

# White Paper

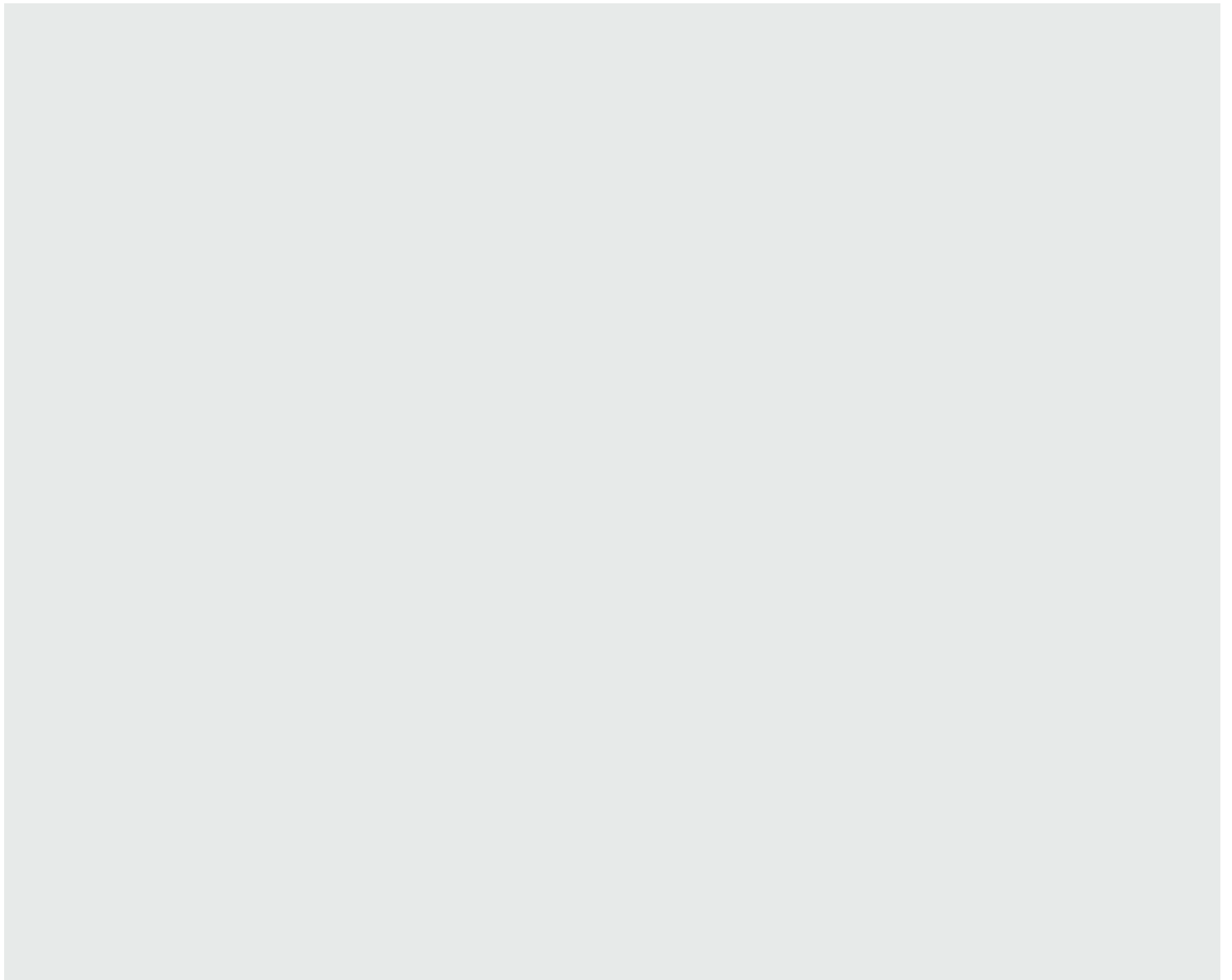
DATA CENTER

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## LAMP on SUSE<sup>®</sup> Linux Enterprise



Get More, Spend Less for Your Custom Applications



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# LAMP: Powering the Open Enterprise

**SUSE Linux Enterprise provides a complete foundation of LAMP components and proven network services, all fully integrated and tested into the distribution.**

Over the past two years, the LAMP stack of open source software components—Linux\*; the Apache Web server; MySQL\* database; and the coder's choice of PHP, Python or Perl—has moved beyond its position as a Web developer's creative toolkit to become a major development platform for the enterprise. Long a cornerstone of the Web's highest volume sites (including Amazon, Friendster, Google and Yahoo), LAMP has more recently been used to create major online transactional systems for Boeing, Disney, Lufthansa and Sabre, to name only a few organizations.

What these bellwethers of online business have discovered is that open source software now offers the simplest, fastest, most flexible,

affordable and scalable platform for building and deploying Web-based, enterprise-class applications. It's a major shift in the software landscape with implications for anyone concerned with the cost, functionality and performance of enterprise applications.

If you are considering deploying a LAMP stack inside your organization, you should consider the SUSE® Linux Enterprise platform from Novell®. SUSE Linux Enterprise provides a complete foundation of LAMP components and proven network services, all fully integrated and tested into the distribution. SUSE Linux Enterprise offers unique performance and security advantages and is fully supported by the Novell global service organization.

## First Light: LAMP Ignites on the Web

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LAMP stack components have furnished the software building blocks for Web applications for almost as long as the Web itself has existed. Originally adopted by developers because they were open, free, easily configurable and robust, these tools evolved quickly as the open source community added features and functionality. Over time, the LAMP stack came to form a *de facto* platform as tens of thousands of developers polished the integrations and documented best practices.

Individually, the core LAMP components are as follows:

### Linux

Linus Torvald's 1991 announcement that he was coding a free UNIX-type operating system was a watershed event in the open source movement. Since version 1.0 was released in 1994, Linux has become firmly established

as an enterprise-class alternative to proprietary UNIX\* and Microsoft\* products, largely through the efforts of commercial software providers like Novell that have extended the free Linux kernel and created the support and services infrastructure essential to enterprise users.

### Apache

The Apache Web server traces its roots to the public domain HTTP daemon developed at the National Center for Supercomputing Applications at the University of Illinois, Urbana-Champaign. In 1995, it was adopted and completely rewritten by a group of volunteers that eventually became the Apache Software Foundation. Apache has been the most popular Web server every year since 1996 and has a current market share of just over 68 percent, according to a February 2006 Netcraft survey.

## MySQL

MySQL is the world's most popular open source database, with more than 8 million active installations. Many of the world's largest organizations—including Sabre Holdings, Cox Communications, The Associated Press, NASA and Suzuki—are realizing significant cost savings by using MySQL to power Web sites, business-critical enterprise applications and packaged software.

## PHP

PHP is a widely used general-purpose scripting language that is especially suited for Web development and that can be embedded in HTML. In recent years, its relatively simple syntax, ease of use and open source licensing have made PHP one of the most popular languages on the Web.

## Perl

Sometimes called “the duct tape of the Internet,” Perl is a cross-platform programming language popular with Web developers for its text manipulation capabilities and rapid development cycle. It is highly extensible, with more than 500 third-party modules currently available through the Comprehensive Perl Archive Network (CPAN).

## Python

Python is a portable, interpreted, object-oriented programming language developed under the ownership of the Python Software Foundation. It features an elegant but not overly simple syntax, a small number of powerful high-level data types and a core that can be systematically extended with modules written in a compiled language such as C or C++.

A combination of rapid technical advances by open source project teams and commercial pressures on enterprise IT managers have combined to make LAMP a viable and increasingly popular alternative to the enterprise development frameworks offered by Microsoft and Sun.

## Business and Technology Trends Drive LAMP into the Enterprise

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In recent years, a combination of rapid technical advances by open source project teams and commercial pressures on enterprise IT managers have combined to make LAMP a viable and increasingly popular alternative to the enterprise development frameworks offered by Microsoft and Sun\*. Among the factors that are accelerating this trend are the following:

- *Constant pressure on developers to do more, faster and with less as firms strive to reduce costs, improve their returns on IT investment and accelerate time-to-value*
- *The growing adoption of SOA environments for enterprise integration, which enable wider choice of application development and implementation technologies by allowing heterogeneous systems to interact freely at the service level*
- *The faster pace of open source software improvement relative to proprietary products, made possible by the active participation of global user communities*
- *The arrival of polished developer tools for the LAMP environment (To cite just two examples, ActiveGrid has released a sophisticated visual development environment and application server to streamline the creation and deployment of LAMP applications, and Zend Technologies provides integrated development and production environments specifically for PHP applications.)*
- *Vast improvements in the performance of affordable x86 architecture server systems and the maturation of clustering and virtualization technologies that allow these systems to deliver reliability and availability equal to that of RISC/UNIX-based systems*
- *The availability of complete open source LAMP software stacks in licensed distributions fully supported by global enterprise software vendors*

The language components of the LAMP stack—PHP, Python and Perl—were created specifically to simplify, streamline and accelerate the type of programming tasks typical of Web development and administration.

## The Embedded Expense of Proprietary Environments

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But perhaps the most significant factors fueling LAMP adoption are the greater complexity and higher development expense associated with the two leading environments for Web-based applications—Microsoft's .NET and Sun's J2EE\*.

Each camp claims a large market share, provides high-quality development tools and enjoys the support of a broad industry

ecosystem. They also share some significant drawbacks, including higher cost, greater complexity, longer development cycles and massive software frameworks that impose substantial processing overhead and complicate application deployment. Both frameworks are also (to different degrees) closed and controlled by single entities in a top-down fashion.

## The LAMP Opportunity: Achieve More, Spend Less

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In contrast, LAMP offers a completely open source development stack that is lightweight, inexpensive, highly efficient and easy to use. Several features distinguish LAMP from proprietary application frameworks and offer advantages that are helping corporate developers and IT managers bring new applications online more quickly and at lower cost while simplifying their infrastructures and improving their returns on IT investment.

### Speed and Simplicity

The use of high-level scripting languages improves developer productivity. The language components of the LAMP stack—PHP, Python and Perl—were created specifically to simplify, streamline and accelerate the type of programming tasks typical of Web development and administration. They are particularly well suited to text handling and to database access for dynamic content generation. In general, they feature a simple, clear syntax that makes them easy to learn. Additionally, they are interpreted rather than compiled, which simplifies debugging. They are also highly efficient, with a one-line script often performing the same work as many lines of low-level code.

### A Culture of Cooperation

The open source community and its culture of knowledge- and resource-sharing accelerates problem-solving. Community knowledge-bases and libraries of sample application code help compress development time by enabling convenient reuse and adaptation.

### Low Overhead

The compact LAMP component stack simplifies deployment and reduces processing overhead. Very tight integration between PHP and Apache, for instance, eliminates the need for application server software and in many instances eliminates an entire physical server tier.

### Platform Portability

Because LAMP runs on a wide range of hardware platforms, users have maximum flexibility in deployment and server infrastructure design decisions. Of particular value is the option to deploy on clusters or grids of affordable x86-based servers. These utility computing architectures provide an optimized combination of efficient resource utilization, high availability, versatility and instant scalability.

## Security and Stability

The LAMP stack has a lower bug density—the number of bugs per thousand lines of code—than a baseline of 32 open source projects analyzed, according to a 2006 study by Coverity, a maker of code-analysis tools.

In the analysis, more than 17.5 million lines of code from 32 open source projects were scanned. On average, 0.434 bugs per 1,000 lines of code were found, Coverity reports. The LAMP stack, however, “showed significantly better software quality,” with an average of 0.29 defects per 1,000 lines of code.

**Both SUSE Linux Enterprise Server 9 and SUSE Linux Enterprise 10 include every core component of the LAMP software stack.**

## The Benefits of Deploying LAMP on a Major Linux Distribution

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While Web developers have been using LAMP in very large systems for the better part of a decade, the fact remains that the individual components are not a homogeneous software stack that has been vertically integrated by a single vendor. Enterprise developers who simply download freely available releases of Linux, Apache, MySQL and PHP can spend considerable time and energy performing and troubleshooting that integration themselves. While documentation and support may be found online, users may also find themselves dependent on the goodwill of volunteers at the worst possible moment. Upgrade releases aren't coordinated among the various component project

teams, and new features in one may cause compatibility issues with another. What's more, applications built with high-level scripting language can be difficult to secure, particularly for novice developers.

Developers can take a huge step toward avoiding these and other potential pitfalls by building on and deploying to a major Linux distribution—one that includes all the essential LAMP components in its distribution bundle and supports each one with a global service organization and complete lifecycle support services: in short, a distribution like SUSE Linux Enterprise from Novell.

## SUSE Linux Enterprise: The Platform for the Open Enterprise

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SUSE Linux Enterprise provides a secure, reliable and scalable platform for open source computing in the enterprise that's backed by the worldwide Novell support infrastructure and partner network. It also delivers a comprehensive, tightly integrated and fully tested software stack for building and deploying Web-enabled LAMP applications.

SUSE Linux Enterprise is packed with features that offer unmatched performance and scalability in large-scale LAMP deployments. It provides advanced memory management and processor support, Native Posix Thread

Library (NPTL), advanced I/O capabilities and unique class-based kernel resource management (CKRM). High-availability features include Hotplug services support, cluster IP aliases and support for the latest server and storage virtualization technologies.

Both SUSE Linux Enterprise Server 9 and SUSE Linux Enterprise 10 include every core component of the LAMP software stack. Scheduled for release in Summer 2006, SUSE Linux Enterprise 10 includes the following packages:

SUSE Linux Enterprise integrates a comprehensive portfolio of core operating system features, open source applications, network services, development tools and management resources, creating a uniquely capable platform for LAMP applications.

## Apache

Apache 2.2.0 features a hybrid multi-process/multi-threaded implementation and supports extension modules for IPv6, filtering, multi-language error responses and simplified configuration, and a new API. SUSE Linux Enterprise 10 also includes Apache version 1.3 for backward compatibility with earlier installations and modules.

## MySQL

Version 5.0 of the popular database includes rollback, crash recovery, low-level locking, database replication, clustering, and full-text indexing and search. Novell has partnered with MySQL AB to provide enhanced support services for this popular open source database as well as optional subscription-based access to the MySQL Network commercial-database service.

## PHP

Version 5.1 of the popular PHP Web development framework, complete with all extensions, is shipped with the distribution. Version 5.1 features include the following:

- *A complete rewrite of date handling code with improved timezone support*
- *Significant performance improvements compared to PHP 5.0.x*
- *Default PHP Data Objects (PDO) extension enablement*
- *More than 30 new functions in various extensions and built-in functionality*

## Make LAMP More Versatile, Manageable, Reliable and Secure

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SUSE Linux Enterprise integrates a comprehensive portfolio of core operating system features, open source applications, network services, development tools and management resources, creating a uniquely capable platform for LAMP applications.

- *Bundled libraries, PCRE and SQLite upgraded to latest versions*
- *PEAR upgraded to version 1.4.5*

Each module ships as a separate package, providing administrators with granular control of installed server functionality.

## Python

Version 2.4.2 is included, along with bindings for QT, Gtk, LDAP, XML, MySQL, Tk and curses.

## Perl

SUSE Linux Enterprise ships with version 5.8.8 of this popular multipurpose scripting language. While Perl is a cross-platform scripting language used for almost any task, it is best suited to small applications, text processing and Web forms.

## LAMP Stack Alternate Components

Also included in the distribution are several open source applications and tools that frequently figure as alternate components of the LAMP stack, including PostgreSQL (version 8.1) and the Ruby scripting language (version 1.8.4) PostgreSQL 8.1 is another flexible and extensible open source database with many features similar to those of MySQL. Ruby is an interpreted scripting language designed for quick and easy object-oriented programming and the basis for the open source Web application framework Ruby on Rails.

## Fine-grained Deployment and System Management

YaST, a comprehensive installation, configuration and administrative suite unique to SUSE Linux Enterprise, provides a common management foundation for the operating

system and all services and applications running under it. YaST not only simplifies the management of the operating system but also accompanying services including DNS, Apache Web server, SAMBA fileshare, Xen virtual servers and even third-party applications. Novell ZENworks® Linux Management complements YaST, providing centralized control, administration and maintenance for large server deployments.

## Unparalleled Security

Security is a fundamental design point for the SUSE Linux Enterprise platform. The platform includes essential security capabilities such as encryption, security certificate creation and management, user authentication and access control, and firewall and proxy management. SUSE Linux Enterprise also includes AppArmor, the most effective and easy-to-use application security solution, to protect applications on the desktop and server from internal or external attacks, malicious applications and viruses.

## Broad Hardware Support

SUSE Linux Enterprise supports a wide range of hardware architectures, including 32-bit x86; AMD64; Intel® EM64T and Itanium® 2; IBM Power®, zSeries® and S/390®, providing users with freedom of choice in deployment decisions.

## Service Pack Releases

To keep the thousands of software packages included in the SUSE Linux Enterprise distribution up to date, Novell provides fully integrated and rigorously tested service packs that incorporate security patches, updates and new user-requested features.

## Novell Lifecycle Product Support

Novell backs the SUSE Linux Enterprise platform with an enterprise-class software

## SUSE Linux Enterprise Server 9 was recently chosen “Best Enterprise Server Distribution” by an international jury at the November 2005 LinuxWorld\* Conference & Expo in Frankfurt, Germany.

ecosystem, providing technical support, training, consulting services and indemnification through its global partner network and internal staff of more than 700 support technicians. New support packages offer customers a choice of two service levels: 12x5 and 24x7.

The rich feature set provided in SUSE Linux Enterprise is so comprehensive that SUSE Linux Enterprise Server 9 was recently chosen “Best Enterprise Server Distribution” by an international jury at the November 2005 LinuxWorld\* Conference & Expo in Frankfurt, Germany.

Developers who would like to evaluate LAMP on SUSE Linux without commitment can download the free distribution from [openSUSE.org](http://openSUSE.org), which is home to the openSUSE™ project, a Novell-sponsored community initiative that promotes the use of Linux everywhere. The openSUSE project has more than 20,000 registered members, including Linux engineers, graphic artists, application developers, user interface designers, technical writers and end users. Every day, more than 7,500 copies of SUSE Linux, the distribution created by the openSUSE community, are installed.

Interested developers can download SUSE Linux from [openSUSE.org](http://openSUSE.org), build an application and then deploy their tested applications to a fully licensed SUSE Linux Enterprise Server to gain the full service and support advantages Novell offers.

**Developers who would like to evaluate LAMP on SUSE Linux without commitment can download the free distribution from [openSUSE.org](http://openSUSE.org), which is home to the openSUSE project, a Novell-sponsored community initiative that promotes the use of Linux everywhere.**

Only SUSE Linux Enterprise provides a complete open source solution that includes all the LAMP stack components, is optimized for the enterprise environment and is supported worldwide by Novell and its global partner network.

## Novell Open Enterprise Server Adds Network Services

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NetWare® users who wish to migrate to Linux should consider Novell Open Enterprise Server, which brings the robust set of networking and management services from NetWare to the SUSE Linux Enterprise platform. By implementing a security solution based on the identity-management capabilities of Novell eDirectory™ and Novell Identity Manager, system administrators can provide fine-grained access control and enhanced threat protection for all server systems and applications.

With Novell Open Enterprise Server, existing Novell customers don't have to rip out existing infrastructure. Customers can deploy any or all of the included technologies, which include the following:

- *The latest NetWare operating system and services, including new enhancements*
- *The complete SUSE Linux Enterprise Server 9 operating system (for Intel-based x86 platforms)*
- *Integrated common management tools to allow platform coexistence and management*

## LAMP Shines Brightest on SUSE Linux Enterprise

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Lower cost, faster development, open source code access and superior performance have helped bring the LAMP stack components together as a popular environment for Web application development and production. The same factors are making it an increasingly popular choice for enterprise developers building service-oriented systems for Web-based access. Those applications will require

a different and wider set of platform resources to enable tighter security, high reliability and enterprise class support. Only SUSE Linux Enterprise provides a complete open source solution that includes all the LAMP stack components, is optimized for the enterprise environment and is supported worldwide by Novell and its global partner network.

## Turning Up the ROI with LAMP: Novell Forge

Novell Forge provides a perfect example of the time-to-value acceleration that can be achieved by using LAMP as an application development and deployment environment. Created as an online developer portal to help system administrators, corporate developers, ISVs, CSIs, consultants and systems analysts by providing an environment for code collaboration, technology and vertical market communities, discussions, code samples and FAQs. The site now hosts more than 800 projects and 30,000 registered users.

Novell developers originally planned to build the site using a conventional J2EE environment and tool set, but early estimates of a 12-month development cycle weren't compatible with their assignment to have the site in production for the start of BrainShare® 2005—which was only three months away. So instead the team chose Wikimedia, a new open source content management solution built on the LAMP stack.

“We took a large part of the code directly from the open source community and rebuilt it,” recalls current project manager Paul Jones. “We had two people working on the front end, which was all done using PHP, and one guy working on the back end. We built the entire site, tested everything and went live just in time for BrainShare. That's how fast we can develop with LAMP and PHP.”

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