



**ORACLE<sup>®</sup>**

## **MySQL Update**

Your name

Your title

# Please Read

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The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

# Hardware and Software Engineered to Work Together



Built together  
Tested together  
Managed together  
Serviced together  
Based on open standards  
Lower cost  
Lower risk  
More reliable

## MySQL Completes The Stack



Ed Presz  
Senior Director Database Engineering,  
Ticketmaster/Live Nation  
Entertainment Inc.

“At Ticketmaster, we use MySQL and Oracle Database to complement each other. The end result is a highly-distributed, optimal-performing database environment that powers one of the largest e-commerce and ticketing sites in the world.”

*ticketmaster*

ORACLE

# Investment in MySQL

## Rapid Innovation

- **Make MySQL a Better MySQL**
  - #1 Open Source Database for Web Applications
  - Most Complete LAMP Stack
  - Telecom & Embedded
- **Develop, Promote and Support MySQL**
  - Improve engineering, consulting and support
  - Leverage 24x7, World-Class Oracle Support
- **MySQL Community Edition**
  - Source and binary releases
  - GPL license



# Oracle + MySQL Customers

- **Product Integration in Progress**
  - Oracle GoldenGate (Complete!)
  - Oracle Enterprise Linux + Oracle VM
  - Oracle Secure Backup
  - Oracle Audit Vault
  - Oracle Enterprise Manager
- **Support**
  - Leverage 24x7, World-Class Oracle Support
  - MyOracle Support



**Announced at  
MySQL Sunday:  
MySQL 5.5 GA in  
Dec, 2010**



**Making MySQL Better Everyday**

# MySQL 5.5 Early Adopters Speak!

*“Thanks to the MySQL and InnoDB teams for their continued hard work and dedication to making MySQL faster as hardware evolves. I, for one, cannot wait to see what this stuff does for us. “*

**– Jeremy Zawodny, Craigslist**

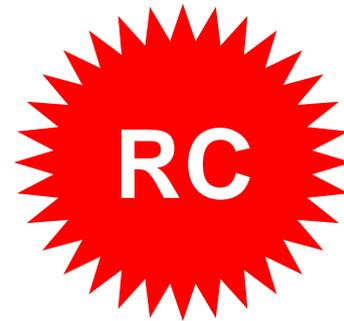
*“I’m really blown away by MySQL 5.5.4’s improvements. “*

**- Don MacAskill, SmugMug**

*“My expectations for 5.5 were not high. I am pleasantly surprised!”*

**- Mark Callaghan, Facebook, MySQL UC Keynote**

# MySQL 5.5



## InnoDB becomes default

- ACID Transactions, FKs, Crash Recovery

## Improved Availability

- Semi-synchronous Replication
- Replication Heartbeat
- Replication Slave fsync options
- Automatic Relay Log Recovery

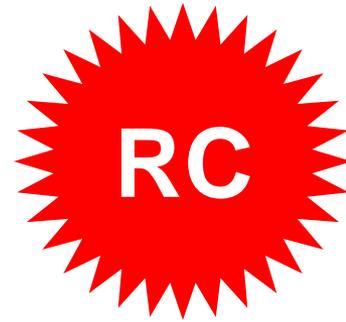
## Improved Usability

- SIGNAL/RESIGNAL
- More Partitioning Options
- PERFORMANCE\_SCHEMA
- Replication Server Filtering
- Replication Slave Side Type Conversions
- Individual Log Flushing

## Better Instrumentation/Diagnostics

- InnoDB stats in 5.5 PERFORMANCE\_SCHEMA

# MySQL 5.5 is Faster!



## InnoDB Performance improvements

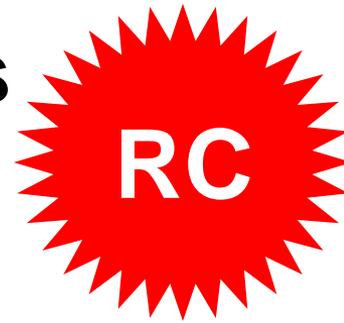
- Multiple Buffer Pool Instances
- Multiple Rollback Segments
- Extended Change Buffering (with delete buffering, purge buffering)
- Improved Purge Scheduling
- Improved Log Sys mutex
- Separate Flush List mutex

## MySQL Performance Improvements

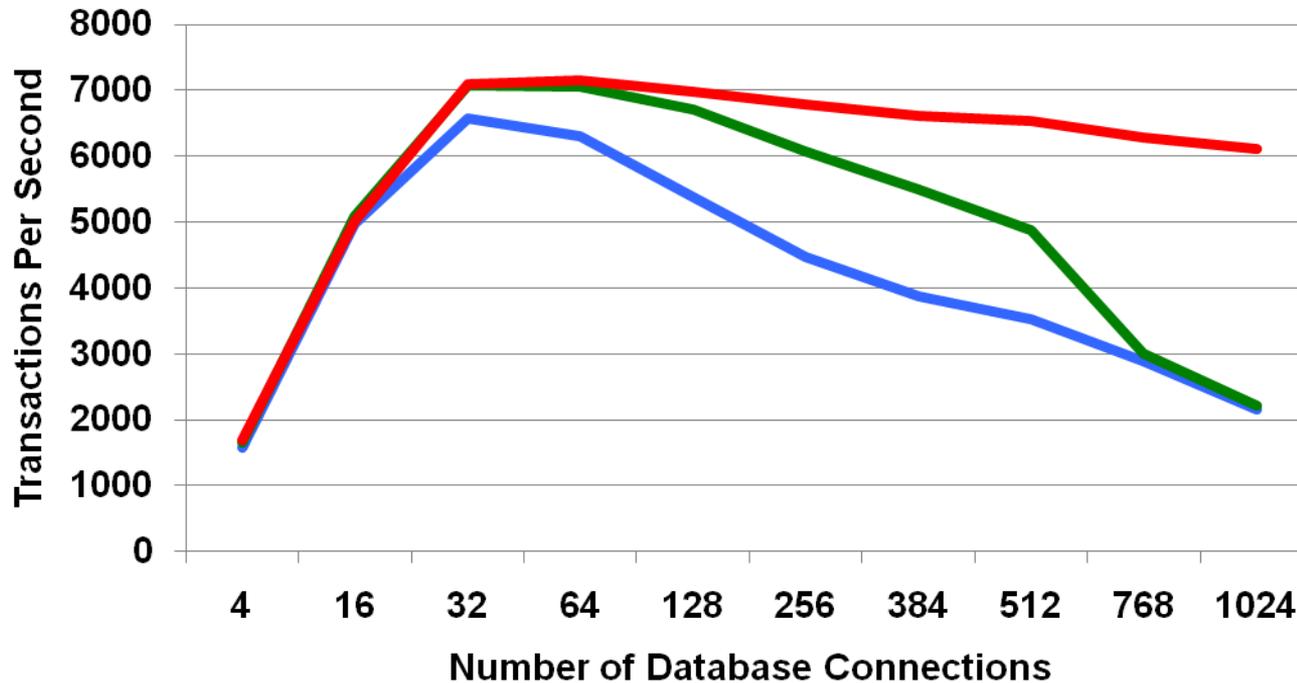
- Better Metadata Locking within Transactions
- Split LOCK\_open mutex
- Eliminated LOCK\_alarm mutex as bottleneck
- Eliminated LOCK\_thread\_count as bottleneck
- Improved Performance/Scale on Win32, 64

**More than 10x improvement in recovery times**

# MySQL 5.5 SysBench Benchmarks Linux



MySQL 5.5 vs. 5.1 - Read Only



**MySQL 5.5.6**  
(New InnoDB)

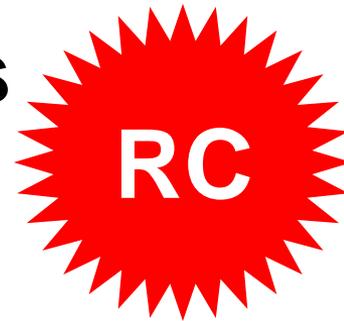
**MySQL 5.1.50**  
(InnoDB Plug-in)

**MySQL 5.1.50**  
(InnoDB built-in)

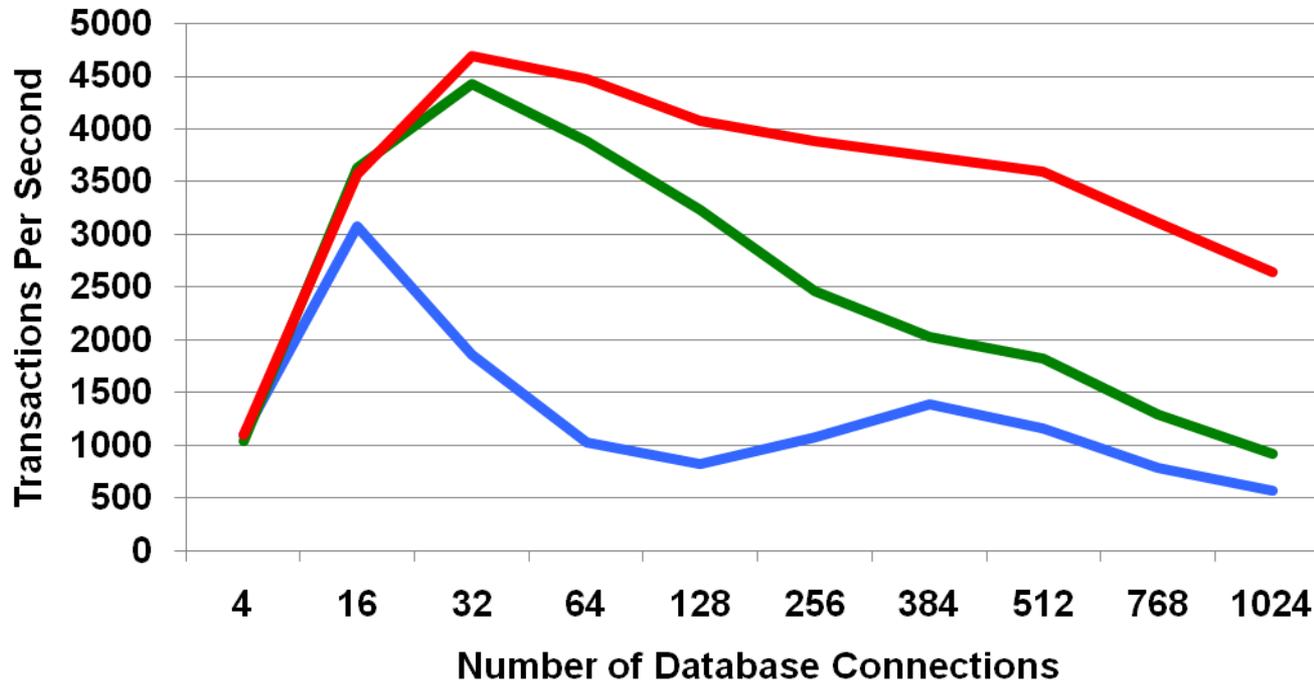
**200% performance gain**  
for MySQL 5.5 over 5.1.50; at scale

Intel Xeon X7460 x86\_64  
4 CPU x 6 Cores/CPU  
2.66 GHz, 32GB RAM  
Fedora 10

# MySQL 5.5 SysBench Benchmarks Linux



MySQL 5.5 vs. 5.1 - Read Write



**MySQL 5.5.6**  
(New InnoDB)

**MySQL 5.1.50**  
(InnoDB Plug-in)

**MySQL 5.1.50**  
(InnoDB built-in)

**369% performance gain**  
for MySQL 5.5 over 5.1.50; at scale

Intel Xeon X7460 x86\_64  
4 CPU x 6 Cores/CPU  
2.66 GHz, 32GB RAM  
Fedora 10

# MySQL Server Priorities – FY2011-12

## Improved Performance/Scalability

- Optimized subqueries, views, push-down joins
- Batched fetch of data from storage engines (MRR, BKA)
- Focus on Windows specific optimizations

## Improved Security

- External authentication
- Auditing capture and policy administration

## Improved Availability

- Online operations (ALTER tables, indexes)

## Improved Ease of Use

- MySQL Scripts and Utilities
- Management/Monitoring Tools, Universal Installer – msi

## Integration with Oracle products

- Fusion MW/BI Suite, OEM, Secure Backup, Audit Vault, Golden Gate

# MySQL Server Priorities – FY2011-12

## InnoDB Performance

- Multi-threaded purge
- Kernel mutex split (cont)
- Make InnoDB mutexes green
- Improved deadlock checking
- Async flushing in master thread
- Async redo application during recovery
- Page\_hash patch with multiple buffer pools
- Performance improvements on Windows
- Optimized for SSD

## InnoDB Ease of Use

- Metrics tables
- Persistent optimizer statistics
- Fulltext search
- InnoDB Transportable tablespaces

# MySQL Server Priorities – FY2011-12

## Replication Ease of Use

- Server UUIDs - Unique server ids making it easier to analyze replication topologies
- Modular replication architecture - Use different replication tools to replicate to/from a MySQL server
- Scriptable replication - Write your own plugin (e.g. replication filtering on data or statement type, extraction of data, preheating of caches)
- Replication checksums - Detect transmission or disk corruptions
- Transactional replication information - Automatically recover from a slave crash
- Informational events - Original statement for RBR, User and IP of statement executor, engine dependent information
- High resolution replication delay measurement - IO and SQL delay separately measured in milliseconds
- Information schema for replication state - Query the state instead of using show commands

# MySQL Server Priorities – FY2011-12

## Replication Performance

- Multithreaded slave for higher performance - Reduce possibility for slave to lag behind master
- Preallocated binlog files - Improve performance by not having to append to files
- Options for writing full or partial row images in RBR - Optimize for performance, disk size, or functionality
- DTrace replication probes - Internal performance monitoring and debugging

# MySQL on Windows

## The Right Choice

### Significant Developer Adoption

- Windows is the #1 development platform for MySQL
- Making MySQL better on Windows

#### Performance & Scalability

- Improved on Windows
- MySQL 5.5 Benchmarks

#### Lower TCO

- More Affordable
- Easier to Administer

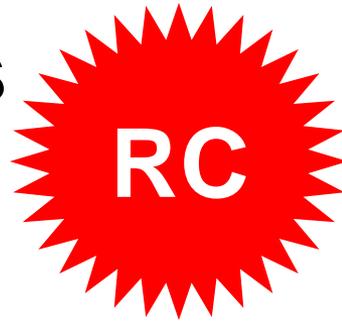
#### Ease of Use

- MySQL Workbench
- New Connector/NET 6.3

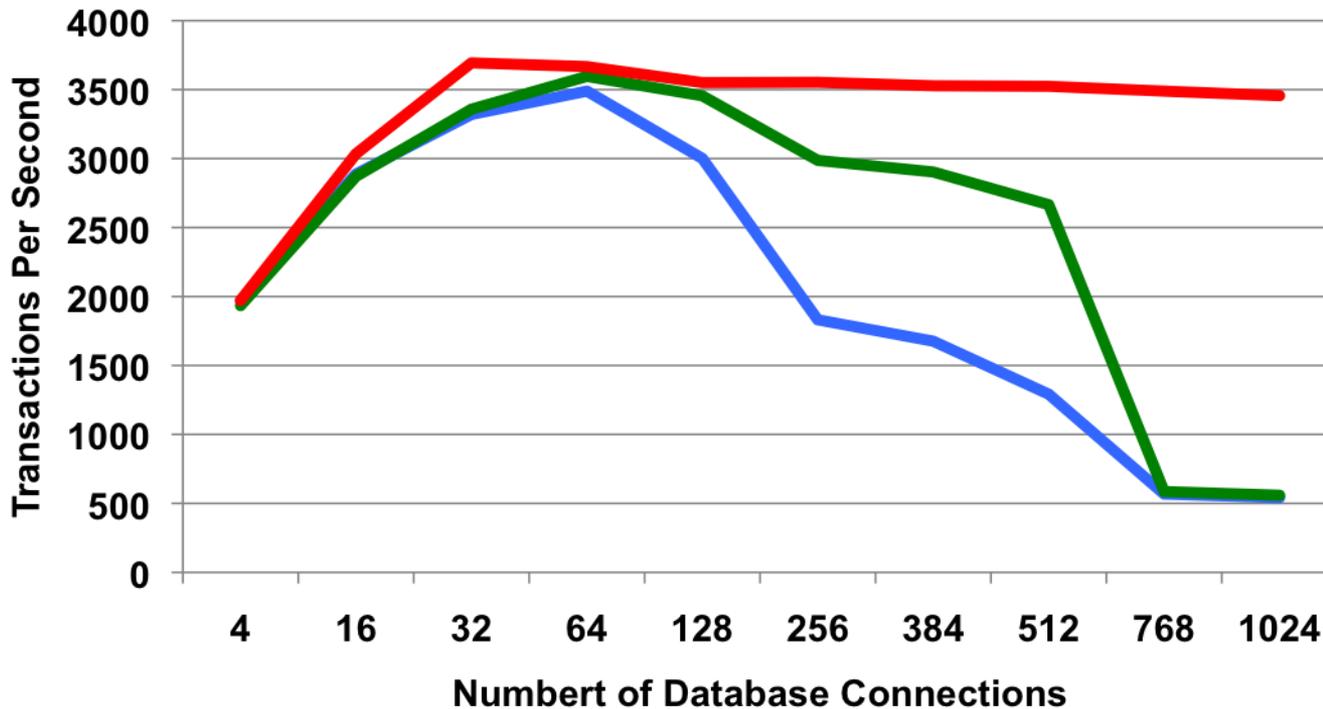
#### Cross-platform

- 20+ Platforms
- No Lock-in

# MySQL 5.5 SysBench Benchmarks Windows



MySQL 5.5 vs. 5.1 - Read Only



**MySQL 5.5.6**

(New InnoDB)

**MySQL 5.1.50**

(InnoDB Plug-in)

**MySQL 5.1.50**

(InnoDB built-in)

**538% performance gain**

**for MySQL 5.5 over 5.1.50; at scale**

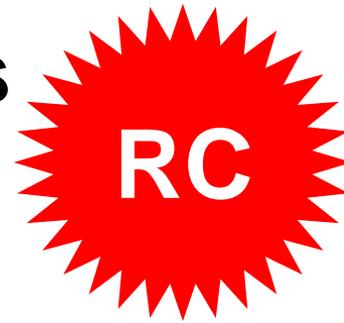
Intel x86\_64

4 CPU x 2 Cores/CPU

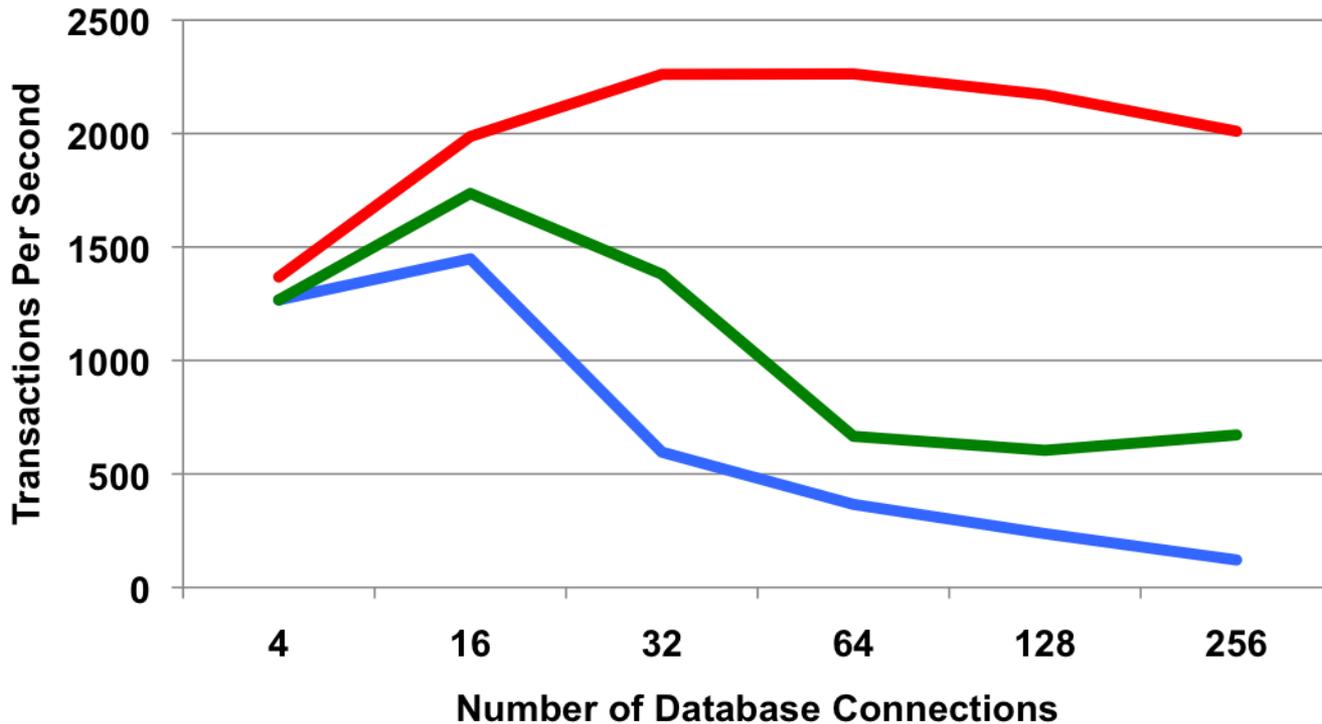
3.166 GHz, 8GB RAM

Windows Server 2008

# MySQL 5.5 SysBench Benchmarks Windows



MySQL 5.5 vs. 5.1 - Read Write



**MySQL 5.5.6**

(New InnoDB)

**MySQL 5.1.50**

(InnoDB Plug-in)

**MySQL 5.1.50**

(InnoDB built-in)

**1561% performance gain**

**for MySQL 5.5 over 5.1.50; at scale**

Intel x86\_64

4 CPU x 2 Cores/CPU

3.166 GHz, 8GB RAM

Windows Server 2008

# MySQL on Windows Priorities – FY2011-12

- Universal Windows Installer
  - Installs, configures, upgrades
- Native Windows authentication
  - MySQL Enterprise Authentication
- Windows Eco-system Support
  - Visual Studio
  - Entity Framework
  - Windows administration tooling
  - Connector Enhancements
- Windows Performance & Scalability optimizations
  - Added Performance Enhancements
  - Additional Windows Eco-system Support

# MySQL Cluster 7.1



- **Improved Administration**
  - NDBINFO: Real time status & usage statistics
  - MySQL Cluster Manager (CGE Only)
- **Higher Performance**
  - MySQL Cluster Connector for Java
  - Native Java & OpenJPA access to MySQL Cluster
- **Carrier Grade Availability & Performance**
  - Shared nothing, distributed design for 99.999% availability
  - Sub-Second Failover & Self Healing Recovery
  - On-Line Scaling and Maintenance
  - Parallel Multi-Master Architecture
  - Low Latency, Real Time Responsiveness

# MySQL Enterprise Edition

## Database

- MySQL Database
- Regular Updates, Bug Fixes
- Hot Fix Program



## Management

- Global Monitoring
- Query Analysis, Tuning
- Online “Hot” Backup, Recovery
- Visual Design, Development Tools
- Administration, Management Tools



## Support

- Oracle’s Premier Technical Support
- 24 x 7 x 365 Problem Resolution
- Consultative Help
- Integrated with Enterprise tools



# MySQL Enterprise Backup



- Online Backup for InnoDB & MyISAM
- High Performance Backup & Restore
- Compressed Backup
- Full Backup
- Incremental Backup
- Partial Backups
- Point in Time Recovery
- Unlimited Database Size
- Cross-Platform
  - Windows, Linux, Unix



# MySQL Enterprise Backup 3.5

## What's New

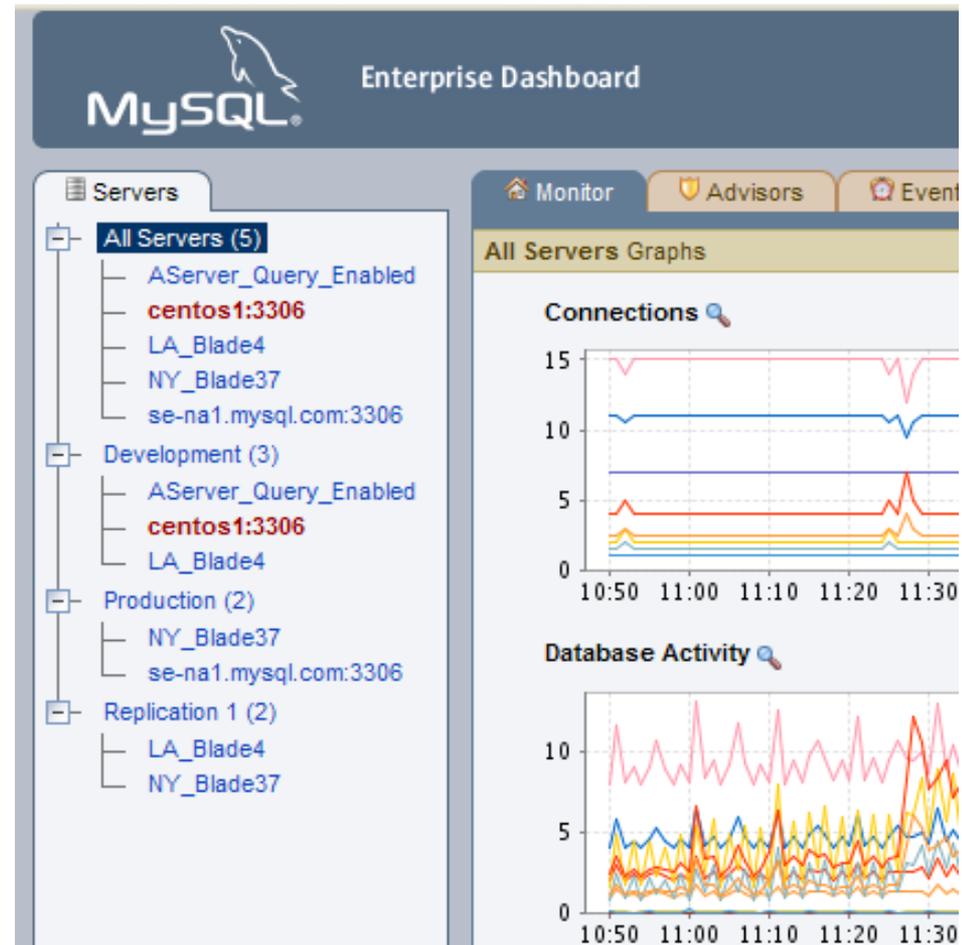


- Incremental Backup
- Support for InnoDB Barracuda file format
- Backup of compressed tables
- Backup of partition files
- Backup of in-memory database
  - With `-exec-when-locked` option
- Adds MySQL system tables to keep backup status, progress and history



# MySQL Enterprise Monitor

- Single, consolidated view into entire MySQL application development environment
- Auto-discovery of MySQL servers, replication topologies
- Automated, customizable rules-based monitoring, tuning, SNMP/SMTP alerts
- Query Analyzer for query monitoring, analysis, tuning, source code tracing
- Application Tuning during Dev/QA/Roll out
- Reduces risk of problems after apps are deployed



*A Virtual MySQL Tuning Assistant!*



Jeff Freund  
CEO,  
Clickability

*“The MySQL Query Analyzer allows us to quickly identify and optimize our most expensive queries so that we can constantly improve our platform and scale more efficiently.”*



# MySQL Enterprise Monitor 2.3

## What's New



### New Cluster Advisor and Graphs

- Monitoring of Data Nodes
- Up/down status
- Memory
- undo/redo buffer, logs

### Improved Advisors and Graphs

- Monitoring of transactions
- Binlog cache and space usage
- Disk space, I/O

Integrated with My Oracle Support  
Query monitoring via Connectors



**MySQL Cluster**

- Monitors and Advises on status/ performance of MySQL Cluster Data Nodes.

**Administration**

- Monitors and Advises on Optimal Configuration

**Performance**

- Monitors and Advises on Optimal Performance Variable Settings

**Custom**

- Built by DBA to Enforce Organization specific best practices.

**Upgrade**

- Monitors and Advises on Bugs/Upgrades that affect current installation

**Replication**

- Monitors and Advises on Master/Slave Latency.

**Security**

- Monitors and Advises on Unplanned Security Changes/Loopholes

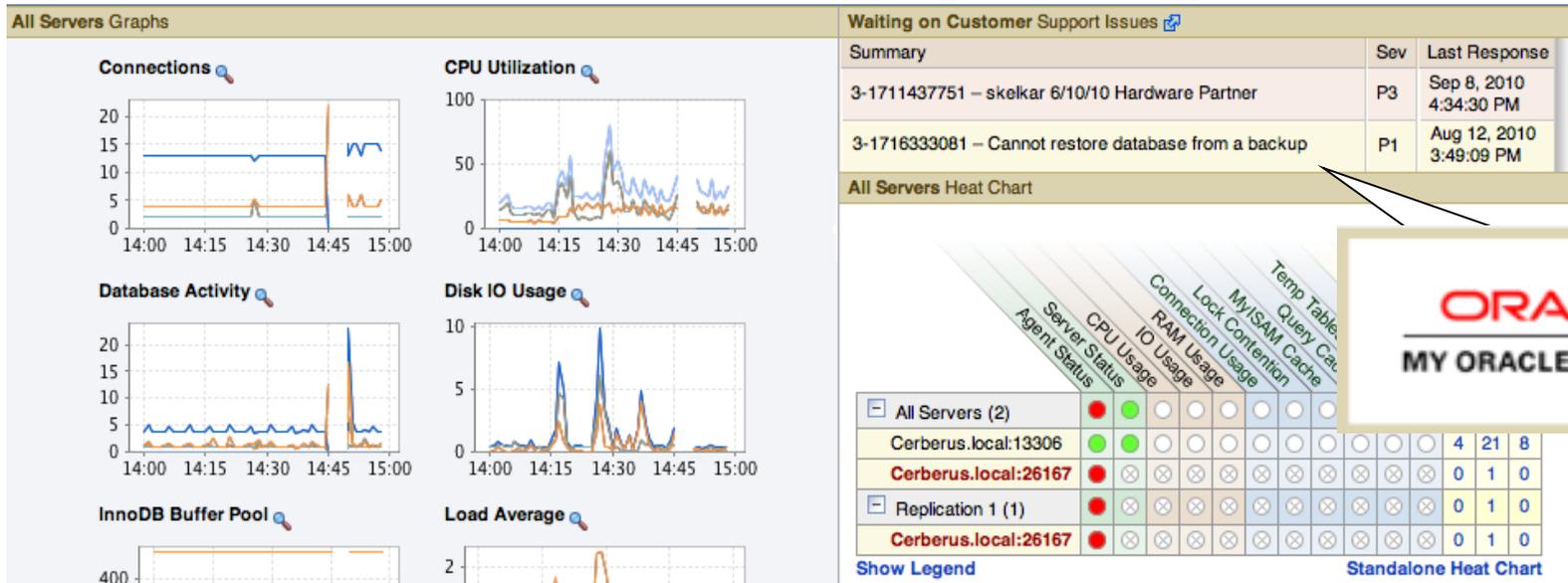
**Schema**

- Monitors and Advises on Unplanned Schema Change

**Memory Usage**

- Monitors and advises on optimal memory/cache settings

# MySQL and MyOracle Support



## MySQL Enterprise Monitor

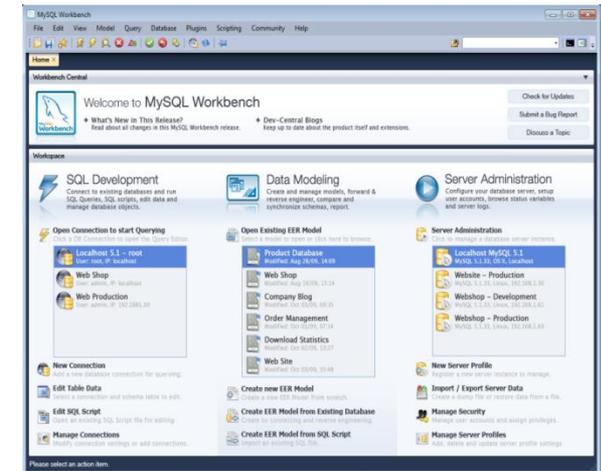
- Collect MySQL diagnostics and upload to MOS SR (now!)
- Track SRs from Enterprise Dashboard (CY 2010)
- Create/maintain SRs (CY 2011)
- Saves DBA *time*
  - collecting data for Support team, tracking status



# MySQL Workbench 5.2



- SQL Development
  - SQL Editor - Color Syntax Highlighting
  - Object Management - Import/Export, Browser, Edit
  - Connection Management - Wizard, SSH Tunnel
- Database Administration
  - Status, Configuration, Start/Stop, Replication
  - Users, Security, Session Management
  - Import/Export Dump Files
- Data Modelling
  - Visual Design
  - Forward/Reverse Engineer
  - Schema Validation, Schema Doc
- Scripting & Plug-in Support





## MySQL Workbench Tweets from Users!!

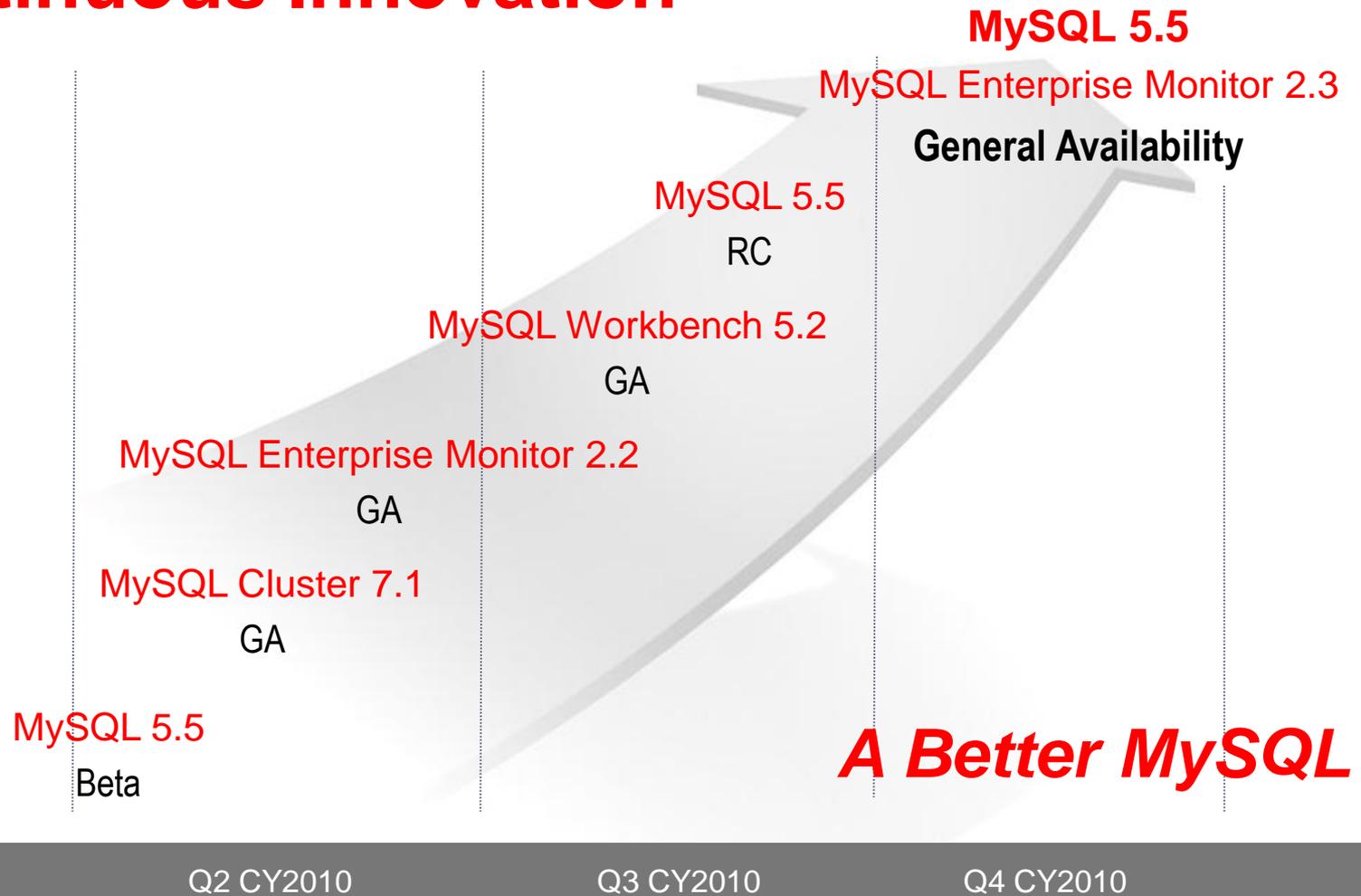
“Absolutely loving the MySQL Workbench!”

“MySQL Workbench is freaking awesome. It makes my life a whole lot easier.”

“@MySQL Workbench is awesome! Microsoft could learn from this product! LIVE database changes are so quick to synch with local model!”

# MySQL Product Releases

## Continuous Innovation



***A Better MySQL***

Q1 CY2010

Q2 CY2010

Q3 CY2010

Q4 CY2010

# Key Takeaways

- MySQL is important to Oracle and our customers
  - Part of our Complete, Open, Integrated strategy
- Oracle is making MySQL better **today**
  - Major Feature, Performance, Scalability enhancements
  - 24x7, Global support in 145 countries

**Download MySQL 5.5 Now!**

**<http://dev.mysql.com/downloads>**