



A Guide to Developing an Enterprise Open Source Strategy

The Rise of Open Source and the LAMP Stack



A MySQL® Business White Paper

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Executive Summary

Not only is open source ready for the enterprise, it's also proven there. Many of the world's largest organizations, including Yahoo!, Sabre Holdings, Cox Communications, The Associated Press, Google, and NASA, are realizing significant cost savings by using open source products to power web sites, business-critical enterprise applications and packaged software. But, it's not just the largest enterprise companies that are implementing open source. Consider these examples:

- When Lycos Europe moved its ISP-services and WebServices off high-cost, high-maintenance proprietary systems, they decided they would architect their solution on the LAMP (Linux, Apache, MySQL, PHP) open source stack with a mix of additional Java application servers. This implementation quickly proved successful and cost Lycos Europe a fraction of their traditional solution.
- The city of Austin made the decision to shift 300 desktops in the Communications Technology Management department to OpenOffice after testing the software on 30 desktops for several months. The city may expand the use of OpenOffice to more of the city's 5,200 desktops as an alternative to Microsoft Office.
- The Commonwealth of Massachusetts' Department of Environmental Protection migrated from Network Associates Magic help desk software using Microsoft SQL Server to OneOrZero's open source helpdesk system using MySQL as the back-end database. It was able to take the source code, customize it, and go into production in approximately 5 weeks. Since then, the system has performed flawlessly with no downtime. They also saved at least \$50,000 in annual license fees. This was their first foray into the use of open source.
- In June, 2004 France's civil service minister Renaud Dutreil told Reuters that he wants to use open source software providers to re-supply some of its almost one million state computers, under a government cost-cutting drive designed to trim a bulging public deficit. He said, "My estimate is that we can cut the state software bill at least in half."

Thousands of organizations have found open source to be highly reliable, secure, and cost-effective. In addition, leading companies are standardizing on the open source LAMP stack (Linux, Apache, MySQL, PHP/Perl/Python) because of its lower cost, greater efficiency, and freedom from platform lock-in.

Today, you no longer have to trade off support and stability to get the benefits of open source. Second generation open source companies provide:

- Commercial support
- Training and consulting
- Responsibility for product roadmap
- Clear ownership of intellectual property (IP)
- Large number of third-party tools
- Best practices resources available to ensure your success

If you're under pressure to "do more with less," or if you're seeking ways to reduce costs while maintaining quality and performance in your infrastructure, this guide can help you develop an open source strategy.

Can a company count on Linux to lower the total cost of ownership (TCO) of an enterprise system? Reaction to this question from CIOs and IT managers usually goes something like: "Well, of course it saves money on the bottom line. No sky-high enterprise licensing fees every year. No over-the-top support subscription costs; you can maintain the code in-house. Way fewer security and access issues, keeping the system down time low. No paying for unnecessary bells and whistles on end-user software. No worrying about mandatory upgrades every year and a half."

Chris Preimesberger
**"Four out of four experts agree:
Linux lowers TCO"**
IT Manager's Journal

The Rise of Open Source

Source code is the foundation of all software. Open source means that you can see, change and share the code to make it fit your exact needs. This provides users greater control and freedom from vendor lock-in. In this paper, when we say open source, we mean software that is Free or Open Source (also known as “FOSS”) as defined by the Free Software Foundation (FSF) or the Open Source Initiative (OSI).

The concept of “freedom” is very important to the open source community. With its huge community of testers and rapid iteration, the open source approach has been able to produce higher quality code, with fewer defects and fewer security vulnerabilities. In fact, a December 2003 study conducted by Reasoning (a leading provider of automated software inspection services) showed that the code quality of MySQL was six times better than that of comparable proprietary code. This is because a huge community of developers tests the software across a range of platforms 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.

Some confuse the concept of “open source freedom” with “free-of-charge software.” A growing number of companies offer open source software products under a dual licensing model including MySQL, Digium, OSAF, MandrakeSoft, Sleepycat Software, Technical Pursuit and Trolltech. Under this model, the software is available at no cost for open source projects through a Free / Open Source Software license (such as the GNU Public License or similar), and is also available through a commercial license backed by the company delivering the software. Under the commercial license option, companies can develop and distribute applications without opening their source code to the public.

“We’ve stated our technology goals as ‘better, faster, cheaper’. Open-source tools, used appropriately, mean that we can actually deliver on all three goals instead of picking just one or two.”

Craig Murphy
Chief Technology Officer
Sabre Holdings Corporation

This “quid pro quo” solution benefits everyone. The open source license helps create a huge community with potentially millions of users. The testing and feedback from this community continually improves the product. For those corporations that do not want to publish the source code of their applications, the commercial licensing option provides the benefits and support they need for a modest fee.

Evolution of Open Source

In the 1960s and 1970s all software was effectively open source. Most applications were sold with source code so that you could customize and integrate as necessary. Although this trend waned in the 1980s, with the rise of the Internet there has been a resurgence of Free / Open Source Software.

In fact, the underpinnings of the Internet (Apache HTTP server, SendMail, BIND, OpenSSL, etc.) are all based on open source standards. The Internet has also made it possible for collaboration on a global scale, thereby enabling communities to readily maintain and support open source technology.

The Linux operating system is credited with bringing open source into the mainstream. IDC estimates that Linux today makes up 25% of all server operating systems. Open source is widely endorsed by IBM, HP, Novell, Oracle, Red Hat and more. Even traditional closed source companies such as BEA, Computer Associates, Microsoft and Sun have started to open source pieces of their technology. In the

near future, the industry may see software companies trying to bring new life to “dead” database products by making them open source.

Open source has become an expected part of an IT strategy where there is pressure to do more with less. Today, we are seeing open source enter its second generation. A second-generation open source company is one that stands behind its software and offers a development roadmap, technical support from the developers and other services. These second-generation companies deliver open source software with certified binaries, complete documentation, and easy installation software. This gives enterprises the best of both worlds – enterprise-grade software without the risk of platform lock-in.

“In today’s market, we are constantly striving to keep cost down. Hardware and software costs contribute heavily to our IT budget. Leveraging open source and the MySQL database allow us to save money without sacrificing performance.”

Mark Cotner
Manager of Network Application
Development
Cox Communications

Successful second-generation open source offerings have clear leadership. For example, MySQL and JBoss oversee a product roadmap and development process that has the same level of rigor as any closed source vendor. They evaluate software submitted by the open source community, test it, and decide if it will be included in upcoming releases.

Why Open Source is Important to the Enterprise

Compared to traditional software, using successful open source infrastructure components offers some key advantages in the enterprise:

Lower Cost of Operation. Open source products typically not only have lower license costs, but also dramatically reduce the running costs that make up the total cost of ownership. An IDC¹ study revealed 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. A comparable open source database reduces TCO by much as 90%. For large organizations, this can be savings on the level of tens of millions of dollars.

Reliability and Performance. A huge community of users test open source software across a range of platforms before it is certified for production. Bugs are found and fixed quickly. Rapid iteration and extensive public review has helped make open source software more reliable than closed source.

Ease of Deployment. As opposed to having hundreds of rarely used features, open source software focuses on the most essential capabilities. This makes deployment easier than proprietary software. Most mature open source software now comes with easy-to-use installation software, graphical management tools, and on-line help.

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

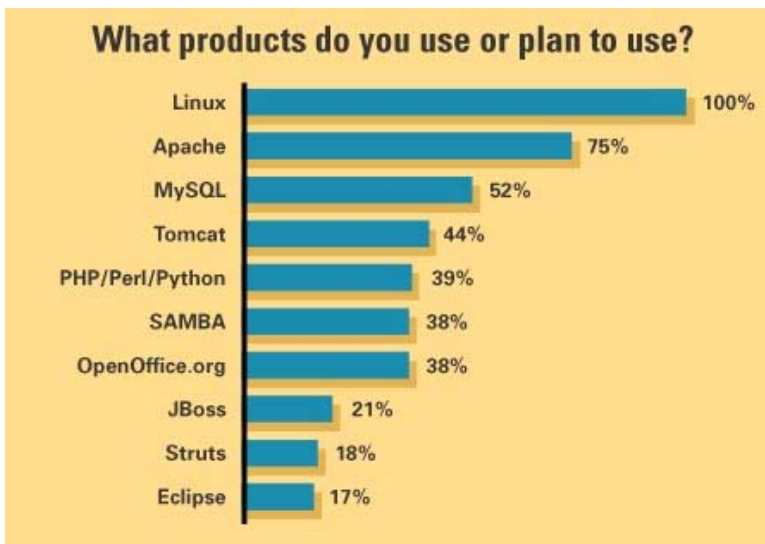
Security. Because open source software is out in the open, it is typically more secure and suffers fewer vulnerability attacks than proprietary software. When a problem is uncovered, it is addressed quickly.

¹ IDC, Maximizing the Business Value of Enterprise Database Applications on a Unix Platform. 2002.

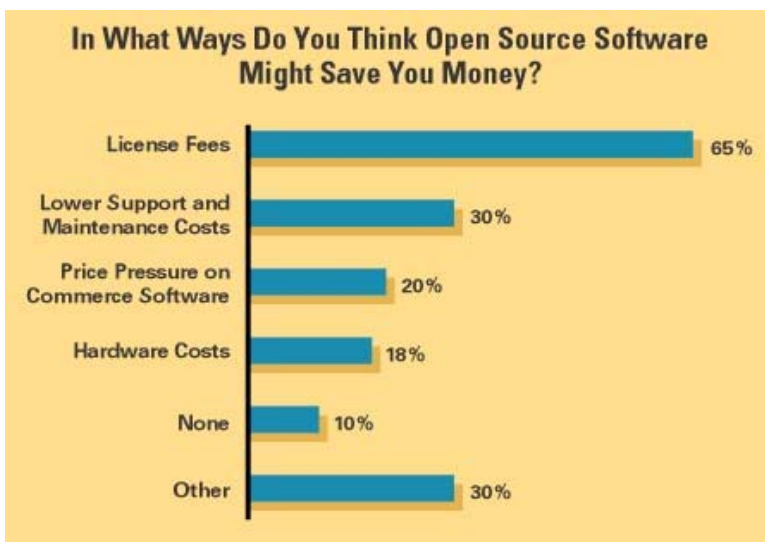
Corporate acceptance of Linux has laid a foundation, both technically and culturally, for the broader adoption of open source technology. Leading organizations are now using open source technology to further increase operational efficiency by driving down the cost of ownership for new and existing applications.

Open Source @ Work

A 2003 survey by Forrester Inc.² shows over 70% of \$1B+ North American companies are now running the Linux open source operating system. Seventy-two percent of these plan to use more open source with the majority (68%) citing lower cost as the primary benefit. When Forrester asked, “What products do you use or plan to use?” the answers were:



With regard to cost savings, the respondents answered as follows:



² Forrester Inc. “Your Open Source Strategy”. Schadler, Rustein, Lambert, Tseng, Whitely. September 2003.

CIO magazine has been closely following open source in 2004. In a survey of CIOs, it learned:

- 69% will use MORE open source software in 2004
- 25% will use the SAME amount of open source in 2004
- 6% will use LESS open source software in 2004

Open Source in the Enterprise

While many think of open source as synonymous with the most famous example of Linux, there are in fact thousands of open source technologies in use. While not all are widespread, there are dozens of mature, stable open source products that are well supported from vendors.

This section identifies some of the most mature open source technologies that should be part of your open source strategy:

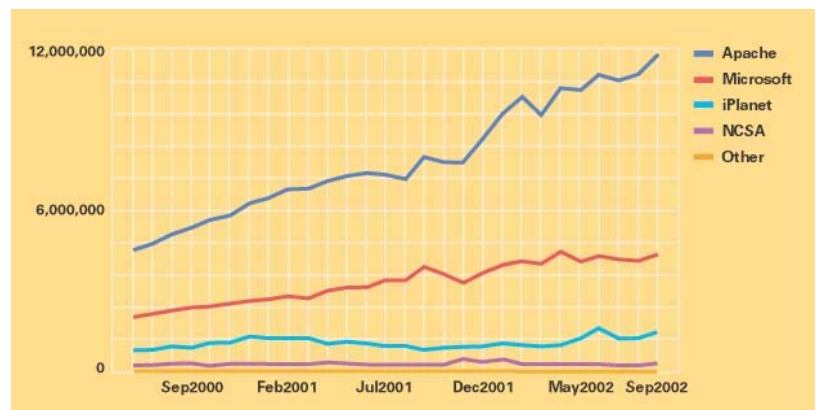
LAMP stack

Many companies are starting to evaluate an open source stack as an alternative or complement to proprietary solutions from companies like Microsoft, IBM, and Oracle. Later in this paper we provide an open source scorecard that lists some of the key decision criteria for evaluating open source software. Your goal may not necessarily be to completely replace a proprietary stack, but to have a heterogeneous environment with the freedom to choose the right platform for the right application. After harvesting huge efficiencies from using open source software such as Linux and Apache, many companies are now targeting their database infrastructure, development environments and application servers for the next round of cost savings. 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. The key components in the LAMP stack are:

Linux: Originally developed in 1991 by Linus Torvalds, a Finnish computer science student at Helsinki University, Linux rapidly grew as an alternative to expensive proprietary UNIX implementations. It has become the *de facto* enterprise server for web applications due to its reliability and uptime. Linux is packaged, sold and supported by leading IT companies such as HP, IBM, Novell, Oracle and Red Hat, making open source legitimate in the enterprise.

An example of the power of Linux is its use in the United States Postal Service. The USPS uses Linux in 250 mail distribution centers to recognize destination addresses on envelopes in its mail routing processes. This deployment uses more than 6,000 Linux systems supporting optical character recognition (OCR) applications.

Apache has been the dominant web server since April 1996 with 68% market share estimated NetCraft in April 2004. Surveys show sites using Apache have, on average, less than one-third the downtime of those running Microsoft's IIS (3.23 hours per month vs. 11.03 hours per month).





Weather.com, the online counterpart of The Weather Channel Interactive Inc.'s 24-hour TV channel, serves more than 50 million pages on stormy days, running on Apache servers. Weather.com is also working on swapping out its Oracle database for the open-source MySQL.

MySQL has grown to become the world's most popular open source database with more than six million active installations. MySQL Network has quickly become the core of many high-volume, business-critical applications.

"Now when I talk to senior management about moving from Oracle to MySQL they don't ask me, 'Are you sure?' They ask me, 'When?'"

**Dan Agronow, CIO,
Weather.com**

MySQL Network can scale to support the most-demanding enterprise applications. For example, the Los Alamos National Laboratory's implementation of MySQL stores 1.4 billion rows of data on 7 Terabytes of disk storage.

The company MySQL AB also offers MaxDB by MySQL, a heavy-duty, SAP-certified open source database targeted for SAP R/3 and Netweaver applications.

Customers such as Yahoo!, Google, Cisco, Sabre Holdings, HP and NASA are realizing significant cost savings by using MySQL's high performance database management software to power large web sites, business-critical enterprise applications and packaged software applications. MySQL is available on more than 20 platforms and is supported or embedded by over 100 software ISVs including companies like Adobe, Hyperion, NetIQ, SAS, SAP and others. MySQL offers a complete range of services including support, training and consulting.

PHP / Perl / Python are various scripting languages used for building dynamic web sites. They are used by developers to quickly create powerful web based applications that access back-end systems or databases. These languages are used by such companies as Air Canada, Cisco, Deutsche Telecom, GE Marketplace, Lucent, Lufthansa, Nortel, Philips, Sprint, and Unilever.

Deutsche Lufthansa AG web site's e-ticketing functionality, including on-line booking, payment, frequent traveler services, scheduling, check-in, etc., rely on a PHP-based e-booking engine developed and maintained by Lufthansa.

Other Open Source Products

There are a wide variety of open source products for infrastructure and as end-user applications. Some of them are listed in the following tables.

Open Source Infrastructure Products

	Category	Key Customers	Key Supporters
JBoss	J2EE Application Server	Best Western La Quinta MCI Nielsen Siemens Unisys Wells Fargo	JBoss Group HP Intel Iona Unisys

Eclipse	Integrated Development Environment (IDE)	Alcoa Boeing Corporate Express Fuji Xerox Lockheed Martin Siemens	Ericsson Fujitsu Hitachi HP IBM Intel Red Hat SAP
Samba	File and Print Sharing Server	BMW Boeing Canon Inc. Medtronic NASA P&G Ziff-Davis	Cobalt Networks HP Veritas
SendMail	Email Server	Avaya Cablevision Systems Sherwin-Williams Yahoo!	HP IBM Intel
OpenLDAP	Information Directory Access Protocol	University of Michigan	HP IBM Intel Netscape
Tomcat	Java Servlet and Java Server Pages (JSP) technologies	Best Western MCI Nielsen Siemens Weather.com	Apple Borland HP IBM JBoss Novell Sun
Snort	Network Intrusion Detection	Ernst & Young PwC Scientific-Atlantic	IBM Sun SourceFire

Open source applications

	Category	Key Customers	Key Supporters
OpenOffice	Office Application Suite	China Government City of Munich, Germany City of Austin, Texas France Government	IBM Sun
OneOrZero	Helpdesk System	Commonwealth of Massachusetts	OneOrZero
Compiere ERP	Enterprise Resource Planning	Donau Verlag Com Division GM LHI Technology	Compiere
Evolution	Email/Calendaring/Contact Management	DAS Georgia Court of Appeals	Novell

OpenGroup ware	Groupware Server	HCC (SAP-university competence center)	Fujitsu Siemens SKYRIX Software AG
Mozilla	Web Browser and Mail Client	Red Hat Bloomberg	HP Oracle

With the wide range of open source development platforms, tools, and applications, you may have open source experience and expertise in your organization already.

Open Source Scorecard

To help you get started with your open source strategy we have developed this scorecard. You should evaluate open source as you would any new technology. Compare open source as well as closed source solutions; many enterprises use a mixed environment so that they can recognize the benefits of open source while still leveraging their existing IT investments and expertise. For example, you can readily deploy MySQL Network on Windows or, in fact, on any of more than 20 other platforms including Solaris, AIX, HP-UX, Netware and Mac OS X. And MySQL can easily be accessed from traditional programming tools such as Visual Basic, Java, C, C++, C#, Delphi or in conjunction with closed source application servers such as BEA WebLogic or IBM WebSphere.

"I see that the feature war is over. Now it is a question of who can deliver the best way. I strongly believe that open source can achieve better products over the long term."

Ernst Loessing
IT Director
Enercon

You'll also want to focus on basics that are needed for your applications, rather than all possible bells and whistles, as well as the support and services available from the open source vendor.

The following checklist is a useful tool for evaluating both proprietary and mature open source software.

Decision Criteria

(Are the following Considerations important to you?)

Consideration	Important?	
	Yes	No
TCO		
Lower initial licensing cost		
Lower hardware expenditure		
Reduced administration, engineering and support costs		
Cutting costly system downtime		
Lower support cost		
Lower training cost		
Performance	Yes	No
High speed		
Independent benchmarks on comparable hardware and load		

Reliability	Yes	No
Server and application up time		
Tests of code quality		
Responsiveness to bug reports		
Scalability	Yes	No
Ability to scale out more servers as necessary		
Independent benchmarks		
Security	Yes	No
No or low number of known vulnerabilities		
Independent validation of security		
Platforms	Yes	No
For which platforms is the software available		
Multi-language support		
Standards	Yes	No
Support industry standards		
Interoperability with other software or systems		
No platform lock-in		
Management	Yes	No
Ease of management		
Ability to manage more servers		
Support	Yes	No
Standard support		
Advanced support programs		
24x7x365 support		
Worldwide support		
Training		
Consulting		
3 rd -party products and services		
Maturity	Yes	No
Maturity of product		
Reliability of current version		
Frequency of updates		
Ease of installation		
Good documentation		
Best practices information available		
Original developers still involved and committed		
Strength of company behind the product		
Large community of users		
Certification available		
User conferences		

Expertise	Yes	No
Availability of experts		
Books and reference material		
Certified trainers		
Certified consultants		
Reference	Yes	No
References to talk to, preferably in your industry		
Experience on performance, reliability, scalability		
Best practices available		
Good experience with support		

If you've answered yes to more than half of the evaluation criteria above, you may be ready to start using some of the mature open source products described earlier in this paper.

Getting Started with Open Source

Once you've decided that open source is appropriate for your organization, the following are the top tips for developing an open source strategy. Remember that many enterprises use a mixed environment so that they can recognize the benefits of open source while still leveraging their existing IT investments and expertise. So, you don't need to think of moving to open source as an "either/or" scenario. The beauty of open source is that it easily co-exists with your current environment.

1. **Spec out the development project.** Make sure there is a clear specification and requirements phase before starting any new initiative. Using open source software for a new application is easier than migrating an existing application.
2. **Audit your resources.** Do an "audit" to find out who is using open source already in your organization. You may be surprised to find out what's already running! Focus where you have expertise and experience already.
3. **Have an evaluation phase.** You'll want to evaluate the software hands-on; don't just read about it. Encourage people to download it, learn it, experiment with it, and report back their impressions. You'll want to invite others in your organization to participate as well, not just your group. Encourage everyone to get training early so that the team has the same knowledge base when starting a project.
4. **Take advantage of support resources.** The open source community is very accessible. Ask questions in newsgroups; you will get answers. Consider going to a user conference to learn best practices. Perhaps most importantly, buy support *before* you need it.
5. **Understand Free / Open Source Software License vs. Commercial License Options.** Many enterprises want to benefit from open source products and tools, but do not want to make the software they develop available under Free / Open Source Software licenses. That is why mature, second-generation open source software companies provide a Commercial License option. Under commercial licenses, companies can develop and distribute applications without opening their source code to the public.
6. **Create a deployment plan.** It is very important to create a production plan as you would for any software. It is best to do a pilot project before ever attempting a mission-critical one (i.e. develop

an Intranet application before you build a customer-facing application). In your plan, always establish a go/no go date and establish a backup plan. Of course, you'll always want to have the ability to "roll back" to a previous working system. Finally, when you implement a LAMP stack, make sure you have someone experienced in each of the components; you may even want to get an outside expert to transfer some skills or lead the design.

7. **Become a part of the open source community.** You'll want to create an open source advisory group. Be sure to report bugs; they will be fixed. Give back to the community if you are developing applications under a Free / Open Source Software license. For example, if you customize the application or write samples and documentation, share them with the community.

Conclusion

Open source is not only ready for the enterprise, it's proven there. When you launch your open source initiative, a disciplined approach will allow you to maximize savings and minimize risks. To give yourself a level of comfort with your first open source projects, start with low-risk projects. And, recognize that open source can co-exist with your current IT investments and infrastructure.

Often the easiest way to get success with open source software is by using commodity software on the server where performance and reliability can be easily demonstrated. As you become more comfortable with open source, you can naturally evolve to a broader LAMP stack.

New projects in your organization are a great way to get started with open source. Your experience there will be invaluable later when you undertake more sophisticated application migrations.

About MySQL

MySQL AB develops, markets and supports a family of high performance, affordable database servers and tools. The company's flagship product is MySQL, the world's most popular open source database, with more than five million active installations. Many of the world's largest organizations, including Google, Sabre Holdings, The Associated Press, Suzuki and NASA, are realizing significant cost savings by using MySQL to power Web sites, business-critical enterprise applications and packaged software. MySQL AB is a second generation open source company, and supports both open source values and corporate customers needs in a profitable, sustainable business. For more information about MySQL, please go to www.mysql.com.

Resources

White Papers & Articles

A Guide to Lower Database TCO, MySQL AB, <http://www.mysql.com/tco>

A Computerworld article, "MySQL Breaks Into the Data Center" 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 this white paper we'll show you how. You'll also learn how organizations such as Cox Communications, NASA, Sabre Holdings and Yahoo! have improved database reliability, performance and TCO using MySQL.

How to Evaluate Open Source Software / Free Software (OSS/FS) Programs, Wheeler, http://www.dwheeler.com/oss_fs_eval.html

This paper describes 12 key steps for evaluating open source software.

Four out of four experts agree: Linux lowers TCO, Preimesberger, *IT Manager's Journal*, June 8, 2004, <http://management.itmanagersjournal.com/article.pl?sid=04/06/04/2114222>

Four well-informed professionals all agree that you can't help having a lower TCO using Linux in an enterprise system.

Analyst Reports

Your Open Source Strategy, Forrester: Schadler, September 2003

Enterprises are intrigued by open source software --- but stymied by myths of cost, support, and risk. Smart firms will master these myths to get the open software stack they want.

Open Source Databases: Side Street to Main Street, AMR Research: Kirby, Lundstrom, Carillo, O'Brien, February 2004

Open source databases will create an opportunity for users to dramatically lower the costs of application deployment, particularly for new projects

Equating Linux TCO Requires New Equation, META Group: Ferengul, Corey, April 2004

Distribution + Support + Management Tools + Software Stack + Use Case = User-Controllable TCO

Case Studies

A Sunny Forecast for Open-Source, Computerworld, April 26, 2004, <http://www.computerworld.com/developmenttopics/websitemgmt/story/0,10801,92583,00.html>

Weather.com's move to an all-open-source web site infrastructure has enabled the company to lower costs while meeting increased capacity demands.

Cox Communications Powers Massive Data Warehouse with MySQL, MySQL AB, <http://www.mysql.com/it-resources/case-studies/cox.php>



Cox Communications is the fourth largest cable-television provider in the United States, serving approximately 6.3 million customers. To maintain optimum performance and customer-service levels, Cox has developed a huge data warehousing application. At the heart of this business-critical system is a 2-billion row MySQL database.

Statistics

Why Open Source Software / Free Software (OSS/FS)? Look at the Numbers!, Wheeler,
http://www.dwheeler.com/oss_fs_why.html

This paper provides quantitative data that show using open source software can be a superior approach to using their proprietary competition according to various measures.

Open Source Database Development Closes in on Microsoft, Evans Data Corporation,
http://www.evansdata.com/n2/pr/releases/Database_Winter_04.shtml

Results from the latest Database Development Survey from Evans Data Corporation showing how open source databases are gaining strength.