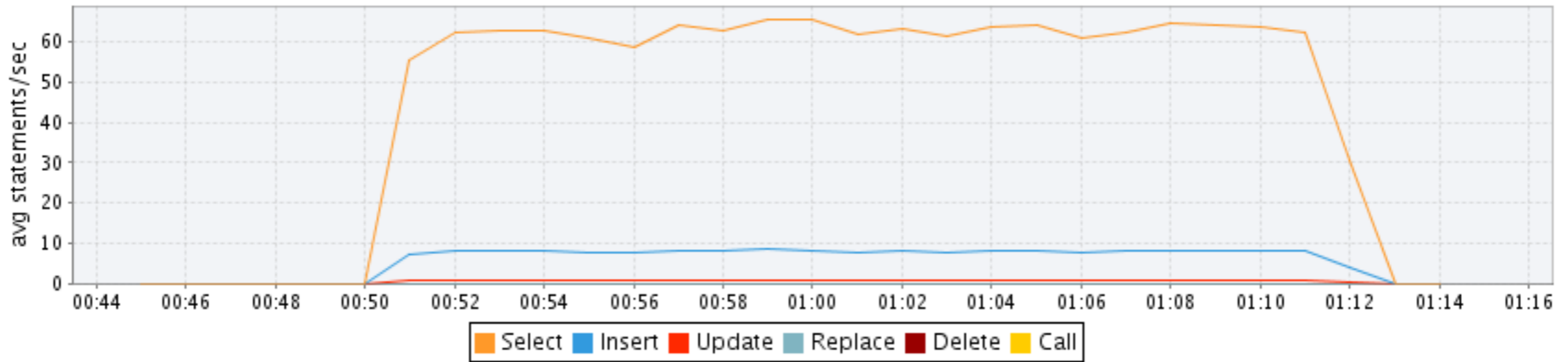


Demo: Enterprise Monitor

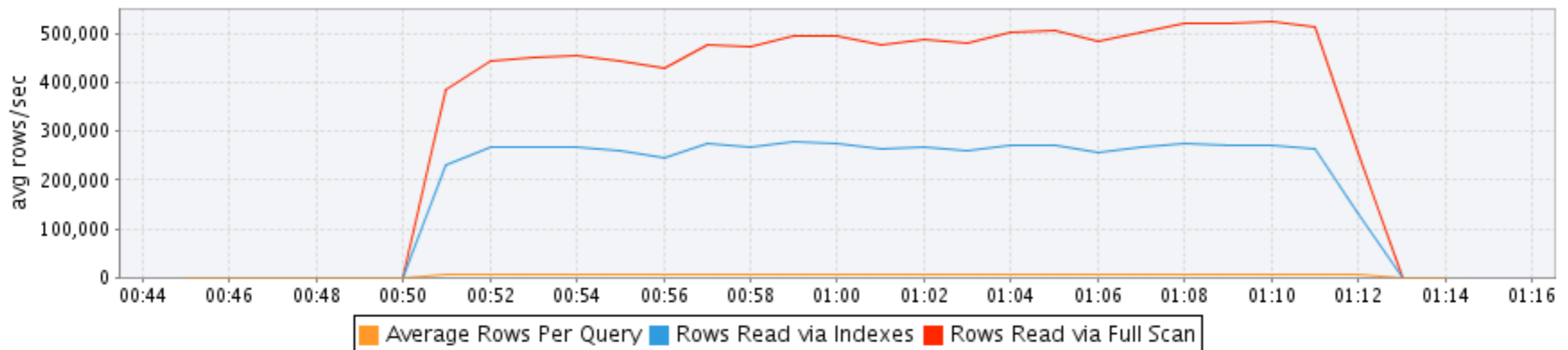
CPU Utilization



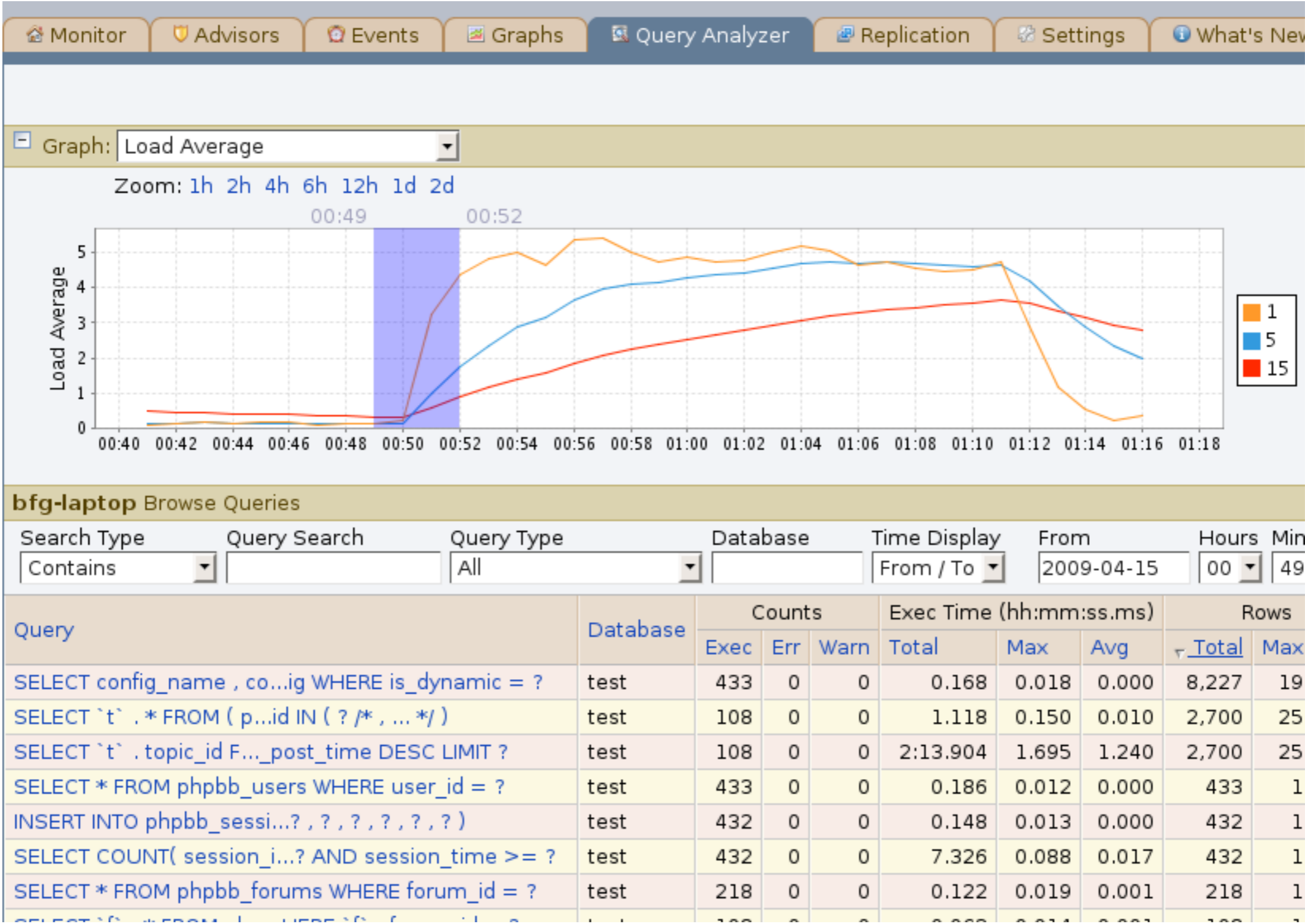
Database Activity



Row Accesses



Query Analyzer: Rows Affected



Query Analyzer Explain

Monitor | Advisors | Events | Graphs | **Query Analyzer** | Replication | Settings | What's New?

troubleshooting | Canonical Query | Example Query | **Explain Query**

Explain of a query that occurred during the Time Span (usually the slowest but not always).

Explain

id	select_type	table	type	possible_keys	key	key_len	ref	rows	extra
1	SIMPLE	phpbb_config	ref	is_dynamic	is_dynamic	1	const	23	

hide

expand »

Query	test	17,426	4:42.843	0.072	0.016	17,426	1	1	Avg	Total
SELECT COUNT(session_i...? AND session_time >= ?	test	17,426	4:42.843	0.072	0.016	17,426	1	1	160.01 KB	
SELECT `t` . * FROM (p...id IN (? /* , ... */)	test	4,355	29.515	0.156	0.007	108,875	25	25	11.01 MB	
SELECT `t` . * FROM (p...Y` t` . topic_time DESC	test	4,358	9.352	0.051	0.002	0	0	0	0 B	
SELECT `s` . session_us... . session_user_id <> ?	test	17,424	8.603	0.031	0.000	0	0	0	0 B	
INSERT INTO phpbb_sessi...?, ?, ?, ?, ?, ?)	test	17,426	6.984	0.354	0.000	17,425	1	1	0 B	
SELECT * FROM phpbb_users WHERE user_id = ?	test	17,426	6.876	0.024	0.000	17,426	1	1	3.99 MB	
SELECT `t` . *, `f` `f` . forum_id = ?)	test	4,350	6.432	0.058	0.001	4,350	1	1	1.25 MB	
SELECT * FROM phpbb_forums WHERE forum_id = ?	test	8,717	5.799	0.065	0.001	8,717	1	1	1.73 MB	
SELECT config_name , co...ig WHERE is_dynamic = ?	test	17,426	5.778	0.021	0.000	331,094	19	19	8.43 MB	
SELECT bbcode_id , bbco... = ? ORDER BY bbcode_tag	test	9,511	4.342	0.029	0.000	0	0	0	0 B	
SET NAMES ?	test	17,426	4.247	0.036	0.000	0	0	0	0 B	
SELECT @@session . sql_mode AS sql_mode	test	17,426	3.412	0.022	0.000	0	0	0	0 B	
SET SESSION sql_mode = ?	test	17,426	3.301	0.041	0.000	0	0	0	0 B	
DELETE FROM phpbb_sessi...AND session_user_id = ?	test	4,360	3.218	0.352	0.001	1	1	0	0 B	
SELECT `p` . post id FR... post time ASC LIMIT ?	test	4,350	2.808	0.029	0.001	4,350	1	1	33.54 KB	

Query Analyzer: Average Time

bfg-laptop Browse Queries									
Search Type	Query Search	Database	Time Display	From	Hours	Minutes	To	Hours	Minutes
Contains			From / To	2009-4-5	21	17	2009-4-5	22	0
filter		reset							
Query	Database	Exec Count	Exec Time (hh:mm:ss.ms)			Rows			Total
			Total	Max	Avg	Total	Max	Avg	
SELECT `t` . topic_id F..._post_time DESC LIMIT ?	test	4,355	1:59:41.039	3.648	1.649	108,875	25	25	1.14 MB
SELECT COUNT(session_i...? AND session_time >= ?	test	17,426	4:42.843	0.072	0.016	17,426	1	1	160.01 KB
SELECT `t` . * FROM (p...id IN (? /* , ... */)	test	4,355	29.515	0.156	0.007	108,875	25	25	11.01 MB
SELECT COUNT(DISTINCT ... `s` . session_time >= ?	test	1	0.006	0.006	0.006	1	1	1	6 B
SELECT COUNT(DISTINCT session_forum_id = ?	test	49	0.300	0.014	0.006	49	1	1	294 B
SELECT `t` . * FROM (p...Y `t` . topic_time DESC	test	4,358	9.352	0.051	0.002	0	0	0	0 B
SELECT `t` . * , `f` ... `f` . forum_id = ?)	test	4,350	6.432	0.058	0.001	4,350	1	1	1.25 MB
DELETE FROM phpbb_sessi...AND session_user_id = ?	test	4,360	3.218	0.352	0.001	1	1	0	0 B
SELECT * FROM phpbb_forums WHERE forum_id = ?	test	8,717	5.799	0.065	0.001	8,717	1	1	1.73 MB
SELECT `p` . post_id FR... post_time ASC LIMIT ?	test	4,350	2.808	0.029	0.001	4,350	1	1	33.54 KB
SELECT `f` . * FROM php...HERE `f` . forum_id = ?	test	4,358	2.801	0.046	0.001	4,358	1	1	885.22 KB
SELECT `u` . * , `z` ... er_id = `p` . poster_id	test	4,350	2.528	0.036	0.001	4,350	1	1	1.55 MB
SELECT `u` . * , `s` ... = `s` . session_user_id	test	4,361	2.399	0.024	0.001	2	1	0	788 B
SELECT `s` . session_us... . session_user_id <> ?	test	17,424	8.603	0.031	0.000	0	0	0	0 B
SELECT bbcode_id , bbco... = ? ORDER BY bbcode_tag	test	9,511	4.342	0.029	0.000	0	0	0	0 B
SELECT `s` . style_id ... id = `s` . imageset id	test	1	0.000	0.000	0.000	1	1	1	67.03 KB

Query Analyzer: Example

Monitor Advisors Events Graphs Query Analyzer Replication Settings What's New?

Canonical Query Example Query Explain Query

The query with the longest execution time during the Time Span (usually the slowest but not always).

Sampled Query
[truncated](#) | [full](#) | [formatted](#)

```

SELECT
  t.topic_id
FROM
  phpbb_topics
AS t
WHERE
  t.forum_id = 2 AND t.topic_type IN (0, 1) AND t.topic_approved = 1
ORDER BY
  t.topic_type DESC, t.topic_last_post_time DESC
LIMIT 25
        
```

Execution Time
2,567 ms

Date
Apr 5, 2009 10:03:07 PM

User
test

Thread ID
188091

From Host
192.168.0.87:38851

To Host
/data/6.0.10/mysqld.sock

Comments

minutes To 2009-4-5 Hours 22

Rows			
Total	Max	Avg	Total
108,875	25	25	1.14 MB
17,426	1	1	160.01 KB
108,875	25	25	11.01 MB
0	0	0	0 B
0	0	0	0 B
17,425	1	1	0 B
17,426	1	1	3.99 MB
4,350	1	1	1.25 MB
8,717	1	1	1.73 MB
331,094	19	19	8.43 MB
0	0	0	0 B
0	0	0	0 B
0	0	0	0 B
0	0	0	0 B
0	0	0	0 B
1	1	0	0 B
4,350	1	1	33.54 KB