# The State of The Dolphin
 "Real innovation and
   advantage of MySQL"

Ryusuke Kajiyama
MySQL Sales Consulting Manager
MySQL Global Business Unit

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.

BEST IN CLASS
COMPONENTS
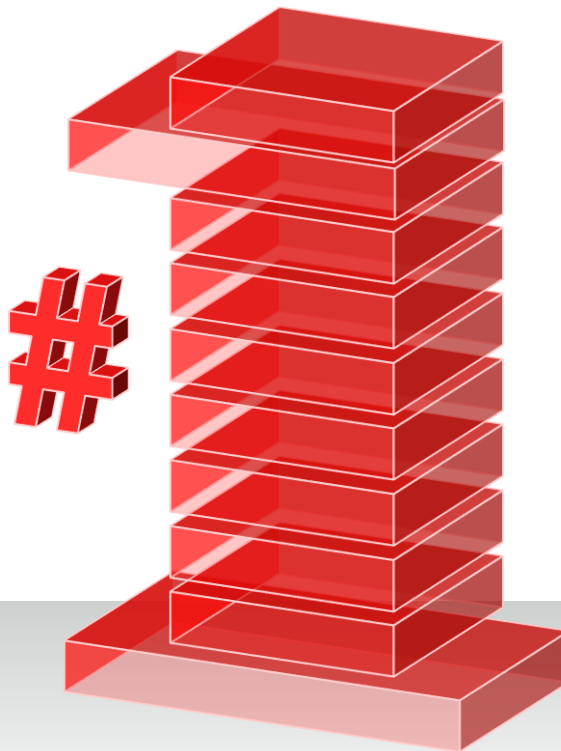
MySQL: Next Generation Web Applications
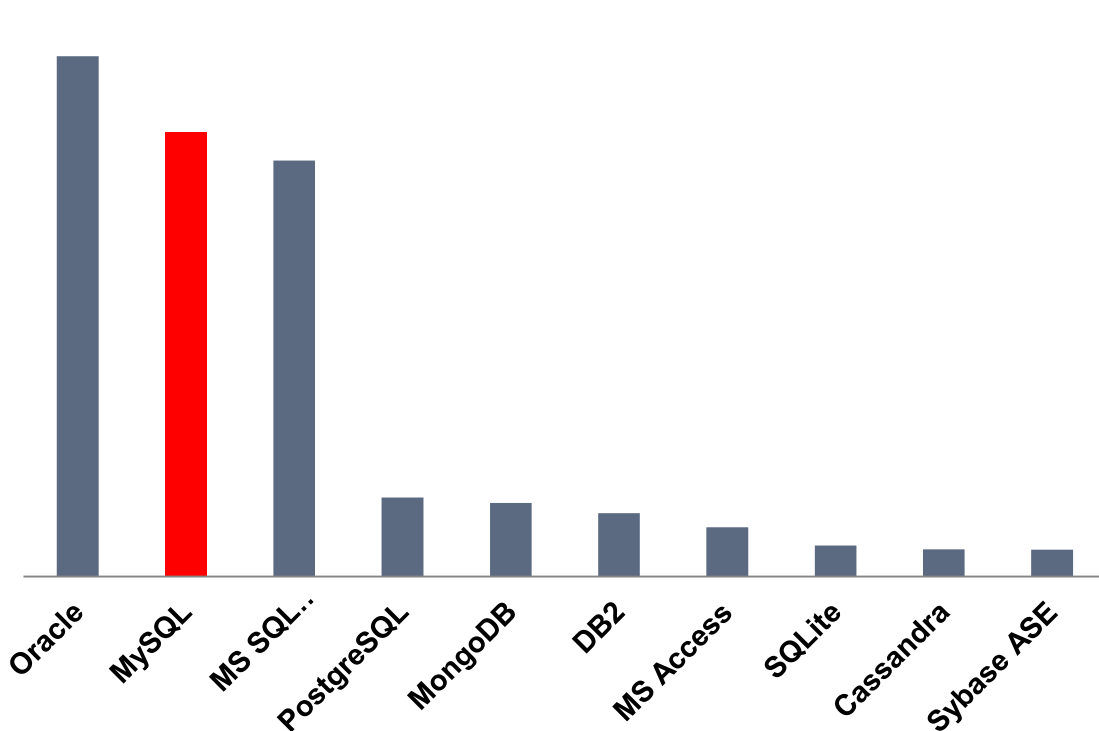On-Premises, in the Cloud, Distributed Applications

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The world's most popular open source database
According to DB-Engines

MySQL is No.1 open
source database
- – Discussion
- – Mentions
- – Interests
- – Job & Specialist

http://db-engines.com/en/

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1,000+ customers in Korea

Driving MySQL Innovation: 2010 - 2014

MySQL Enterprise Monitor 2.2

MySQL Cluster 7.1

MySQL Cluster Manager 1.0

MySQL Workbench 5.2

MySQL Database 5.5

MySQL Enterprise Backup 3.5

MySQL Enterprise Monitor 2.3

MySQL Cluster Manager 1.1

MySQL Enterprise Backup 3.7

All GA!

Oracle VM Template for MySQL

Oracle Products Certifications

MySQL Windows Installer

MySQL Enterprise Security

MySQL Enterprise Scalability

MySQL Cluster 7.2

MySQL Cluster Manager 1.3

MySQL Utilities 1.0.6

MySQL Workbench 6.0

All GA!

MySQL Enterprise Backup 3.10

MySQL Enterprise Audit

MySQL Windows Tools

MySQL Database 5.6

MySQL Cluster 7.3

MySQL Workbench 6.1

All GA!

MySQL Fabric 1.4 RC

MySQL Database 5.7 DMR

Available Now!

*Development Milestone Release

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MySQL 5.6: GA 15 Months Ago – Best GA Ever

IMPROVED PERFORMANCE AND SCALABILITY
- Scales to 48 CPU Threads
- Up to 230% performance gain over MySQL 5.5

IMPROVED INNODB
- Better transactional throughput and availability

IMPROVED OPTIMIZER
- Faster query execution and diagnostics for query tuning and debugging

IMPROVED REPLICATION
- Higher performance, availability and data integrity

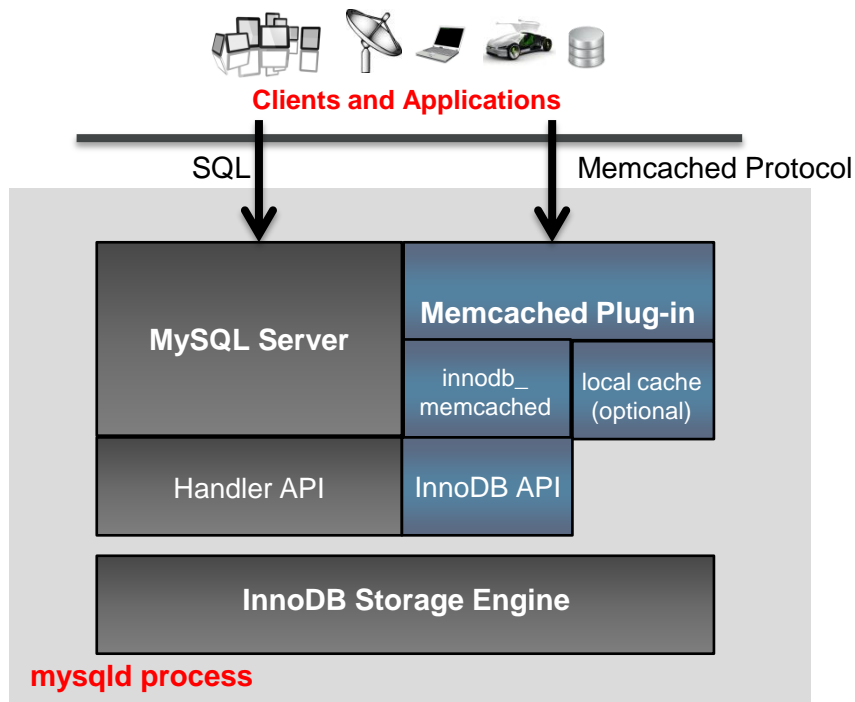**IMPROVED PERFORMANCE SCHEMA**
- Better Instrumentation, User/Application level statistics and monitoring
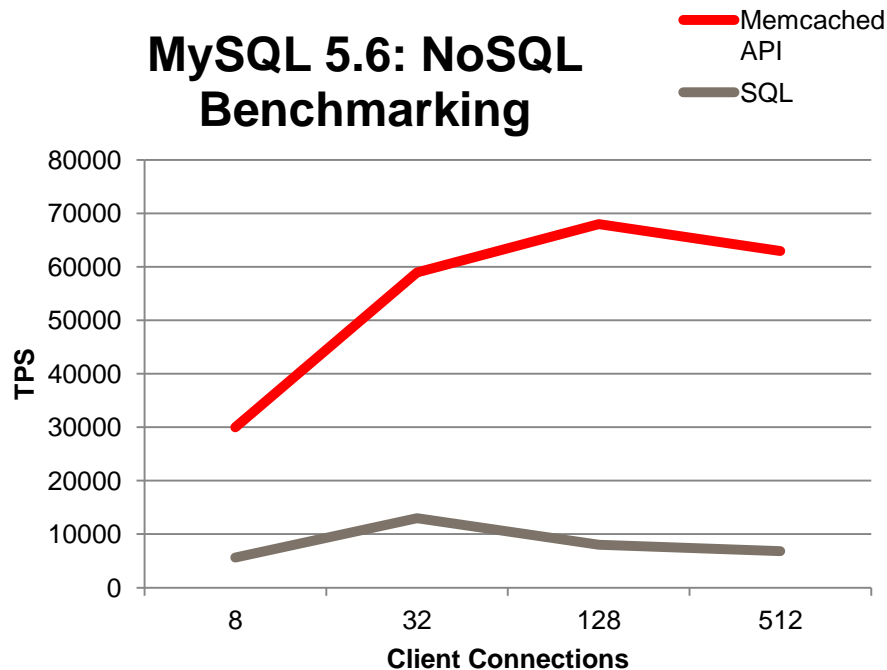
New! NoSQL ACCESS TO INNODB
- Fast, Key Value access with full ACID compliance, better developer agility

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MySQL 5.6 - InnoDB NoSQL API

Best of Both Worlds

Clients and Applications

SQL   Memcached Protocol

MySQL Server

Memcached Plug-in

innodb_memcached

local cache (optional)

Handler API

InnoDB API

InnoDB Storage Engine

mysqld process

MySQL 5.6: NoSQL Benchmarking

Memcached API

SQL

TPS

80000
70000
60000
50000
40000
30000
20000
10000
0

8   32   128   512

Client Connections

Up to 9x Higher "SET / INSERT" Throughput

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The largest MySQL websites

APPLICATION

Facebook is a social networking site that connects people with friends and others who work, study and live around them.

KEY BUSINESS BENEFIT

MySQL has enabled facebook to grow to 1 billion users.

WHY MySQL?

"We are one of the largest MySQL web sites in production. MySQL has been a revolution for young entrepreneurs."

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Welcome, WebScaleSQL!

Thank You, Facebook, Google, LinkedIn & Twitter!

- Investment to improve MySQL for Web Scale

- Great news for the MySQL Community & new developers

- Even easier for Oracle to continue close cooperation

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From FAQ of WebScaleSQL

Q: What source code is WebScaleSQL based on?

A: WebScaleSQL is currently based on Oracle's publicly available MySQL 5.6 Community release.

Q: Is this a fork of Oracle's MySQL Community release?

A: No. As long as the MySQL community releases continue, we are committed to remaining a branch – and not a fork – of MySQL that's focused specifically on the challenges of deploying MySQL at our scale.

Q: Why didn't you base this on MariaDB, Percona Server, Drizzle, etc....

A: We reached a consensus that MySQL-5.6 was the right choice for this, as it has the production-ready features we need to operate at scale, and the features planned for MySQL-5.7 seem like a fitting path forward for us. We will continue to revisit this decision as the ecosystem evolves.

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The Open Road to MySQL 5.6

Predictable Releases for the MySQL Community, Allowing Feedback

DMR1* April 2011	DMR2 Oct 2011	DMR3 Dec 2011	DMR4 April 2012	DMR5 Aug 2012	RC Nov 2012
Optimizer:	**Optimizer:**	**Optimizer:**	**Optimizer:**	**InnoDB:**	**New Server Defaults**
MRR, ICP, File Sort	BKA, New EXPLAIN, Traces	Sub-Queries	JSON EXPLAIN, Sub-Queries	TT, Online DDL, Memcached API	
InnoDB:	**InnoDB:**	**InnoDB:**	**Replication:**	**Replication:**	**More Partitioning**
Split Kernel Mutex, MT Purge	Dump/Restore Buffer Pool	Full Text Index, Read-Only Optimizations	GTIDs	Binary Log Group Commit	
Replication:					**More GTID, TT**
Crash-Safe, Multi-Thread Slave, Checksums	**More P_S**	**Condition Handling**	**TIMESTAMP & DATESTAMP**	**Password Mgmt**	
Memcached API					
New P_S			**More P_S**		
Partitioning Improvements		**Fractional Seconds**		**More Partitioning**	

*Development Milestone Release

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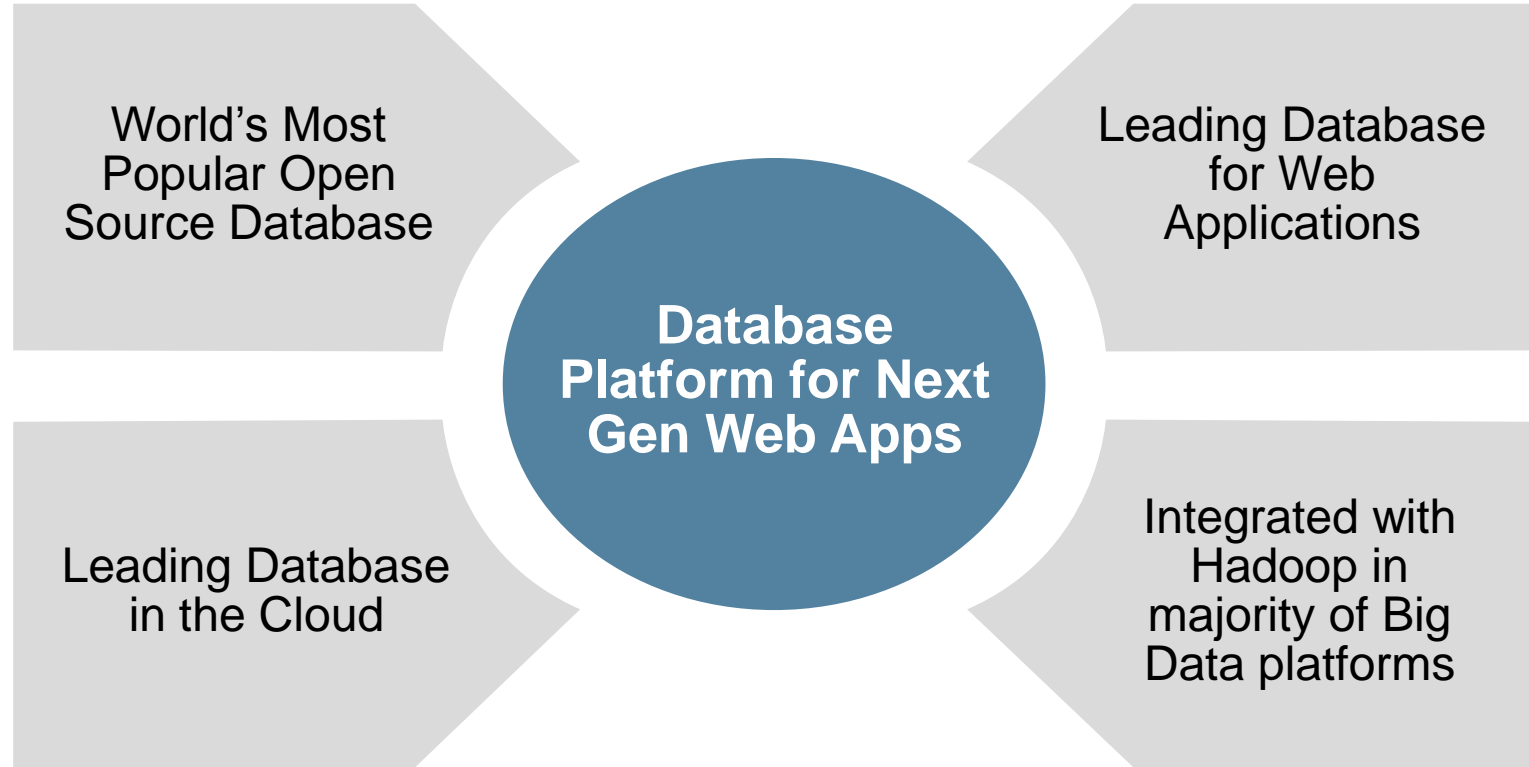# MySQL Makes Sense for Oracle

- Complete Solutions

- Best of Breed at Every Level

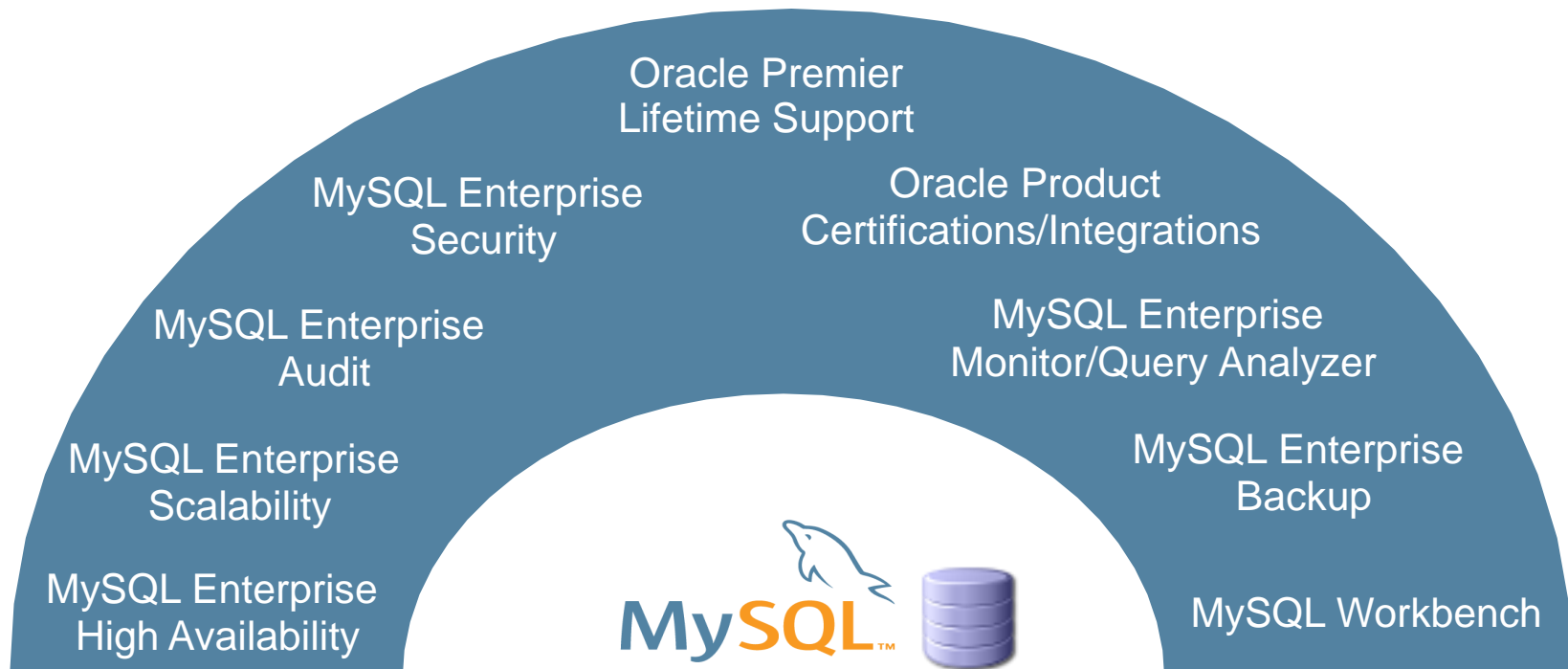- On Premise and in the Cloud

- MySQL: Web, Mobile & Embedded

Applications
Middleware
Database
Operating System
Virtual Machine
Servers
Storage

Confidential - Oracle Internal Use Only

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MySQL: Everywhere and Growing

Platform for Next Generation Web, Cloud & Embedded Applications

World's Most Popular Open Source Database

Leading Database for Web Applications

Database Platform for Next Gen Web Apps

Leading Database in the Cloud

Integrated with Hadoop in majority of Big Data platforms

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MySQL Enterprise Edition
Highest Levels of Security, Performance, and Availability

Oracle Premier
Lifetime Support

Oracle Product
Certifications/Integrations

MySQL Enterprise
Security

MySQL Enterprise
Monitor/Query Analyzer

MySQL Enterprise
Audit

MySQL Enterprise
Scalability

MySQL Enterprise
Backup

MySQL Enterprise
High Availability

MySQL Workbench

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MySQL Enterprise Monitor 3.0

- 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

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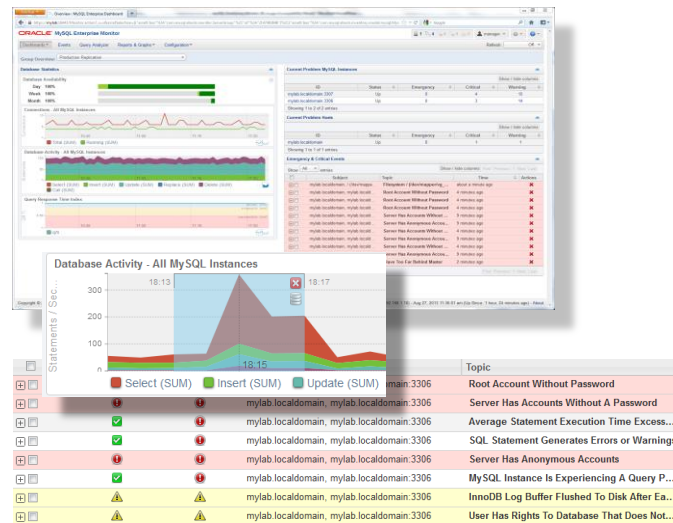
MySQL Query Analyzer

- Real-time query performance

- Visual correlation graphs

- Find & fix expensive queries

- Detailed query statistics

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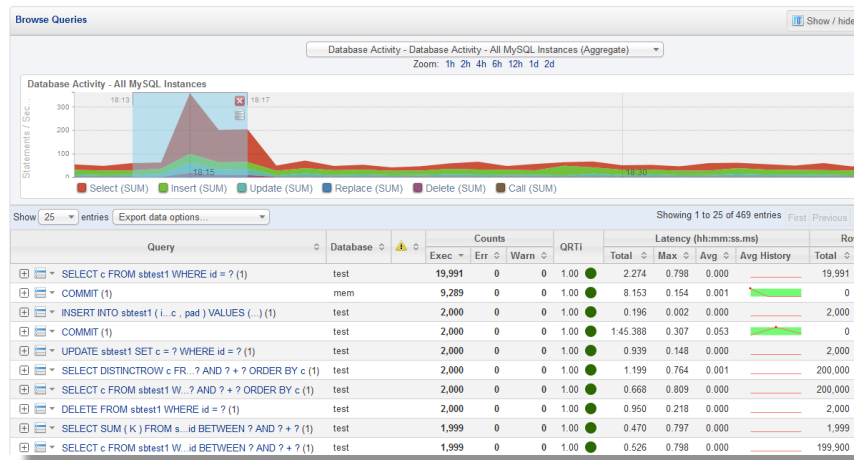
"With the MySQL Query Analyzer, we were able to identify and analyze problematic SQL code, and triple our database performance. More importantly, we were able to accomplish this in three days, rather than taking weeks."

Keith Souhrada
Software Development Engineer
Big Fish Games

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MySQL Technology Updates

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DMRs: Development Milestone Releases

- Fully Functional Release Candidate Quality

- Two to Four per Year

- Early Community Testing, Use, & Feedback

- Accelerates Rate of Enhancements

- Improves Quality

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# MySQL 5.7: DMR 4

MySQL 5.7 builds on MySQL 5.6 by improving:

- **InnoDB** for better transactional throughput, availability, IO
- **Replication** for better scalability and availability
- **Utilities** for dev/ops automation
- **Performance Schema** for better performance metrics
- **Optimizer** for better EXPLAINing, query performance, enhanced buffering and partition optimization
- **Connecting** at higher rates, improve session efficiency

Available Now! Get it here: dev.mysql.com/downloads/mysql/

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MySQL 5.7 Sysbench Benchmark

Sysbench Point Select

630,000 QPS
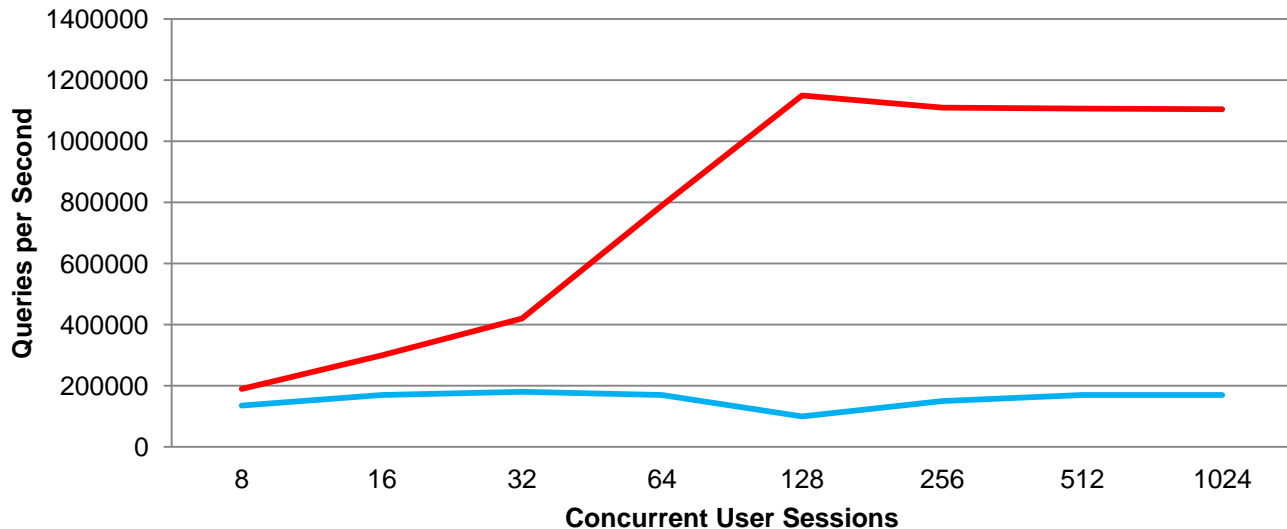

MySQL 5.7: SysBench Read Only (Point Select)
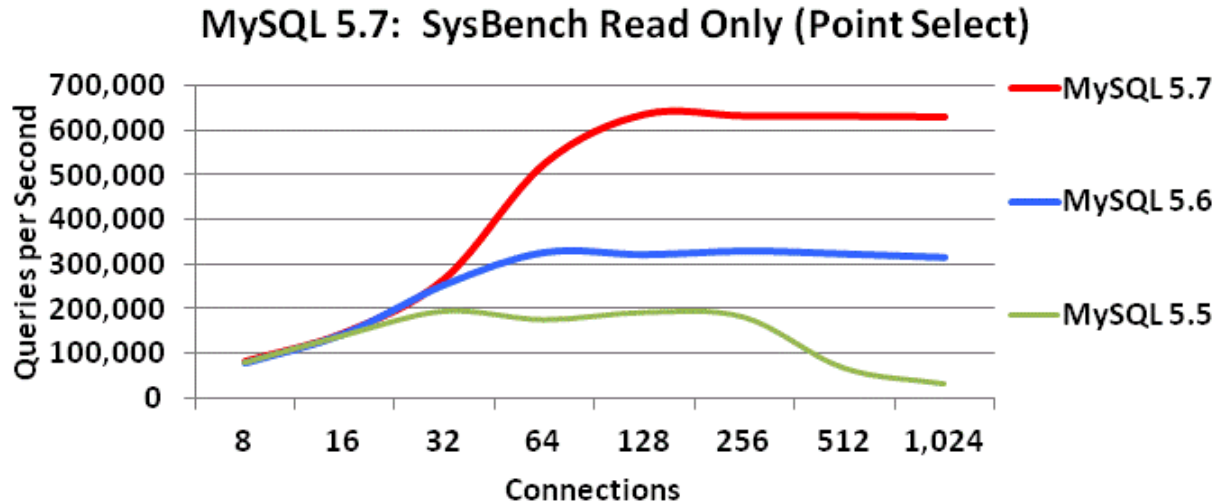
Intel(R) Xeon(R) CPU X7560 x86_64
5 sockets x 8 cores-HT (80 CPU threads)
2.27GHz, 256G RAM
Oracle Linux 6.5

2X Faster than MySQL 5.6
Over 3X Faster than MySQL 5.5

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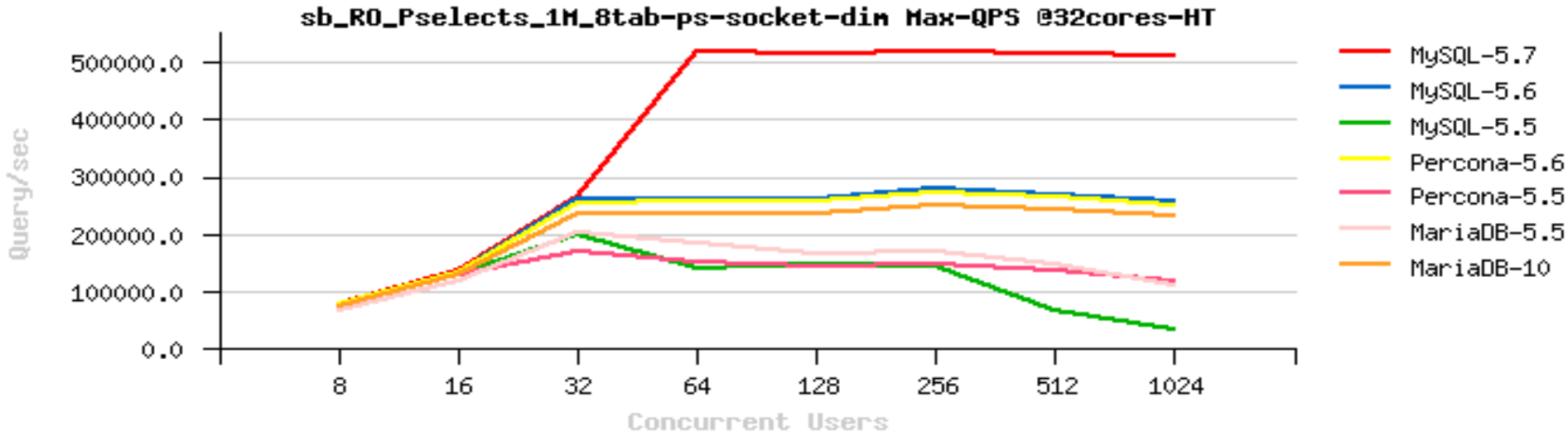# MySQL 5.7: InnoDB Memcached

MySQL's NoSQL API since MySQL 5.6

1,150,000 QPS

5.7.3
5.6

Intel(R) Xeon(R) CPU X7560 x86_64
8 sockets x 6 cores-HT (96 CPU threads)
2000Mhz, 256G RAM
Oracle Linux 6.2

6x Faster than MySQL 5.6
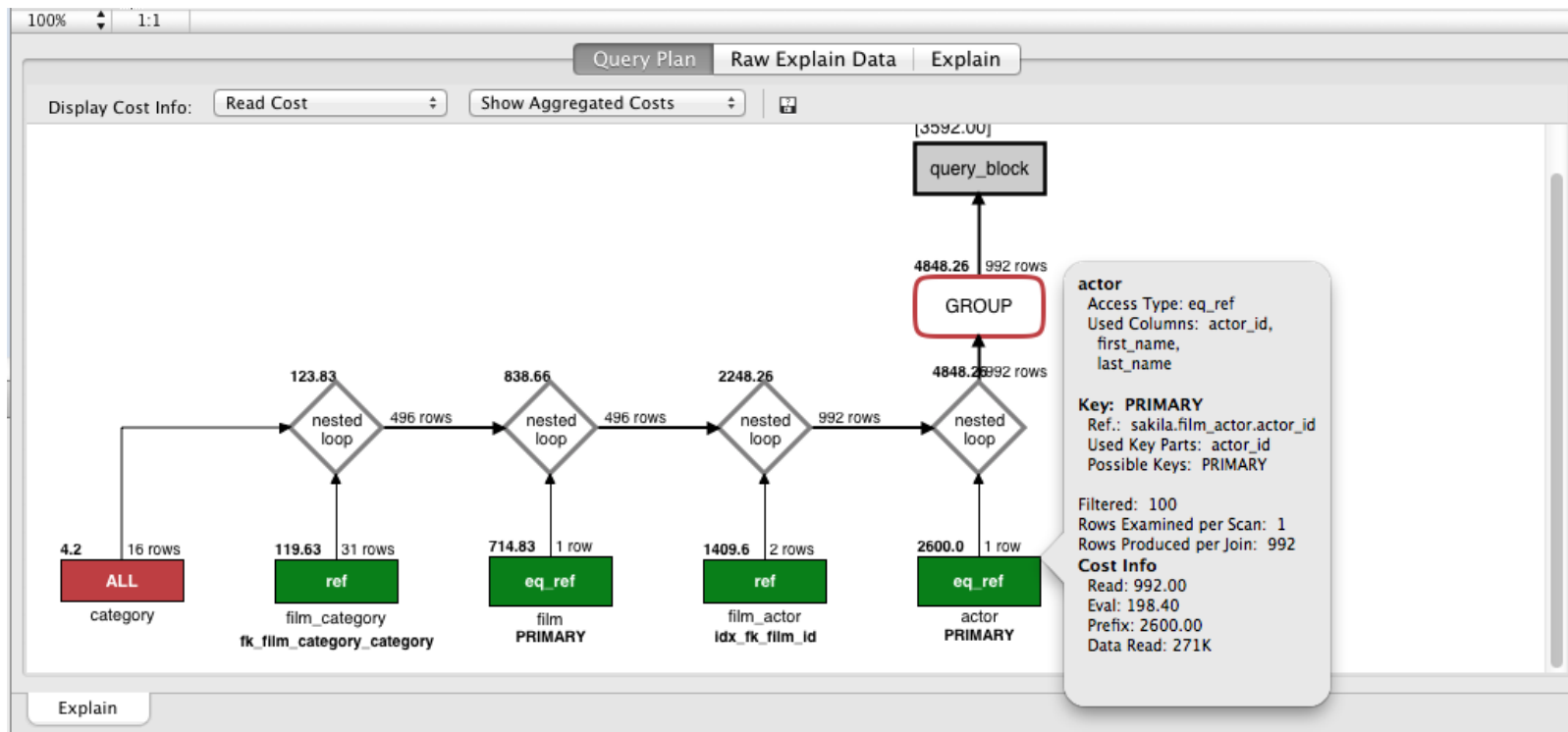
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Benchmark test MySQL 5.7

MySQL 5.7 is the fastest, MySQL 5.6 is the best option of today

http://dimitrik.free.fr/blog/archives/2014/04/mysql-57-just-rocks.html
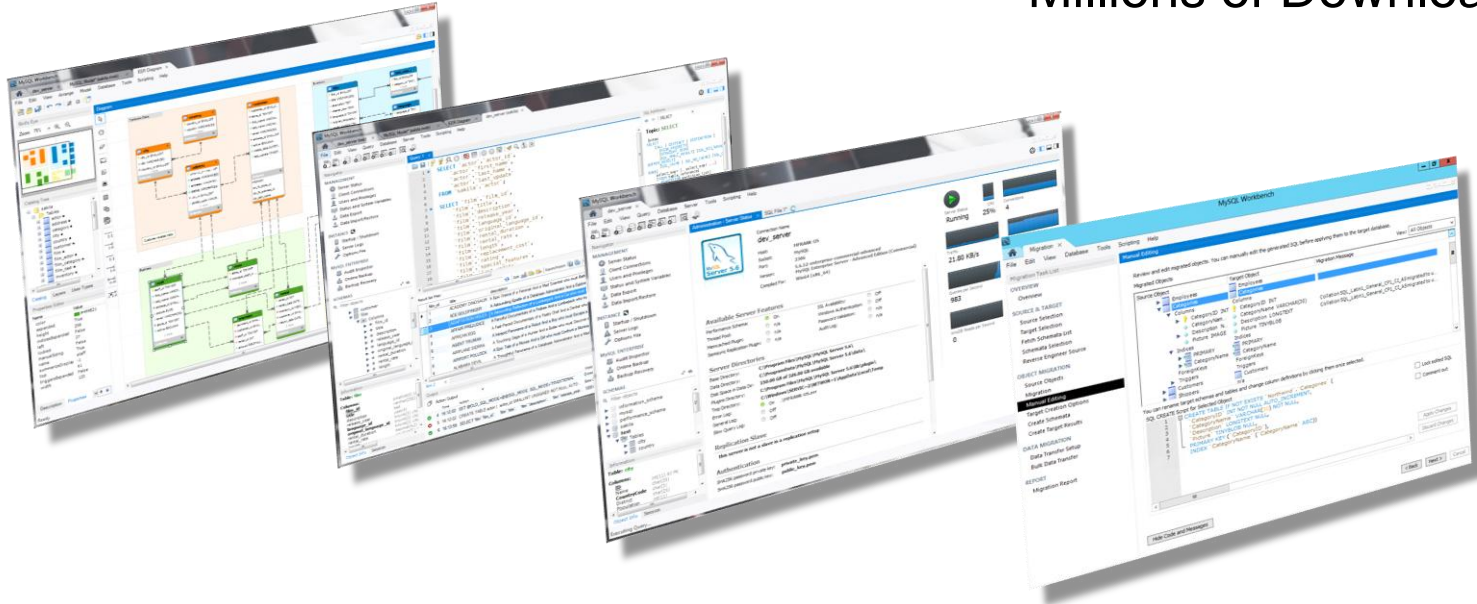
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MySQL 5.7.2: Optimizer
Expanded JSON EXPLAIN output

MySQL Workbench

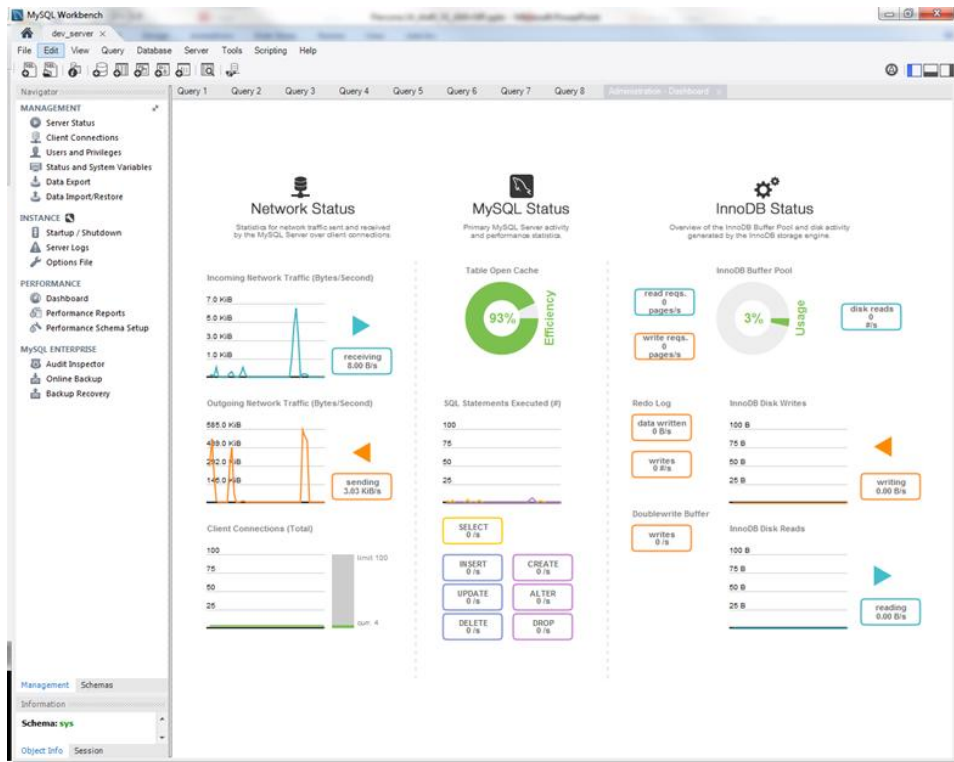Design, Develop, Administer, Migrate
Windows, Linux, Mac OS X

- MySQL Database IDE
- Millions of Downloads

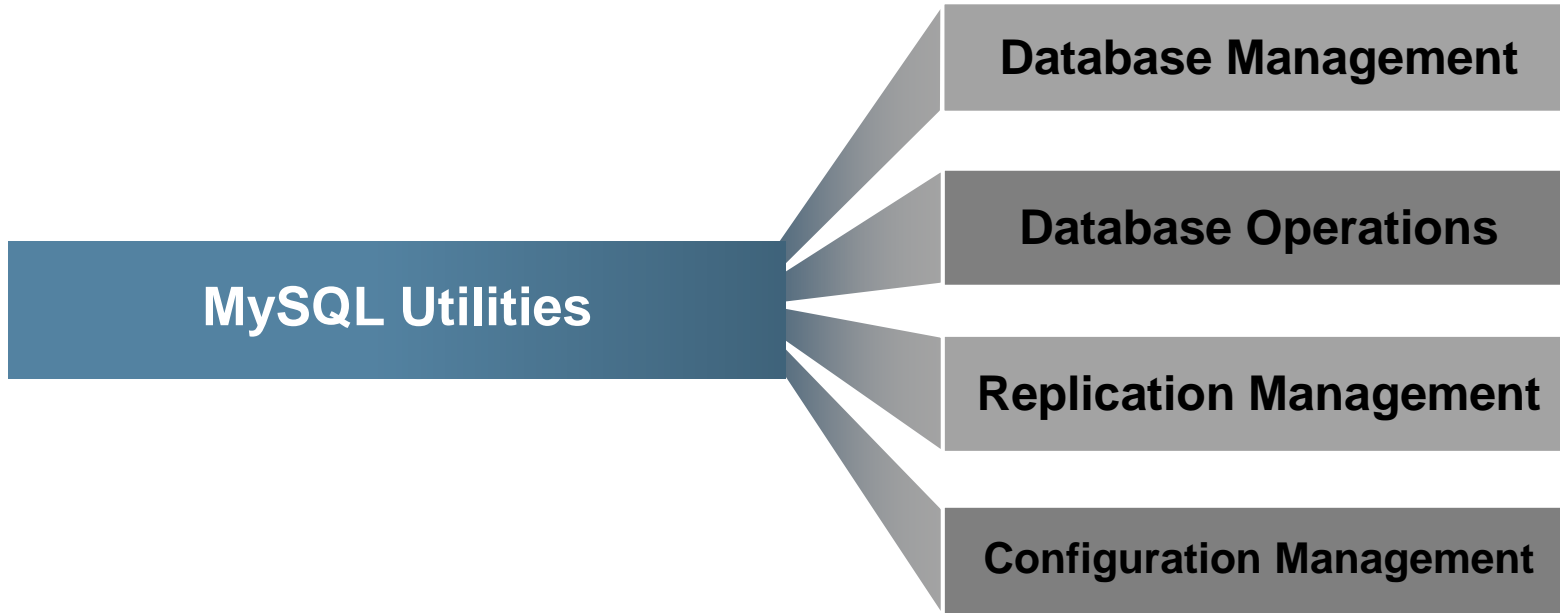ORACLE®

New! MySQL Workbench 6.1
Performance and Status Dashboards

- Performance Dashboard
  - Network, Server, InnoDB
- Performance Reports
  - Analyze hotspots
  - Costly SQL statements
  - Wait times, locks
  - InnoDB stats, and more

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MySQL Utilities

Python scripts for DevOps, GPL License

MySQL Utilities

- Database Management
- Database Operations
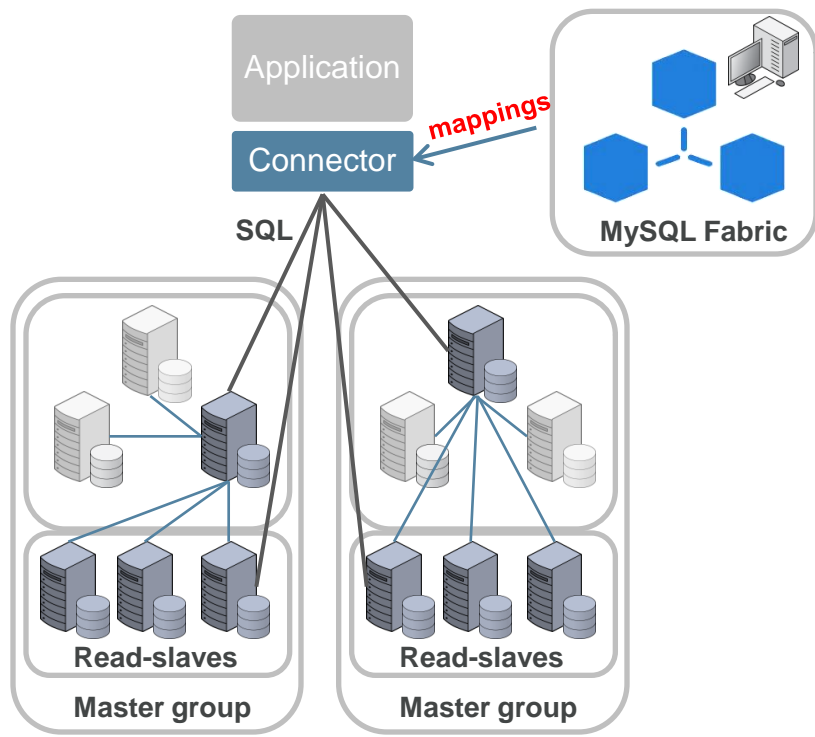- Replication Management
- Configuration Management

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MySQL Fabric

An extensible and easy-to-use **framework** for managing a farm of MySQL server supporting **high-availability** and **sharding**

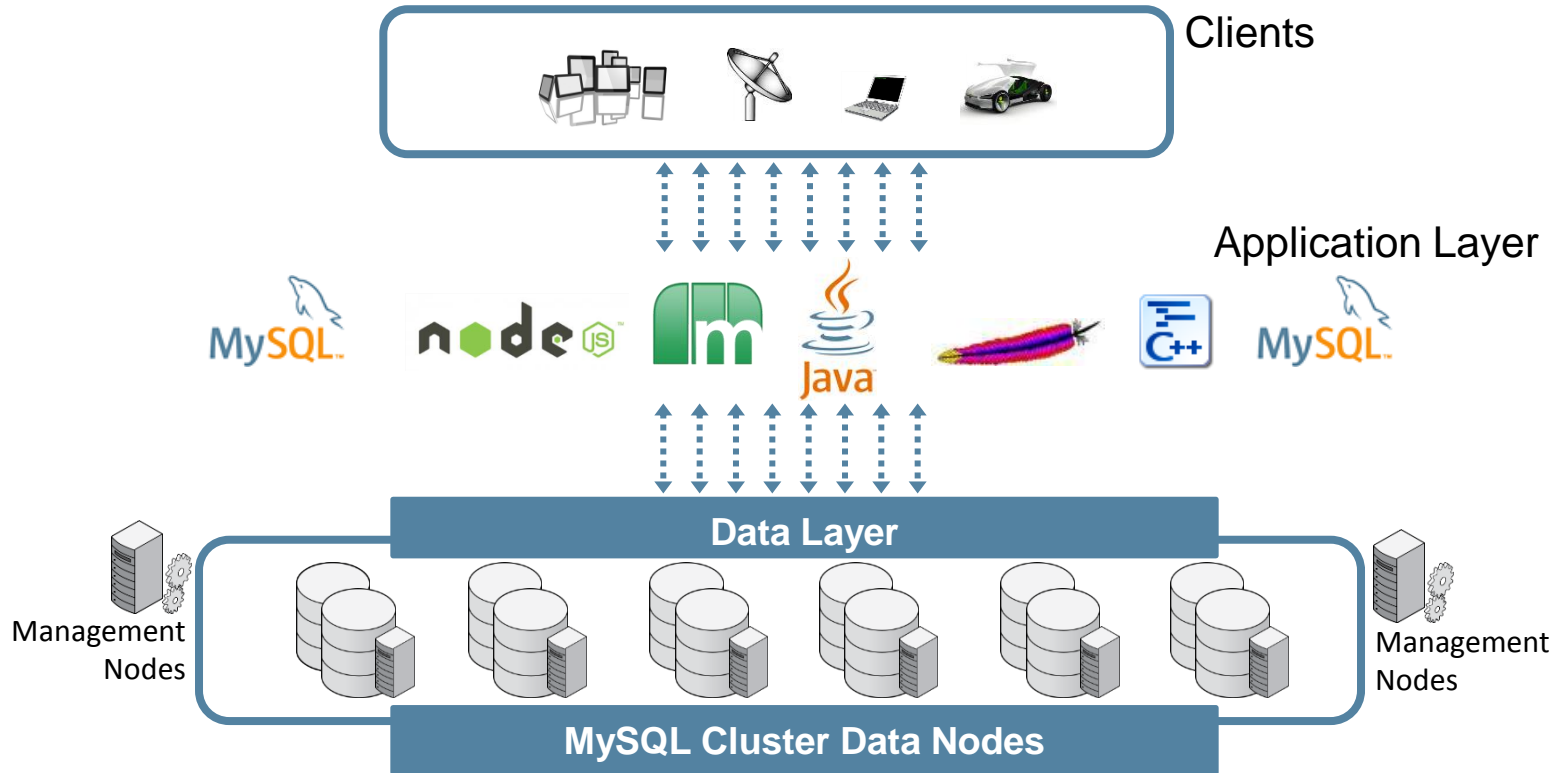ORACLE®

MySQL Fabric 1.4 RC

High Availability + Sharding-Based Scale-out

- High Availability:
  - Server monitoring with auto-promotion and transparent application failover
- Fabric-aware connectors rather than proxy: Python, Java & PHP
- Optionally scale-out through sharding
  - Application provides shard key
  - Range or Hash
  - Tools for resharding
  - Global updates & tables
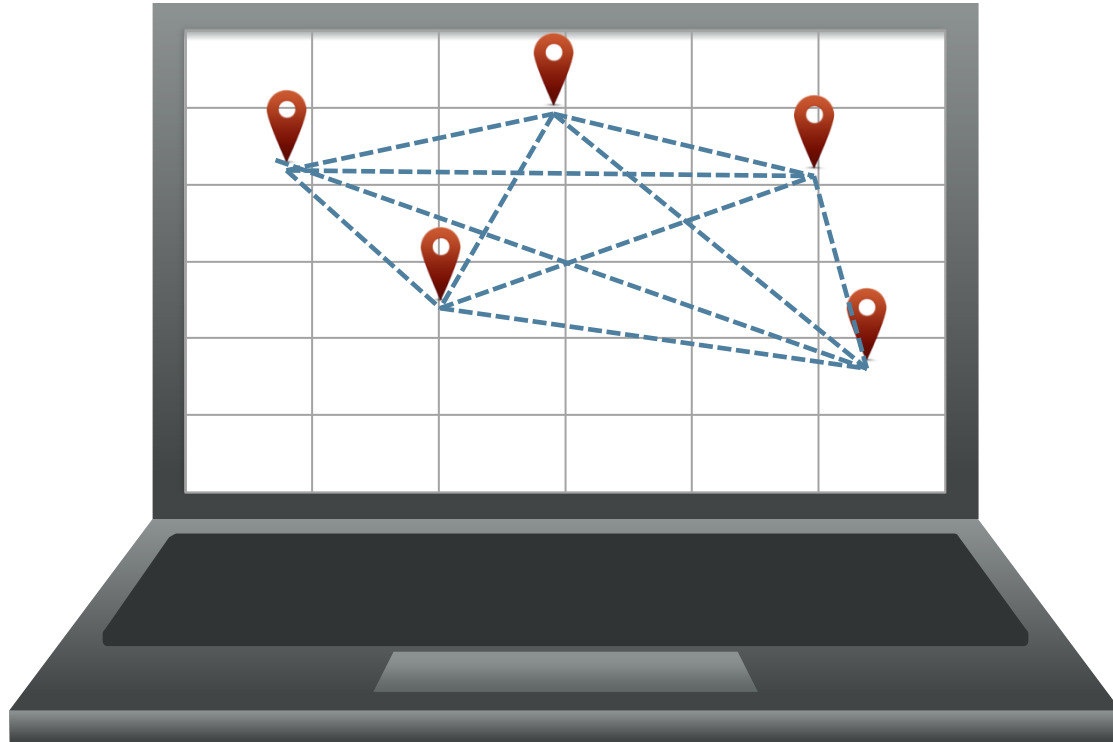- Available in MySQL Utilities 1.4.2 RC

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MySQL Cluster

Shared Nothing Active-Active Cluster & Transactional NoSQL

Clients

Application Layer

Data Layer

Management Nodes

Management Nodes

MySQL Cluster Data Nodes
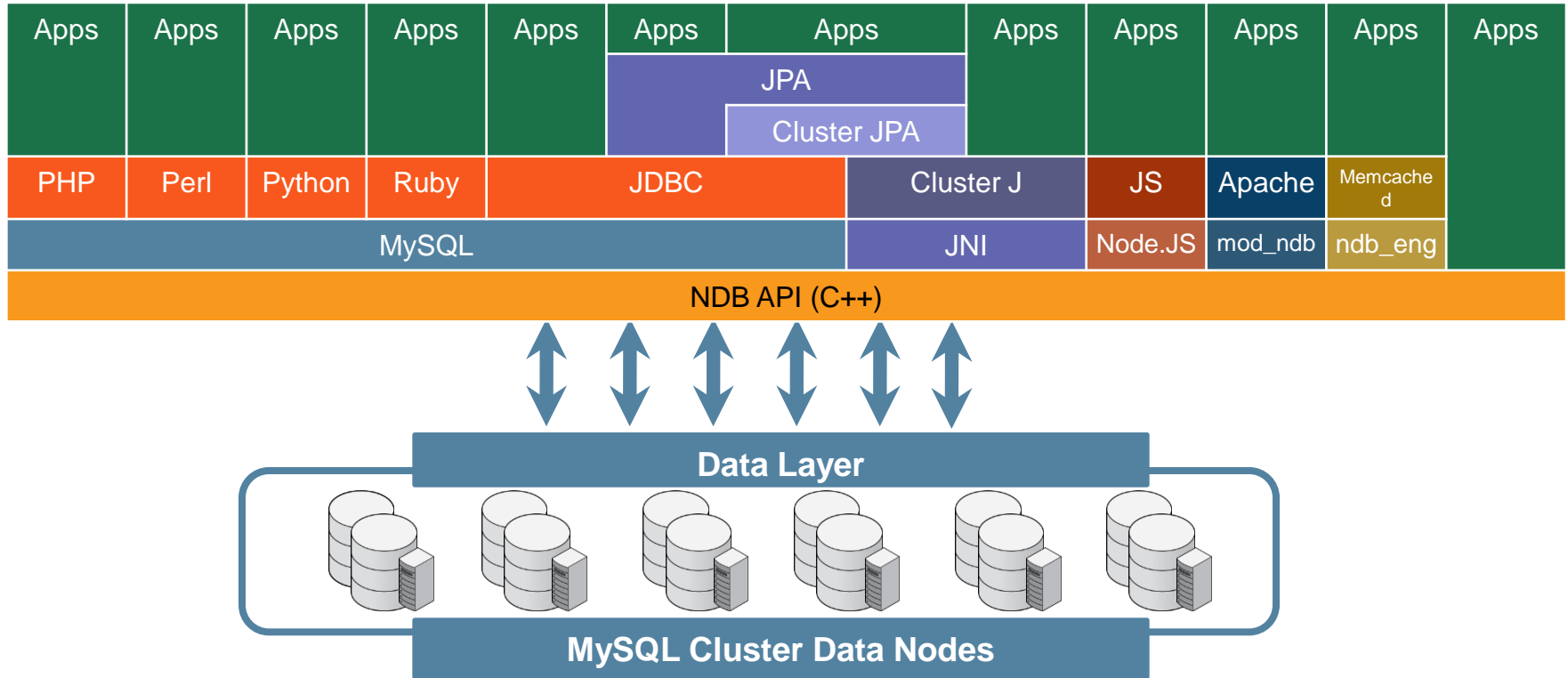
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MULTI-REGION AVAILABILITY

Geographic Replication

- DR and Global Scale
- Replicate complete clusters across regions
  - Fully active/active
  - No passive resources
- Split individual clusters across availability zones
  - Synchronous replication & auto-failover between sites

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SQL and NoSQL

Best of both world with ACID Transactions

Apps	Apps	Apps	Apps	Apps	Apps	Apps		Apps	Apps	Apps	Apps	Apps
					Apps	JPA						
						Cluster JPA						
PHP	Perl	Python	Ruby	JDBC		Cluster J		JS	Apache	Memcached		
MySQL						JNI		Node.JS	mod_ndb	ndb_eng		
NDB API (C++)												

Data Layer

MySQL Cluster Data Nodes

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Protecting $100BN+ Transactions

https://blogs.oracle.com/mysql/entry/with_its_mysql_database_as

PayPal™

CUSTOMER

One of largest payment providers on the internet, 30% year-on-year growth

CHALLENGES

Protect financial transactions with fraud detection system. Must be real-time with global reach servicing 100m+ users

KEY BUSINESS BENEFIT

MySQL Cluster deployed across 5 AWS regions gives global latency of <1/3rd of a second, enabling real-time fraud detection
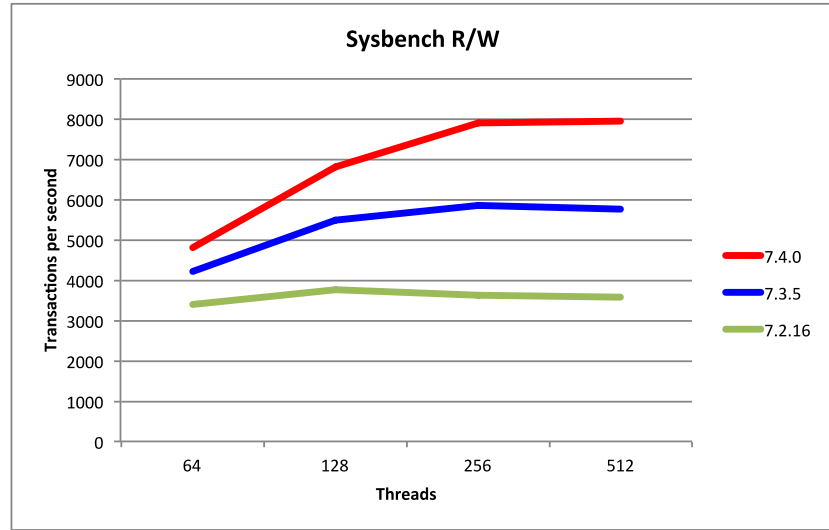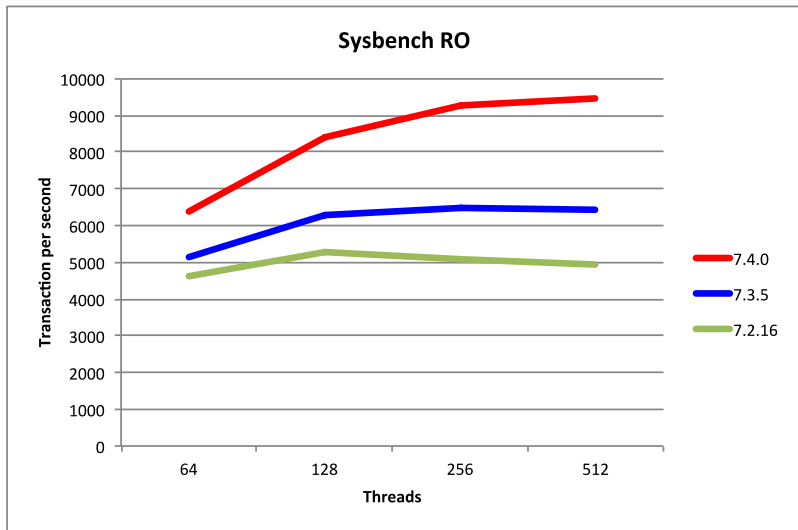
WHY MySQL?

"MySQL Cluster enables users to get the best of both world's… agility of NoSQL systems with the trust, maturity & reliability of the SQL model"

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MySQL Cluster 7.4
Better performance and operational simplicity

Sysbench RO

Transaction per second vs Threads (64, 128, 256, 512)
- 7.4.0
- 7.3.5
- 7.2.16

Sysbench R/W

Transactions per second vs Threads (64, 128, 256, 512)
- 7.4.0
- 7.3.5
- 7.2.16

- Performance gain over 7.3
  - 47% (Read-Only)
  - 38% (Read-Write)

- Faster node restarts
  - Recovering nodes rejoin the cluster faster

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5.6 MySQL Server - GA
The best release ever with high quality and performance
InnoDB NoSQL API and improved replication durability

5.7 MySQL Server - DMR
Refactoring and adding more pluggable components
Faster performance and easier management

7.3 MySQL Cluster - GA
Integration with MySQL 5.6
Node.jp NoSQL API, Foreign key support

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The world's most popular open source database
세계에서 가장 인기있는 오픈 소스 데이터베이스