Your Introduction to SUSE® Linux Enterprise 10

The Platform for the Open Enterprise™

Novell.

Table of Contents

SUSE LINUX ENTERPRISE 10

SUSE®Linux Enterprise 10 is the premier Platform for the Open Enterprise™. Only SUSE Linux Enterprise 10 offers built-in application security, virtualization and integrated systems management across the full range of hardware architectures. Supported and certified by the world's leading hardware and software vendors, SUSE Linux Enterprise 10 is backed by award-winning Novell® technical support and a global ecosystem of partners and services. As a result, your organization can better address the challenges of increasing competition, spiraling IT costs, growing system security threats and demanding customers.

When performance, reliability and world-class support really matter, choose SUSE Linux Enterprise from Novell.

SUSE Linux Enterprise 10 Platform Overview

With solutions for your entire enterprise—from desktops to data centers—the best Linux* platform just got better. SUSE Linux Enterprise delivers powerful capabilities for security, virtualization and software management.

Security

Only SUSE Linux Enterprise 10 includes Novell AppArmor, the revolutionary application-level security service that provides ironclad protection for your system and any processes you are running. With AppArmor, you can rapidly deploy powerful application security for both servers and desktops while reducing the burden on your IT department and lowering your total cost of ownership. AppArmor helps you rapidly develop and enforce security policies to protect your infrastructure from attackers who find and exploit application flaws. Using AppArmor policies you could, for example, define the scope of an application's access to system resources or enforce beneficial application behavior. AppArmor gives you the tools to protect your critical infrastructure without huge investments in time, resources or training.

Virtualization

SUSE Linux Enterprise 10 is the first enterprise platform to include a fully integrated and supported version of Xen 3.0, the emerging open source standard for virtualization services. Xen 3.0 allows you to consolidate multiple workloads on a single server or allocate a single workload across multiple servers. With Xen 3.0, you gain the flexibility to reconfigure your applications and your systems for maximum efficiency. (Most servers run at less than 20-percent utilization. With Xen and SUSE Linux Enterprise 10, you can increase that utilization to levels of up to 70 percent.)

Novell is the second-largest contributor to Xen technology (after XenSource, the creator of Xen), so you can be assured that the integration of Xen 3.0 and SUSE Linux Enterprise 10 is the tightest in the industry. Novell also supports Xen with the unique YaST-based management tools you need to quickly and easily deploy virtualization in your enterprise. The virtualization features of SUSE Linux Enterprise will help your enterprise lower costs and improve utilization, with maximum performance and reliability.

Software Management

SUSE Linux Enterprise introduces a new paradigm for software and subscription management, the Novell Customer Center. In its first release, the Novell Customer Center is a centralized online portal that you use to obtain software updates and patches, and access Novell technical support. Over time, the capabilities of the Novell Customer Center will expand, automating much of the day-to-day burden of managing your software.

Best of all, the Novell Customer Center is completely integrated with the Novell ZENworks® management suite. As your needs evolve, you can seamlessly migrate from a world where you manage individual systems to a world where you automate the management of your entire deployment.

World-class Support

SUSE Linux Enterprise 10 is backed by world-class Novell technical support. Novell is the only Linux vendor to receive Support Center Practice (SCP) Certification, an internationally recognized standard developed by the Service & Support Professionals Association (SSPA) and a consortium of IT companies. In addition, the VARBusiness Annual Report Card ranked Novell number-one in server operating system support, primarily because Novell Technical Support meets more than 99 percent of its Service Level Agreements.

Subscription Benefits

When you choose SUSE Linux Enterprise, you're subscribing to the best-engineered Linux platform in the world. With access to the Novell Customer Center, you'll receive the latest software enhancements, bug fixes and security patches through regular updates. This ensures that you always have the newest functionality and the best hardware support. Throughout the term of your subscription, Novell will work with leading hardware and software vendors to ensure that their latest products and enhancements are fully supported. You will also have access to numerous support services. Depending on your subscription level, your level of support can range from electronic assistance (via the Web and e-mail), to three tiers of telephone support or even the daily expertise of an onsite dedicated support professional.

Hardware Support

SUSE Linux Enterprise is supported by all leading hardware vendors. Whether you want to run it on servers, clients, single-processor whitebox systems, blades or the largest mainframes, you'll find that SUSE Linux Enterprise is certified on the architectures you need. Novell works closely with chip manufacturers like Intel and AMD and supports 32-bit and 64-bit architectures as well as the latest single- and dual-core processors. SUSE Linux Enterprise is fully certified on the latest servers, workstations, desktops and laptops from Dell, Fujitsu, HP, Lenovo, Silicon Graphics, Sun, Unisys and others. These vendors have partnered closely with Novell engineering teams throughout the design and creation of SUSE Linux Enterprise. Such tight collaboration enables SUSE Linux Enterprise to take full advantage of the platforms where it is deployed, giving you the best possible performance—from your desktops to your data center.

Highest-quality Engineering

Novell creates the SUSE Linux Enterprise platform with AutoBuild, a unique Novell development and testing methodology. AutoBuild ensures that all Linux software code from Novell meets the highest technical standards for reliability and integrity. Using AutoBuild, Novell can create and deliver important software updates in hours, not days or weeks. AutoBuild also allows Novell to create SUSE Linux Enterprise for multiple platforms simultaneously. As a result, you can configure a more efficient IT infrastructure, running and managing the same Linux operating system on all your mainframes, grids, clusters, workstations and desktops.

Lifecycle Support

SUSE Linux Enterprise 10 is backed by a seven-year lifecycle guarantee. During that time, you can access all available security patches and bug fixes through the Novell Customer Center.

Application Developer Services

SUSE Linux Enterprise includes a complete software development kit (SDK) to facilitate the quick customization and rapid development of a broad range of applications. SUSE Linux Enterprise 10 also provides the latest stable releases of key development tools, services and environments, including a "Web 2.0" infrastructure with Apache Web Server 2.2.0, PHP 5.1, MySQL 5.0, PostgreSQL 8.1, Ruby, Geronimo and Apache Tomcat. Moreover, SUSE Linux Enterprise is the only platform that ships with Mono®, an open source development platform based on the .NET framework.

SUSE LINUX ENTERPRISE SERVER FEATURES

SUSE Linux Enterprise Server is a secure, reliable and flexible server operating system for enterprise computing. Built for your busy organization, it delivers:

- Industry-proven performance and scalability
- Lower operational costs for your data center applications and workgroup services
- Higher computing utilization
- Tight security for your corporate data
- Support for a broad range of hardware platforms and software packages

Fully backed by Novell with a seven-year lifecycle guarantee, SUSE Linux Enterprise Server is here to stay. It provides open programming and development tools that simplify Linux integration and customization. It also offers comprehensive open source functionality and virtualization capabilities that help your business lower operational costs, increase computing utilization and protect corporate data.

Virtualization

Feature or Function	Description
Xen 3.0 Hypervisor	
Xen 3.0 Virtual Machine Monitor (VMM)	Runs many smaller virtual machines (VMs) on a single server, each with a separate operating system and application instance.
Processor architectures	Provide support for SMP x86 and SMP x86-64 systems. They also provide virtual SMP support for virtual servers, virtual block-device support and virtual network-interface support.
Native hardware support	Fully supports AMD* Pacifica and Intel* VT hardware.
Administration interface	Creates virtual machine profiles and configures individual virtual servers with a fully integrated YaST module.
Guest operating systems	Run multiple SUSE Linux Enterprise Server 10 guest servers on the same SUSE Linux Enterprise Server 10 host server.

Administration and Manageability

Feature or Function	Description
Administration	
YaST2	Covers a wide range of management tasks and has been enhanced to give a consistent management experience across all SUSE Linux platforms.
CIM management	Delivers an open Web-based Enterprise Management (WBEM) Common Information Model Object Manager (CIMOM) as well as a variety of CIM providers for consumption by management frameworks.
LiMAL management library	Provides a common operating system interface for use by management utilities such as YaST, CIM and third-party tools.
Directory Integration	
Supported directories	Give all organizations—both small and large—a choice of LDAP-compliant directory services: • Microsoft* Active Directory* • OpenLDAP • Novell eDirectory™
Other Manageability Tools	
SPident	Queries the RPM database and matches each installed package against all known service packs (SPs). Only the newest SP, the one that does not contain any out-of-date packages, is marked as being "installed."
Intelligent Platform Management Interface (IPMI) 1.4.19	Uses IPMItool to monitor health, inventory and remote power control of OpenIPMI 1.4.19 compatible servers.
iprutils 2.1.2	Includes a suite of utilities to manage and configure small computer system interface (SCSI) devices supported by the ipr SCSI storage device driver. Version 2.1.2 contains utilities for the IBM* Power *Linux RAID adapters.
net-snmp 5.3.0.1	Provides tools and libraries relating to Simple Network Management Protocol (SNMP). These resources include an extensible agent, an SNMP library, tools to request or set information from SNMP agents and tools to generate and handle SNMP traps.

Security

Feature or Function	Description
Application Security	
Novell AppArmor 2.0	Provides easy-to-use Linux security software that protects Linux servers and applications from malicious threats. Novell AppArmor features: • YaST-integrated administration tools for configuration, maintenance and automated development of per-program security policy • Pre-defined security policies for standard Linux programs and services • Robust reporting and alerting capabilities to facilitate regulatory compliance The following features are new in Novell AppArmor 2.0: • CIM-enabled clients that integrate with industry-standard management consoles • ZENworks Linux Management integration for profile distribution and report aggregation • Enhanced auditing and reporting
MIT Kerberos 5 release 1.4.3	Uses secret-key cryptography to provide strong authentication for client/server applications.
Monitoring	
Snort 2.4.3	Provides a lightweight network-intrusion detection system to enhance overall security. Snort performs protocol analysis and content searching and matching. It can also be used to detect a variety of attacks and probes, such as buffer overflows, stealth port scans, CGI attacks, SMB probes, OS fingerprinting attempts and much more.
Advanced Intrusion Detection Environment (AIDE) 0.10	Enhances security by performing data-integrity assurance with the file-manipulation monitoring system.

Scalability and Performance

Feature or Function	Description
CPU scalability	Scales to 512 processors on most standard architectures and up to 1024 processors on IA-64 systems.
CPU performance and scheduler enhancements	Provide hyperthreading, which enables multi-threaded server software applications to execute threads in parallel within each individual server processor. This feature dramatically improves transaction rates and response times. In addition, system resource affinity table (SRAT) improvements increase multi-core performance by up to 15 percent.

Feature or Function	Description
CPUSET	Delivers lightweight kernel objects (CPUSETs) that enable users to partition their multiprocessor machines in terms of CPUs. CPUSETs are strong "jails," meaning that processes running on predefined processors won't be able to run on other processors.
Pluggable I/O scheduler	Improves performance and allows administrators to tune the server to match its usage with four I/O behavior policies: • Complete Fair Queuing (CFQ): This default scheduler is suitable for a wide variety of applications, especially desktop and multimedia workloads. • Deadline: The deadline I/O scheduler implements a per-request service deadline to ensure that no requests are neglected. Deadline policy is best for disk-intensive database applications. • Anticipatory: The anticipatory I/O scheduler uses the deadline mechanism plus an anticipation heuristic to predict the actions of applications. The anticipation heuristic is best suited for file servers. • No-Op: This no-operation mode does no sorting at all and is used only for disks that perform their own scheduling or that are randomly accessible.
Raw I/O	Improves database performance by reducing read/write times. This is especially useful for SCSI and Fibre Channel devices that transfer data directly to a buffer in the application address space. Raw I/O utilizes high-bandwidth and low-overhead SCSI disk I/O by skipping kernel buffering and I/O queuing.
Intel I/O Acceleration Technology	Provides a kernel that supports networking acceleration technology from Intel. Customers using Intel server chipsets will experience increased network performance.
Memory limits	Offer the following scalability: • 10 TB in production for 64-bit architectures • Large memory support on 32-bit machines through efficient memory management (anon-vma and objrmap) • Up to 1 GB Highmem support on x86 systems • Up to 4 GB with Physical Address Extensions (PAE) support on x86 systems

Storage and High Availability

Feature or Function	Description
File Systems	
Network File System (NFS) v4	Delivers network file-sharing capabilities for UNIX* and Linux installations. SUSE Linux Enterprise 10 supports NFS versions 2 and 3—and now also 4—over both UDP and TCP. Version 4 includes performance improvements, mandates strong security and introduces a "stateful" protocol.
Oracle Cluster File System 2	Runs in shared Oracle* home installations and makes the management of

Feature or Function	Description
(OCFS2)	Oracle Real Application Cluster (RAC) installations easier. The following features are new in OCFS2: • Node and architecture local files that use Context Dependent Symbolic Links (CDSL) • Support on all architectures • Network-based pluggable Distributed Lock Manager (DLM) • Improved journaling and node recovery using the Linux Kernel Java* Debugger (JDB) subsystem • Improved performance of meta-data operations • Improved data caching and locking
High Availability and Failover	
Heartbeat 2.0.3	Provides core cluster membership and messaging infrastructure. It implements the Open Clustering Framework APIs and provides services for node fencing, fault isolation and health monitoring. The following features are new in Heartbeat 2.0.3: • YaST enhancement to configure more than two-node failover • Sub-second failure detection • I/O data integrity checks that are performed before resources are moved to alternate nodes • Failed nodes return to action set to "automatic" or "manual"
Multipath I/O	Enables greater load balancing and fault tolerance by simultaneously accessing storage devices through multiple "channels." Multipath I/O tools include: • multipath: scans the system for multipathed devices, assembles them, and updates the device-mapper's maps • multipathd: waits for maps events and then executes multipath • devmap-name: provides a meaningful device name to udev for devmaps • kpartx: maps linear devmaps to device partitions Version 0.4.6 improves support for EMC storage arrays.
Serviceability	
Linux Kernel Crash Dump (Kexec/Kdump)	Provides a new and preferred way to perform kernel crash dumps. Kexec/Kdump is supported on i386, x86-64 and ppc/ppc64 systems.
Storage Management	
High Availability Storage Foundation	Integrates Oracle Cluster File System 2 (OCFS2), Enterprise Volume Management System (EVMS) and Heartbeat 2 clustering services to deliver an entirely open source high-availability (HA) storage solution.
Enterprise Volume Management System	Administers storage through a single mechanism. Administrators can use EVMS to manage RAID*, LVM, various file-system formats, disk checking and

Feature or Function	Description
(EVMS)	maintenance, bad block relocation and more.
Distributed Replicated Block Device 0.7.15 (DRBD)	Builds single partitions from multiple disks that mirror each other. Using this disk-management tool, performance is similar to a RAID1 system, but it runs over a network. DRBD 0.7.15 allows partition sizes to be changed at runtime.
Internet Small Computer System Interface (iSCSI)	Links data storage facilities via local area networks (LANs), wide area networks(WANs) or the Internet. SUSE Linux Enterprise Server can act as both a target and initiator. For example, SUSE Linux Enterprise Server can be used as a SAN box (target) or as an iSCSI client (initiator).

Server Services

Feature or Function	Description
File and Print Services	
Samba 3.0.21b	Provides authentication, file, print and Windows* Internet Name Service (WINS) services for Microsoft Windows Client systems. Additionally, Samba allows a Linux client to integrate into existing Microsoft domains. With Samba 3.0.21b, Linux clients can also join Active Directory domains and authenticate against Active Directory servers.
Mail Services	
Postfix 2.1.1 and Sendmail 8.12.10	Provide mail serving. Postfix 2.1.1 is the default mail server for SUSE Linux products. Sendmail 8.12.10 is available as an alternative and for backward compatibility.
Internet Message Access Protocol (IMAP), specifically Cyrus IMAP Daemon 2.2	Enhances data protection and generally runs on "sealed" servers.
Databases	
MySQL* 5.0	Provides the popular open source database, now with rollback, crash recovery, low-level locking, database replication, clustering, full-text indexing and searching.
PostgreSQL 8.1	Offers another flexible and extensible open source database. The following features are new in PostgreSQL 8.1: • Database roles that simplify the management of large numbers of users • IN/OUT parameters that improve support of complex business logic for J2EE and .NET applications • Improved Two-Phase Commit to support WAN applications, heterogeneous

Feature or Function	Description
	data centers and ACID-compliant transactions • Improved multiprocessor (SMP) performance • 64-bit shared memory to support up to 2 TB of RAM on 64-bit platforms
Middleware Services	
Apache Web Server 2.2.0	Deserves its reputation as the number-one HTTP server on the Internet. Apache 2.2.0 features a hybrid multi-process/multi-threaded implementation. It also supports extension modules for IPv6, filtering, multi-language error responses, simplified configuration and a new API.
Geronimo	Delivers an open source Java Application Server from apache.org. Key features in Geronimo include: • J2EE* 1.4 compatibility • New ASF code for a complete J2EE stack • Full Tomcat integration
Java 1.4	Provides the popular object-oriented development language. SUSE Linux Enterprise 10 ships with the Java 2 platform, version 1.4.2.
PHP 5.1	Provides a general-purpose scripting language that is especially suited for Web development. Key features in PHP 5.1 include: • Completely rewritten date-handling code, with improved timezone support • Significant performance improvements (compared to PHP 5.0.X) • Default enablement of the PHP Data Objects (PDO) extension • More than 30 new functions in various extensions and built-in functionality • Bundled libraries, PCRE and SQLite upgraded to latest versions • PEAR upgraded to version 1.4.5
Python	Delivers an object-oriented interpreted language that is often used for rapid development of cross-platform applications. SUSE Linux Enterprise 10 includes the current Python version along with bindings for QT, Gtk, LDAP, XML, MySQL, Tk and curses.
Tcl/Tk scripting tools	Enable the rapid development of cross-platform GUI applications.
Ruby	Provides an interpreted scripting language designed for quick and easy object-oriented programming. The latest version is suitable for many of the same processing tasks performed by Python or Perl.
Shell scripting	Delivers bash (default), ksh, tcsh and zsh in SUSE Linux Enterprise 10.
Enterprise Application Services	
orarun	Significantly simplifies Oracle configuration. With orarun, you can: • Create Oracle users and groups • Set Oracle environment variables

Feature or Function	Description
	• Set Oracle-recommended kernel parameters • Automate the start and stop of Oracle system components • Rely on YaST integration
suse-sapinit	Automatically or manually start and stop SAP-application components at system startup, shutdown or reboot.

Application and Developer Services

Feature or Function	Description
Runtime Application Support	
Mono 1.2	Accommodates developers who prefer to use .NET development skills. SUSE Linux Enterprise Server is the only distribution to include Mono. Mono 1.2 includes the following features: • Optimized C# 2.0 compiler • Gtk# 2.0 • Mono Debugger • System.Windows.Forms implementations • VB.NET runtime (VB.NET compiler preview) • db4o for object persistence
Developer toolchain	Delivers the latest developer toolchain with the following features: • binutils 2.16.91 • GCC 4.1.0 • glibc 2.3.90 • GDB 6.4 • Tools for C, C++, Fortran77, Java, Ada and Objective-C
Non-uniform memory (NUMA) development tools	Fine-tune applications for NUMA usage on both x86-84 (Opteron*) and IA-64 (Itanium*) systems.

SUSE LINUX ENTERPRISE DESKTOP FEATURES

SUSE Linux Enterprise Desktop is a breakthrough business desktop that provides market-leading usability and seamless interoperability with existing enterprise systems—plus dozens of essential productivity applications. It is deployable as a general-purpose desktop platform or can be tailored for use in thin- or thick-client configurations for specialized tasks. By deploying SUSE Linux Enterprise Desktop to knowledge workers, your business can dramatically reduce costs, improve end-user security and increase operational flexibility.

Feature or Function	Description
Usability	
Intuitive user interface	Provides a more intuitive user interface, including a redesigned menu, control center and application browsing. Tightly integrated search capabilities provide quick and easy access to all content. Provides a more usable desktop environment through ongoing usability tests and a commitment to share all data with the open source community on BetterDesktop.org.
GNOME 2.12	Provides an intuitive and attractive desktop environment for your office workers and end users.
KDE 3.5	Delivers a powerful graphical desktop environment for Linux and UNIX workstations. KDE combines ease of use, contemporary functionality and outstanding graphical design.
Enhanced 3-D accelerated graphics	Allow your users to create richer graphical experiences for the Linux desktop. These powerful new 3-D acceleration graphical capabilities are unique to Novell. With these features, hardware manufacturers can create drivers that take advantage of accelerated 3-D rendering, and software developers can easily extend graphical capabilities.
Productivity Applications	
OpenOffice.org 2.0	Delivers a complete office suite. SUSE Linux Enterprise Desktop is the first fully supported enterprise desktop to deliver OpenOffice.org 2.0. It includes the following features: • A powerful spreadsheet program, business-presentation tool and word processor • OpenOffice Visual Basic macro interpreter • Microsoft Office compatibility
F-Spot photo library management	Offers advanced support for photo importing, publishing, cataloging and versioning. F-Spot offers full-scale photo management that is completely integrated into the Linux desktop.

Feature or Function	Description
Beagle^{TM}	Provides new integrated search functionality with fast and easy access to files via simple keywords. Using a single dialog, you can search files, e-mail, address books, source code, applications, images, music files and more.
Banshee	Delivers a music-management and playback application for the GNOME desktop environment. You can use Banshee to easily import, manage and play selections from your music collection. Using Banshee, you can: • Import CDs • Manage your music library • Play music • Create and maintain playlists • Sync music with an iPod* • Play music directly from an iPod • Create audio and mp3 CDs
Tomboy	Provides a desktop note-taking application for Linux and UNIX. This simple and easy-to-use tool helps your office workers organize ideas and information.
RealPlayer*	Makes it easy to view multimedia files and streaming audio or video feeds, create CDs or DVDs, and more.
Adobe* Reader	Allows you to view Adobe PDF files.
Novell Evolution™	Ships with all the leading commercial Linux distributions and is the most widely used Linux collaboration client in the world. Novell Evolution features direct connections to Novell GroupWise®, Microsoft Exchange 2000/2003 and any collaboration server that supports the IMAP and POP standards. Meeting the needs of enterprise users who must manage large volumes of e-mail, Novell Evolution offers complete e-mail management. It includes the unique vFolder* technology from Novell that allows your users to create powerful contextual views of inbound and outbound e-mail.
Compatibility and Interoperability	
Novell Edition OpenOffice.org 2.0: Microsoft file compatibility	Save and open documents created in Microsoft Office formats. The flexibility of OpenOffice 2.0 is convincing many organizations of the benefits of migrating to Linux and operating in a mixed-OS environment.
Novell Edition OpenOffice.org 2.0: macro support	Eliminates one of the largest barriers to OpenOffice adoption. Novell was the first company to implement the OpenOffice Visual Basic macro interpreter.
Novell Edition OpenOffice.org 2.0: Open	Fully supports the OpenDocument file format, the new public standard for document files. OpenOffice.org 2.0 is the only office suite available today that

Feature or Function	Description
Document support	supports this format.
Adobe Portable Document Format (PDF) compatibility	Includes two open source document viewers for Adobe PDF documents: • Evince is a document viewer for GNOME that can display multiple- and single-page document formats like PDF and Postscript. • KPDF for the KDE desktop has some unique features like continuous-mode presentation support.
Multilingual support	Supports single- and double-byte character sets in the following languages: • Chinese (Simplified and Traditional)** • English • French • German • Italian • Japanese** • Korean** • Portuguese • Spanish **Language support available soon

SUSE LINUX ENTERPRISE HARDWARE SUPPORT

Feature or Function	Description
Latest hardware support	Includes the latest open source drivers for: • Networking (including support for I/OAT and Wireless) • Platform management (IPMI) and power management • USB devices and IEEE-1394 (Firewire) • Storage • HW RAID solutions • Serial-Attached SCSI (SAS) • Serial-Attached ATA (SATA) • Multipathing • Fibre Channel • Desktop (Graphics, Audio and Bluetooth*)
Hardware plug-and-play	Provides new hardware support for USB and Bluetooth. This includes everything from memory sticks and scanners to digital cameras and portable music players (including Apple iPod).

THE PLATFORM FOR THE OPEN ENTERPRISE

With so many enhancements and new features, it's easy to see why organizations choose SUSE Linux
Enterprise from Novell. To discover more about the platform for the Open Enterprise, please visit:
www.novell.com/linux

Note: The features described in this document are based on the current beta build of SUSE Linux Enterprise 10.
They are subject to change. Novell, Inc. reserves the right to amend or remove features until the general
availability of SUSE Linux Enterprise 10.