



# **Top 10 Reasons to Choose MySQL for Web-based Applications**

**A MySQL Strategy Whitepaper  
August 2011**

## Table of Content

<b>Introduction .....</b>	<b>3</b>
<b>1. MySQL: Designed for the Web .....</b>	<b>3</b>
<b>2. Lower TCO .....</b>	<b>3</b>
<b>3. Performance &amp; Scalability .....</b>	<b>5</b>
<b>4. Reliability &amp; Uptime .....</b>	<b>8</b>
<b>5. The LAMP Stack .....</b>	<b>9</b>
<b>6. Ease of Use &amp; Administration .....</b>	<b>11</b>
<b>7. The Right Choice for SaaS &amp; the Cloud .....</b>	<b>13</b>
<b>8. MySQL Cluster for Web Scale .....</b>	<b>14</b>
<b>9. MySQL Enterprise Edition from Oracle .....</b>	<b>16</b>
<b>10. MySQL &amp; NoSQL .....</b>	<b>20</b>
<b>Conclusion .....</b>	<b>21</b>
<b>Additional Resources .....</b>	<b>22</b>

# Introduction

MySQL powers 9 of the 10 top Web sites worldwide, as well as thousands of corporate web-based applications. When you are using Facebook, Twitter or Wikipedia, you are relying on MySQL to do so. When you are watching videos on YouTube, you are using MySQL. Anytime you search for events tickets on Ticketmaster, you are using MySQL.

In this whitepaper, we will help you better understand the top 10 reasons why MySQL has become the default choice for Web based applications, and how the world's most popular database keeps evolving to address the needs of the next generation of highly demanding web applications.

## 1. MySQL: Designed for the Web

While most relational databases were designed several decades ago for complex ERP-type applications, MySQL was designed and optimized for Web applications. As new and different requirements emerged with the Internet, MySQL became the platform of choice for web developers, and the default database for web-based applications.

Since then, the performance & scalability, reliability, and ease of use of the world's most popular open source database, characteristics that made MySQL the #1 choice for web applications, have relentlessly been improved.

As the social web keeps evolving, and leading web properties such as Facebook, Google and Twitter are pioneering new ways to make sense of a huge and constantly growing amount of data, MySQL is also evolving to remain the premier choice for web-based applications. Oracle for example delivers new features "early and often" via <http://labs.mysql.com> to the MySQL community for early testing and feedback, such as NoSQL access to the InnoDB and MySQL Cluster storage engines that we will review later in this document.

Additionally, Oracle's MySQL team leveraged the unique insights it gained working with the leaders of the Web to develop a series of reference architectures for Web infrastructures. Optimum deployment architectures and topologies are defined based on sizing and availability requirements for each environment. The reference architectures are presented in a whitepaper available at:

[http://www.mysql.com/why-mysql/white-papers/mysql\\_wp\\_high-availability\\_webrefarchs.php](http://www.mysql.com/why-mysql/white-papers/mysql_wp_high-availability_webrefarchs.php)

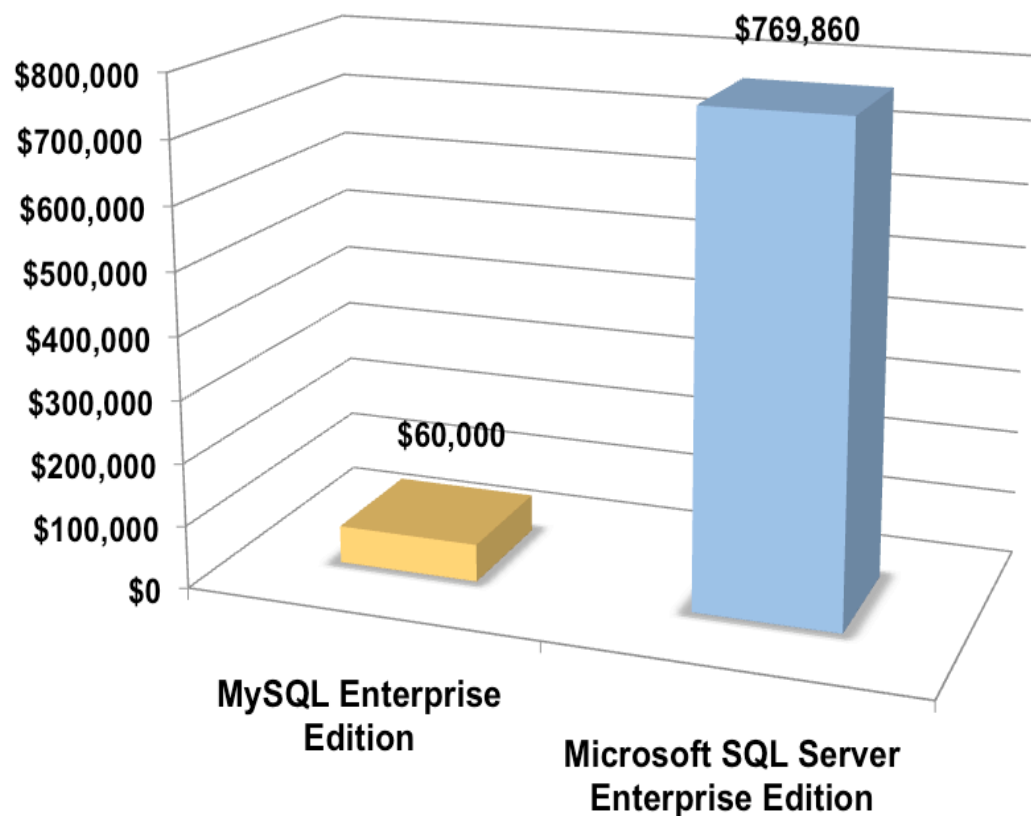
## 2. Lower TCO

By selecting MySQL for their web-based applications, startups and established corporations alike are realizing significant cost savings. Accomplished through the use of the MySQL database and scale-out architectures that utilize low-cost commodity hardware, organizations are finding that they can achieve very high

levels of scalability, availability and performance, while significantly lowering their TCO. In addition, the reliability and easy maintainability of MySQL means that database administrators don't waste time troubleshooting performance or downtime issues, but instead can concentrate on making a positive impact focusing on higher level and more strategic tasks.

Below is a chart comparing the 3 year TCO of MySQL Enterprise Edition vs. Microsoft SQL Server Enterprise Edition.

## MySQL vs. Microsoft SQL Server 3 Year Database TCO



- Term: 3 Years
- Users: Unlimited (web)
- MySQL: MySQL Enterprise Edition
- Microsoft: SQL Server Enterprise Edition
- Hardware: Intel x86
- Servers: 4
- CPUs/Server: 4

#### Microsoft SQL Server vs. MySQL: 3 Year Database TCO

The table below presents a simple comparison of licensing costs between MySQL Enterprise and Microsoft SQL Server Enterprise Edition. Pricing is based on publicly available list price information:

Microsoft

<http://www.microsoft.com/sqlserver/2008/en/us/pricing.aspx>

MySQL Enterprise Edition:

<http://www.mysql.com/products/>

Hardware Configuration:

- Web application (Unlimited Users)
- Windows
- Intel x86
- Servers: 4
- CPUs/Server: 4
- Cores/CPU: 4

	Microsoft SQL Server Enterprise Edition License + 3 Year Support	MySQL Enterprise Edition 3 Year Subscription
License List Price	\$27,495/CPU	N/A
Support List Price	25% of List Price	N/A
Subscription List Price	N/A	\$5,000/Server/Year
Total License	\$439,920	N/A
Total Support (3 Years)	\$329,940	N/A
Total Subscription (3 Years)		\$60,000
Total (3 Years)	\$769,860	\$60,000
Total Savings (\$)		\$709,860
Total Savings (%)		92%

You can customize Oracle's MySQL TCO Savings Calculator with your system configuration at: <http://www.mysql.com/tcosavings/>

### 3. Performance & Scalability

In our online world, competition is always a mouse click (or screen touch) away, and rapid responses to customer inquiries and activities are therefore paramount. The database serving web-based applications needs to provide extreme performance for both read (simple and complex queries) and write operations.



Another factor of performance is that this same type of extreme performance must be exhibited no matter the workload (e.g. thousands of current connections) or data volume (GB to multi-TB).

Successful web properties need to be able to quickly adapt to a growing and expanding customer workload, without experiencing any interruption in customer service.

One of MySQL's hallmarks is exceptional performance & scalability, which is why so many Web-based businesses use MySQL. The world's most popular open-source database utilizes a number of key strengths to deliver fast performance. They include:

### **InnoDB Default Storage Engine in MySQL 5.5**

InnoDB is the most widely used storage engine for Web/Web 2.0, eCommerce, Retail and Media & Entertainment applications built on MySQL, and for good reason; InnoDB provides highly efficient ACID compliant transactional capabilities and includes unique architectural elements that assure high performance and scalability. Further, InnoDB is structurally designed to handle transactional applications that require crash recovery, referential integrity, and high levels of user concurrency.

One of the most notable enhancements in MySQL 5.5 is that InnoDB is now the default storage engine for newly created tables, allowing users to develop transactional applications without configuration setting changes. For MySQL 5.5 InnoDB has been re-architected so that it can be optimized to take full advantage of the latest multi-core, multi-threaded hardware and operating system capabilities

In benchmarks using the MySQL 5.5 release candidate version compared to MySQL 5.1, results demonstrated marked performance improvements:

- On Windows: up to 1,500% performance gains for Read/Write operations, and up to 500% gain for Read Only.
- On Linux: up to 360% performance gain in Read/Write operations and up to 200 percent improvement in Read Only.

More information is available in the "What's New in MySQL 5.5" whitepaper at: <http://www.mysql.com/why-mysql/white-papers/mysql-wp-whatsnew-mysql-55.php>

### **MySQL Replication**

MySQL Replication has been widely deployed by some of the leading web properties to deliver extreme levels of database scalability. DBAs can simply & rapidly create multiple replicas of their database to scale-out beyond the capacity constraints of a single instance, enabling them to serve rapidly growing database workloads.

### **Rapid Connection Handling**

MySQL offers a specialized internal thread/connection cache that very quickly establishes incoming new connections and efficiently terminates existing connections upon request. The MySQL connection pool always has new threads at the ready to



service new customer requests so no overhead is wasted on building new connections from scratch. This means that connecting to and disconnecting from the MySQL Database does not incur a performance penalty.

## **Utilizing the Power of Memory**

MySQL exploits the advances in and the abundant supply of memory in today's modern servers to deliver exceptional database performance. Of course, MySQL utilizes industry-standard data and index caches to keep often-referenced information in memory for fast access, but also offers specific additional features:

First, MySQL offers main memory tables for extremely fast response times. MySQL Cluster provides the option to use main memory tables as part of a database schema. Main memory tables deliver higher speed than standard disk tables, even when the caches utilized by disk tables are "warm."

In addition to main memory tables, MySQL provides a query cache that is especially designed for modern Web-based applications that service repetitive queries asking for the same information. The MySQL query cache stores not only the query sent from a client application but the computed result set as well. Note this is radically different than a result set being reconstructed from raw data already in memory – the result set is not recomputed. It's easy to see why this unique type of cache can prove to be an invaluable aid to Web applications that must constantly service the same questions over and over again.

## **Auto-Sharding with MySQL Cluster**

MySQL Cluster is implemented as a distributed, multi-master database with no single point of failure. Tables are automatically sharded across a pool of low cost commodity nodes, enabling the database to scale horizontally to serve read and write-intensive workloads, accessed both from SQL and directly via NoSQL APIs (Memcached, REST/HTTP, C++, Java, JPA and LDAP). By automatically sharding tables in the database, MySQL Cluster eliminates the need to shard at the application layer, greatly simplifying application development and maintenance.

## **Other Performance-Related MySQL Features**

MySQL contains many other performance-related features that help web-based applications perform at a rate that modern businesses demand. For example, data partitioning is available for applications needing to horizontally separate data in a table and any associated indexes. The MySQL optimizer is smart enough to scan only the partitions needed to satisfy an end-user query, which can drastically reduce overall response times. Full support for range, hash, list, and composite/sub partitioning is available across multiple columns as well as numeric and character based data types.

Finally, MySQL contains all the right utilities and functions that help architects of Web based database systems design applications that yield very high rates of performance. Parallel load utilities, strong indexing support (clustered, full-text, hash, spatial, b-tree), unlimited row-level locking coupled with MVCC (which results in little, if any lock contention issues), and much more make MySQL a very good option for those wanting a high-performance database.

## 4. Reliability & Uptime

Web-based applications must typically be available 24/7. Downtime can be extremely detrimental to customer loyalty, and potentially very costly. Web properties need their database platform to exhibit high code quality, fault tolerance, rapid restart & restore, dynamic adaptation to increasing workload as well as simple upgrades and easy maintenance operations.

### Robustness

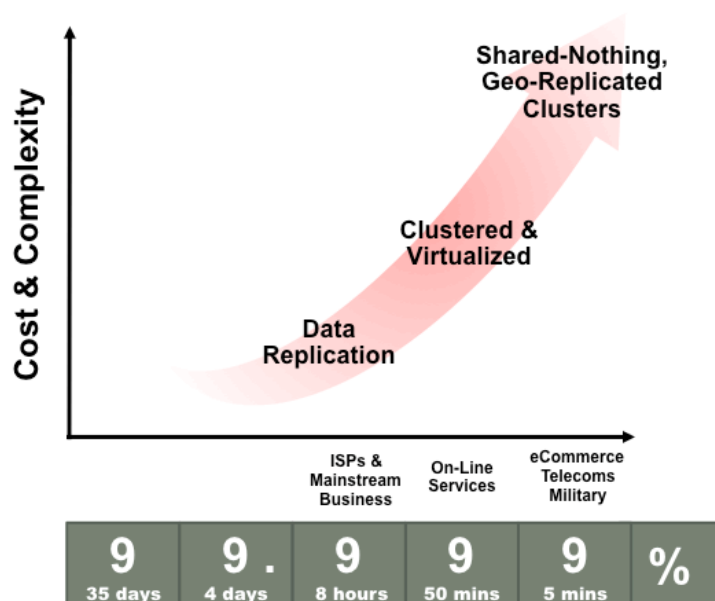
In addition to extensive QA testing at Oracle, MySQL is battle-tested by millions of users in a very wide variety of application scenarios. As Eric Raymond noted: “given enough eyeballs, all bugs are shallow”, the huge MySQL community contributes to the extremely high quality of the world’s most popular open source database.

### Security

Because guarding the data assets of corporations is the number one job of database professionals, MySQL offers exceptional security features that ensure absolute data protection. In terms of database authentication, MySQL provides powerful mechanisms for ensuring only authorized users have entry to the database, with the ability to block users down to the client machine level being possible. SSH and SSL support are also provided to ensure safe and secure connections. A granular object privilege framework is present so that users only see the data they should, and powerful data encryption and decryption functions ensure that sensitive data is protected from unauthorized viewing. Finally, backup and recovery utilities are provided through MySQL Enterprise Edition.

### High Availability

As noted, uptime is a crucial consideration for web-based applications. MySQL provides a number of options to make your database infrastructure highly available. Selecting which high availability solution is right for you will largely depend on how many “nines” of availability you require and the type of application you are deploying.







## MySQL Replication

Using MySQL replication, organizations can cost-effectively deliver a high availability solution. Master/slave replication enables operations to manually fail-over to another server in the event of a hardware or software problem. In addition, with MySQL replication, organizations can incrementally scale out their infrastructure to accommodate exponentially growing capacity demands. MySQL Replication ships out of the box and is used by some of the world's most highly trafficked Web sites including YouTube, Yahoo!, flickr, Wikipedia and Craigslist. In MySQL 5.5, new semi-synchronous replication and replication Heart Beat improve the reliability of data and the speed of failover for continuous application availability.

## MySQL Cluster

MySQL Cluster is designed to deliver 99.999% availability (less than 5 ½ minutes of downtime per year), including both regularly scheduled maintenance operations, as well as systems failures.

MySQL Cluster is designed around a distributed, shared-nothing architecture, which eliminates dependencies between nodes, enabling MySQL Cluster to continue to provide service, even if multiple nodes fail. Data is synchronously replicated between nodes within a node group and can be replicated remotely across wide geographic areas for disaster recovery

MySQL Cluster detects any failures instantly and control is automatically failed over to other active nodes in the cluster, without interrupting service to the clients. The cluster is self-healing so recovered nodes can automatically rejoin and resynchronize with the running cluster, without any administrator intervention, while maintaining transparency to the application.







To further support continuous operation, users can scale the cluster by adding nodes on-line. MySQL Cluster also allows on-line updates to a live database schema, enabling users to rapidly evolve applications as required, without downtime. Online upgrades and maintenance are supported as well as on-line back-up operations.

## 5. The LAMP Stack

Describing why MySQL became the #1 database choice for web-based applications would not be complete without mentioning the LAMP stack.

LAMP (standing for Linux, Apache, MySQL, PHP/Perl/Python) became the leading open source web platform, adopted by a large majority of popular Web sites across the world including Facebook, Google, Twitter, YouTube, Craigslist and Zappos.

LAMP is chosen by savvy IT leaders as a way to improve operational efficiency and reduce IT infrastructure costs.

Operating System		L
Application Server		A
Database		M
Scripting	  	P

In order to further increase the convenience and cost-effectiveness of deploying applications based on the LAMP stack, Oracle recently announced the first Oracle VM template for MySQL Enterprise Edition.

The new Oracle VM Template eliminates manual configuration efforts and risks by providing a pre-installed, pre-configured and certified software stack that includes Oracle VM, Oracle Linux with the Unbreakable Enterprise Kernel and MySQL Enterprise Edition.

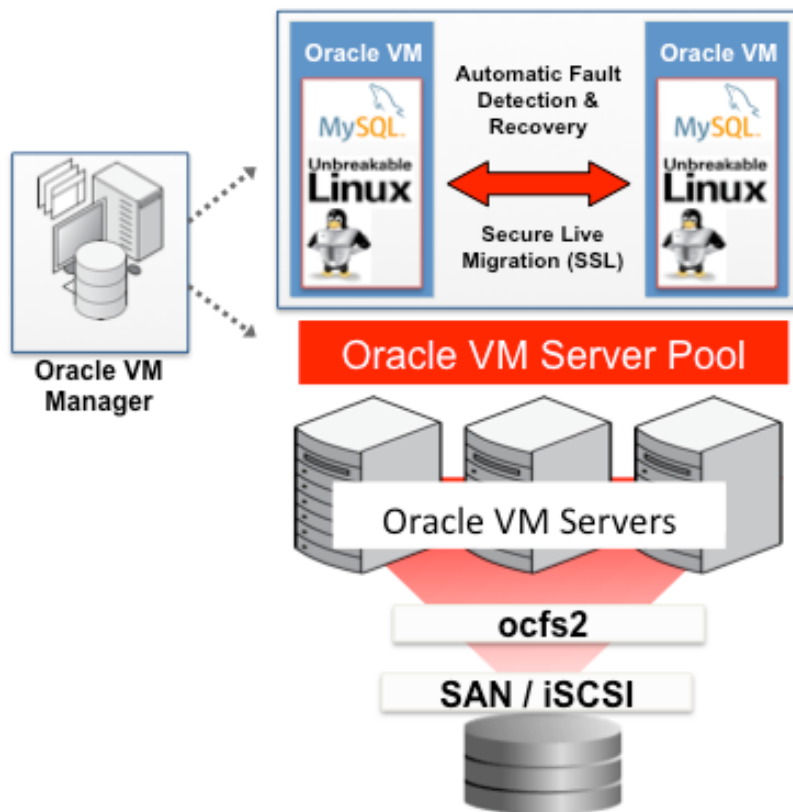
Organizations can achieve faster time to market and reduce costs while deploying virtualized MySQL environments, either on premise or in the cloud. Users benefit from:

- **Faster deployments:** Drastically reduced installation and configuration cycles
- **Increased reliability:** Using a pre-installed and pre-configured software stack that has already undergone extensive integration and quality testing, and is certified for production use.
- **Higher uptime:** With MySQL's replication capabilities plus Oracle VM's built-in high availability features both planned and unplanned downtime can be reduced.

## Template Components

The Oracle VM Template comprises the following components, each of which are described below:

- Oracle Enterprise Linux, with the Unbreakable Enterprise Kernel
- Oracle VM
- Oracle VM Manager
- Oracle Cluster File System
- MySQL Database (Enterprise Edition)



## 6. Ease of Use & Administration

Ease of use has been a design goal for MySQL since its inception. MySQL offers exceptional quick-start capability with the average time from software download to installation completion being less than fifteen minutes. Once installed, self-management features like automatic space expansion, auto-restart, and dynamic configuration changes take much of the burden off already overworked database administrators. The visual database design, development, administration and monitoring tools delivered within MySQL Enterprise Edition and presented later in this document further enhance MySQL's ease of use and administration.

MySQL's ease of use is critical for the rapid and cost-effective delivery of both new and enhanced web based applications. Time to market for those applications is likely going to be increasingly important to serve a considerable base of customers online and on the move, and is largely impacted by the underlying database powering them. The ease of use & administration of the database is therefore paramount.

### Ability to Experiment

Innovative web companies must be able to experiment and constantly deliver new online applications quickly and at low cost to beat the competition. Most of those applications may not be successful but as long as the experimentation cost is low then they can afford the risk, which is why it is essential to have a low TCO database platform. Moreover, the database needs to be open and allow



customizations so the capabilities and functions can as closely as possible match the requirements of groundbreaking businesses.

Once launched, some of those applications can however truly become an overnight success, and will be required to fail over and scale transparently without any disruption in service to the consumer. Indeed, as new applications are increasingly connected or delivered via platforms such as Facebook, the traffic increase they face if those are successful can be pretty dramatic.

## Cross-platform Availability

MySQL is about flexibility and choice. Users have the ability to run MySQL on all major platforms, and to write applications in all popular language.

Supported Operating Systems	Supported Languages
Oracle/RedHat Enterprise Linux	PHP
Fedora Linux	Perl
Ubuntu Linux	Python
Debian Linux	Java
SuSE Linux	C
Oracle Solaris	C++
Microsoft Windows	C#
Apple MacOS	Ruby
FreeBSD	<i>And more</i>
<i>And more</i>	

Despite being the M of the LAMP stack, Microsoft Windows consistently ranks as the #1 development platform for MySQL users in our surveys.

In order to improve the ease of use of MySQL on Windows, Oracle recently introduced the MySQL Installer for Windows. The MySQL Installer for Windows radically simplifies the installation process for all MySQL users on the Windows platform. It only takes 3 minutes from downloading the MySQL Installer to having a ready to use MySQL system on your machine. An easy to use - wizard based - UI will guide you through the installation process. You can select which products you want to have installed on your machine. After the file installation you can configure your system and setup your MySQL server. MySQL Installer also helps you to keep your system up-to-date by offering a simple "Check for Updates" feature. If you choose to run this feature the MySQL Installer will connect to the MySQL.com webpage to check if new versions of your MySQL products are available. Those will then be downloaded and installed with a single mouse click.



The MySQL Installer for windows is available for download at:  
<http://dev.mysql.com/tech-resources/articles/mysql-installer-for-windows.html>

## 7. The Right Choice for SaaS & the Cloud

### Software as a Service

MySQL is a proven database choice for SaaS (Software as a Service), with companies including RightNow, SugarCRM, Omniture, Supply Dynamics, Workday and Zimbra relying on the world's most popular database to power their applications.

Consider the following case study:

RightNow Technologies provides customer relationship management (CRM) software solutions for large global enterprises. The company serves nearly 2,000 organizations worldwide, including large, well known companies such as Black & Decker, Electronic Arts, Nikon and British Airways. RightNow helps these organizations manage all of their customer interactions, enabling them to provide outstanding customer experiences while controlling costs. The RightNow solutions have received numerous awards and industry recognition from publications and research firms such as CRM Magazine, Forrester and Gartner Group.

RightNow's client base has grown rapidly. To meet increasing demand for RightNow's solutions, which are available under a Software-as-a-Service (SaaS) delivery model, the company needed an IT infrastructure that was reliable, scalable and delivered peak performance, under heavy loads, in order to handle many high-volume client deployments. RightNow also needed to be able to continue to cost-effectively add capacity to its IT infrastructure so it could quickly add new customers, without having costs spiral out of control.

The RightNow solution includes service, marketing, and sales applications, which enables companies to interact with their customers consistently across all channels of communication. To ensure high levels of scalability, reliability, security and high-performance, RightNow chose to build its solution on high-quality, open source components including Red Hat Enterprise Linux, Apache, the MySQL database and PHP.



RightNow's MySQL implementation has evolved into a modern horizontal scale-out database architecture that utilizes master-slave replication, failover servers, backup servers, reporting servers and geographical redundancy. This scale-out architecture has enabled them to triple their Web traffic and manage:

- 30+TB of data - all stored in MySQL
- 17 billion queries and 500 million page turns per month
- Thousands of database schemas, all from different customers running dynamically-generated SQL, based on customer design

In addition, MySQL's low administration benefits allow RightNow to manage more than 200 servers with only four DBAs.

## **MySQL in the Cloud**

MySQL is the most popular database for hosting services providers such as Rackspace and GoDaddy. Those companies and other leading PaaS (Platform as a service) providers have now integrated MySQL within their cloud offerings.

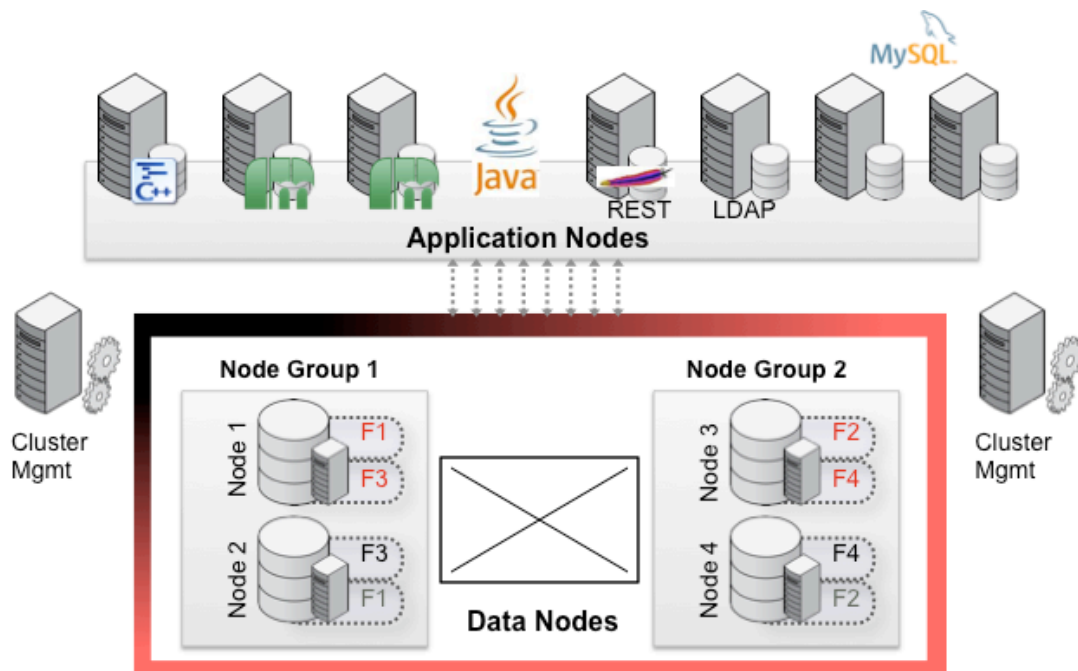
When Amazon launched its RDS (Relational Database Service) to allow organizations to easily deploy a database in the cloud, it selected MySQL.

MySQL's performance, reliability and ease of use make it an ideal choice for deployments both in public and private clouds.

## **8. MySQL Cluster for Web Scale**

MySQL Cluster is a write-scalable, real-time transactional database, combining 99.999% availability with the low TCO of open source. With a distributed, multi-master architecture and no single point of failure, MySQL Cluster is able to scale horizontally on commodity hardware to serve read and write intensive workloads, accessed via SQL and NoSQL interfaces.

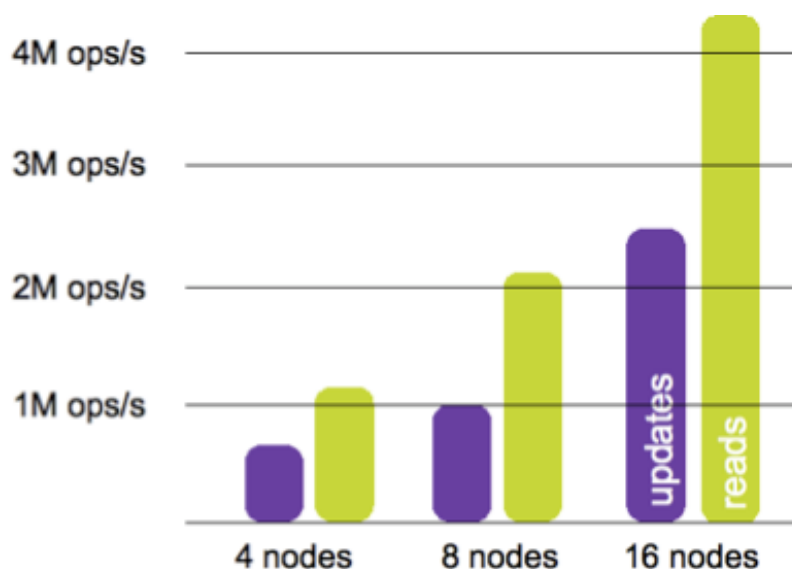
MySQL Cluster's real-time design delivers predictable, millisecond response times with the ability to service millions of operations per second. Support for in-memory and disk-based data, automatic data partitioning (sharding) with load balancing and the ability to add nodes to a running cluster or update schema with zero downtime allows linear database scalability to handle the most unpredictable web-based workloads.



More information about the MySQL Cluster Architecture can be found at:  
[http://mysql.com/why-mysql/white-papers/mysql\\_wp\\_cluster7\\_architecture.php](http://mysql.com/why-mysql/white-papers/mysql_wp_cluster7_architecture.php)

Oracle's MySQL Cluster development team recently ran a series of benchmarks that characterized performance across 8 x dual socket 2.93GHz, 6 core commodity Intel servers, each equipped with 24GB of RAM. As seen in the figure above, MySQL Cluster delivered just under 2.5 million updates per second with 2 x data nodes configured per server.

Across 16 Intel servers, MySQL Cluster achieved close to 7 million read operations per second.







MySQL Cluster will be a great choice for the following web applications:

- User Profile Management
- Session stores
- eCommerce
- Online Gaming
- Application Servers

Shopatron, neckermann.de, go2, Telemaque and many more companies deploy MySQL Cluster in highly demanding web environments.

## 9. MySQL Enterprise Edition from Oracle

MySQL Enterprise Edition reduces the risk, cost and time required in developing, deploying and managing business-critical MySQL applications.

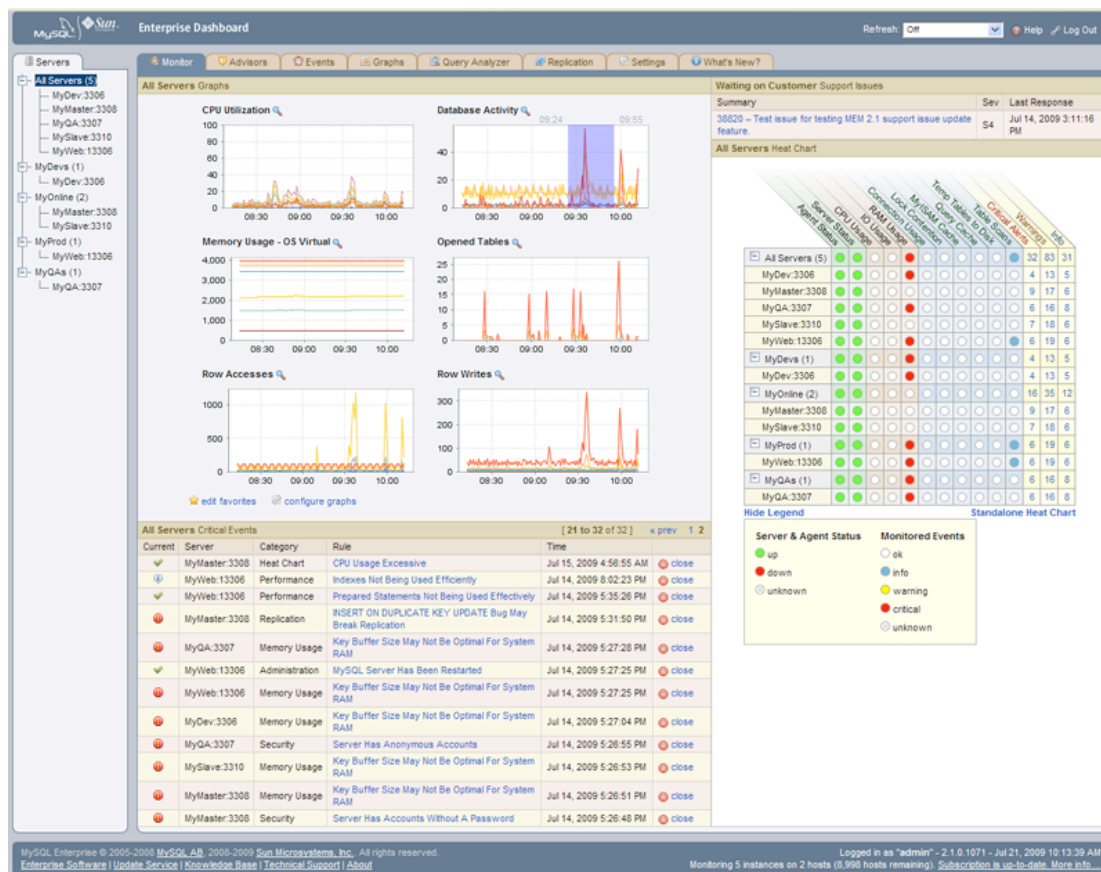
MySQL Enterprise Edition includes the most comprehensive set of MySQL production, backup, monitoring, modeling, development and administration tools and services so businesses that are using MySQL can achieve the highest levels of performance, reliability, security and uptime.

In addition to the MySQL Database, MySQL Enterprise Edition includes:

- **The MySQL Enterprise Monitor:**

The MySQL Enterprise Monitor provides at-a-glance views of the health of your MySQL databases. It continuously monitors your MySQL servers and alerts you to potential problems before they impact your system. It's like having a "virtual DBA" assistant at your side to recommend best practices and eliminate security vulnerabilities, improve replication, and optimize performance. As a result, DBAs and system administrators can manage more servers in less time.





## MySQL Replication Monitor

The MySQL Replication Monitor provides real-time replication health and status checks on master/slave performance and latency issues.

## MySQL Advisors

The MySQL Enterprise Monitor includes more than 140 MySQL advisor rules that monitor more than 600 MySQL and operating system specific variables to help you automatically enforce MySQL recommended database best practices. They deliver expert advice that come straight from the database professionals who build the MySQL database. The advisors provide tailored step-by-step instructions to solve specific problems. The MySQL Enterprise Monitor includes the following:

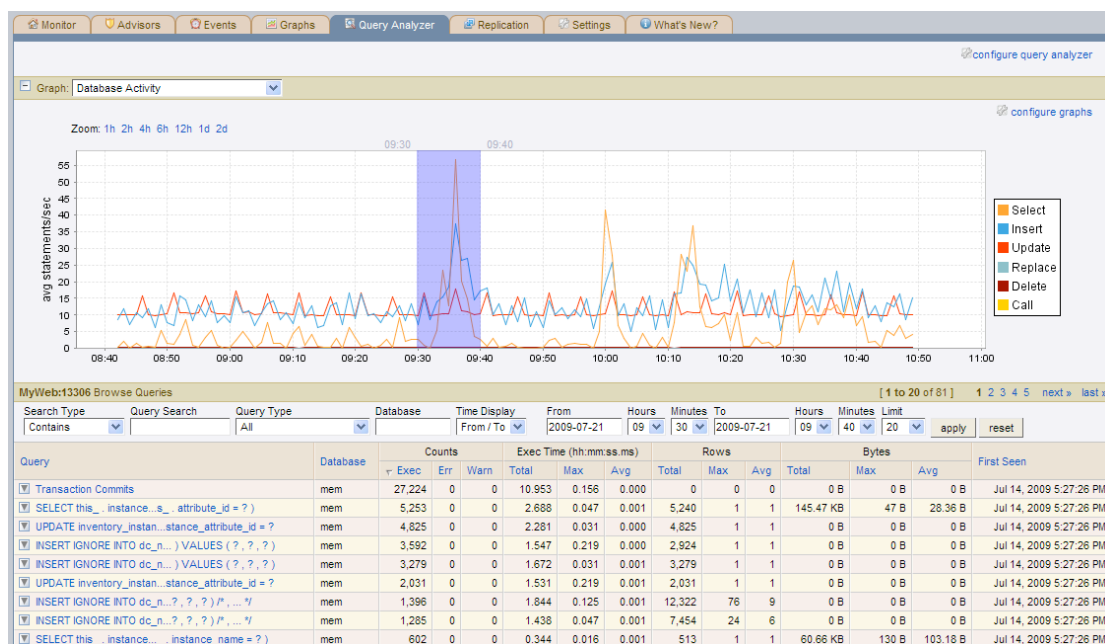
- **Upgrade Advisor** - Monitors and advises you on using the most up-to-date version of MySQL.
- **Administration Advisor** - Enforces DBA best practices to prevent costly outages.
- **Security Advisor** - Minimizes exposure to security vulnerabilities.
- **Replication Advisor** - Recommends solutions for replication setup and performance improvements.
- **Schema Advisor** - Assists in uncovering database design issues that reduce performance.
- **Performance Advisor** - Recommends changes to boost database performance.

- **Memory Usage Advisor** - Monitors dynamic memory-related server metrics and recommends configuration changes to improve performance.
- **Custom Advisor** - Enables you to create custom best practice rules tailored to your needs.
- **MySQL Cluster Advisor** - To help ensure that MySQL Cluster deployments are always up and running at the highest levels of performance and availability.

## MySQL Query Analyzer

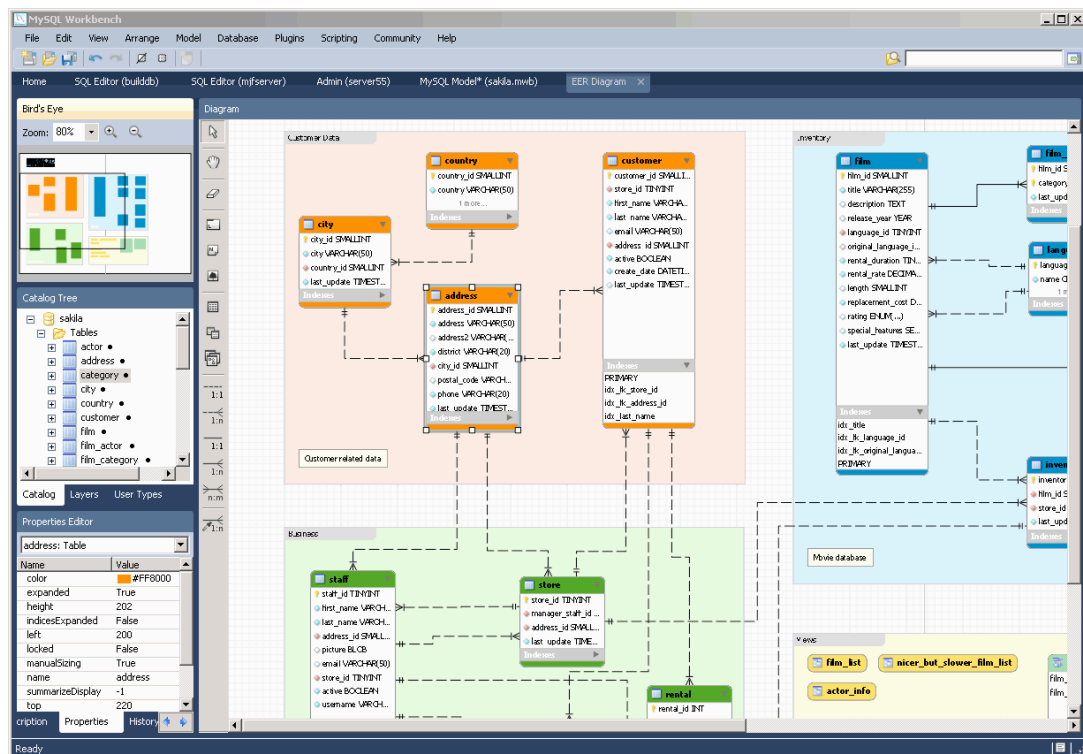
The MySQL Query Analyzer helps developers and DBAs improve application performance by monitoring queries and accurately pinpointing SQL code that is causing a slow down. With the new MySQL Connector Plug-ins, performance of Java and Microsoft .NET applications can be optimized more efficiently by communicating directly with the MySQL Query Analyzer.

Queries are presented in an aggregated view across all MySQL servers so DBAs and developers can filter for specific query problems and analyze their most expensive code. With the MySQL Query Analyzer, DBAs can improve the SQL code during active development and continuously monitor and tune the queries in production.



## MySQL Workbench

MySQL Workbench is a unified visual tool that enables developers, DBAs, and data architects to design, develop and administer MySQL servers. MySQL Workbench provides advanced data modeling, a flexible SQL editor, and comprehensive administrative tools.



MySQL Workbench allows you to:

- **Design:** MySQL Workbench includes everything a data modeler needs for creating complex ER models, forward and reverse engineering, and also delivers key features for performing difficult change management and documentation tasks that normally require much time and effort.
- **Develop:** MySQL Workbench delivers visual tools for creating, executing, and optimizing SQL queries. The SQL Editor provides color syntax highlighting, reuse of SQL snippets, and execution history of SQL. The Database Connections Panel enables developers to easily manage database connections. The Object Browser provides instant access to database schema and objects.
- **Administer:** MySQL Workbench provides a visual console to easily administer MySQL environments and gain better visibility into databases. Developers and DBAs can use the visual tools for configuring servers, administering users, and viewing database health.
- **MySQL Enterprise Backup**

MySQL Enterprise Backup performs online “Hot” backups of your MySQL databases. You get a consistent backup copy of your database to recover your data to a precise point in time. In addition, MySQL Enterprise Backup supports creating compressed backup files, and performing backups of subsets of InnoDB tables. Compression typically reduces backup size up to 90% when compared with the size of actual database files, helping to reduce storage costs. In conjunction with the MySQL binlog, users can perform point in time recovery.

- **Oracle Premier Support:**

MySQL Enterprise Edition provides 24x7x365 access to Oracle's MySQL Support team, which is staffed by seasoned database experts ready to help with the most complex technical issues. Oracle's Premier support provides you with:

- 24x7x365 phone and online support
- Rapid diagnosis and solution to complex issues
- Unlimited incidents
- Emergency hot fix builds
- Access to Oracle's MySQL Knowledge Base
- Consultative support services

## 10. MySQL & NoSQL

The ever increasing performance demands of web-based services have generated significant interest in providing NoSQL (Not-Only-SQL) access methods to MySQL, enabling users to maintain all of the advantages of their existing relational database infrastructure while providing blazing fast performance for simple queries, using an API to complement regular SQL access to their data.

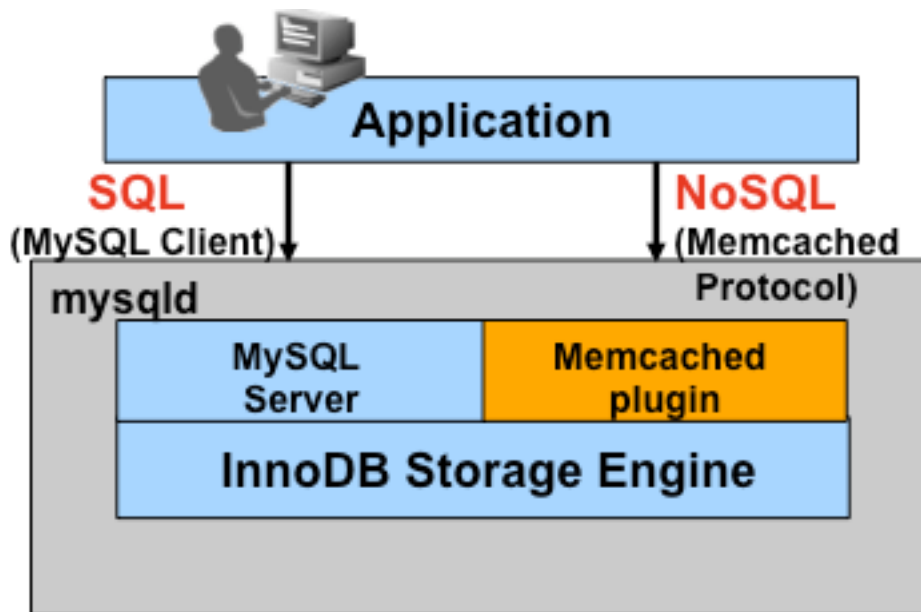
Through <http://labs.mysql.com>, Oracle's Not-Only-SQL solution for MySQL is available for early testing. It is delivered via Memcached, with implementations to access both the InnoDB and MySQL Cluster storage engines.

Using the Memcached API, web services can directly access the InnoDB and MySQL Cluster storage engines without transformations to SQL, ensuring low latency and high throughput for read/write queries. Operations such as SQL parsing are eliminated and more of the server's hardware resources (CPU, memory and I/O) are dedicated to servicing the query within the storage engine itself.

Over and above performance, there are a number of additional potential benefits in this approach for both developers and DBAs:

- Preserves investments in Memcached infrastructure by re-using existing Memcached clients and eliminates the need for application changes.
- Access to the full range of Memcached client libraries and platforms, providing maximum deployment flexibility and consistently high performance across all supported environments.
- Extends Memcached functionality by integrating persistent, crash-safe, transactional database back-ends offering ACID compliance, rich query support and extensive management and monitoring tools.
- Reduces service disruption caused by cache re-population after an outage (note that buffer pool reloading enhancements planned for a future milestone release will further improve recovery performance by warming the cache)
- Simplifies web infrastructure by compressing the caching and database layers into a single data tier, managed by MySQL.
- Reduces development and administration effort by eliminating the cache invalidation and data consistency checking required to ensure synchronization between the database and cache when updates are committed.

- Eliminates duplication of data between the cache and database, enabling simpler re-use of data across multiple applications, and reducing memory footprint.
- Flexibility to concurrently access the same data set with SQL, allowing complex queries to be run while simultaneously supporting Key-Value operations from Memcached.



The Memcached implementations for InnoDB and MySQL Cluster are still in their early phases of development and therefore not suitable for production deployment yet. Nonetheless, developers can at least get a taste of what is possible as these features evolve.

More information is available at: <http://dev.mysql.com/>

## Conclusion

In this whitepaper we've reviewed the top 10 reasons to choose MySQL for Web-based applications.

The internet would not be what it is today without open source software and MySQL, and the world's most popular web database is well positioned to power the next generations of highly demanding web applications leveraging the social web and cloud infrastructures.



## Additional Resources

MySQL Whitepapers

<http://www.mysql.com/why-mysql/white-papers/>

MySQL Webinars:

- Live: <http://www.mysql.com/news-and-events/web-seminars/index.html>
- On Demand: <http://www.mysql.com/news-and-events/on-demand-webinars/>

MySQL Enterprise Edition Flash Demo:

[http://www.oracle.com/pls/ebn/swf\\_viewer.load?p\\_shows\\_id=10146324](http://www.oracle.com/pls/ebn/swf_viewer.load?p_shows_id=10146324)

MySQL Enterprise Edition Trial:

<http://www.mysql.com/trials/>

MySQL Case Studies:

<http://www.mysql.com/why-mysql/case-studies/>

MySQL TCO Savings Calculator:

<http://mysql.com/tco>

To contact an Oracle MySQL Representative:

<http://www.mysql.com/about/contact/>