Technical White Paper

LINUX OPERATING SYSTEMS

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What's New in SUSE® Linux Enterprise 10 Service Pack 2

Novell®

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General Service Pack Information

Service Packs are available for download from Novell Customer Center located at: www.novell.com/center

Because system maintenance is an essential part of SUSE® Linux Enterprise 10, Novell provides Service Packs (SPs) throughout the product lifecycle for all registered customers with valid SUSE Linux Enterprise Subscriptions. Service Packs are available for download from Novell® Customer Center at: www.novell.com/center

A Service Pack is an original software update that consolidates periodic security and maintenance patches. Where it is appropriate, where compatibility is ensured, and where Independent Software Vendor (ISV) certifications will not be affected, Service Packs also incorporate product enhancements such as new hardware support. This is very much the case with SUSE Linux Enterprise 10 SP2, which delivers a host of new capabilities.

Products based on SUSE Linux Enterprise include materials licensed to Novell under the GNU General Public License (GPL), which requires Novell to make available certain source code corresponding to those materials. The source code for all free software and open source packages is available for download at: www.novell.com/linux/source. For up to three years following official product release, Novell will also provide, on request, a mail copy of included source code. Requests should be sent by e-mail to: sle_source_request@novell.com or as otherwise instructed at www.novell.com/linux/source. Novell may charge a fee to recover reasonable costs of distribution.

SUSE Linux Enterprise 10 Service Pack 2 Summary

With the release of the second Service Pack for SUSE Linux Enterprise 10, Novell continues to set the standard in enterprise Linux* technology. This update delivers significant advances in virtualization, security, systems management, high availability, performance, developer services, network management, desktop computing and hardware enablement.

Maintenance Patches

SUSE Linux Enterprise 10 SP2 contains all security patches and bug fixes released for the Linux kernel 2.6 and associated packages since SUSE Linux Enterprise 10 was originally released in July 2006. Furthermore, it contains all Problem Temporary Fixes (PTFs) for each package released in the same period via the maintenance Web site.

While Novell and its technology partners jointly test each Service Pack to safeguard ISV certifications, we recommend you consult your ISV regarding the certification status of your application.

Hardware and Drivers

SUSE Linux Enterprise 10 SP2 supports many new hardware components via driver and PCI ID updates. It also adds support for a number of network and storage drivers, as well as support for new audio and graphics devices. Improvements and enhancements have been made to:

- *Hardware plug-n-play*
- *Printer standards support*
- *File standards support*
- *Network standards support*

Release Notes and Package Descriptions

The release notes and package lists for SUSE Linux Enterprise 10 SP2 contain detailed information on all new features,

version numbers, package specifications and modifications. As an additional benefit, the release notes also contain comprehensive information about SP2 installation methods, including new server set up and updating an existing SUSE Linux Enterprise Server 10 server:

- *SUSE Linux Enterprise Server 10 Service Pack 2: www.novell.com/documentation/sles10*
- *SUSE Linux Enterprise Desktop 10 Service Pack 2: www.novell.com/documentation/sled10*

The current versions and descriptions of each package can be found at the following URLs:

- *SUSE Linux Enterprise Server 10 Service Pack 2: www.novell.com/products/server/techspecs.html*
- *SUSE Linux Enterprise Desktop 10 Service Pack 2: www.novell.com/products/desktop/techspecs.html*

New and Enhanced Features in SUSE Linux Enterprise 10 Service Pack 2

NOTE: *This document is intended to give an overview and describes only the most important enhancements shipped with SUSE Linux Enterprise 10 SP2. It does not give a complete and exhaustive list of all enhanced and new features. No responsibility is taken for the correctness of the version numbers of the packages described.*

For a comprehensive overview of all new and updated packages and version numbers, please see the package descriptions for SUSE Linux Enterprise Server 10 SP2 and SUSE Linux Enterprise Desktop 10 SP2.

The GPL requires that Novell make available certain source code that corresponds to those GPL-licensed materials. The SUSE Linux Enterprise Product Sources are available for download at: www.novell.com/linux/source

Virtualization

Feature or Function	Description
Xen*	Xen is a virtual machine monitor for x86 environments that supports multiple guest operating systems with unprecedented levels of execution performance and resource isolation. In SUSE Linux Enterprise 10 SP2, Xen is updated to version 3.2, which supports fully virtualized guest systems, including Microsoft* Windows* Server 2008, as multi-CPU VMs. Successfully partitioning a machine to support the concurrent execution of multiple operating systems poses several challenges. First, virtual machines must be isolated to prevent the execution of one from adversely affecting the performance of another. This is particularly true when virtual machines are owned by mutually untrusting users. Second, the virtualization layer must support a variety of guest operating systems to accommodate the heterogeneity of popular applications. Third, the performance overhead introduced by virtualization should be small. Xen uses a technique called paravirtualization in which the guest OS is modified, mainly to enhance performance. The Xen hypervisor (microkernel) provides no hardware device drivers except for CPU and memory. This job is left to the privileged kernel running in domain 0, which has full hardware access and is started immediately after Xen starts up. Other domains access hardware through virtual interfaces provided by Xen and the domain 0 kernel. In addition to the hypervisor, running paravirtualized guest systems requires installation of the kernel-xen and xen-tools packages. Xen 3.2 also supports full virtualization of unmodified guests if appropriate hardware is present and the xen-tools-ioemu package has been installed.

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The release notes include a comprehensive list of updated and added features.

- SUSE Linux Enterprise Server 10 Service Pack 2: www.novell.com/documentation/sles10
- SUSE Linux Enterprise Desktop 10 Service Pack 2: www.novell.com/documentation/sled10

Feature or Function	Description
VM management tool	SUSE Linux Enterprise 10 SP2 ships with an updated version of virt-manager. This Virtual Machine Manager application provides a graphical interface for virtual machine management. It presents a summary view of all live domains with current performance and resource utilization statistics. A detailed graphical view shows performance and utilization over time. Ultimately this application will support new domain creation with centralized configuration, resource allocation, performance monitoring and management. An embedded Virtual Network Computing (VNC) client viewer provides a complete graphical console for the guest domain.
libvirt library	The libvirt library is updated to version 0.4.0, and includes MDNS and NUMA support. libvirt is a C toolkit for interacting with the virtualization capabilities of Linux and other operating systems. The library aims to provide a long-term stable C API, initially for the Xen paravirtualization, with the ability to integrate with other virtualization mechanisms if needed. MDNS (or zero configuration networking) is a set of techniques that automatically create a usable IP network with no configuration or special servers. This allows inexpert users to easily and automatically connect computers, networked printers and other devices. Non-Uniform Memory Access or Non-Uniform Memory Architecture (NUMA) is a memory design used in multiprocessor computers, where memory access time depends on memory location. Under NUMA, a processor can access its own local memory faster than memory that is shared or local to another processor.
Xen management tools support	To improve support for Xen management tools, the following packages are being added: - gtk-vnc is a GTK viewer widget for VNC clients. It is built using co-routines, which allows it to be completely asynchronous while remaining single-threaded. - Virt-viewer is a lightweight virtual machine viewer application for interacting with the graphical displays of virtualized guest OSs. It uses GTK-VNC for display and libvirt to lookup VNC server details associated with the guest. It is intended as a replacement for the traditional vncviewer client, which does not support SSL/TLS encryption for x509 certificate authentication.

Security

Feature or Function	Description
AppArmor®	AppAmor is updated to the latest version. AppArmor is the most effective and easy-to-use security system for Linux applications available today. It's a security framework that proactively protects the operating system and applications from external or internal threats, including zero-day attacks, by enforcing good program behavior and preventing even unknown software flaws from being exploited. Security profiles completely define what system resources individual programs can access, and with what privileges. A number of default policies are included, along with learning-based tools and advanced statistical analytics that simplify the development of customized policies, even for very complex applications.
Virtual private network (VPN)	Service Pack 2 includes StrongSwan, an open source IPsec-based VPN solution for Linux.
Pluggable authentication module	pam_faildelay, a new pluggable authentication module (PAM), is being added to allow the delay on failure to be individually set for each application.
Fingerprint reader	Service Pack 2 provides added support for SGS Thomson Microelectronics Fingerprint Reader, including a YaST2 configuration module.
Kerberos support for Evolution™	krb4 support for Evolution is enabled in SP2. Kerberos provides strong authentication for client/server applications using secret-key cryptography. Evolution is the integrated GNOME suite of mail, calendar and address book applications. The suite's modular design makes it easy to add new components or to embed the existing ones in other applications.

Management, Installation and Serviceability

Feature or Function	Description
Subscription Management Tool for SUSE Linux Enterprise	The Subscription Management Tool for SUSE Linux Enterprise is a package proxy system that helps customers manage their SUSE Linux Enterprise software updates while maintaining corporate firewall policy and regulatory compliance requirements. It is integrated with the Novell Customer Center and provides a repository and registration target that is synchronized with the Novell Customer Center and maintains all of its capabilities while allowing a more secure centralized deployment. The Subscription Management Tool for SUSE Linux Enterprise is included with every SUSE Linux Enterprise subscription.
YaST enhancements	YaST supports a wide range of management tasks and provides a consistent administrative experience across all SUSE Linux Enterprise products. Its scalable design makes it easy to add hardware and software configurations or new administrative plug-ins to the frame set. Service Pack 2 incorporates many important improvements to YaST, including: ■ FirstBoot enhancements – Welcome screen – License(s) – Setting up time zone and system clock – Keyboard layout – Machine name and domain – Root password and local user account creation – Register and activate – Includes the hardware configuration step in sound, printers, Bluetooth.. – Completed Installation screen ■ iSNS support is added to the YaST iSCSI modules. The Internet Storage Name Service (iSNS) protocol allows automated discovery, management and configuration of iSCSI and Fibre Channel devices (using iFCP gateways) on a TCP/IP network. ■ The YaST storage module now supports online resizing of ext3, and also allows online resizing of the root filesystem on ext3. ■ Support for bridge devices, FICON devices on mainframes and VLANs is added to the YaST network module. ■ Python bindings are added for YaST. ■ A YaST module is added for configuring SGS Thomson Microelectronics fingerprint readers. ■ SP2 adds the kdump package and YaST front end with support for saving dumps over the network and filtering kdump images. kexec/kdump is the preferred way to perform kernel crash dumps.
AutoYaST enhancements	AutoYaST provides fully customizable, automatic and remote Linux installation for large numbers of systems that share a similar environment, perform similar tasks and have similar—but not necessarily identical—hardware. AutoYaST dramatically shortens installation times and reduces administration costs for enterprise software rollouts. AutoYaST has seen several important improvements, including the addition of complete iSCSI support.
Installation	It is now possible to install NFS on the root partition. The maximum number of raw devices can now be specified as a boot option (max_raw_minors=XX, where 1 <= XX <= 65536). Support for 'start this script before' is added to insserv, a program for arranging initialization scripts. insserv enables an installed system init script (boot script) by reading the comment header and calculating the dependencies between all scripts.
Serviceability	Service Pack 2 adds several important enhancements to general serviceability. ■ The crash utility for live systems is updated to version 4.0-4.8, and the the number of supported CPUs is increased to 16384. This core analysis suite is a self-contained tool that can be used to investigate either live systems, kernel core dumps created from the Red Hat* Linux netdump and diskdump packages, the mcore kernel patch offered by Mission Critical Linux, or the LKCD kernel patch. ■ The iprutils package containing utilities for IBM* Power* Linux RAID Adapters is updated to version 2.2.8. This package provides a suite of utilities for managing and configuring small computer system interface (SCSI) devices supported by the ipr SCSI storage device driver.

The current version and description of each package can be found at the following URLs:

- SUSE Linux Enterprise Server 10 Service Pack 2: www.novell.com/products/server/techspecs.html
- SUSE Linux Enterprise Desktop 10 Service Pack 2: www.novell.com/products/desktop/techspecs.html

High Availability and Storage

Feature or Function	Description
Heartbeat	The Heartbeat subsystem adds failover functionality to your system, allowing two Linux servers (a primary and a backup) to determine if the other is "alive." If the primary isn't functioning, Heartbeat sends failover resources to the backup. It is a foundational technology of the High Availability Linux Project. In SUSE Linux Enterprise Server 10 SP2, Heartbeat is updated to the latest version, and includes a resource agent for iSCSI initiator and hooks to SAP resource agents
Stonith	The HPI STONITH module of Heartbeat is enabled in SP2. The STONITH module (also known as STOMITH) provides an extensible interface for remotely powering down a cluster node. The idea is quite simple: when the software running on one machine wants to make sure another machine in the cluster is not using a resource, it can pull the plug on the other machine.
Oracle* Cluster File System 2	Oracle Cluster File System 2 (OCFS2) is the only symmetrical parallel cluster filesystem to be accepted into the Linux Mainline Kernel. OCFS2 has been designed to host and perform on larger files in a clustered environment, making it a perfect fit for hosting virtual server disk images in a high-availability configuration. In SUSE Linux Enterprise Server 10 SP2, the OCFS2 userland tools are updated. This package contains the core user-space tools for creating and managing the file system. The update improves simultaneous write access.
XFS	XFS is a high-performance journaling file system which originated on the SGI IRIX platform. It is completely multi-threaded and can support large files and filesystems, extended attributes and variable block sizes. It is extent-based and uses Btrees (directories, extents and free space) to improve performance and scalability. Refer to the documentation at http://oss.sgi.com/projects/xfs/ for complete details. SP2 adds several packages for managing the XFS file system: ■ xfsdump is updated to a newer version. This package contains administrative utilities for the XFS file system, including xfsdump, xfsrestore and others. xfsdump examines files, determines which need to be backed up, and copies those files to a specified disk, tape or other storage medium. It uses XFS-specific directives to optimize a file system dump, and knows how to backup XFS extended attributes. Backups created with xfsdump are endian safe, and can thus be transferred between Linux machines of different architectures and also between IRIX machines. xfsrestore performs the inverse function of xfsdump: it can restore a full file system backup. Subsequent incremental backups can then be layered on top of the full back-up. Single files and directory subtrees can be restored from full or partial backups. ■ xfsprogs is updated to the latest version. This package contains utility commands for using and managing the XFS file system, including mkfs.xfs.
ReiserFS	ReiserFS is the default journaling file system in SUSE Linux Enterprise 10. In Service Pack 2: ■ The reiserfs tools package is updated to version 3.6.19. It includes utilities for creating the file system (mkreiserfs), checking for consistency (reiserfsck), and resizing (resize_reiserfs). ■ Support is added for mount counting and last check timestamping for fsck -a on reiserfs. The system utility fsck (for file system check or file system consistency check) is a tool for checking the consistency of a file system. Generally, fsck is run automatically at boot time when the system detects that a file system is in an inconsistent state, indicating a non-graceful shutdown such as a crash or power loss. Typically, fsck utilities provide options for either: – Interactively repairing damaged file systems (the user must decide how to fix specific problems) – Automatically deciding how to fix specific problems (so the user doesn't have to answer any questions) – Or reviewing the problems that need to be resolved without actually fixing them.

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Feature or Function	Description
iSCSI target	iSCSI target is updated to version 0.4.15 This package is an open source iSCSI target with professional features. It works well in enterprise environments under real workloads, and is scalable and versatile enough to meet the challenge of future storage needs and developments.
DMAPI	DMAPI is updated to version 2.2.8. The Data Management API Runtime Environment package contains files required by system software using the Data Management API (DMAPI). The Data Management API / Data Storage Management (XDSM) API is a CAE specification. It defines APIs which use events to: ■ Notify data management (DM) applications about operations on files ■ Enable DM applications to store arbitrary attribute information with a file ■ Support managed regions within a file ■ Use DMAPI access rights to control access to a file object. DMAPI refers to the interface defined by the XDSM specification. The Data Management API (DMAPI/XDSM) allows the implementation of hierarchical storage management software with no kernel modifications, and of high-performance dump programs that require no raw access to the disk or knowledge of file system structures.
Filesystem images	SP2 adds support for LUKS (Linux Unified Key Setup) and LVM (Logical Volume Manager) over iSCSI to mkinitrd. mkinitrd creates file system images for use as initial RAM disk (initrd) images, which can then be used to preload the block device modules (SCSI or RAID) needed to access the root file system. In other words, generic kernels can be built without drivers for any SCSI adapters that load the SCSI driver as a module. Because the kernel needs to read those modules, but is unable to address the SCSI adapter, an initial RAM disk is used. The operating system loader (normally LILO) loads the initial RAM disk image, then the RAM disk loads the proper SCSI adapter, allowing the kernel to mount the root file system. LUKS is the emerging standard for Linux hard-disk encryption. By providing a standard on-disk format, it not only facilitates compatibility among distributions, but also provides secure management of multiple user passwords. In contrast to existing solutions, LUKS stores all necessary setup information in the partition header, enabling the user to transport or migrate data seamlessly.
Kernel-based automounter	SP2 supports both autofs version 4 and 5. autofs is a kernel-based automounter for Linux. Although still under development, the features currently implemented seem to work well. An automounter is any program or software facility that automatically mounts file systems in response to access operations by user programs. These are system utilities (daemons under UNIX*) which, when notified of file and directory access attempts under selectively monitored subdirectory trees, dynamically and transparently make remote or local devices accessible. The purpose of the automounter is to conserve local system resources and reduce the coupling between systems that share filesystems.
Open-iSCSI boot/install	The Open-iSCSI stack is updated to expand the iSCSI boot/install capability beyond the single integrated network interface. This update changed the sysfs layout.
NFS cluster filesystem locking	SP2 includes integrated locking support for NFS cluster filesystems.

Performance and Scalability

Feature or Function	Description
System activity: sar and iostat commands for Linux	The updated sysstat package, version 8.0.4, contains sar and iostat commands for Linux. The sar command collects and reports system activity information. The iostat command reports CPU statistics and I/O statistics for TTY devices and disks. Information collected by sar and iostat can be saved in a binary file for future inspection. Both commands now support SMP machines when displaying CPU utilization.
Interrupt request balance	The irqbalance package is updated to a newer version for better NUMA awareness. On SMP machines, irqbalance dynamically switches the target CPUs for interrupt requests, preventing CPU0 from being used for all IRQs.

Application and Developer Services

Feature or Function	Description
Binary utilities	Binutils is a collection of binary utilities for linking and managing archives. Their applications include object code handling, libraries, profile data and symbol names. SUSE Linux Enterprise 10 SP2 adds support for: ■ -dynamic-list, ■ AMDFAM10h, ■ SSE5 ■ and all POWER6 instructions to binutils. The GNU binutils C compiler utilities are needed whenever you want to compile a program or kernel.
GNU Compiler Collection (GCC)	The GNU Compiler Collection (GCC) is a set of programming language compilers developed by the GNU Project. It is: ■ A free software project ■ The key component of the GNU toolchain ■ The standard compiler for Linux operating systems ■ A collection that supports multiple architectures and diverse environments. In SUSE Linux Enterprise 10 SP2, GCC is updated to version 4.3, providing support for IBM POWER6 and AMD* Family 11h processors. For a comprehensive list of all GCC enhancements, please visit: http://gcc.gnu.org
Libraries	GLib is the low-level core library that forms the basis for projects such as GTK+ and GNOME. GLib2 provides data structure handling for C, portability wrappers and interfaces for various runtime functionality, including event loops, threads, dynamic loading and an object system. SUSE Linux Enterprise Server 10 SP2 ships with GLib2 version 2.15.6. The GNU C Library (glibc) provides the most important standard libraries used by nearly all programs: the standard C library, the standard math library and the POSIX thread library. Without glibc, a system is not functional. In SP2, the GNU C Library is updated to version 2.7, adding support for RFC3484 (getaddrinfo/IPv6), AF_IUCV, and up to 4096 CPUs for specific systems.
Mono®	Mono provides interoperable support for .NET client and server applications for heterogeneous environments. Several Mono-related packages are updated with Service Pack 2: ■ The XSP server is a small Web server that hosts the Mono System.Web classes for running what is commonly known as ASP.NET. ■ The mod_mono module interfaces Apache with Mono for running ASP.NET pages on UNIX and UNIX-like systems. To load the module into Apache, run the command a2enmod mono as root.
Korn shell	ksh is the original Korn shell, an sh-compatible command interpreter that executes commands read from standard input or from a file. In SP2, ksh is updated to version 0.93s, making the signal handler for SIGINT and SIGQUIT compatible with the behavior of other operating systems and shells.
PHP	PHP is updated to version 5.2.5. PHP is a widely-used general-purpose scripting language that is especially suited for Web development and is easily embedded in HTML. PHP generally runs on a Web server, taking PHP code as its input and creating Web pages as output. However, it can also be used for command-line scripting and client-side GUI applications. PHP can be deployed on most Web servers and on almost every operating system and platform free of charge. The PHP Group also provides the complete source code for users to build, customize and extend for their own use. This package contains the PHP5 core files, including PHP binary (CLI) and PHP configuration (php.ini). This package must be installed in order to use PHP. Additionally, extension modules and server modules (e.g., for Apache) may be installed.
QT	QT is updated to support LSB compliance. QT, also known as the Widget toolkit, is a cross-platform application development framework widely used for building GUI programs, most notably the KDE desktop environment. It's also used for developing non-GUI programs such as console tools and servers.
Java* CIM client library	SP2 adds sblim-cim-client to the CIM client class library. This package provides a CIM client class library for Java applications. It complies with the DMTF standard CIM Operations over HTTP, and will be JCP JSR48-compliant when that standard becomes available. To learn more about DMTF visit: www.dmtf.org More information about the Java Community Process and JSR48 can be found at: www.jcp.org and www.jcp.org/en/jsr/detail?id=48

Network

Feature or Function	Description
Network manager	NetworkManager is updated to version 0.7.0. NetworkManager attempts to keep an active network connection available at all times by making network configuration and setup as painless and automatic as possible. If using DHCP, NetworkManager is intended to replace default routes, obtain IP addresses from a DHCP server, and change name servers whenever it sees fit.
Timeserver	SP2 updates XNTP, a time server designed to synchronize local system time with an external time server. It can also be used as a time server to synchronize other hosts on a LAN, and is an important support package for NetworkManager.
DHCP	Dynamic Host Configuration Protocol (DHCP) is a client-server networking protocol that automatically assigns static or dynamic IP addresses to computers that use TCP/IP. DHCP has several major advantages over manual configurations: ■ Each computer automatically gets its configuration from a pool of available numbers for a specific time period (called a leasing period), meaning no wasted numbers. ■ When a computer has finished with the address, it is released for another computer to use. ■ Configuration information can be administered from a single point. Major network resource changes (e.g., a router address change), requires only the DHCP server to be updated with the new information, rather than every system. Service Pack 2 adds support for DHCP FailOverPeer objects.
IPv6	With SUSE Linux Enterprise 10 Service Pack 2, IPv6 enhancements are shipped according to US government requirements. Furthermore, dhcp6, the DHCP client library for IPv6, is updated to version 1.0.10, providing DHCPv6 client support for network control applications.
NSS LDAP module	SP2 updates nss_ldap. Nss_ldap is a glibc NSS module that allows X.500 and LDAP directory servers to be used as a primary source of aliases, ethers, groups, hosts, networks, protocol, users, RPCs, services, and shadow passwords—instead of, or in addition to, using flat files or NIS.
FreeRADIUS	FreeRADIUS is a free open source Remote Authentication Dial-In User Service (RADIUS) server, in which RADIUS is also an AAA protocol (authentication, authorization, and accounting) for network access control. FreeRADIUS offers a highly modular and feature-rich alternative to other enterprise RADIUS servers available today. It is said to be the most-used RADIUS server worldwide in terms of deployment numbers and users authenticated daily. It scales from embedded systems with small amounts of memory to systems with multiple millions of users. It is fast, flexible, configurable, and supports more authentication protocols than many commercial servers. SP2 adds support for Novell Modular Authentication Service (NMAS™), an essential component of Novell eDirectory™, to FreeRADIUS.

Desktop Computing

Feature or Function	Description
OpenOffice.org support	SUSE Linux Enterprise Desktop 10 SP2 includes the latest version of OpenOffice.org Novell Edition (version 2.4), with improved form input support, VBA improvements and Office Open XML translator as a technical preview.
Active Directory integration	SUSE Linux Enterprise Desktop 10 SP2 fits more seamlessly into existing environments with enhancements in Microsoft Active Directory*: ■ Time synchronization in Pure AD environments ■ GSS-TSIG (Generic Security Service Algorithm for Secret Key Transaction) provides lightweight security services for the DNS TSIG protocol. It leverages the GSS-API framework to to provide authentication, integrity and confidentiality.
Networking	NetworkManager keeps an active network connection available at all times, making network configuration and setup as painless and automatic as possible. Service Pack 2 delivers enhancements to wired and wireless security, and supports radio kill switch detection, network editing and wireless broadband (3G, UMTS).

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Feature or Function	Description
Web browser	With broad standards support and compatibility features, the Mozilla Firefox* Web browser works with most Web pages and applications that would otherwise require Microsoft Internet Explorer. In SUSE Linux Enterprise Desktop 10 SP2, Mozilla Firefox has been updated to the latest version and comes with MIME HTML (MHTML) support and new lock-down capabilities to: ▪ Restrict URLs via a white list ▪ Disable the ability to save pages ▪ Disable the ability to view page source ▪ Disable the ability to print pages ▪ Disable writing anything to disk cache
Multimedia	In SUSE Linux Enterprise Desktop 10 SP2, the K3b universal CD and DVD burning suite is updated to to the latest version. K3b supports Ogg Vorbis, MP3 audio files, DVD burning, CDDB, and much more.
Unicode text editor Yudit	SP2 brings cross-language text editing capabilities to SUSE Linux Enterprise 10 with the addition of Yudit, a Unicode text editor for the X Window System. Yudit can perform TrueType font rendering, printing, transliterated keyboard input and handwriting recognition with no dependencies on external engines. Its conversion utilities can convert text between various encodings, and its keyboard input maps can act like text converters. There is no need for a pre-installed multi-lingual environment, and menus are translated into many languages.
IPA type fonts	SP2 adds IPA type fonts, including the Japanese TrueType font made by IPA Information-technology Promotion Agency.
Third-party software	SUSE Linux Enterprise Desktop 10 SP2 provides enhancements for several third-party applications, including: ▪ Adobe* Acrobat* Reader, the free software from Adobe to view, fill out, print, and search Adobe PDF files. ▪ Citrix* ICA client. Independent Computing Architecture (ICA) is a proprietary protocol for an application server system, designed by Citrix Systems. The protocol lays down a specification for passing data between server and clients, but is not bound to any one platform.

Hardware Enablement and Drivers

Feature or Function	Description
Network drivers	New: ▪ ipw3945 driver ▪ ipw3945d tools ▪ iwlwifi driver ▪ mac80211 driver ▪ bnx2x 10 gigabit ethernet driver ▪ xgbe driver ▪ igb driver ▪ Chelsio 10GB driver (cxgb) ▪ Myricom 10G driver (myri10ge) Updates: ▪ Realtek r8169 driver to support newer chipsets ▪ IPv6 stack to support better Source Address Selection ▪ tg3 driver ▪ bnx2 driver ▪ e1000 driver ▪ netxen driver ▪ qla3xxx driver ▪ s2io driver

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Feature or Function	Description
Storage drivers	Updates: ■ qla2xxx ■ qla4xxx ■ megaraid driver ■ megaraid_sas ■ 3w-9xxx ■ 3w-xxxx ■ aic7xxx ■ aic94xx driver to include SATA support for SAS ■ aacraid driver ■ cciss driver ■ lpfc driver ■ fusion driver
Other drivers	New: ■ X11 driver for AMD Geode LX 2D (xorg-x11-driver-video-amd) Updates: ■ CIFS ■ OCFS2 ■ intel-i810 driver ■ X11 driver for Radeon cards ■ XFS and DMAPI driver ■ Wacom driver
Processors	New: ■ 915 resolution is added to change the resolution of the 845G, 855GM, 865G, 915G, 915GM, 945G, 945GM, 965G and 965GM Intel chipsets ■ Docking station support is added for Santa Rosa chipsets, the fourth generation of Intel Centrino* Processors. ■ The firmware for Intel* wireless WiFi Link 4965AGN Cards is added. Updated: ■ microcode_ctl to version 20080108. The microcode updates for Intel CPUs utility allow the updating of microcode for Intel x86 and x86-64 CPUs. This feature is supported by Pentium* II and newer CPUs.
IBM cryptographic hardware	openCryptoki, an Implementation of PKCS#11 (Cryptoki) v2.11 for IBM Cryptographic Hardware, is updated. It supports the IBM 4758 cryptographic coprocessor (with the PKCS#11 firmware loaded) and the IBM eServer Cryptographic Accelerator (FC 4960 on pSeries). SP2 comes also with an updated version of libica. This package contains the interface library routines used by IBM modules to interface with the IBM eServer Cryptographic Accelerator (ICA).
OpenHPI	OpenHPI is updated to version 2.10.1.OpenHPI is an open source project created to provide an implementation of the Service Availability Forum's (SAF or SA Forum) Hardware Platform Interface (HPI). The SA Forum* is a consortium of leading communications and computing companies formed to encourage the use of commercial off-the-shelf building blocks in high availability network infrastructure products, systems and services. The Forum develops and publishes high availability and management software interface specifications, and promotes industry adoption. Forum specifications include the Hardware Platform Interface (HPI), which separates the hardware from management middleware and makes each independent of the other. HPI provides an abstracted management interface to computer hardware, typically for chassis and rack based servers. It includes resource modeling, sensor access and control, watchdog, resource inventory data, abstracted system event log interfaces, hardware events and alerts, and a managed hotswap interface. OpenHPI provides a modular mechanism for easily adding new hardware and device support. The OpenHPI source tree contains many access plug-ins for various types of hardware, including IPMI based servers, Blade Center, and machines that export data via sysfs. For up-to-date status on these and many other components, check out the status page.

Leading organizations from around the world participated in the SP2 beta program, and were deeply involved in testing and usability assessment.

How to Update SUSE Linux Enterprise 10 to Service Pack 2

SUSE Linux Enterprise 10 Service Pack 2 is intended to provide:

- *An easy update of your entire system or individual packages to the latest Service Pack level. This is especially useful if you cannot use online update mechanisms.*
- *An easy fresh install using the latest kernel, drivers and installer updates.*
- *Additional information and documentation.*

Products based on SUSE Linux Enterprise 10 offer various migration paths for updating to SP2, including patches and installation media.

For installing SP2 via patches, the following tools are supported:

- *YaST Online Update (YOU)*
- *zen-updater*
- *rug*

You can also download the full SP2 media (CD or DVD ISO image(s)), then use one of the following procedures, especially in environments without network access:

- *Booting from SP2 media*
- *Using "Patch CD update"*

The instructions for installing this Service Pack can be found in the README file on CD1 of the physical product. Any documentation (if installed) can be found in the installed system under /usr/share/doc/.

Conclusion

SUSE Linux Enterprise 10 SP2 from Novell lets organizations easily implement the latest technical advances in the best-engineered, lowest-cost and most interoperable platform for mission-critical computing.

Enhancements include improved virtualization support and management, updated high-availability and storage infrastructure, and support for new processor technologies. For the desktop, SP2 provides expanded OpenOffice.org support, new hardware support and substantial advances in enterprise integration.

Leading organizations from around the world participated in the SP2 beta program, and were deeply involved in testing and usability assessment. The advances and improvements in this release are a direct result of customer collaboration and Novell commitment to meeting customer requirements. As enterprise Linux adoption expands and accelerates, so do the pace and scale of Linux development and innovation.

- *For information on installing or updating to SUSE Linux Enterprise 10 SP2, consult the README files on the distribution CDs.*

- *For the detailed changelog information about a particular package from the RPM, execute: rpm --changelog -qp <FILENAME>.rpm (while <FILENAME>. is the name of the respective RPM).*
  Check the ChangeLog file in the top level of CD1 for a chronological log of all changes made to the updated packages.
- *Additional information can be found in the docu directory on disk 1 of the SUSE Linux Enterprise Server 10 distribution CDs. This directory includes PDF versions of the SUSE Linux Enterprise Server 10 startup and preparation guides.*
- *www.novell.com/documentation/sles10/ contains additional or updated documentation for SUSE Linux Enterprise Server 10.*
- *Visit www.novell.com/linux/ for the latest SUSE Linux Enterprise product news from Novell, including pricing, subscription and support options*
- *Visit www.novell.com/linux/source/ for additional information on the source code of SUSE Linux Enterprise products.*

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