# A Guide to Lower Database TCO

## How the Open Source Database MySQL® Reduces Costs by as Much as 90%


**A MySQL® Business White Paper**

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# Executive Summary

Not too long ago, Computerworld revealed how MySQL has become the world's most popular open source database and why corporations intent on lowering their cost of operations are using it to further commoditize their IT infrastructure. In that same article, experts highlight what many believe is a new era of databases. Charlie Garry from the Meta Group is confident that: "the future of the database market will be the standardization on MySQL."[1]

After harvesting huge efficiencies from using open source software such as Linux and Apache, many companies are now targeting their database infrastructure for the next round of cost savings through commoditization. Indeed, savvy IT managers are exploring the use of an entire enterprise open source software stack known as LAMP (Linux, Apache, MySQL, PHP / Python / Perl) as a way to further improve operational efficiency.

Savings will vary between companies and projects, but on average companies are experiencing per-project savings of between $250,000 and $500,000. Larger projects, or enterprise deployments, are expecting savings in excess of $10 million.

Based on similar studies by IDC[2], MySQL reduces the Total Cost of Ownership (TCO) of database software by:

- Reducing database licensing costs by over 90%
- Cutting systems downtime by 60%
- Lowering hardware expenditure by 70%
- Reducing administration, engineering and support costs by up to 50%

MySQL complements the use of existing corporate databases such as Oracle, IBM DB2 and Microsoft SQL Server by providing a less complicated solution suitable for widespread application deployment, including those with a high transaction volume.

There are three key reasons why MySQL is world's most popular open source database:

1. MySQL is a fast, easy-to-use and reliable database developed and marketed at a fraction of the cost of proprietary software by using an open source approach. These cost savings are passed on directly to the customer.
2. MySQL has been battle tested in the market place. It has over 11 million active installations and over 60,000 downloads every day.
3. The MySQL database is supported by MySQL, a second-generation open source company founded in 1995. The company is profitable, owns and supports all of its code and offers MySQL Enterprise, a comprehensive set of software and proactive services that saves enterprise developers and DBAs time and effort.

In this white paper, you'll learn how organizations such as Sabre Holdings, Cox Communications, and NASA have improved database reliability, performance and TCO using MySQL. You'll also see how these techniques can apply in your organization.

[1] "MySQL Breaks Into the Data Center," *Computerworld,* October 13, 2003
[2] TCO Percentages by International Data Corporation, LinuxWorld SFO 2003

# Driving Down Software Infrastructure Costs

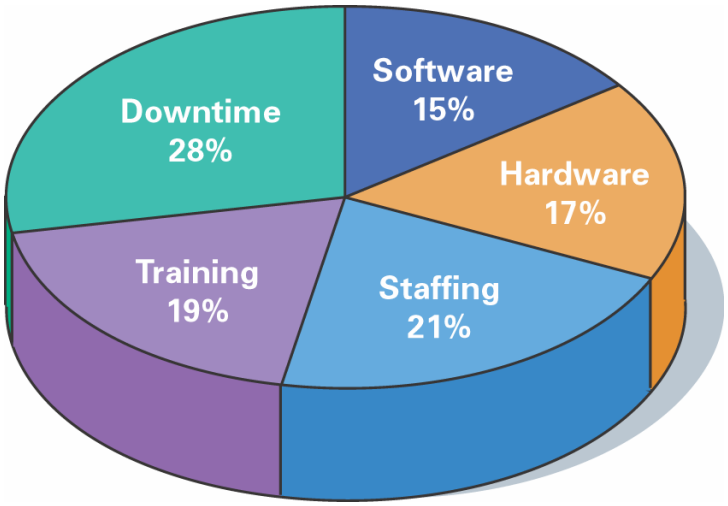
Throughout history, innovations have created new business opportunities, but it's only when these inventions become cost efficient that their potential to change markets is truly realized.

The pace of this evolution from invention to commodity varies — steam engines took over 100 years, cell phones took 20 years, web servers less than five — but the basis for change remains the same. The radical change is not the product's ability to do a job; it's the cost of doing it. Open source technology further accelerates commoditization by driving the widespread adoption of new technologies at a decreasing cost.

Server systems are a good example. Not long ago all central processing was done on multi-million dollar mainframes. As processing became less expensive, many tasks were moved to cheaper mid-range Unix servers. Now these jobs are being done on what many believe is the ultimate commodity server system – the Intel Linux server. In fact, a survey by Forrester Inc.[3] shows over 70% of $1B+ North American companies are now running the Linux open source operating system.

To be truly efficient, a product must not only have lower up front license costs, but also slash the running costs that make up the total cost of ownership. In another study, IDC[4] found that software cost is only 15% of the total cost of deploying an Oracle 8i Database application — the hardware was 17%, staffing 21% and training 19%. A full 28% of the total cost of Oracle database deployment is attributed to system downtime.

**TCO Breakdown of Database Software**




[3] Forrester Inc. "Your Open Source Strategy". Schadler, Rustein, Lambert, Tseng, Whitely. September 2003.
[4] IDC, Maximizing the Business Value of Enterprise Database Applications on a Unix Platform. 2002.

Compared to traditional software, open source offers some key advantages:

**Reliability and Performance.** A huge community of developers tests the software across a range of platforms and uses before it is certified for production. Bugs are found and fixed quickly. Access to source code ensures a thorough understanding of the system. Developers can also make modifications or performance enhancements as necessary.

**Ease of deployment.** Because open source software focuses on the most essential capabilities, as opposed to having hundreds of rarely used features, installation and deployment is often easier than proprietary software. Most open source software now comes with easy-to-use installation software, graphical management tools, and on-line help.

**Freedom from Platform Lock-in.** By providing ready access to source code, open source ensures freedom, thereby preventing lock-in to a single company or platform. Open source software is typically available on dozens of platforms so you can choose the most economical for your project needs.

**Security.** Because open source software is out in the open, it is typically more secure and suffers fewer vulnerability attacks than proprietary software. When a problem is uncovered, it is addressed quickly.

**Millions of Trained and Certified Developers.** It's easy to find high-quality, skilled staff. The open source community is self-supportive, with vast product knowledge available on the Web. In addition, there is a large community of certified consultants, third party add-ins, technical books, training courses and so on.

Corporate acceptance of Linux has laid a foundation, both technically and culturally, for the broader adoption of open source technology. Leading organizations are now using open source database technology to further increase operational efficiency by driving down the cost of ownership for new and existing applications.

## Beyond Linux – Databases Go Open Source

Just as Linux helped drive down the price of proprietary Unix servers by offering lower-cost, more reliable Intel and AMD based commodity servers, many believe that the time is ripe for change in the $6.6 billion[5] database market. The market has been dominated by three large incumbents, each consumed with introducing new "upgraded" proprietary technology at ever increasing prices year after year. Yet, paradoxically, many database users are seeking simpler, easier to use products that provide enterprise functionality at commodity pricing.

With software running about 16% of the TCO of database applications, the annual cost to the economy of running database applications can be estimated at over $40 Billion. Not surprisingly, CIOs are on a warpath to reduce unnecessary spending by introducing open source database technology.

Charlie Garry, an analyst at Meta Group Inc. claims that as the leading open source database, MySQL is "a disruptive technology."[6] According to Garry, the question is no longer whether companies will use open source databases, but rather "which open source database will they deploy."

[5] Gartner Group. 2002 Database Market Estimates.
[6] "MySQL Breaks Into the Data Center," *Computerworld,* October 13, 2003

## *Second Generation Open Source*

MySQL can be characterized as 'Second Generation' open source company:

- MySQL is a commercial company. It develops the software in-house and owns all the relevant source code, patents, copyrights and trademarks. As a result, MySQL provides the support customers expect from a trustworthy vendor.
- The software is proven in very large deployments. MySQL customers such as NASA and Sabre Holdings use the software for very large applications that are critical to their business.
- An established user community backs MySQL. With over 11 million active installations and over 60,000 downloads per day, it is deployed as widely as any proprietary database software.

> *Among the factors that distinguish MySQL, one has become the defining difference: the business model. MySQL is maintained by a for-profit company.*
>
> *MySQL's promotion by a company, rather than an organization, makes all the difference for customers, Meta Group Analyst Charlie Garry said. "That makes Global 2000 companies feel a lot better. It's a model they understand."*
>
> *Enterprises know that MySQL has a codified support structure. "And, more importantly, because MySQL owns the rights, there is one definitive place to get MySQL," he said.*
>
> ***Enterprise Linux Today***

- MySQL offers an all-in-one enterprise-grade database, support and services subscription service named MySQL Enterprise to enable enterprises to achieve the highest levels of reliability, security and uptime at an affordable price.
- MySQL stands behind its certified software, training, developer certification and consulting.

## *Why Over-Engineered Software Increases TCO*

For years, proprietary database companies have been adding new features that are seldom, if ever, used. What's worse is that the continued addition of unnecessary features has resulted in overly complicated systems that are slower, more resource intensive, harder to maintain and more prone to failure.

Proprietary database companies continue to hit corporations with a double burden. Complicated, unused features push up both licensing costs and the cost of ownership.

Some number of applications will have high functional requirements and in these cases, Oracle, IBM DB2 or Microsoft SQL Server is appropriate. However, for many applications, MySQL is much less expensive to own and run. It is also faster and more reliable – even at very high levels of users and transactions.

# Major Companies Recognize Lower TCO

For **Sabre Holdings**, any database downtime translates directly to large sums of lost revenue. The S&P 500 Company is one of the world's leading travel retailers, also providing distribution and technology solutions for the travel industry.

Its Air Travel Shopping Engine (ATSE) platform provides sophisticated fare searches to millions of customers every day. When you book a fare online with Travelocity or through a travel agent, you're almost certainly using the Sabre application. The system uses HP's NonStop servers and database for a core; all searching functions run on Linux, using MySQL.

By using MySQL in ATSE, Sabre Holdings will recognize multi-million dollar savings for the company. These savings are a combination of low license fees, low-cost 7 x 24 support, and reduced downtime.

Sabre has found MySQL to:

- Be highly reliable
- Deliver high performance
- Lower TCO by as much as 80%
- Be easy to set up

**A Selection of MySQL Customers**

CitySearch
Google
Cox Communications
DaimlerChrysler
The Associated Press
Earthlink
Alcatel
Ericsson
Hoover's Online
HypoVereinsbank
Lufthansa
NASA
Caterpillar
Omaha Steaks
Powell's Bookstore
Sabre Holdings
Texas Instruments
United Parcel Service
US Census Bureau

According to Systems Architect Alan Walker, "We looked at all applicable products on Unix and Linux, and we benchmarked about five different configurations on two or three hardware platforms. MySQL ran faster or as fast as any commercial database we tested. It never crashed. It was the fastest to get working, taking us two or three days to port our whole code base to it and get going.

"Then, of course, MySQL saved us millions of dollars. We were quite happy to use a commercial database if it would make our core systems work. At Sabre, if you can't find the low fare or price a ticket, we can't sell a ticket to you.

"Now, if you are pricing a ticket on Sabre's system, you are pricing it on C++ code on MySQL and Linux. You're not pricing it on the mainframe anymore."[7]

**NASA's Acquisition Internet Service** (NAIS) has grown to be a vital component of its business, saving over $4 million per year by managing large acquisitions online.

Dwight Clark, an IT Specialist and Systems Analyst at NASA says that when their previous database vendor decided to restructure its license program, NASA was faced with fees that would cost "more than twice their total annual budget" – for a simple upgrade.

With MySQL, NASA not only found a solution to their licensing problem, they uncovered a number of other unexpected benefits:

- **MySQL averaged 28% faster than their existing proprietary database.** Clark says that compared to other databases, "MySQL was not a machine resources hog."

[7] "Innovation, cost-saving highlight mainframe-to-Linux move," *SearchEnterpriseLinux.com,* December 17, 2003

- **Upgrading the application was simple.** “To switch to MySQL we only had to install the MySQL database driver module and change the connect call to the database interface module. Once this was done, we literally had to change one line of code out of 15,000 lines to begin using MySQL in our first application,” said John Sudderth, Senior Computer Scientist of Computer Sciences Corporation, who was the lead developer on the conversion project.
- **Support costs were slashed.** “The cost of the optional technical support for MySQL was about a fraction of that for the commercial product previously used.”
- **Extreme reliability. “**We've been up and running for 3 years now without any data loss or downtime. That's just incredible,” said Sudderth.

NASA’s story is not uncommon. Many companies discover MySQL when looking for more cost-effective licensing deal, but end up reaping savings across a broad range of areas.

For example, Mark Cotner, manager of network application development at **Cox Communications Inc.** in Atlanta used MySQL in a large data warehousing application. It runs across 27 collection servers with over 3,600 MySQL tables. MySQL's replication feature is used to keep five copies of the database distributed across several large servers. The MySQL application currently has over 2 billion rows doing about 4 million inserts every two hours and the database is expected to grow to over 600GB in size.

By selecting MySQL, Cotner was able to budget just $14,000 per year for license fees and maintenance compared to $300,000 for a proprietary database. In fact, the whole set of database servers including hardware and license cost Cotner less than $98,000."

# Measuring the TCO Benefits of MySQL

Major corporations have found that MySQL delivers costs savings in many different areas of their business. In this section, we’ll take a more detailed look at four major sources of cost savings that you can expect to see in your business:

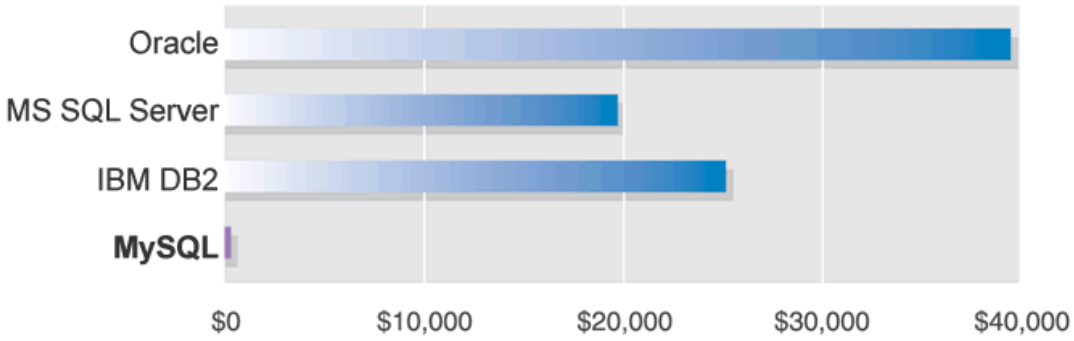
1. Reduced database license fees
2. Better reliability avoids expensive downtime
3. Improved performance reduces hardware expenditure
4. Reduced administration, engineering and support costs

## *1. Reducing Database License Fees*

A study by Meta Group into comparative database costs (detailed in the chart below) shows that MySQL can be **at least 90% less expensive** than products from other vendors.[8]

[8] “MySQL Breaks Into the Data Center,” *Computerworld,* October 13, 2003

**Comparing Database License Costs**




Using MySQL helps companies free up budget for other projects and enables them to implement systems that were previously cost prohibitive.

## *2. Better Reliability Avoids Expensive Downtime*

System downtime is often the most expensive cost of any application. As businesses have moved from batch processing to real-time enterprise systems running critical customer service or online sales systems, the impact of any outage directly impacts the bottom line:

**Lost productivity** of employees dependent upon the system. On a 1,000 user system, assuming an average loaded salary of $40,000 per employee, downtime costs $10,000 per hour, assuming that the employees are 60% productive on other tasks.

> *"I've got MySQL running on a dozen boxes, and none of them has ever failed since MySQL was installed more than 18 months ago. This kind of stability means that I don't have to worry constantly about database crashes, and then scramble to fix everything if one happens. It's peace of mind."*
>
> **Rich Allen, MTA**

**Lost revenue.** Downtime on transactional systems is counted in lost orders. The average cost in revenue per hour is over $12,000, although a company retailing over the web will be hit more severely. In such cases, lost revenues could exceed $200,000 per hour.[9]

**Increase in call center load.** Companies are increasingly encouraging customers to use online self-service systems rather than costly call centers, saving an estimated $14 per transaction. The cost impact of an outage is two-fold. First there is the hard cost of the increased volume of transactions being routed to an increasingly overloaded call-center. If two hundred additional calls are fielded per hour, this can easily come to $2,800 per hour. Even worse is the loss of business from customers who become frustrated and don't call!

**Increased IT costs.** Outage fire drills have a direct cost to IT support groups. Every hour a team of 10 spend trying to remedy a system outage will cost over $2,000. This figure can rise rapidly if engineering resources are required to remedy the problem with application upgrades. IDC found that the average annual downtime for a Unix database system is over 22 hours. For a 1,000 user system annual TCO impact starts at $250,000 and increases dramatically for public ordering and self-service systems.

When e-Week[10] stress tested the top five databases they concluded that only two could run their test for nine hours without crashing. MySQL was one of them.

It's not surprising that reliability is a major motivator for companies moving to MySQL. Using MySQL they can **reduce downtime by at least 60%.** This could result in **savings exceeding $100,000** for

[9] IDC, Maximizing the Business Value of Enterprise Database Applications on a Unix Platform. 2002.
[10] e-Week. "Sever databases clash"

most companies. For larger organizations, the improvements will be measured in millions of dollars of cost avoidance.

## 3. Improved Performance Reduces Hardware Expenditure

By improving performance, MySQL applications can typically be run on lower cost, commodity hardware such as Intel based Linux servers. In eWeek's performance tests, compared to Microsoft SQL Server and IBM's DB2 7.2, MySQL was three times faster:

| Database Server | Response Time in Seconds |
|---|---|
| MySQL 4.0.1 | 31 |
| IBM DB2 7.2 Fix Pack 5 | 102 |
| MS SQL Server 2000 Ent. Ed. SP2 | 109 |

IDC estimates that deploying on Intel Linux will reduce hardware costs by about 60%. MySQL's efficient performance can enable an additional 20% in savings resulting in **nearly 70% lower hardware-associated costs than running Oracle on Unix.**[11]

## 4. Reduced Administration, Engineering and Support Costs

A combination of low complexity, high reliability and a wealth of support resources lowers the cost of developing, maintaining and supporting database applications using MySQL. The elegant and uncomplicated architecture has numerous benefits:

*"Compared to Oracle, MySQL was considerably easier to maintain and tune."*

**Charlie Garry**
**Meta Group**
**Infrastructure Strategies**
**Server Infrastructure**
**Strategies, March 2003**

- Engineers are less likely to make mistakes. Complex systems often harbor hard-to-find bugs that are not apparent until deployment. Uncomplicated systems help reduce downtime.
- Non-complex tasks can be allocated to less expensive developers enhancing the overall productivity and cost-effectiveness of the team.
- MySQL training and certification focuses on excellence in core competences, rather than lightweight coverage of many superfluous features. Certified MySQL developers are true masters of their trade.
- Systems administration in MySQL is easier and less expensive. Regardless of skill level, a MySQL administrator will accomplish more in less time. In many cases administration can be handled by existing team members.
- Computerworld's research found that "The MySQL database is also easy to administer. For example, users say that data migration is a snap because administrators simply move their data directly into MySQL."

Also, MySQL Enterprise includes a comprehensive Knowledge Base with hundreds of technical articles resolving difficult problems on popular database topics such as performance, replication, and migration. At a centralized repository, the Knowledge Base eliminates time-consuming browsing and reading of often unrelated information in mailing lists and newsgroups.

Using MySQL, a mid-size company could easily free up 25-50% of the time of an experienced database administrator and improve the efficiency of development teams by 15%. Assuming a team of five

[11] IDC, Maximizing the Business Value of Enterprise Database Applications on a Unix Platform. 2002.

developers and one administrator, savings would be in the region of $50,000 in loaded salary time and $10,000 in reduced training costs.

## MySQL Enterprise
## All-in-One Enterprise Grade Database, Support and Services

Regardless of how inexpensive it is to buy and run, MySQL would have no credibility with corporate customers unless it delivered enterprise reliability, security, uptime and scalability. MySQL has the capabilities to handle enterprise-grade database application requirements with an architecture that is extremely fast, reliable and easy to use.

Perhaps MySQL's architectural superiority comes from its Scandinavian origins — extensive reuse of code and a minimalist approach make it a very clean and well-designed product.

> *MySQL CEO Marten Mickos, makes a virtue of his product's stripped-down simplicity. "Software shouldn't be glorified," he says. "We say, 'Let's do this as compactly as possible and then sell it at a price that blows the competition away.' "*
>
> **The Wall Street Journal**

MySQL Enterprise includes standard enterprise features plus many innovations:

- **The MySQL Enterprise Monitor** - continuously monitors your MySQL servers and alerts you to potential problems before they impact your system. Its like having a "Virtual DBA Assistant" at your side to recommend best practices to eliminate security vulnerabilities, improve replication, optimize performance and more. As a result, the productivity of your developers, DBAs and System Administrators is improved significantly.
- **Production Support** - around the clock protection and error resolution for the MySQL Enterprise server from the experts at MySQL.
- **Scheduled Service Packs** - ensure the most up-to-date and stable version of MySQL software is available.
- **Emergency Hot Fix Support** - guards against a critical bug from interrupting key business processes.
- **Software and Security Update Service** - custom notifications that keep you informed of critical technical and security updates.
- **Online Knowledge Base** - supplies a robust online library of technical articles and how-to's that help MySQL professionals gain key knowledge and insight into how best to maximize the MySQL Enterprise server and related components.
- **Legal Protection** - provides worry-free deployment of open source software.

# Conclusion

Adding open source software to the data center has become an increasingly strategic way for CIOs to reduce the total cost of their systems infrastructure — TCO savings in excess of 75% or more with the dollar savings ranging from $250,000 to several million dollars.

For thousands of companies worldwide, MySQL has proven lower Total Cost of Ownership (TCO) by:

- Reducing database licensing costs by over 90%
- Cutting systems downtime by 60%

- Lowering hardware expenditure by 70%
- Reducing administration, engineering and support costs by up to 50%

MySQL is fueling the next wave of IT commoditization, enabling leading organizations to develop and deploy new innovative applications more reliably and at lower cost than ever before.

## About Sun’s MySQL Database

MySQL is the world's most popular open source database software, with over 100 million copies of its software downloaded or distributed throughout its history. With its superior speed, reliability, and ease of use, MySQL has become the preferred choice for Web, Web 2.0, SaaS, ISV, Telecom companies and forward-thinking corporate IT Managers because it eliminates the major problems associated with downtime, maintenance and administration for modern, online applications.

Many of the world's largest and fastest-growing organizations use MySQL to save time and money powering their high-volume Web sites, critical business systems, and packaged software — including industry leaders such as Yahoo!, Alcatel-Lucent, Google, Nokia, YouTube, Wikipedia, and Booking.com.

. At www.mysql.com, Sun provides corporate users with commercial subscriptions and services, and actively supports the large MySQL open source developer community.For more information about MySQL, please go to www.mysql.com.