

What's New in SUSE® LINUX Enterprise Server 9

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EXECUTIVE SUMMARY

Backed by the extensive Novell® support infrastructure and partner network, SUSE® LINUX Enterprise Server 9 is a secure, reliable platform for open source computing in the enterprise. With new features like the 2.6 kernel base, improved systems-management tools and enhanced developer tools, SUSE LINUX Enterprise Server 9 offers unmatched performance and scalability, comprehensive open source functionality and support for a broad range of hardware platforms and software packages. SUSE LINUX Enterprise Server 9 also provides open application programming interfaces (APIs) and other development tools that simplify Linux* integration and customization.

NEW KERNEL

SUSE LINUX Enterprise Server 9 includes the Linux kernel version 2.6, a dramatic improvement over earlier systems in terms of scale, speed and power. The following improvements stem directly from the new kernel:

Feature	Description
Kernel 2.6.x scalability enhancements	<ul style="list-style-type: none"> • More processors: More than 128 CPUs have been tested on available hardware, but theoretically, there is no limit on the number that will work. • More users: Systems can now have more than 4 billion unique users. • More processes: Run up to 65,535 user-level processes, plus additional kernel-level processes that represent threads. • More open files: SUSE LINUX Enterprise Server 9 automatically tunes its resources' usage dynamically to support the maximum number of simultaneous open files.
Kernel 2.6 device enhancements	<ul style="list-style-type: none"> • More device types: 4,095 major device types and more than a million subdevices per type make larger storage arrays, print farms and tape units more feasible. • More devices: The server can now manage more devices. For example, it can control up to 32,000 SCSI disks. • Faster devices: Support for high-speed USB 2.0 and Firewire* (IEEE 1394 and 1394b). • Higher throughput: High-speed Serial ATA (S-ATA) device support enables transfer rates up to 150 MB/sec.
Non-Uniform Memory Access (NUMA)	<p>NUMA allows SUSE LINUX Enterprise Server to scale more efficiently for systems with dozens or hundreds of CPUs because CPUs can access a dedicated memory bus for local memory. It also supports multiple interconnected memory nodes, each supporting a smaller number of CPUs. The result is greater scalability for applications that use local memory.</p>

Feature	Description
NUMA development tools	<p>For x86-64 (Opteron) and IA-64 (Itanium*), the NUMA tools allow developers to fine-tune applications for NUMA usage. Both Oracle and DB2 are developing NUMA API support, and Oracle already uses it in testing—one reason that SUSE LINUX Enterprise Server has surpassed other distributions in database benchmarks.</p>
Hyperthreading	<p>Hyperthreading enables multi-threaded server software applications to execute threads in parallel within each individual server processor, thereby dramatically improving transaction rates and response times.</p>
Flexible I/O scheduler	<p>The new I/O scheduler allows administrators to tune the server to match its usage with four I/O behavior policies:</p> <ul style="list-style-type: none"> • Complete Fair Queuing: CFQ is suitable for a wide variety of applications, especially desktop and multimedia workloads. It is the default I/O scheduler. CFQ treats all competing processes equally by assigning each process a unique request queue and giving each queue equal bandwidth. • 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 a heuristic to anticipate the actions of applications. This provides greater disk throughput but slightly increases latency. The anticipation heuristic is suitable for file servers but does not work as well for database workloads. • No-Op: This “no-operation” mode does no sorting and is used only for disks that perform their own scheduling or are randomly accessible. <p>The first three behaviors group and merge requests to maximize request sizes, cutting down on the amount of seeking performed.</p>

Feature	Description
Class-based Kernel Resource Management (CKRM)	CKRM allows system administrators to provide differentiated service at a user or job level and prevent denial-of-service attacks. It also increases the accuracy of resource-consumption metering.

NEW SCALABILITY AND AVAILABILITY FEATURES

Delivering rapid scalability and high availability, SUSE LINUX Enterprise Server 9 is well suited to meet the demands of the datacenter. SUSE LINUX Enterprise Server 9 provides the rapid scalability and high performance systems that today's businesses require.

Feature	Description
Heartbeat high-availability system	<p>The Heartbeat system provides core cluster membership and messaging infrastructure. It implements the Open Clustering Framework APIs (a subset of the Service-Availability Forum APIs) to provide low-level services for node fencing, fault isolation and basic two-node failover. The node failure detection time can be tuned to under one second, allowing for sub-second failovers in some environments.</p> <p>In the case of a node failure, the Heartbeat system checks I/O to ensure data integrity, then moves resources to the alternate node. Return to action of failed nodes may be set to automatic or manual, depending on administrator preference.</p>
Enterprise Volume Management System (EVMS)	EVMS allows administrators to handle storage through one mechanism. RAID*, LVM, various file system formats, disk checking and maintenance, bad block relocation and more are handled by a single tool.
Distributed Replicated Block Device (DRBD)	This networked disk-management tool constructs single partitions from multiple disks that mirror each other. It is similar to a RAID1 system but runs over a network. The partition size can be changed at runtime.

NEW SYSTEMS MANAGEMENT TOOLS

SUSE LINUX Enterprise Server 9 simplifies system administration, too. Gone are the days of administrators visiting each workstation with a CD; policy-driven remote management makes it possible to apply updates and change configuration quickly and easily. That's just one more way that SUSE LINUX Enterprise Server 9 offers convenience and flexibility.

Feature	Description
Novell ZENworks® Linux Management support	Novell ZENworks Linux Management enables administrators to deploy software enterprise-wide. It includes Red Carpet Daemon in the box, and specifically distributes YaST patches and updates from Novell and SUSE LINUX.
Novell ZENworks® Linux Management server support	Novell ZENworks Linux Management includes the bundled SUSE LINUX Enterprise Server and Novell ZENworks Linux Management. It enables onsite hosting of the server and offers granular administration—with tight control over software and patch deployment. It also provides integration into IT Service Management (e.g., ITIL) change-control processes and offers scriptable or Web-based administration.
New YaST Modules	YaST has several new modules in SUSE LINUX Enterprise Server 9, including: <ul style="list-style-type: none"> • A mail server configuration tool that allows administrators to create secure servers with IMAP and POP service, quotas, access control lists, name spaces, routing, local mail delivery, server-side filtering of viruses and junk mail, and other enterprise-level mail system features. • A VPN configuration assistant for both client and server. The VPN is compatible with Linux and Windows* clients and can be configured without additional software. • Full Samba 3 configuration (see below for more information about Samba 3)

Feature	Description
Improved YaST tools	<p>The following YaST configuration tools have been enhanced and updated in this release. Changes range from user-interface improvements to new features and capabilities:</p> <ul style="list-style-type: none"> • Improved network-configuration tools, including DNS, DHCP, LDAP, NIS, postfix and TFTP • NFS* and Samba network file system settings • Automated default certificate authority (CA) for servers, including LDAP, Apache* and postfix • Virtual Private Network (VPN) • Installation server • Boot server • CD creation • User-Mode Linux installation and virtualization setup • Apache • Wake on LAN • High-availability tools expanded to work with Heartbeat • Update server • User-management-tool support for plugins for external back-ends, including IMAP and Samba

NEW DEVELOPER TOOLS

End users love SUSE LINUX—and so do Independent Software Vendors. That’s because their developers trust SUSE LINUX Enterprise Server to supply a dependable platform and offer rich software-development capabilities through built-in network services and protocols, including CUPS, DNS, DHCP, IMAP, NTP, SLP, Postfix, PXE, Proxy, Samba, SNMP and SMTP. SUSE LINUX Enterprise Server 9 also includes application and database services and supports popular solutions from hundreds of vendors.

Feature	Description
C# and .NET	<p>The SUSE LINUX SDK has always provided state-of-the-art Linux software-development tools for a stable, multi-platform codebase. The newest addition to the toolbox, the Mono™ project, lets developers build and run .NET applications on Linux and other operating systems. Application frameworks supported include ASP.NET, ADO.NET and gtk#.</p>

NEW SOFTWARE

Like its predecessors, SUSE LINUX Enterprise Server 9 supports the best of new software as well as updated favorites. With SUSE LINUX Enterprise Server 9, you'll always know you have great software choices.

Feature	Description
Samba 3	The latest version of the Samba package supports Unicode* and Active Directory* and offers improved authentication and printing tools. Other improvements include migration tools, support for establishing trust relationships with Windows NT 4.0 domain controllers, improved ACL settings and better performance.
User-Mode Linux	<p>User-Mode Linux (UML), originally developed as a kernel-debugging tool, is a tool that allows a Linux instance to run as a regular process under Linux. In other words, UML makes it possible to run several instances of Linux at once.</p> <p>UML is the virtualization tool of choice for the Linux kernel and VPN development and can be used to provide extra systems in labs, testing environments or hosting providers. It also makes an excellent secondary firewall.</p> <p>After installing the UML package like any other application binary, administrators can create additional Linux instances that are installed into directories and managed using the same tools and applications as the non-virtual instance of Linux. While virtual performance is not as optimal as its non-virtual counterpart, and although UML systems require significant amounts of memory, UML instances can generally be used for the same tasks as non-virtual Linux instances.</p>

The new 2.6 kernel, scalability and availability, management tools and developer tools make SUSE LINUX Enterprise Server 9 the most flexible, most convenient, most scalable version yet. And, since SUSE LINUX Enterprise Server 9 is backed by Novell, you can deploy it with confidence, knowing that you've got the help of hundreds of software engineers, support staff and consultants who are dedicated to Linux, open source and customer success.

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