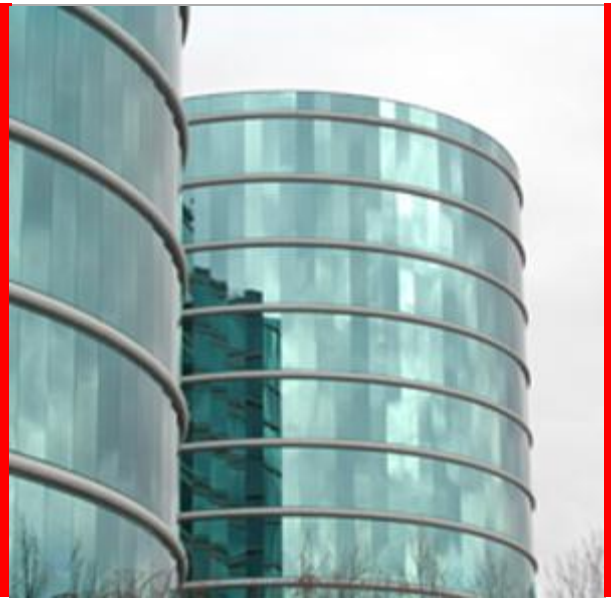


ORACLE®

MySQL 5.5

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 decisions.

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

Overview of MySQL

- 12 million product installations
- 65,000 downloads each day
- Part of the rapidly growing open source LAMP stack
- MySQL GPL & Commercial Editions Available

LAMP

Operating System		L
Application Server	The Apache Software Foundation	A
Database	MySQL™	M
Scripting	php Perl python™	P

MySQL is Everywhere

Multiple Platforms

LAMP
Linux Apache MySQL PHP,Perl,Python

Mac

redhat

opensolaris

solaris

Microsoft Windows

suse

Multiple Languages

php

perl

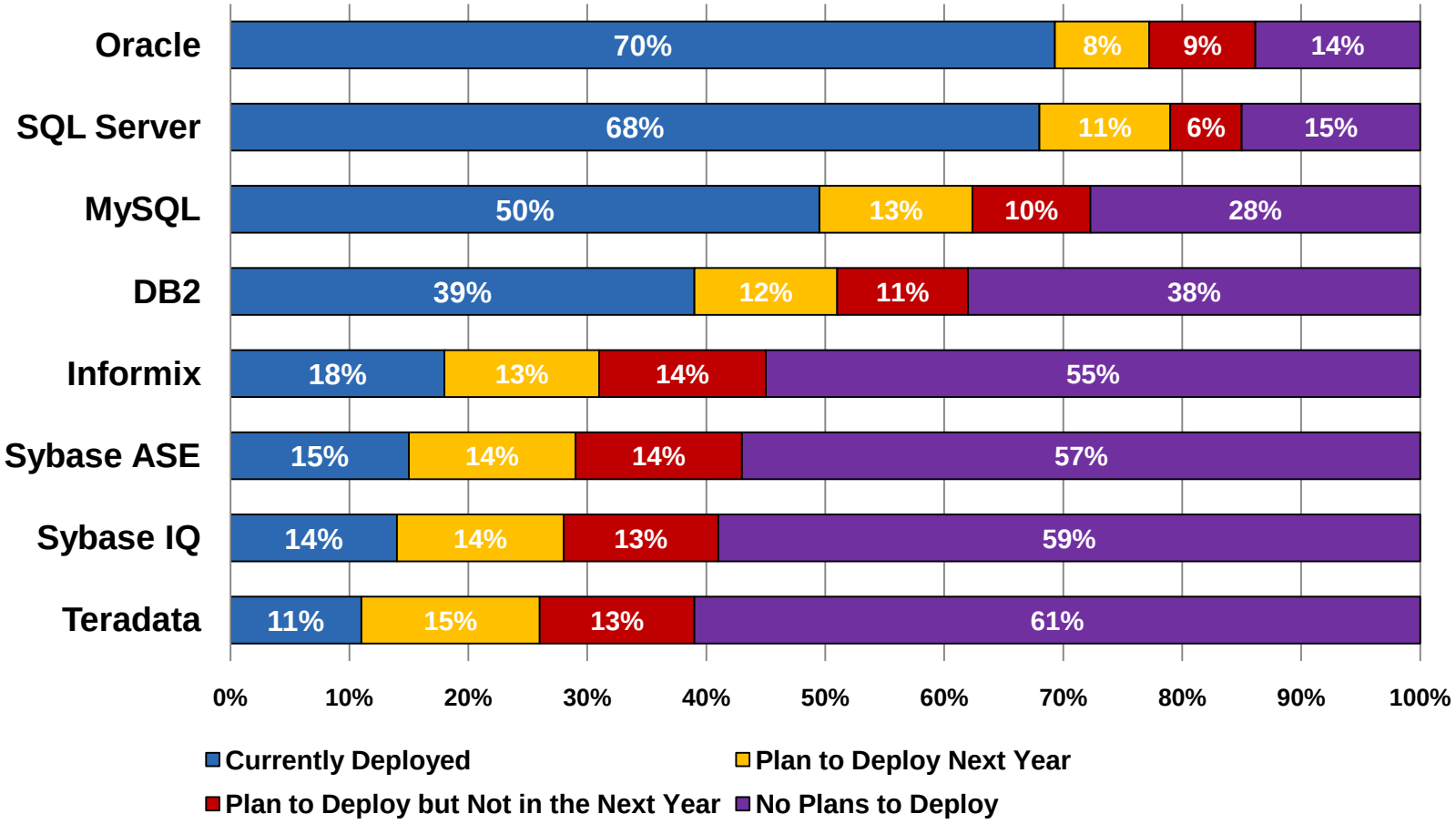
python

Ruby

Java

C C++ C#

MySQL: #3 Most Deployed Database



63% Are Deploying MySQL or Are Planning To Deploy

Oracle's Investment in Open Source

- Driven by customer demand
- Committed to supporting, developing, promoting, and adopting viable open source technologies
- Enable developer communities
- Open standards are key

Investment in MySQL

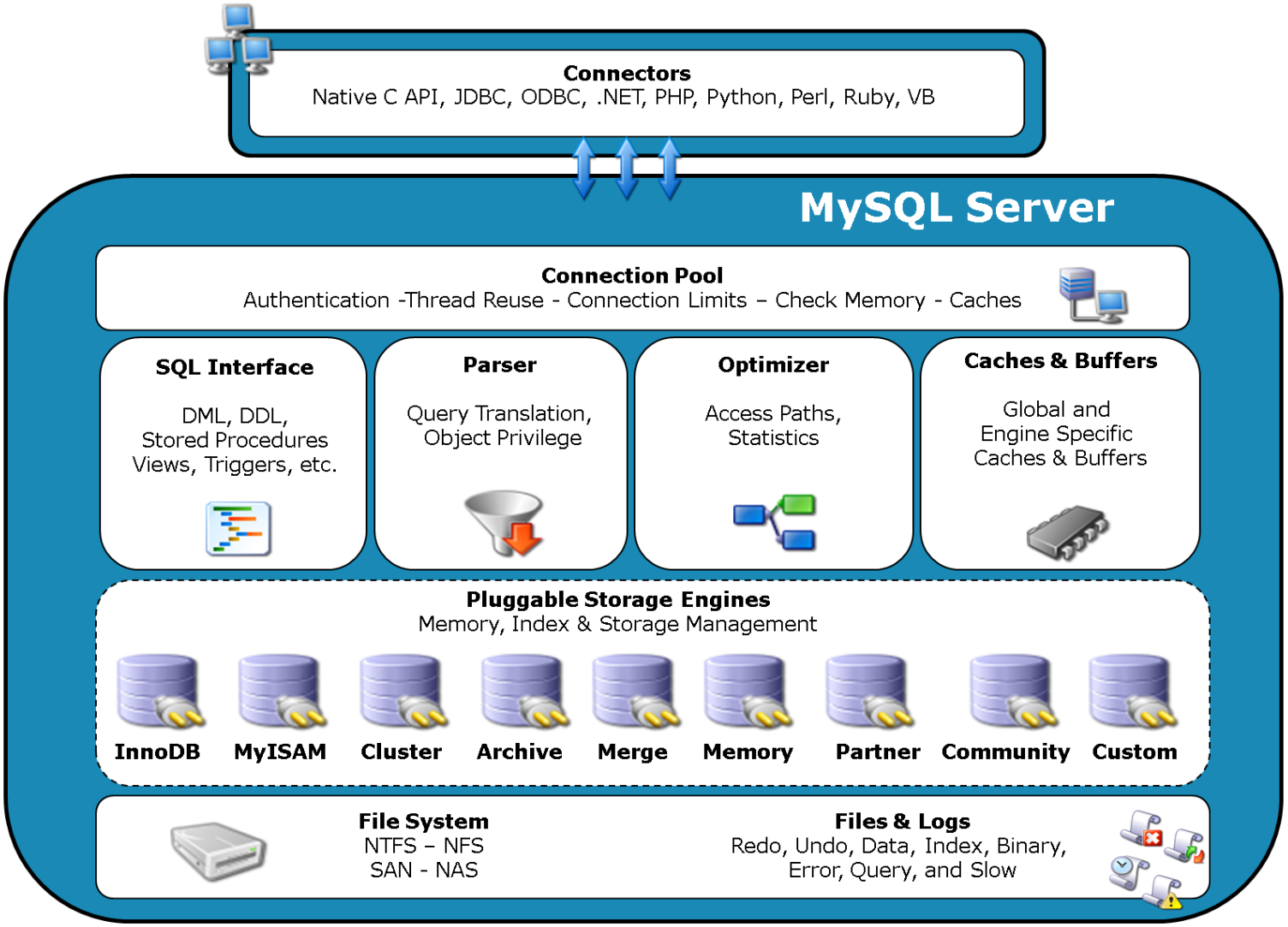
- **Make MySQL a Better MySQL**
  - #1 Open Source Database for Web Applications
- **MySQL Focus Areas**
  - Web, Embedded & Telecom
  - LAMP
  - Windows
- **Develop, Promote and Support MySQL**
  - Improve engineering, consulting and support
  - Leverage 24x7, World-Class Oracle Support
- **MySQL Community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

MySQL Customers

Products

Making MySQL Better Today

Pluggable Storage Engine Architecture

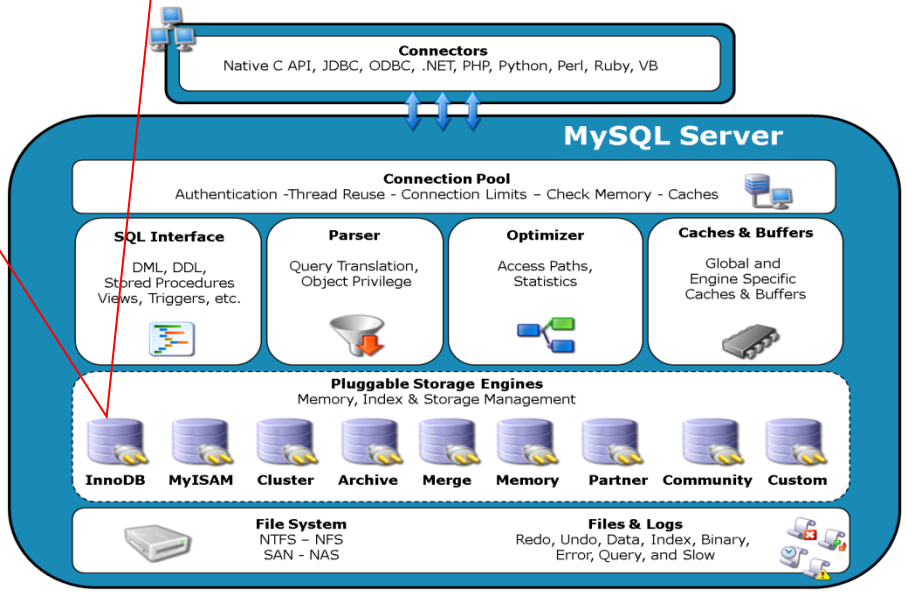


MySQL 5.5 – What's New

GA

InnoDB becomes default storage engine

- 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
- Replication Server Filtering
- Replication Slave Side Type Conversions
- Individual Log Flushing
- Pluggable External Authentication, Audit interfaces

Better Instrumentation/Diagnostics

- New PERFORMANCE_SCHEMA

MySQL™

MySQL 5.5 – What's New

Better Performance, Scalability and Recovery

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…

InnoDB Performance improvements

- Multiple Buffer Pool Instances
- Multiple Rollback Segments – now supports ***128K*** concurrent trxs
- Extended Change Buffering (with delete buffering, purge buffering)
- Improved Purge Scheduling
- Improved Log Sys mutex, Separate Flush List mutex
- Improved Recovery Times
- More…

InnoDB Multiple Buffer Pool

- ***5.1**: 1 Buffer Pool*
- ***5.5**: up to 64 Buffer Pools*

The Car Park Analogy

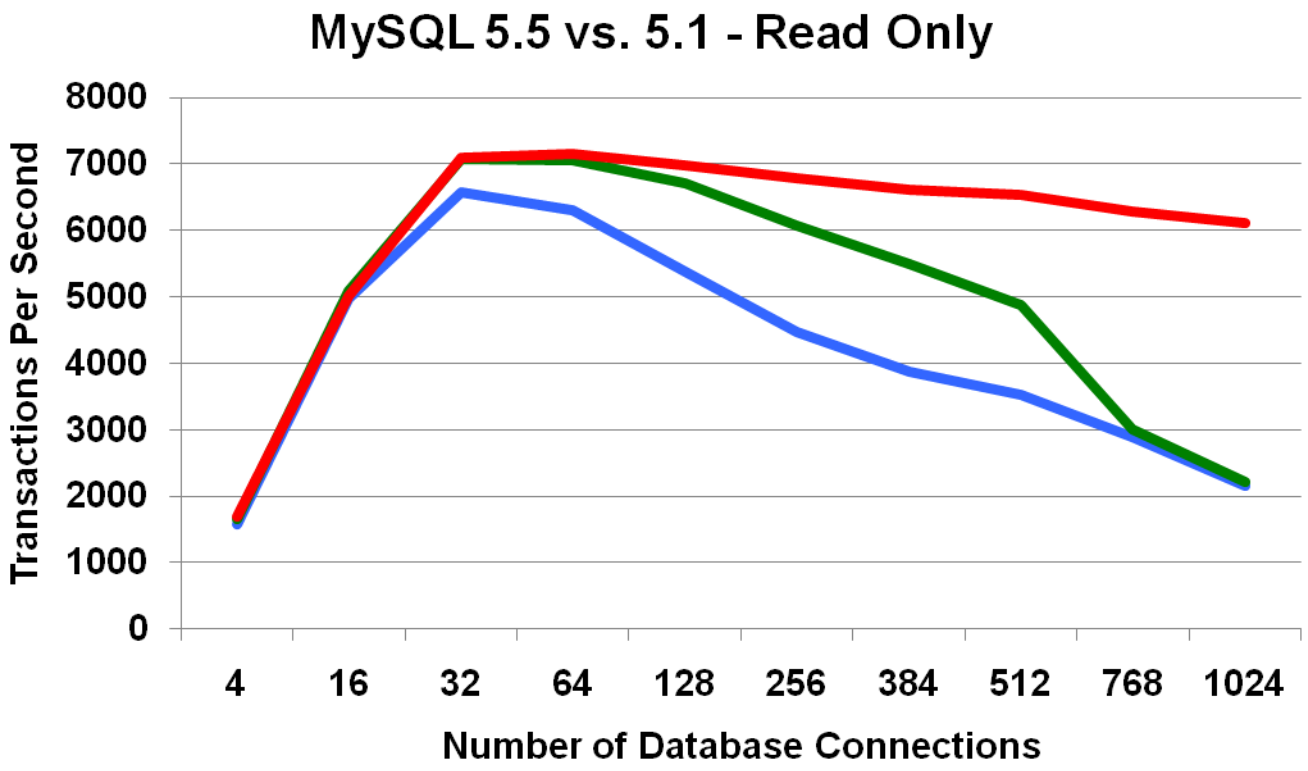
- In **5.1**, the Car Park had 1 entrance and 1 exit

- In **5.5**, the Car Park has 64 entrances and 64 exits

- The number of spaces available is the same, but cars can get in and out quicker

MySQL 5.5 SysBench Benchmark Linux

GA



MySQL 5.5.6
(New InnoDB)

MySQL 5.1.50
(InnoDB Plug-in)

MySQL 5.1.50
(InnoDB built-in)

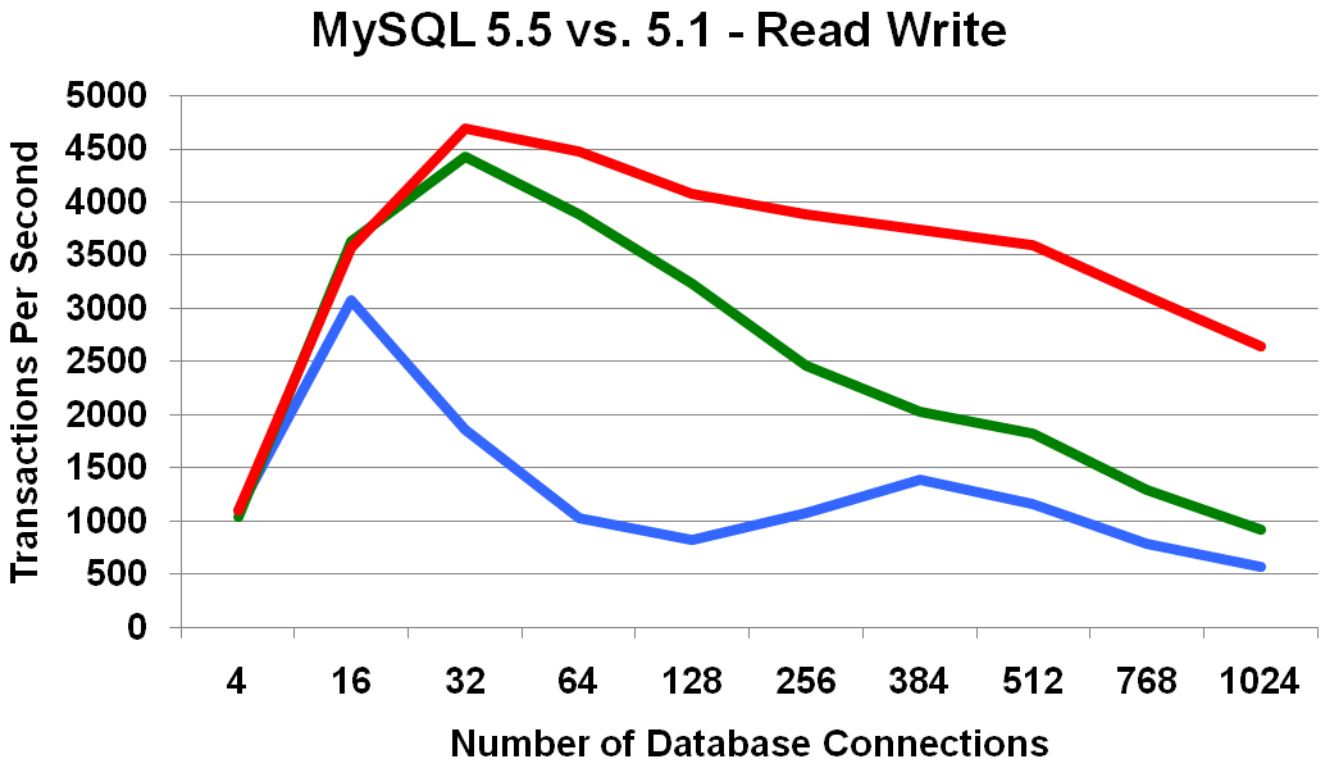
200% performance gain

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 Benchmark Linux

GA



MySQL 5.5.6
(New InnoDB)

MySQL 5.1.50
(InnoDB Plug-in)

MySQL 5.1.50
(InnoDB built-in)

370% performance gain

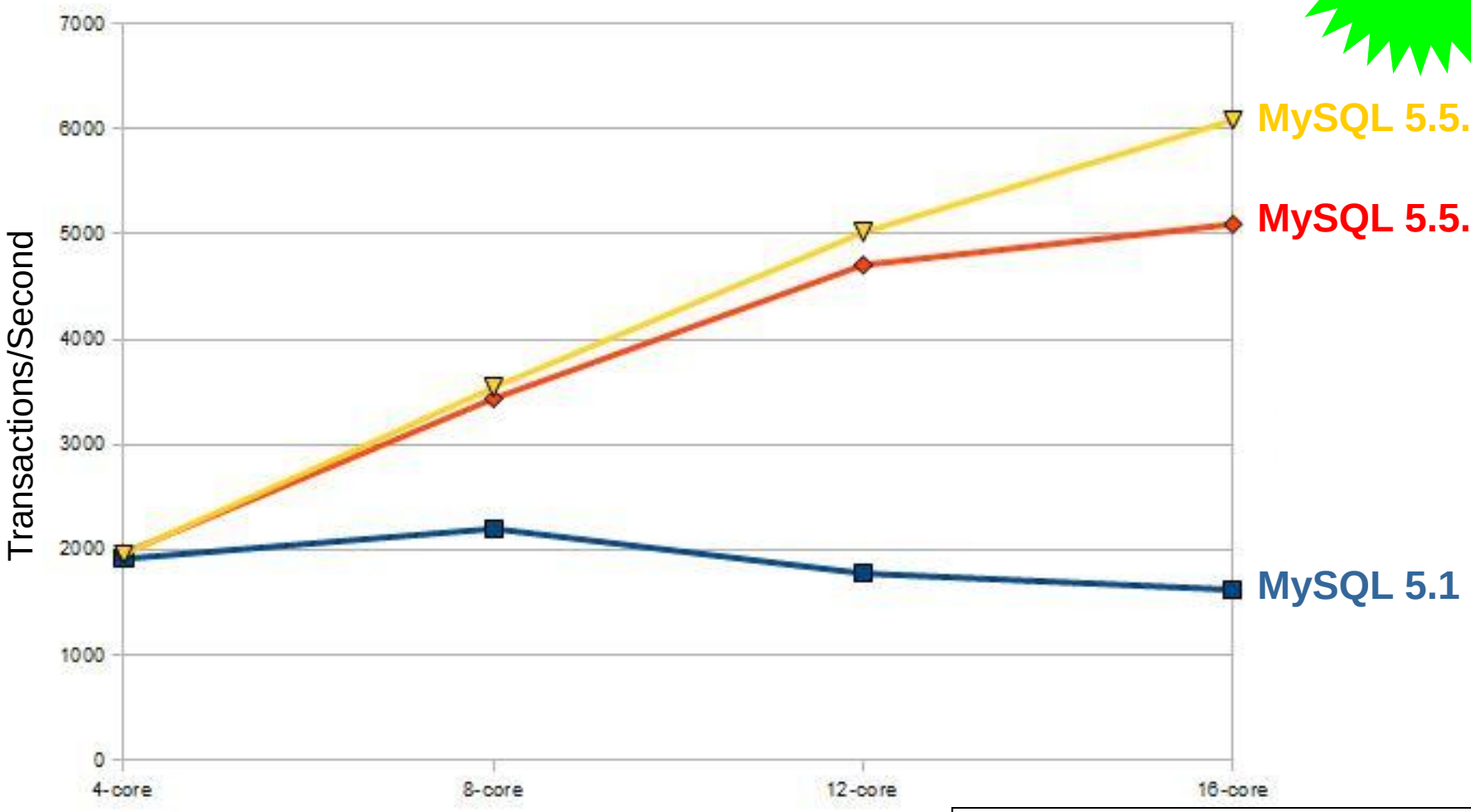
for MySQL 5.5 over 5.1.50; at scale

Intel Xeon X7460 x86_64
4 CPU x 6 Cores/CPU
2.66 GHz, 32GB RAM
Fedora 10

MySQL 5.5 Scales on multi core

SysBench Read Write

GA

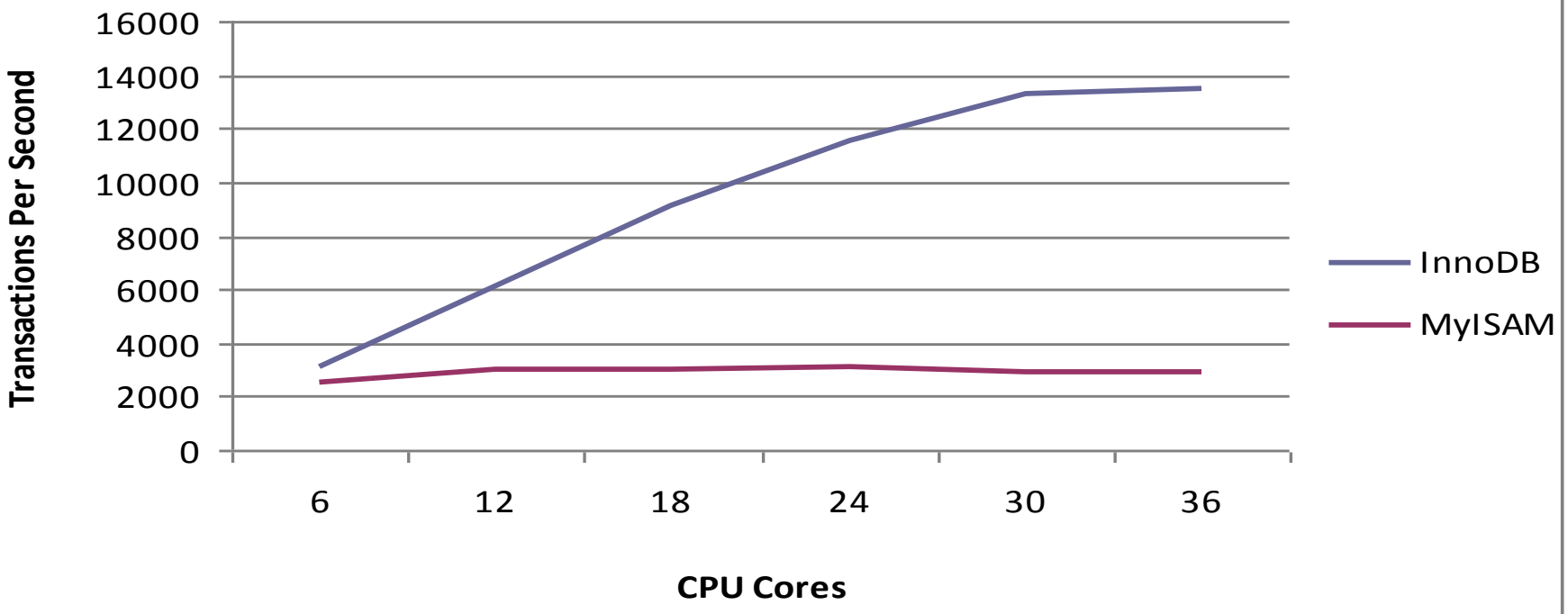


AMD Opteron 7160 (Magny-Cours) @2100 MHz
64 GB memory
2 x Intel X25E SSD drives
OS is Oracle Enterprise Linux with the Enterprise Kernel
4 sockets with a total of 48 cores.

MySQL 5.5 Scales on multi core

GA

Sysbench OLTP: Read Only Performance



AMD Opteron 7160 (Magny-Cours) @2100 MHz
64 GB memory
2 x Intel X25E SSD drives
OS is Oracle Enterprise Linux with the Enterprise Kernel
4 sockets with a total of 48 cores.

MySQL on Windows

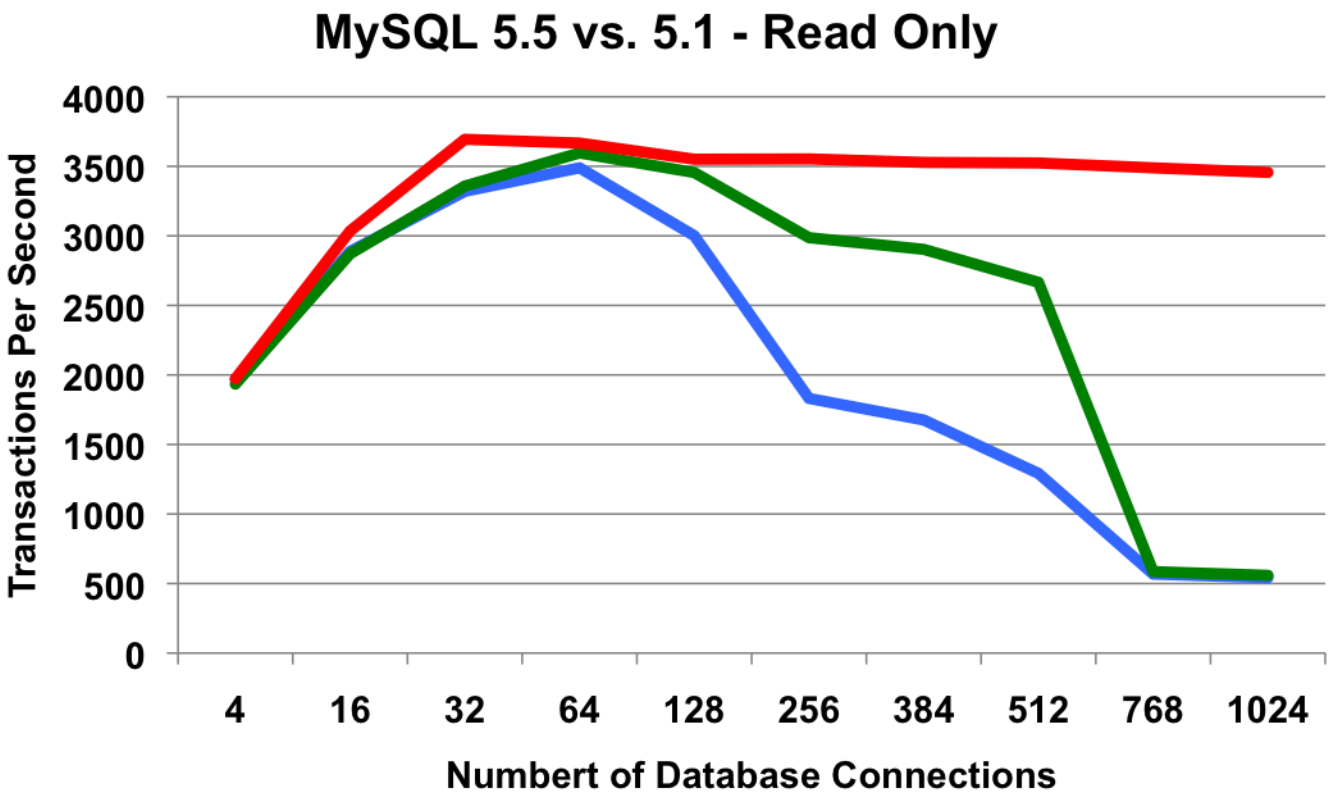
The Right Choice

- **Significant Developer Adoption**
  - Windows is the #1 download and dev platform for MySQL
  - MySQL 5.5 is optimized on Windows

Performance & Scalability • Improved on Windows • MySQL 5.5 Benchmarks	**Lower TCO** • More Affordable than MS SQL Server • Easier to Administer
Ease of Use • MySQL Workbench • New Connector/NET 6.3 • Out of box it “just works”	**Cross-platform** • 20+ Platforms • No lock-in, use OS of choice

MySQL 5.5 SysBench Benchmark: Windows

GA



MySQL 5.5.6
(New InnoDB)

MySQL 5.1.50
(InnoDB Plug-in)

MySQL 5.1.50
(InnoDB built-in)

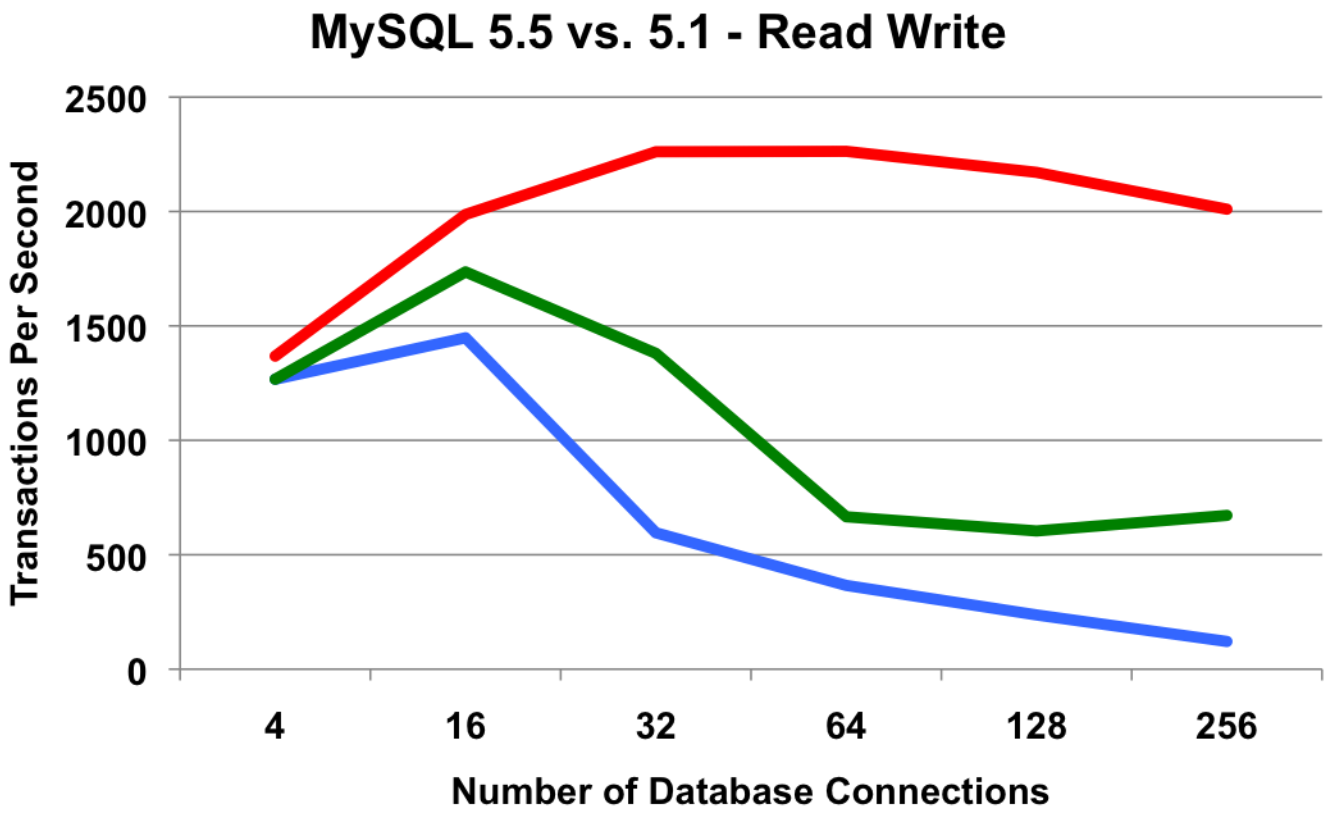
540% performance gain

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 Benchmark Windows

GA



MySQL 5.5.6
(New InnoDB)

MySQL 5.1.50
(InnoDB Plug-in)

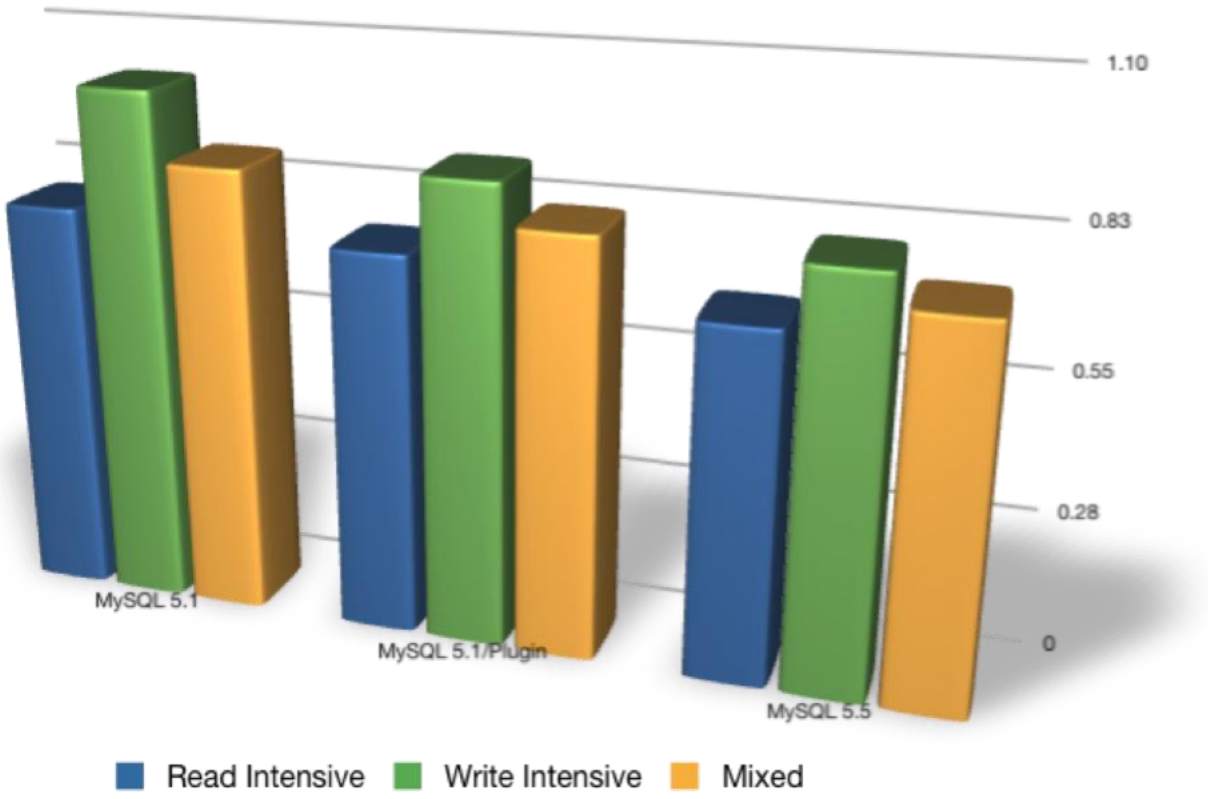
MySQL 5.1.50
(InnoDB built-in)

1560% performance gain

for MySQL 5.5 over 5.1.50; at scale

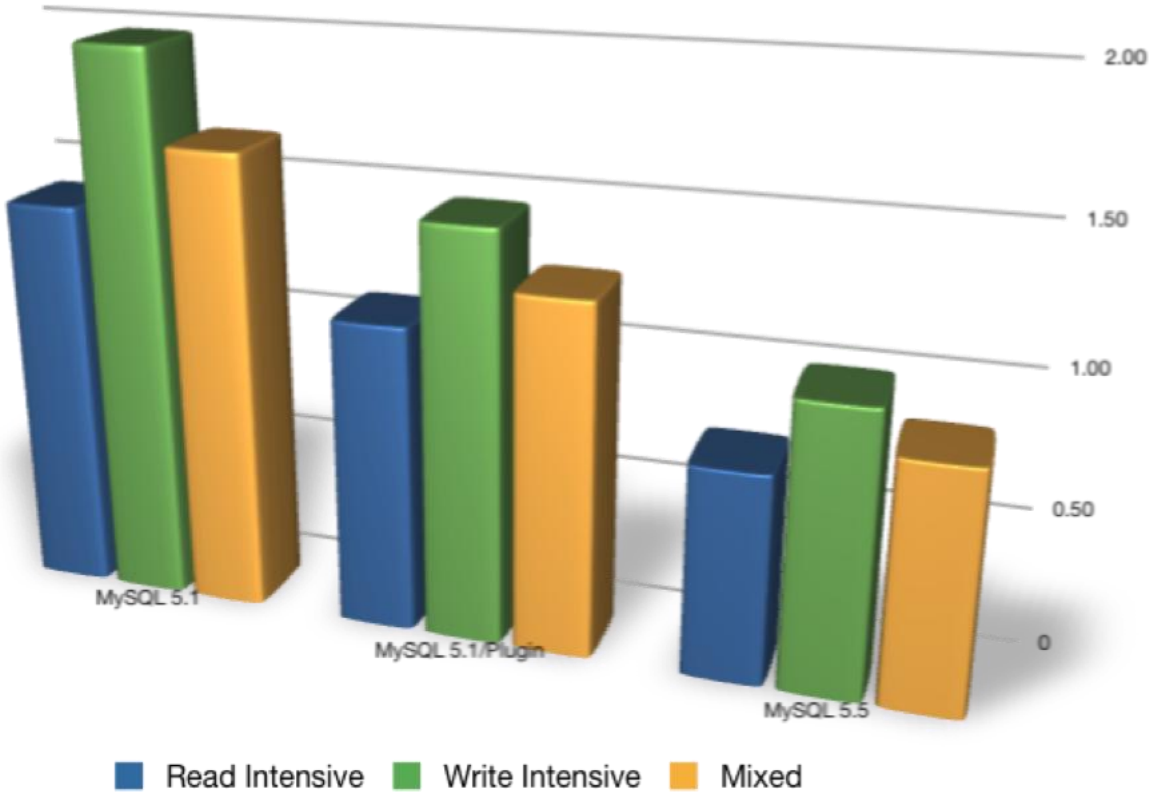
Intel x86_64
4 CPU x 2 Cores/CPU
3.166 GHz, 8GB RAM
Windows Server 2008

MySQL 5.5 with Java Applications Cost per Transaction



	MySQL 5.1	MySQL 5.1/Plugin	MySQL 5.5
Read Intensive	0.78	0.75	0.68
Write Intensive	1.02	0.90	0.80
Mixed	0.88	0.82	0.74

MySQL 5.5 with PhP Applications Cost per Transaction



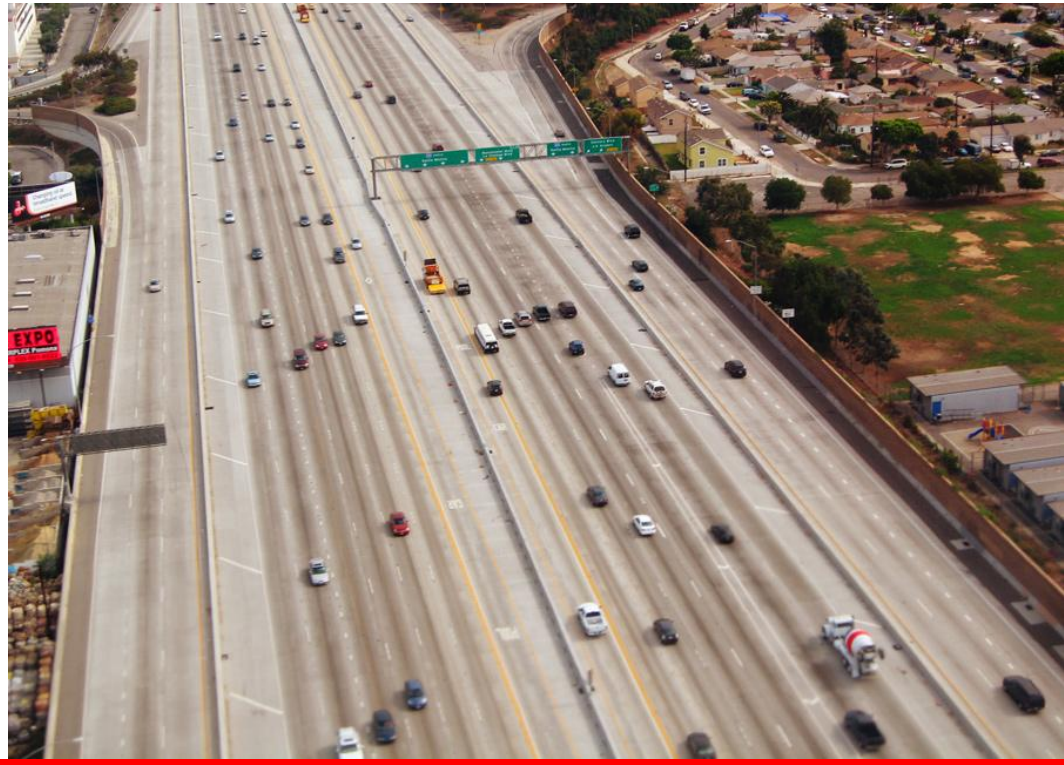
	MySQL 5.1	MySQL 5.1/Plugin	MySQL 5.5
Read Intensive	1.41	1.11	0.75
Write Intensive	1.98	1.47	1.02
Mixed	1.65	1.26	0.86

Multiple Rollback Segments

- ***5.1**: 1 Rollback Segment can handle up to 1023 concurrent "write" transactions*
- ***5.5**: 128 Rollback Segments can handle up to 128k concurrent "write" transactions*

The Highway Analogy

- In **5.1**, the highway had 1 lane
- In **5.5**, the highway has 128 lanes
- Each lane can still handle up to 1023 cars per hour and cars run at the same speed, but 128 lanes can handle 128k cars per hour in total



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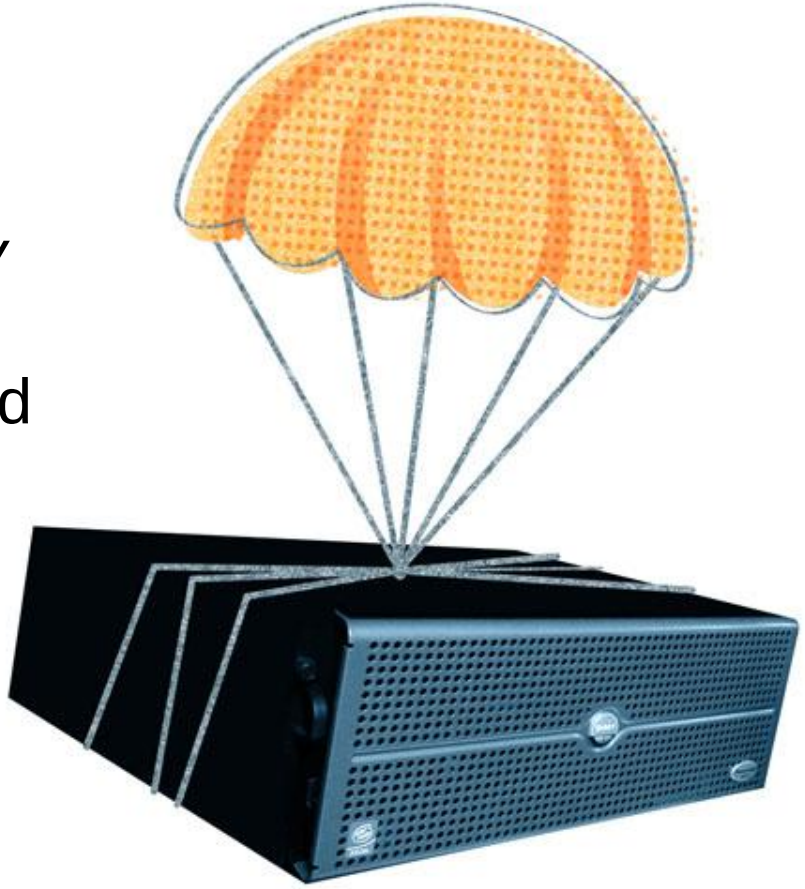
Improved Recovery Performance

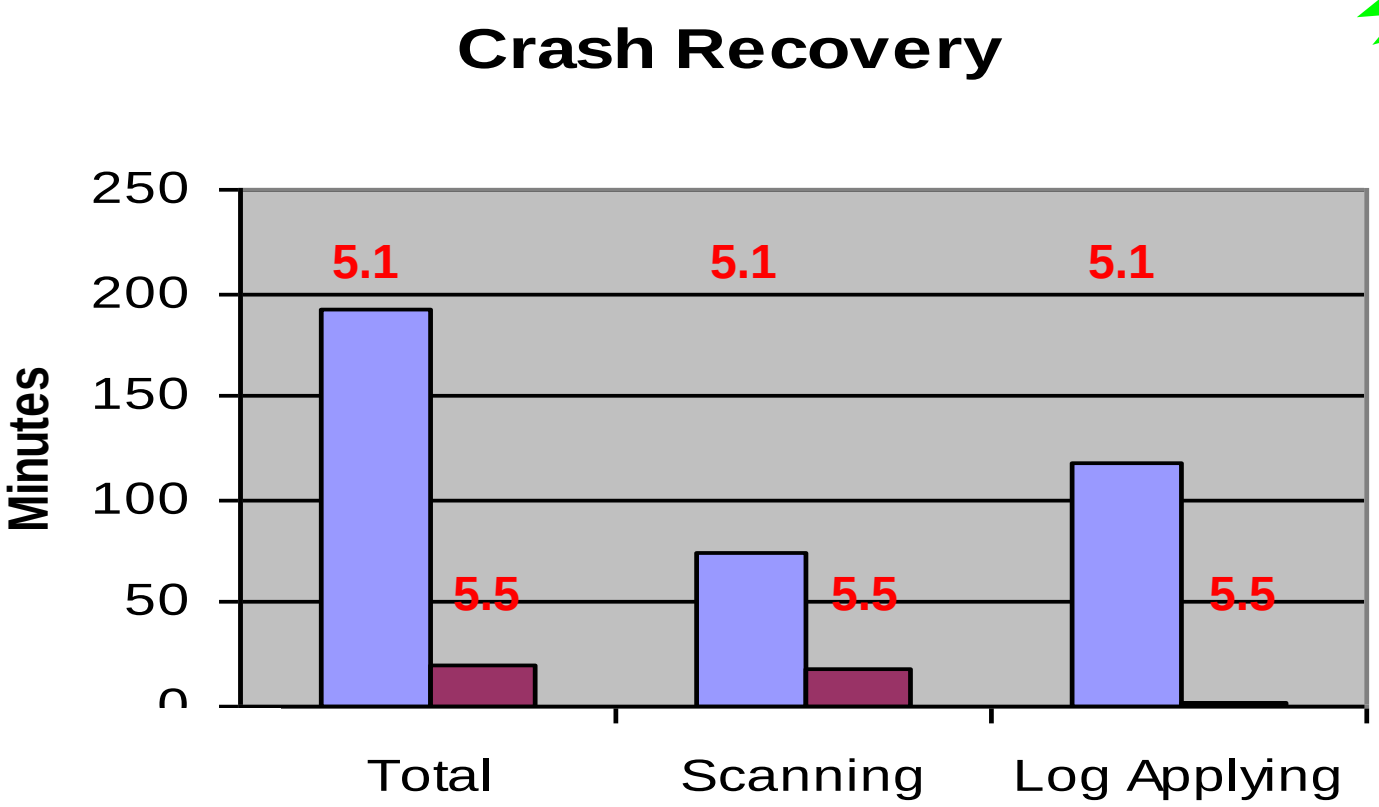
"Standard SysBench recovery improved from 7 hours to 14 minutes"

- In many circumstances, *recovery time* is *downtime*.
- Only MySQL Replication can avoid this situation, but it is not always applicable



Improved Recovery Performan

GA



> 10x recovery performance gain for MySQL 5.5 over 5.1

50 warehouses
Database=9800MB
Innodb_log_file_size=2x1950MB
Buffer_pool-12GB
Started tested, killed server@5 mins

Intel Xeon X7460 x86_64
4 CPU x 6 Cores/CPU
2.66 GHz, 32GB RAM
Fedora 10

What they are saying…

"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**

"I think that it's time to take Don MacAskill's praise of Percona last year ("great things are afoot") and pass it over to MySQL and InnoDB! "
-**Baron Schwartz**

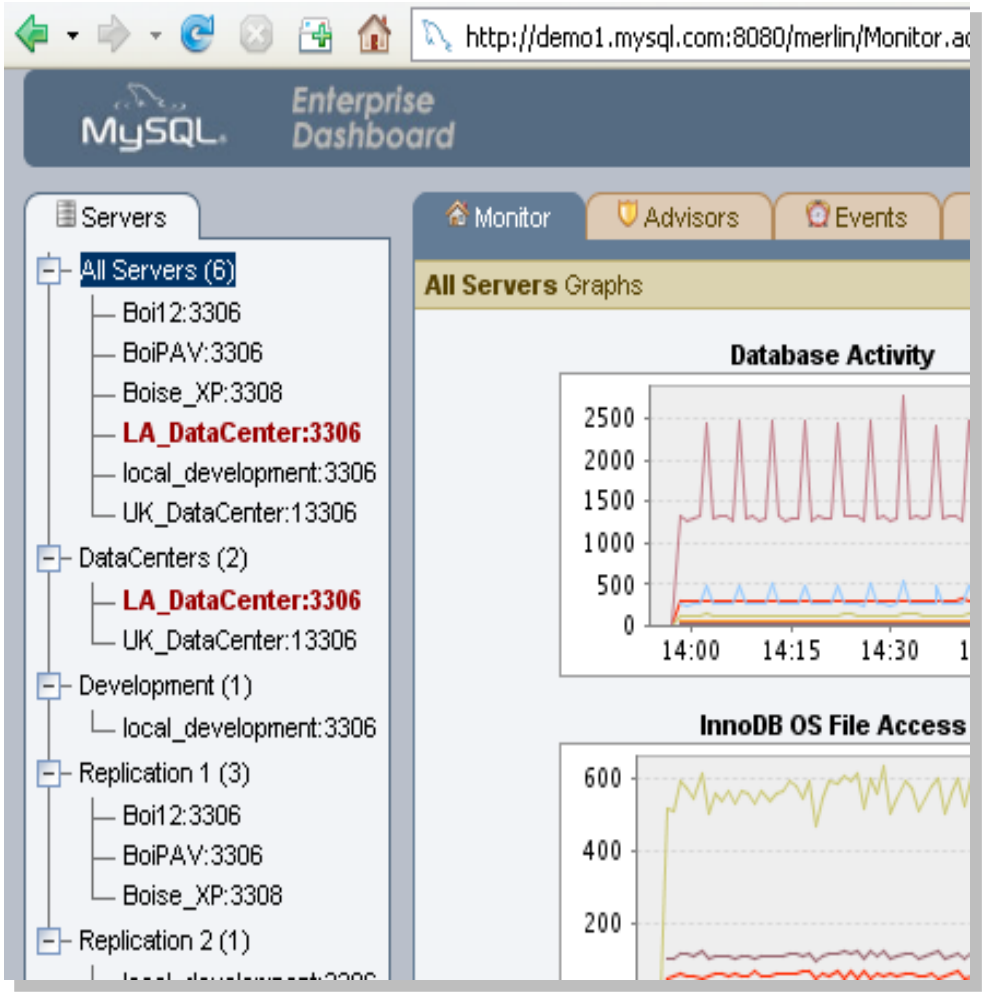
"My expectations for 5.5 were not high. I am pleasantly surprised!"
- Mark Callaghan, Facebook, MySQL UC Keynote

MySQL Enterprise Edition

MySQL Database 	•Reliability •Performance •Ease of Use
MySQL Enterprise Backup 	•Online “Hot” Backup •Full, Incremental, Partial Backups •Point in Time Recovery (PITR)
MySQL Enterprise Monitor 	•Global Monitoring of All Servers •Advisors with Best Practice Advice •MySQL Query Analyzer
MySQL Workbench 	•Database Design •SQL Development •MySQL Administration
Oracle Premier Support 	• Online Knowledge Base • 24x7 Problem Resolution • Consultative Support

MySQL Enterprise Monitor

- ***Single, consolidated view into entire MySQL environment***
- ***Auto-discovery of MySQL servers, replication topologies***
- ***Customizable rules-based monitoring and alerts***
- ***Query monitoring and analysis***
- ***Identifies problems before they occur***
- ***Reduces risk of downtime***
- ***Makes it easier to scale out without requiring more DBAs***



A Virtual MySQL DBA Assistant!

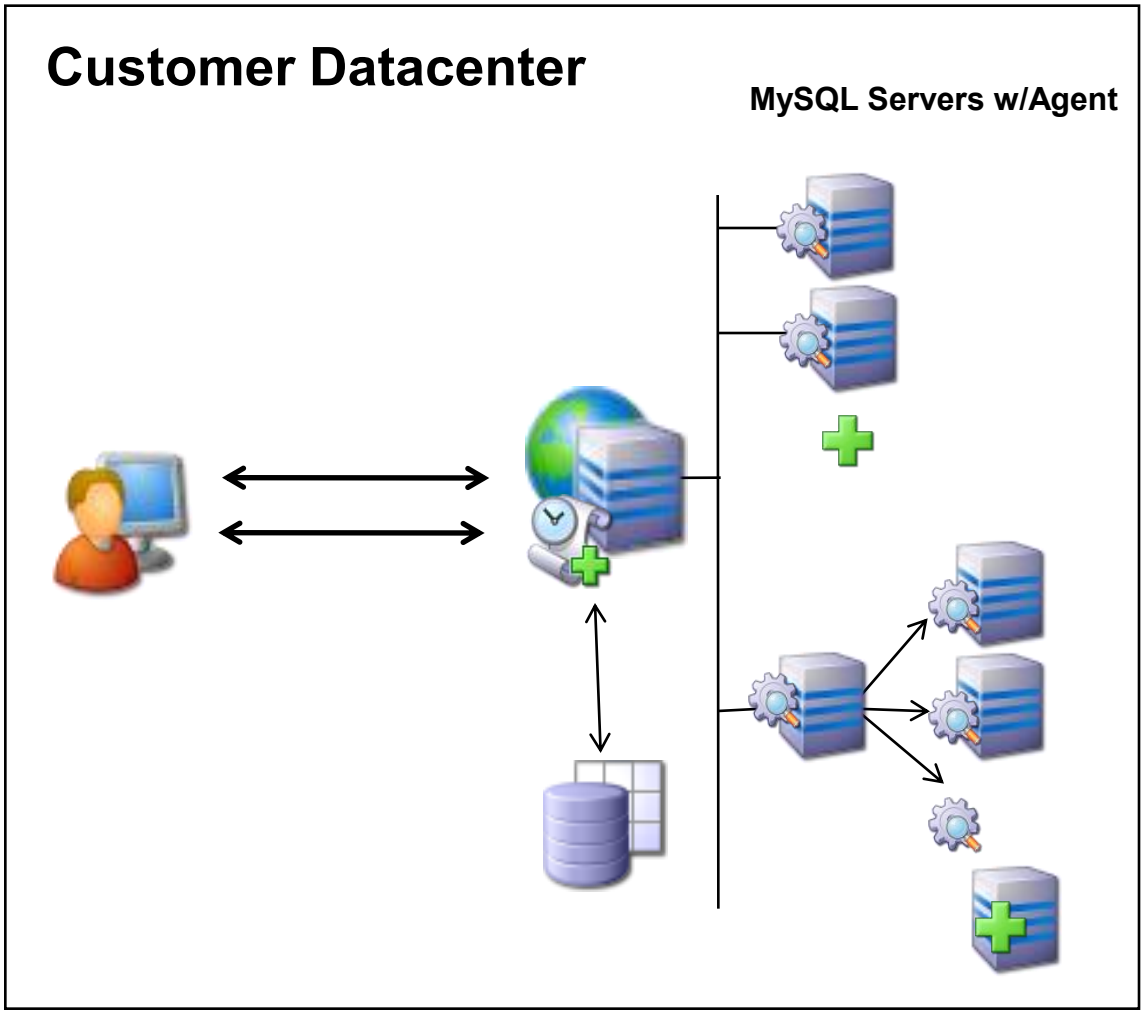
Enterprise Monitor Architecture

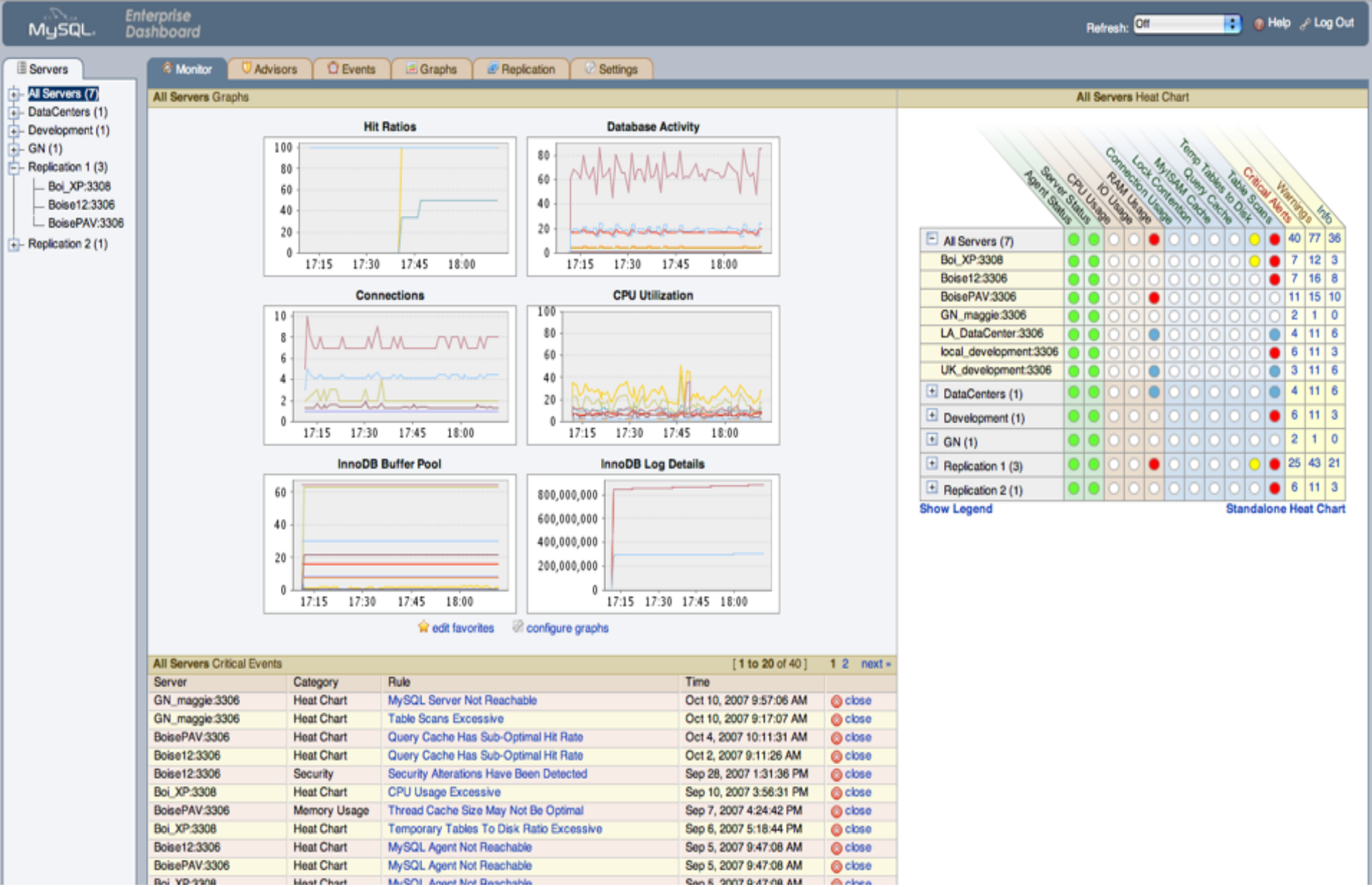
Service Agent written in C and supports all MySQL Enterprise platforms

Service Manager written in Java servlets exposed as web services. Supports Linux, Solaris, Mac OSX and Microsoft Windows

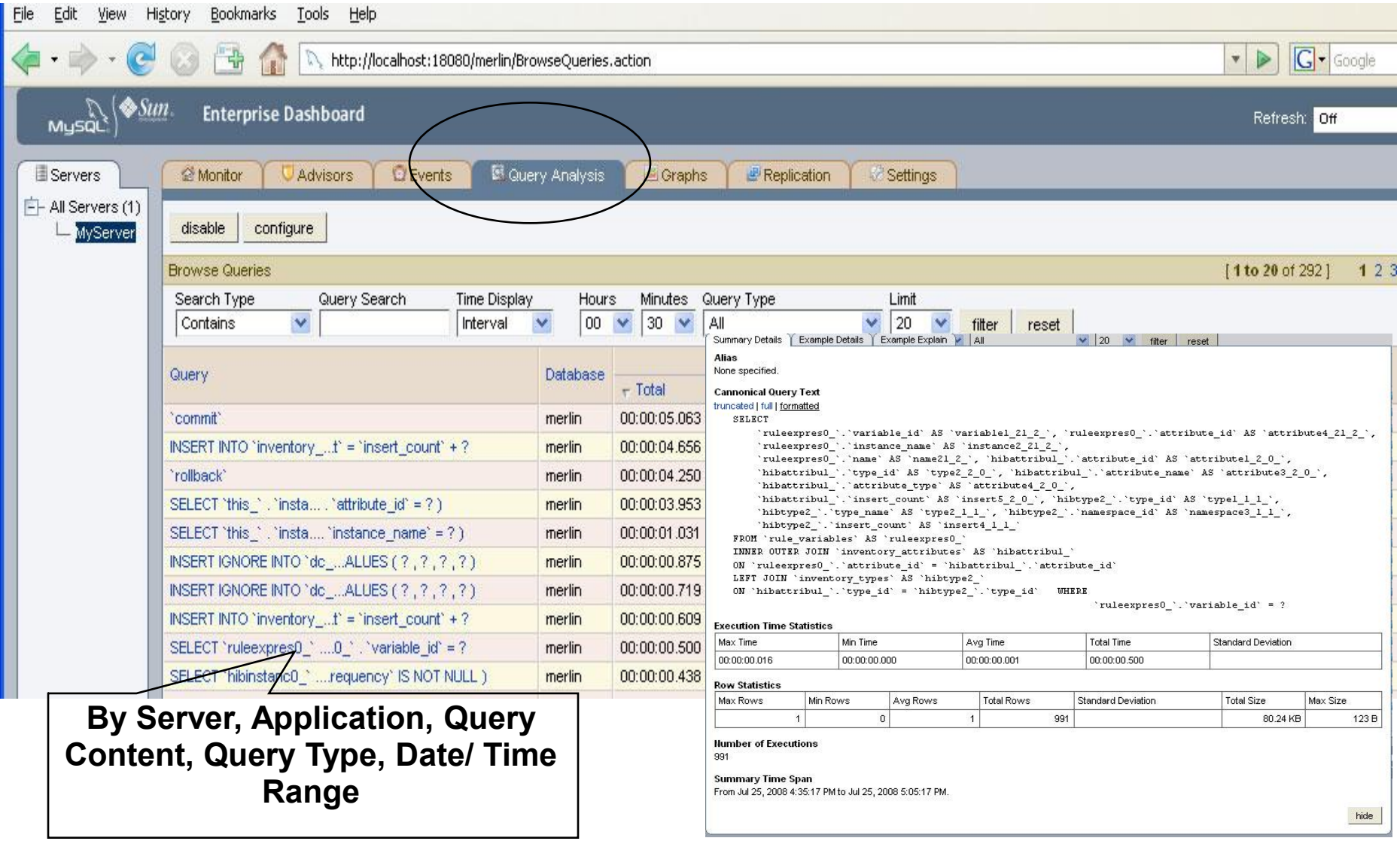
Enterprise Dashboard
Web-based, written in JSP

Repository holds historical performance data for analysis



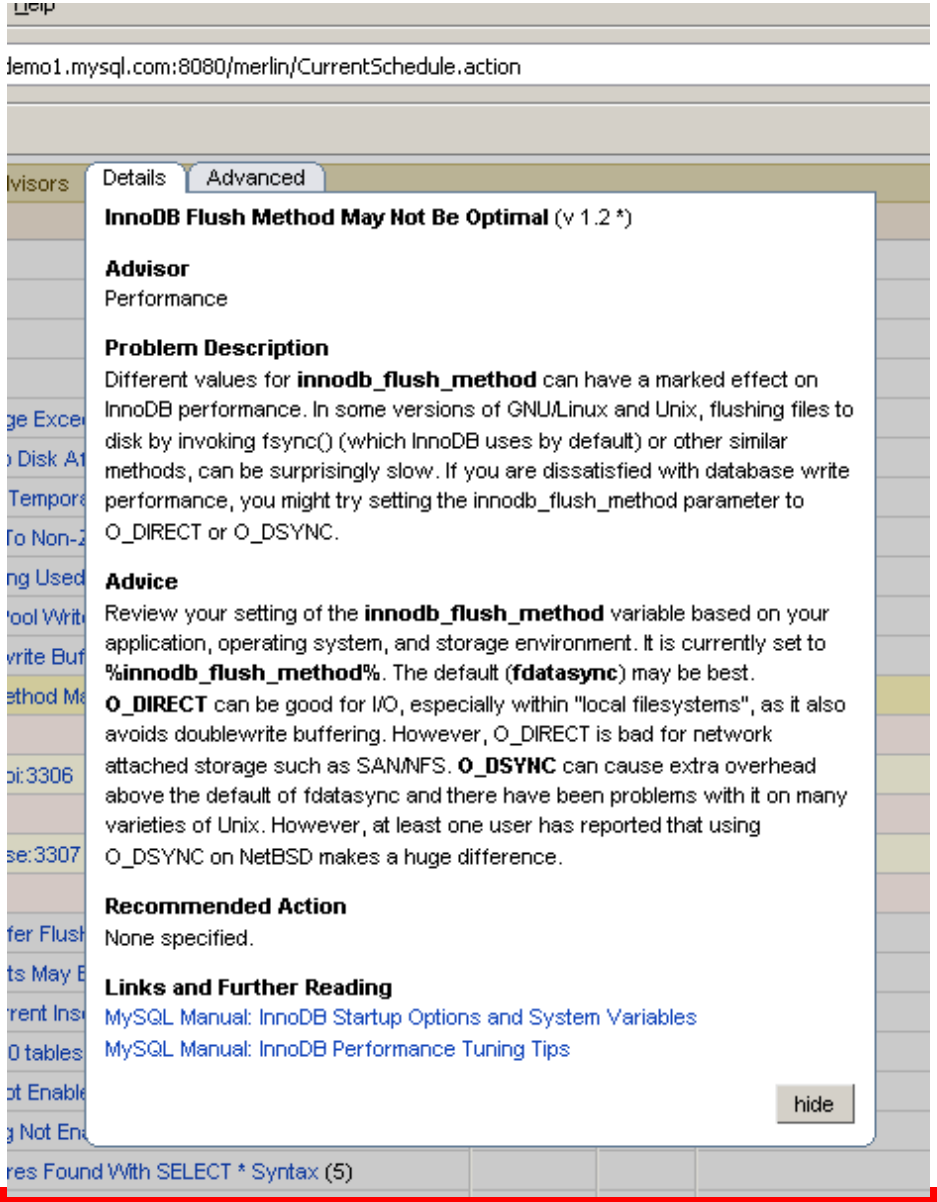

MySQL Enterprise Dashboard
Refresh: Off
Help
Log Out
Servers
All Servers (7)
DataCenters (1)
Development (1)
GN (1)
Replication 1 (3)
Boi_XP:3308
Boise12:3306
BoisePAV:3306
Replication 2 (1)
Monitor
Advisors
Events
Graphs
Replication
Settings
All Servers Graphs
Hit Ratios
Database Activity
Connections
CPU Utilization
InnoDB Buffer Pool
InnoDB Log Details
edit favorites
configure graphs
All Servers Heat Chart
Server Status
Agent Status
CPU Usage
IO Usage
RAM Usage
Connection Usage
Lock Contention
MyISAM Cache
Query Cache
Temp Tables to Disk
Table Scans
Critical Alerts
Warnings
Info
All Servers (7) 40 77 36
Boi_XP:3308 7 12 3
Boise12:3306 7 16 8
BoisePAV:3306 11 15 10
GN_maggie:3306 2 1 0
LA_DataCenter:3306 4 11 6
local_development:3306 6 11 3
UK_development:3306 3 11 6
DataCenters (1) 4 11 6
Development (1) 6 11 3
GN (1) 2 1 0
Replication 1 (3) 25 43 21
Replication 2 (1) 6 11 3
Show Legend
Standalone Heat Chart
All Servers Critical Events
[1 to 20 of 40]
1 2 next »
Server | Category | Rule | Time
GN_maggie:3306 | Heat Chart | MySQL Server Not Reachable | Oct 10, 2007 9:57:06 AM | close
GN_maggie:3306 | Heat Chart | Table Scans Excessive | Oct 10, 2007 9:17:07 AM | close
BoisePAV:3306 | Heat Chart | Query Cache Has Sub-Optimal Hit Rate | Oct 4, 2007 10:11:31 AM | close
Boise12:3306 | Heat Chart | Query Cache Has Sub-Optimal Hit Rate | Oct 2, 2007 9:11:26 AM | close
Boise12:3306 | Security | Security Alterations Have Been Detected | Sep 28, 2007 1:31:36 PM | close
Boi_XP:3308 | Heat Chart | CPU Usage Excessive | Sep 10, 2007 3:56:31 PM | close
BoisePAV:3306 | Memory Usage | Thread Cache Size May Not Be Optimal | Sep 7, 2007 4:24:42 PM | close
Boi_XP:3308 | Heat Chart | Temporary Tables To Disk Ratio Excessive | Sep 6, 2007 5:18:44 PM | close
Boise12:3306 | Heat Chart | MySQL Agent Not Reachable | Sep 5, 2007 9:47:08 AM | close
BoisePAV:3306 | Heat Chart | MySQL Agent Not Reachable | Sep 5, 2007 9:47:08 AM | close

MySQL Query Analyzer

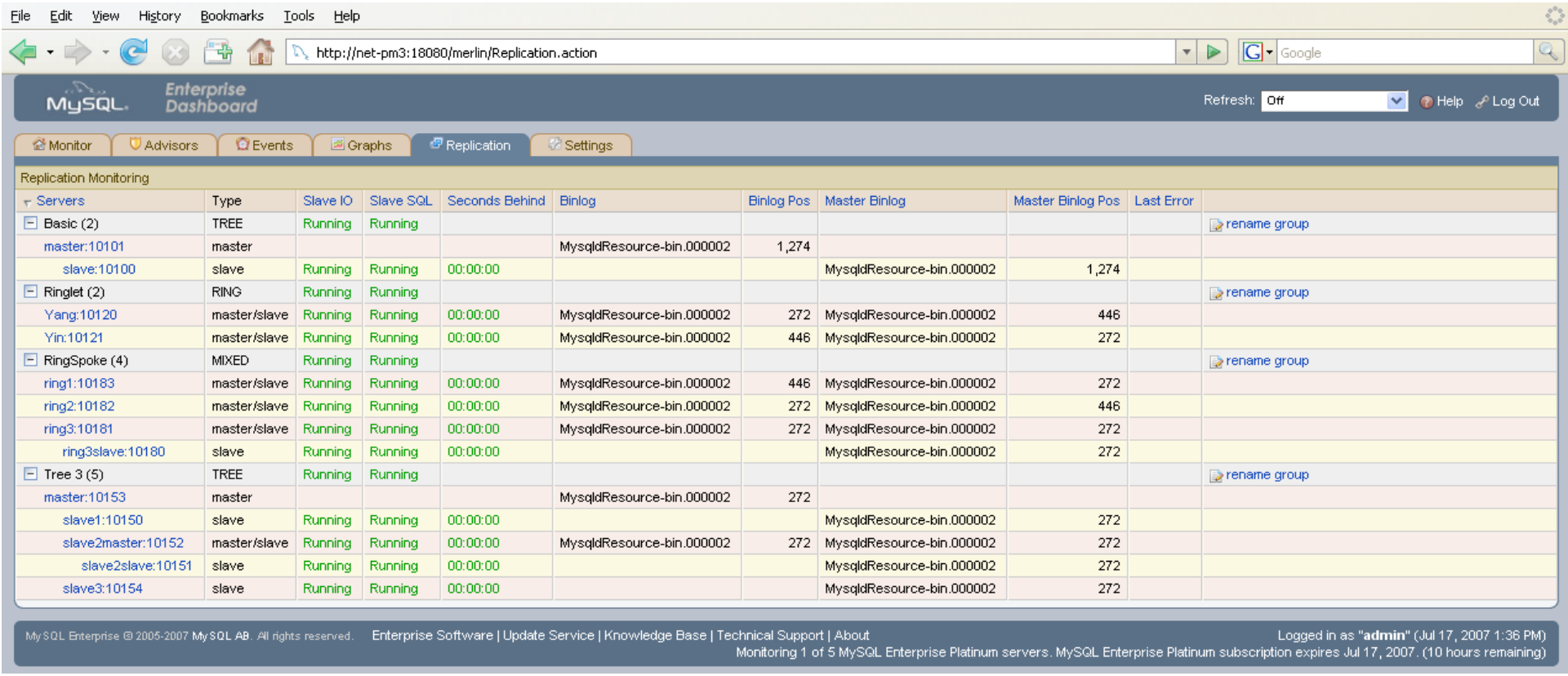


By Server, Application, Query Content, Query Type, Date/ Time Range

Built-In Knowledgebase



MySQL Replication Monitor



Makes it easier to scale out with MySQL

Auto-detects and groups master/slave relationships

Saves DBA time collecting master/slave status info from command line

MySQL Enterprise Backup

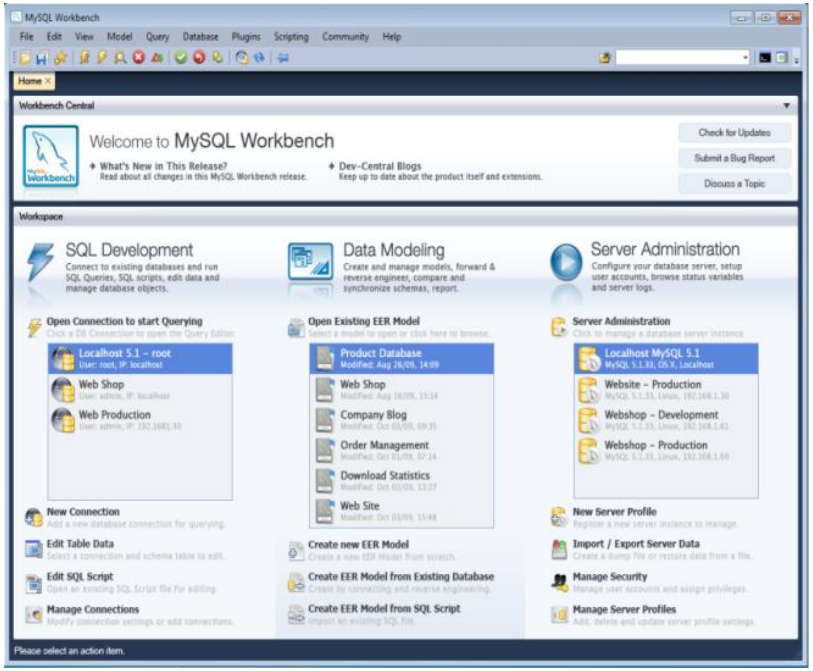
- *Formerly "InnoDB Hot Backup"*
- *Online Backup for InnoDB*
- *Full, Incremental, Partial Backups*
- *Compressed Backup*
- *Point in Time Recovery (PITR)*
- *High Performance*
- *Unlimited Database Size*
- *Cross-Platform (Windows, Linux, Unix)*

MySQL Backup Types: Comparison

	mysqldump	LVM Snapshots	MySQL Replication	MySQL Enterprise Backup
Full Backup	✔	✔	✔	✔
Incremental Backups	✖	✔	✖	✔
Partial Backups	✔	✖	✖	✔
Compression Support	✖	✖	✖	✔
Allows updates	✖	✖	✔	✔
Point in Time - Consistent	✖	✔	✔	✔
Backup Speed	Poor	Good	Very Good	Very Good
Recovery Speed	Very Poor	Good	Very Good	Very Good
Partial Restore	✔	✖	✖	✔
Corruption Detection	✔	✖	✖	✔
Meets Regulatory Archive Req.	✔	✖	✖	✔
Supports DDL	✔	✖	✖	✔

MySQL Workbench

- ***SQL Development***
  - *SQL Editor - Color Syntax Highlighting*
  - *Object Management - Import/Export, Browser, Edit*
  - *Connection Management - Wizard, SSH Tunnel*
  - *Multi-Pane Results View, In-grid data edits*
- ***Database Administration***
  - *Status, Configuration, Start/Stop, Replication*
  - *Users, Security, Session Management*
  - *Import/Export Dump Files*
- ***Data Modelling***
  - *Visual Design*
  - *Forward/Reverse Engineer*



MySQL Training and Certification

- Public and Private Courses
  - Customized Solutions
  - Live Virtual Training via web
  - Delivery Available Globally
- Role Based Curriculum
  - DBA & Developer
  - Hands-On Labs
- Advanced Topic Courses
  - Performance Tuning, High Availability
- Industry Recognized Certifications
  - DBA, Developer, Cluster
- World Class Instructors and Materials
  - Authorized Training from “the Source”
- Learn More at oracle.com/education/mysql

MySQL Editions: Features

Features	New MySQL Editions		
	Standard SE	Enterprise EE	Cluster CGE
MySQL Database	✔	✔	✔
MySQL Connectors	✔	✔	✔
MySQL Replication	✔	✔	✔
MySQL Partitioning		✔	✔
MySQL Workbench SE	✔	✔	✔
Storage Engine: MyISAM	✔	✔	✔
Storage Engine: InnoDB	✔	✔	✔
Storage Engine: NDB			✔
MySQL Enterprise Monitor		✔	✔
MySQL Enterprise Backup		✔	✔
MySQL Cluster Manager			✔
MySQL Cluster Geo-Replication			✔

✔ Only available in select Commercial Editions

MySQL Support: Features

Features	MySQL Lifetime Support		
	Premier (Years 1-5)	Extended (Years 6-8)	Sustain (Years 9+)
24x7 Support	✔	✔	✔
Unlimited Support Incidents	✔	✔	✔
Knowledge Base	✔	✔	✔
Maintenance Releases, Bug Fixes, Patches, Updates	✔	✔	**Pre-Existing only**
MySQL Consultative Support	✔	✔	✔

- **Support is based on LifeCycle (Years since product GA)**
  - Years 1-5: Premier Support
  - Years 6-8: Extended Support
  - Years 9+: Sustaining Support

MySQL Pricing: Subscriptions

Product	Per Server (1-4 Sockets)	Per Server (5+ Sockets)
	Subscription (Per Year)	Subscription (Per Year)
MySQL Standard Edition	**$2,000**	**$4,000**
MySQL Enterprise Edition	**$5,000**	**$10,000**
MySQL Cluster CGE	**$10,000**	**$20,000**

- **Subscriptions (SE, EE and CGE)**
  - Includes Commercial Term License, Support, Software, Maintenance, Fixes, Updates
  - End-users must use Subscriptions for SE, EE, CGE

- **Metric: Server (Two Server Sizes)**
  - Commodity Server: 1-4 Sockets (most popular for MySQL deployments)
  - Big Server: 5+ Sockets

ISVs/OEMs/VARs: For pricing contact the MySQL Embedded Sales Team

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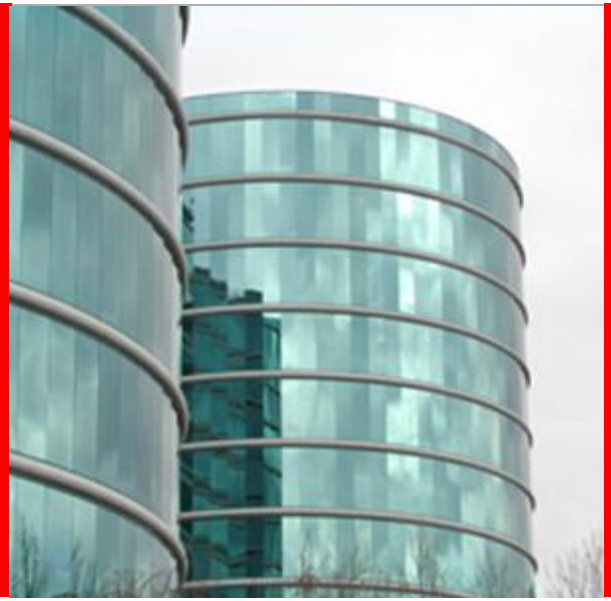

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MySQL 5.5