

# The Business Value of Linux for Today's Enterprise

# Novell Adds Value to Your Business with Linux\*

**Choice plays a key role in keeping today's businesses agile and profitable. With the emergence of enterprise-class service and support for Linux distributions, businesses now have a competitive choice of operating systems for infrastructure services, workgroup computing and mission-critical applications.**

Linux\* has found its way into the IT infrastructure of most businesses and is already part of the modern data center. Now, with Novell® leadership, Linux gives you more options than ever before. Novell delivers software solutions that are open, secure and global, and with SUSE® Linux Enterprise, Novell addresses some of the most crucial pain points of your business—giving you real choice.

## Linux in the Modern Enterprise

Choice plays a key role in keeping today's businesses agile and profitable. With the emergence of enterprise-class service and support for Linux distributions, businesses now have a competitive choice of operating systems for infrastructure services, workgroup computing and mission-critical applications. Until recently, organizations typically aligned themselves with a proprietary operating system—a partnership that meant vendor lock-in, high total cost of ownership (TCO) and lowered return on investment (ROI). With its fully supported SUSE Linux Enterprise 10, Novell levels the playing field and frees you from single-vendor constraints. This paper discusses the Linux advantage in key areas such as availability and scalability, management, security and software licensing.

From its inception, Linux has been free to download and use. Although the landscape is dotted by multiple distributions, the core developmental philosophy has remained consistent. A highly capable global community of developers maintains and improves the Linux kernel, yielding a robust, reliable, scalable and highly secure product through a

constant process of peer review. The collaborative and open nature of the development process makes Linux an excellent value compared to proprietary operating systems.

The modern enterprise is a heterogeneous mix of proprietary and open source technologies. In enterprises that have “standardized” on Microsoft\* or UNIX\*, it is common to have other operating systems fill niche roles. Whether they are hosting a clustered database, an HPC environment, ERP solution or CRM package, these systems require the same management attention as the other systems, albeit from highly skilled staff members. This mixture of technologies and operating systems fosters an environment that is complex, expensive, difficult to manage and even more challenging to secure. The licensing costs, proprietary hardware costs, disparate management tools and staffing required to support the distinct operating systems lead to substantial expense. The management of security creates additional expense through such activities as patch deployment and virus and intrusion detection and cleanup. For these reasons, Linux has begun its migration from the edge of the infrastructure to the mission-critical core.

The earliest uses of Linux in the enterprise were for non-mission-critical roles, usually file/print and networking services such as DNS/DHCP. But with the growing maturity of the operating system and its support ecosystem, Linux is assuming a wider range of roles, including mission-critical ones previously reserved for proprietary operating systems.

With the availability of commodity hardware in the '90s, IT departments began segregating applications on separate servers to allow them exclusive access to the available hardware resources. But the low-cost hardware and dedicated server philosophy has resulted today in server sprawl and a lack of overall utilization. On average, IT managers are seeing 5- to 15-percent utilization of these systems. Electrical consumption costs (which includes HVAC), management costs and licensing across hundreds of servers creates an unreasonably high TCO and lowered ROI.

Enter Linux. Its modular design and open source development address the concerns of the modern heterogeneous enterprise in a number of ways. SUSE Linux Enterprise from Novell decreases TCO and increases ROI with innovative technologies in four main areas:

- *Utilization*
- *Management*
- *Security*
- *Licensing*

It's time to see how SUSE Linux Enterprise 10 can add value to your business.

## Increased Utilization

In today's highly competitive and global business environment, IT managers must constantly do more with less. This pressure has spawned a trend in modern computing—server consolidation. Successful server consolidation can mitigate low utilization and server sprawl, both of which can negatively affect operational costs. The benefits of consolidation are independent of company size or industry and are vital to organizations whose IT departments need to reduce costs. The process of condensing resources to

fewer physical servers while simultaneously satisfying existing SLAs and planning for eventual scale-out and -up initiatives has never been so important.

Virtualization technology is the linchpin in the consolidation movement because it decouples the physical hardware from the operating system, allowing for multiple distinct operating systems to “live” independently on the same physical hardware. While virtualization is not a new technology, it has recently been reborn in the data center to optimize commodity hardware and to take advantage of current management and hardware trends. Consequently, existing servers can be condensed onto fewer and potentially smaller physical appliances. The net effect yields higher overall utilization, increased flexibility and reduced server sprawl. When implemented correctly, virtualization can increase enormously the overall utilization of existing resources. The ability to re-provision new servers as needed at a substantially lowered cost also generates unprecedented flexibility and agility. Likewise, consolidation reduces power consumption costs, including HVAC requirements. Both factors contribute directly to the maintenance of an organization's operational costs.

SUSE Linux Enterprise features the newest release of Xen\* 3, a virtual machine monitor (VMM) or hypervisor. It is a software foundation that governs operating systems' access to computer resources, such as memory and network adapters, in order to securely execute multiple Virtual Machines (VMs)—each running its own operating system on a single physical system. Developed by engineers at the University of Cambridge as an open source project, Xen is the industry's fastest and most secure server virtualization technology.

**SUSE Linux Enterprise from Novell decreases TCO and increases ROI with innovative technologies in the main areas utilization, management, security and licensing.**

# Novell is committed to the propagation of Xen virtualization technologies. These technologies are included in SUSE Linux Enterprise Server 10.

**SUSE Linux Enterprise 10 ships with a comprehensive set of administration, configuration and deployment tools to ease the burden of systems and subscription management.**

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† *Xen will be included in the next major release from Red Hat (Red Hat Enterprise Linux 5). The details of the integration of Xen with RHEL 5 are not available, but the market will reap the benefits of healthy competition fostered by Red Hat, Novell and other flavors of Linux.*

Novell is committed to the propagation of Xen virtualization technologies. These technologies are included in SUSE Linux Enterprise Server 10. Novell is able to take a leading role in the shift to virtualization-based IT due to the convergence of commodity hardware and open source software—that is, Linux running on x86 and x86-64 computers. It's a combination that is transforming racks of compute and storage servers into the pre-eminent enterprise IT platform. Virtualization is also differentiating applications as they evolve into self-contained modular services. Xen virtual machines take that evolution one giant step further.

SUSE Linux Enterprise Server 10 and Xen virtualization technology—coupled with open-standards-based management solutions and identity-driven, directory-based technologies—enable your data center managers to treat all the hardware and software in the data center as a pool of interchangeable resource components. In effect, the technology now exists to dynamically bring together what you need, when you need it, and in ways that make sense for your business.

Although Xen has its roots in the open source community, it has been endorsed and adopted by many of the industry's major vendors, including AMD, Dell, Hewlett-Packard, IBM, Intel, Novell, Red Hat and Sun Microsystems. Because Xen technology is open source, it has continued to attract more and more contributors—essentially becoming an open standard. Although Xen sees broad support from other popular Linux distributions, SUSE Linux Enterprise Server 10 is currently the

only operating system to offer integrated virtualization with Xen.†

## **Comprehensive Systems Management**

Centralized management is a modern enterprise code of conduct that allows staff to be comprehensively trained on a single product. Within this model, system monitoring and configuration changes can be made from a single console. Centralization lowers TCO by increasing efficiency and removing the need to cross train staff on multiple management products. To date, however, the landscape of system management is flooded with management applications and appliances.

Many systems administrators agree that installing and configuring a single server is a trivial task that becomes daunting, for a variety of reasons, when scaled across the enterprise. Different types of networks, such as those based on Windows\*, UNIX and Linux, need to interoperate. Security vulnerabilities need to be continually monitored, and patches need to be applied as soon as they are available. Finally, as the business grows and more applications are deployed, the IT group must add, manage and maintain more machines. Unfortunately, data center managers do not proportionately increase the resources needed to manage an expanding environment. The result is an overtaxed IT department that struggles to support the organization's needs.

It's widely agreed that Linux operating systems have been accompanied by weak centralized management tools. Attempts to remedy this weakness have resulted in a diverse range of tools to perform certain tasks. The problem is that too many tools are often required to perform any given task, and there is often more than one way to perform any single task.

SUSE Linux Enterprise 10 ships with a comprehensive set of administration, configuration and deployment tools to ease the burden of systems and subscription management. No other Linux platform is as easy to deploy, configure and maintain as SUSE Linux Enterprise. The market-leading set of integrated systems management capabilities included with SUSE Linux Enterprise features the following:

- **YaST** is a comprehensive installation, configuration and administration suite unique to SUSE Linux Enterprise 10. It is a common foundation that not only simplifies the management of the operating system but also of accompanying services such as a DNS server, an Apache\* Web server, Samba fileshares, Xen virtual servers and even third-party applications.
- **AutoYaST** is a time-saving tool that automatically performs installation and configuration on similar servers. An extension to YaST, it automates installation to a large number of machines. Because installations can be performed in parallel without user intervention, AutoYaST saves organizations tremendous amounts of time.
- **Novell ZENworks® Linux Management** complements YaST by enabling your IT administrators to centrally control any system in your enterprise as your network grows. Novell ZENworks Linux Management offers all the tools and capabilities you need to extend enterprise-class resource management to distributed Linux systems—efficiently and cost effectively.
- **Novell Customer Center** is a new portal where you can easily manage all your business and technical interactions with Novell, including contracts, subscriptions and support entitlements. From one location,

*you can review the status of all your Novell products, subscriptions and services—and obtain critical Linux updates and support.*

Managing a data center requires you to deal with heterogeneous and distributed environments. Often each device defines its own representation of management information. You have to account for different semantics, terminology, data structures and protocols. You can spend a lot of time and effort trying to unite these silos of management data to achieve a single and consistent representation of all management data. And collecting the information to manage an entire data center is just one part of the management challenge. Normalizing, organizing and analyzing that data is just as critical to ensuring successful data center management.

End-to-end management across the diverse components of a distributed environment is both a reality and a requirement. It is no longer sufficient to manage personal computers, servers, subnets, network core, storage and software in isolation. These components all interoperate to provide connectivity and services. Information regularly crosses these boundaries, and management must do the same.

To address these requirements, SUSE Linux Enterprise 10 integrates and supports the open WBEM/CIM industry standard as a vendor-independent, robust and descriptive framework for systems management. Support for the WBEM/CIM industry standards simplifies systems management across distributed and heterogeneous environments. With SUSE Linux Enterprise 10, Novell promotes these open standards and achieves enterprise readiness for the data center.

**Novell AppArmor, an open source technology included in SUSE Linux Enterprise 10, proactively protects the operating system and applications from external or internal threats, even zero-day attacks, by enforcing good program behavior and preventing even unknown software flaws from being exploited.**

**SUSE Linux Enterprise 10 from Novell addresses the concerns of modern computing from the data center to the desktop. With a world-class support team of more than 800 dedicated Linux engineers, it would be difficult to find a more capable solution partner.**

## Security

A major pain point in modern technical environments is security—or lack of it. With Windows dominating the computing market (70.9-percent market share), enterprises often attribute downtime to virus/intrusion cleanup, and constant security patch deployment. These factors affect TCO negatively. Applications in Windows are typically written to run at the administrator level, making them the perfect gateway for hackers or malicious code to gain access to the operating system. Due to architectural differences, Linux is inherently more secure than Windows. Most applications on Linux are not designed to run with such root privileges, limiting the amount of damage a hacker or malicious code can do. Still, many security vulnerabilities result from bugs in “trusted programs” that could allow an attacker to acquire root privileges.

Red Hat was the first to answer the call, developing SELinux (Security Enhanced Linux) in conjunction with the NSA (National Security Agency). SELinux implements mandatory access controls that use labeled security (the application to each data file of a tag identifying that file’s appropriate security level). While SELinux provides a high level of security protection against software vulnerabilities, its configuration can be extremely complicated, making it difficult to deploy without a significant investment in time, expertise and resources.

A much easier-to-use alternative exists in the form of Novell AppArmor™, an open source technology included in SUSE Linux Enterprise 10. AppArmor proactively protects the operating system and applications from external or internal threats, even zero-day attacks, by enforcing good program behavior and preventing even unknown software flaws from being exploited. AppArmor security pro-

files completely define what system resources individual programs can access, and with what privileges. A number of default policies are included with AppArmor, and you can use a combination of advanced static analysis and learning-based tools to deploy AppArmor policies for even very complex applications in a matter of hours. AppArmor features a name-based design and does not require re-labeling of the file system. Its implementation addresses the issue of data integrity and places a high value on enterprise requirements, especially ease of implementation and performance.

## Licensing

Licensing is another pain point for today’s IT managers. Many Microsoft customers are frustrated with the cost of licenses as well as the Microsoft Software Assurance plan. With the shipment of Vista, most plans will have expired, forcing enterprises to purchase licenses as if they were never in the program. The second pain point is the high TCO of Windows compared to any Linux competitor. In contrast to Windows, where a usage license drives the business model, enterprise-class Linux distributions follow a subscription-based business model. Subscription levels vary from merely obtaining security updates, fixes and patches to worldwide 24x7 support offerings. While the use of Linux itself is free of charge, any enterprise-relevant distribution must be accompanied by support or maintenance offerings. Only such support and services can ensure that production systems will stay productive to prevent costly data loss or system downtime.

SUSE Linux Enterprise from Novell comes with subscription or support bundles at multiple levels. Novell also offers enterprise licensing models and support or service-level agreements for all its products.

## Conclusion

The benefits of Linux and open source offer compelling business value for today's complex enterprise. Decision makers are learning that a Linux solution exists for most of their computing challenges. The number of applications supported on Linux systems is growing rapidly, and Linux operating systems are as robust as their proprietary counterparts while being more secure and less expensive.

SUSE Linux Enterprise 10 from Novell addresses the concerns of modern computing from the data center to the desktop. With a world-class support team of more than 800 dedicated Linux engineers, it would be difficult to find a more capable solution partner.

This paper has touched some common pain points that enterprises are experiencing.

Specific topics of interest are covered in greater detail in a variety of white papers and case studies that can be found at [www.novell.com/linux](http://www.novell.com/linux). The road to a more agile, secure and reliable computing environment is not a lonely one, nor is it the same for all. Novell understands the unique requirements of your environment and industry, and provides assessment and consulting services on a global scale to assist with your migration. These services give you the confidence and concise answers you need to get maximum value from your Open Enterprise.

For more information on all open source technologies mentioned above, please visit [www.novell.com](http://www.novell.com) or have a look at our Technical Linux Library at [www.novell.com/linux/technical\\_library](http://www.novell.com/linux/technical_library).

[www.novell.com](http://www.novell.com)



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