

SUSE[®] Linux Enterprise Server 10 SP1 vs. Red Hat^{*} Enterprise Linux 5

Table of Contents:	2 Comparison of Red Hat Enterprise Linux 5 and SUSE Linux Enterprise Server 10 SP1
	4 Virtualization
	5 TCO Comparison
	6 Performance Comparison
	6 Appendix A: Detailed Red Hat Enterprise Linux 5 and SUSE Linux Enterprise 10 SP1 Comparison
	11 Appendix B: Detailed Comparison of Red Hat Enterprise Linux 5 Desktop and SUSE Linux Enterprise Desktop 10 SP1



Comparison of Red Hat Enterprise Linux 5 and SUSE® Linux Enterprise Server 10 SP1

This document contains a number of tables and Appendices that compare Red Hat Enterprise Linux 5 and SUSE Linux Enterprise Server 10 Service Pack 1 (SP1).

This document is for internal use only, but the content contained in this document can be used to prepare presentations and other documents for customer engagements.

The following table provides a concise comparison of Red Hat Enterprise Linux 5 (both Server and Advanced Platform) and SUSE Linux Enterprise 10 SP1.

Table 1: Summarized Comparison of Red Hat Enterprise Linux 5 and SUSE Linux Enterprise Server 10 SP1

Feature	Red Hat Enterprise Linux 5	SUSE Linux Enterprise Server 10 SP1
Virtualization		
Xen Virtualization	Xen 3.0.3	Xen 3.0.4
Paravirtualized (Modified Kernel) Virtual Machines (VMs)	Yes (Red Hat Enterprise Linux 5 and v4 update 5 only)	Yes (SUSE Linux Enterprise Server10 [GA], SUSE Linux Enterprise Server 10 SP1, SUSE Linux Enterprise Server 9 SP3)
Fully Virtualized, Linux-based VMs	Yes (Only Red Hat Enterprise Linux 5)	Yes (SUSE Linux Enterprise Server 10 [GA], SUSE Linux Enterprise Server 10 SP1, SUSE Linux Enterprise Server 9 SP3, Red Hat Enterprise Linux 3,4 and 5)
Fully Virtualized Windows/Other VMs	Yes (Indirectly, not stated)	Yes (Windows 2000, Windows XP Windows 2003, Solaris* x86, Other)
Virtualization Interface	virt-manager, virsh, xm	virt-manager, YaST module, xm
Fully Virtualized Drivers (For Windows and others)	No	Yes. Novell provides a set of paravirtualized drivers for Windows which allow near-native performance of the Windows guest OS. It also contains 32- and 64-bit paravirtualized network, bus and block drivers for the following platforms: <ul style="list-style-type: none"> ■ Windows Server 2003 on Xen ■ Windows 2000 on Xen ■ Windows XP on Xen
Security		
Application Protection	Yes (SELinux, complex)	Yes (AppArmor, simple)
Audit Framework	Yes (lightweight auditing framework [LAF])	Yes (LAF support added with SP1)
EAL4+, CAPP, LSPP, RBACPP	Yes	Novell has EAL 4+, CAPP with SUSE Linux Enterprise Server 9. SUSE Linux Enterprise Server 10 is in the process of being certified at EAL 4+, CAPP.
NUMA	Yes	Yes
Management Interface	No (Requires extensive manual configuration)	Yes (YaST module, command-line tools)
Add-ons/Extensions/Upsells		
Real Time Support (SUSE Linux EnterpriseReal Time)	Yes (Third party, incomplete)	Yes,SUSE Linux Enterprise Real Time (SLERT) product offering and InfiniBand)
Clustering Suite	Yes (Included in Red Hat Enterprise Linux Advanced Platform; not included in Red Hat Enterprise Linux 5 server. Requires US\$499/yr cluster option and US\$2,200/yr Red Hat Global File System (GFS) subscription)	Yes (Included, High Availability Storage Infrastructure, Heartbeat2, EVMS2, OCFS2 and more) GFS provided as needed on a per-customer basis

continued on next page

Feature	Red Hat Enterprise Linux 5	SUSE Linux Enterprise Server 10 SP1
Add-ons/Extensions/Upsells <i>continued</i>		
Clustering File System	Yes (Included in Red Hat Enterprise Linux Advanced Platform. Not included in Red Hat Enterprise Linux 5 server. requires GFS option at US\$2,200 per year per server)	Yes (OCFS2 included, GFS support available)
Application Stack	Yes (Apache, Tomcat, JBoss* [2])	Yes (WebSphere* Application Server Community Edition integrated with SUSE Linux Enterprise Server 10 SP1, SP2)
Directory Services	Yes (Red Hat Directory Server, additional costs)	Yes (Novell eDirectory™ server, additional costs)
.NET Application Services	No (Removed all Mono® products from distribution)	Yes (Mono, the open source development platform based on the .NET framework, allows developers to build Linux* and cross-platform applications with improved developer productivity. Mono's .NET implementation is based on the ECMA standards for C# and the Common Language Infrastructure. It is used by developers to create cross-platform server and client applications. It runs on all platforms from x86 to Mainframe, and is completely compatible with ECMA Standard DotNet).
Workgroup Suite	No	Yes (Novell Open Enterprise Server 2, including Virtual Office/Teams, Novell iFolder®, Novell iPrint, Domain Services for Windows, Novell Cluster Services™ and more. Additional charge incurred for Novell Open Enterprise Server 2.
Diagnostics		
kexec/kdump	Yes	Yes (over-the-wire network core dumps supported)
Large SMP Support	No	Yes
Multi-core Support	Yes	Yes
Open SLP	No	Yes
Storage Options		
Non-clustering File Systems Support	Ext2/3, ReiserFS, XFS	Ext2/3, ReiserFS, OCFS2, XFS
Online File System Expansion	Yes	Yes
High Availability Multi-node Clustering	No (requires HPCN subscription)	Yes (16+ node, included in base)
Volume Management	Yes (logical volume manager [LVM])	Yes
EVMS2	Yes	Yes
iSCSI Target/Initiator	Yes	Yes
Data Replication	rsync	rsync with metadata, DRBD
Block Device Encryption	Yes (new)	Yes (long supported)
MPIO/Multipathing	Yes	Yes
Management Deployment		
Management Interface	Yes (system-config-*—many individual applications with differing interfaces)	Yes (YaST, single interface with multiple standardized modules, updated in SP1)
Automated Installation	Yes (kickstart)	Yes (AutoYaST, new options for storing XML files, USB devices and more)
Remote Management	Yes (ssh, VNC)	Yes (ssh, VNC, integrated Remote Administration)
Online Update Mechanism	Yes (up2date, Red Hat Network)	Yes (rug, Novell Customer Center)
Patch Proxy Server	Yes (Red Hat Satellite Server, additional costs)	Yes (YUP server support, included)
Management Infrastructure	Yes (partly with Red Hat Network, Management Module costs extra)	Yes (Novell ZENworks Linux Management, full featured, small additional costs)

Further details can be found in Appendix A of this document: “Red Hat Enterprise Linux 5 vs. SUSE Linux Enterprise 10 Detailed Comparison” on page 6.

Virtualization

Virtualization is one of the key differentiators between SUSE Linux Enterprise 10 and Red Hat Enterprise Linux 5.

- *SUSE Linux Enterprise 10 uses Xen* 3.0.2, SUSE Linux Enterprise 10 SP1 uses Xen 3.0.4 and Red Hat Enterprise Linux 5 uses Xen 3.0.3 to enable virtualization capabilities.*
- *In SUSE Linux Enterprise 10, individual virtual machines (VMs) can be managed with YaST, which provides a unified graphical management interface, available via ncurses and X. This gives users a view of the VMs on specific servers. There is also the Virtual Machine Management capability under the YaST Xen module. It is a GUI-based console with start, suspend, stop and kill functions. This module allows you to control the entire VM environment. You can also view the number of VMs configured, the amount of memory allocated to each and the status of each machine. You can start and stop them as well. You can add VMs and install a new operating system manually, or you can point a VM to an existing bootable disk.*
- *Red Hat Enterprise Linux 5 does not have a high-level, data center-quality virtualization management tool, such as Novell® ZENworks® Orchestrator. ZENworks Orchestrator is an add-on product that provides central management of a group of physical servers and virtual machines.*
- *Novell enables a much wider range of paravirtualization and full virtualization guest operating systems (see Table 2), thereby offering customers more flexibility in lowering costs and consolidating workloads on SUSE Linux Enterprise Server.*
- *Virtualization capabilities via the Novell and Microsoft interoperability agreement (see below) give Novell a huge advantage over Red Hat. Novell paravirtualized drivers for Windows* are a clear advantage for Novell over Red Hat, which does not have such drivers.*
- *SUSE Linux Enterprise Server running as the Xen Domain 0 can host the Windows XP, Windows 2000 and Windows 2003 servers. Most importantly, these Microsoft* Windows guest OSs receive full support from Microsoft. No other vendor receives such support from Microsoft.*
- *SUSE Linux Enterprise Server 10 will run as a fully virtualized guest on Virtual Server 2005 R2 SP1, and Windows Server 2008 will support SUSE Linux Enterprise Server 10 as a paravirtualized guest.*

Table 2. Virtualization Comparison for SUSE Linux Enterprise Server 10 and Red Hat Enterprise Linux 5

Features	SUSE Linux Enterprise Server 10 SP1	Red Hat Enterprise Linux 5 Server	Red Hat Enterprise Linux Advanced Platform
Number of Supported VMs (Guests)	Unlimited	Four	Unlimited
Enabled Paravirtualization Guests	SUSE Linux Enterprise Server 10 SP1 (x86, PAE, x86-64)	Red Hat Enterprise Linux 4 Update5 (PAE, x86-64)	Red Hat Enterprise Linux 4 Update5 (PAE, x86-64)
	Novell Open Enterprise Server 2 (x86, PAE, x86-64)	Red Hat Enterprise Linux 5 (PAE, x86-64)	Red Hat Enterprise Linux 5 (PAE, x86-64)
	NetWare® 6.5 (x86, PAE)		
Enabled Full-virtualization Guests (Requires Intel VT or AMD-V Technology)	SUSE Linux Enterprise Server 9 SP3 (x86,PAE, x86-64)	Red Hat Enterprise Linux 3	Red Hat Enterprise Linux 3
	SUSE Linux Enterprise Server 10 SP1 (x86, PAE, x86-64)	Red Hat Enterprise Linux 4	Red Hat Enterprise Linux 4
	Windows 2000 Server (x86)	Red Hat Enterprise Linux 5	Red Hat Enterprise Linux 5
	Windows Server 2003 (x86)	Third-party operating systems (not specified)	Third-party operating systems (not specified)
	Windows XP (x86)		
	Red Hat Enterprise Linux 4 (x86)		
Management	YaST, Novell ZENworks Orchestrator, xm ¹ , vm-install ² , virt-manager-GUI	Red Hat Network virt-manager-GUI ³ virsh ⁴	Red Hat Network virt-manager-GUI virsh
Storage Virtualization	Yes	No	Yes

- 1 Command-line VM lifecycle management
- 2 GUI, command-line and scriptable VM creation and installation
- 3 A graphical interface for virtualization functions such as create, start, stop, suspend, resume, monitor and more
- 4 A scriptable command shell

TCO Comparison

Table 3 provides a high-level cost analysis:

Example customer scenario: 12 virtual machines and four sockets per physical server, mixed Linux/Windows environment (four Windows, eight SUSE Linux Enterprise Server), basic annual subscription.

Table 3. Deploying SUSE Linux Enterprise Server 10 SP1 with Xen vs. Deploying VMware*: TCO Comparison

	SUSE Linux Enterprise 10 SP1 with Xen	VMware Infrastructure 3, Standard Edition
12 Concurrent VM/4 Sockets	US\$349.00	US\$7,500 (\$3,750 per dual socket)
SUSE Linux Enterprise Server Paravirtualized Drivers	Included	Included
Windows Paravirtualized Drivers	US\$299	Included
Licenses for SUSE Linux Enterprise 10 SP1 Guest OS (VM)	Included	US\$349 (additional license required)
Maintenance	Included	Included
Minimum Costs (No Support)	US\$648	US\$7,849
Technical Support	Included	US\$1,412.82 (18%)
Total	US\$648.00	US\$9,261.82
Total x 1,000 Servers	US\$648,000.00	US\$9,261,280.00

Performance Comparison

Figure 1 demonstrates the performance benefits associated with SUSE Linux Enterprise Server 10 with Xen running Windows guest operating systems enabled with the Windows Paravirtualized Drivers (available to Novell).

A native installation of Windows Server 2003 is compared against Windows Server 2003 as a guest on VMware ESX Server 3.2 and Linux/Xen-based host systems from Red Hat and Novell.

Figure 1. Performance Comparison

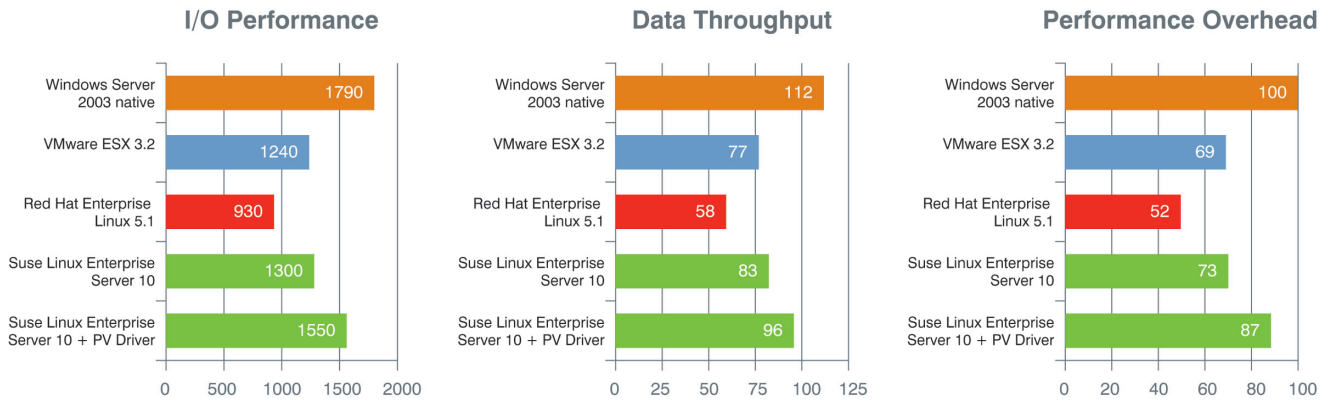


Figure 1. The benchmark tests were performed with Iometer version 2006.07.27, 100% sequential read, 64 KB block size, 32 outstanding I/Os, 10 GB LVM partition on Fujitsu-Siemens RX300 (2 Quadcore Xeon, 2 GHz, 2 GB RAM).

Appendix A: Detailed Red Hat Enterprise Linux 5 and SUSE Linux Enterprise 10 SP1 Comparison

Feature	Red Hat Enterprise Linux 5/Red Hat Enterprise Linux 5 Advanced Platform	SUSE Linux Enterprise 10 SP1	Notes
General—Technical Features			
Technical differences: Since both SUSE Linux Enterprise Server and Red Hat Enterprise Linux originate from the same open source code, most of the differences are in how they are packaged and installed.			
2.6 Kernel	2.6.18	2.6.16	Both Red Hat and Novell take from the same mainline kernel, just different versions, essentially leap-frogging each other. Both will back port important fixes/features as needed.
Xen	3.0.3	3.0.4 ⁵	At the release of SP1 (SUSE Linux Enterprise 10 Service Pack 1, released June, 2007), XenSource ⁵ did not have 3.0.5 ready for us, so Novell backported certain key features for management and frame buffer enhancements to 3.0.4, making it a 3.0.4++
Paravirtualization and full virtualization of x86 and x86-64 *nix OSs	Yes	Yes	Novell supports Red Hat Enterprise Linux versions 3, 4 and 5, SUSE Linux Enterprise Server 9 and 10, and Solaris x86 as virtualized guest OSs. Red Hat supports Red Hat Enterprise Linux 3, 4 and 5 only. Both Novell and Red Hat provide full virtualization of guest OSs via Intel VT* and AMD-V* chipset hardware.

continued on next page

Feature	Red Hat Enterprise Linux 5/Red Hat Enterprise Linux 5 Advanced Platform	SUSE Linux Enterprise 10 SP1	Notes
General—Technical Features <i>continued</i>			
Full virtualization of Windows guests	No	Yes	Novell has an agreement with Microsoft which states that Microsoft will support Windows 2003 R2 and Windows Server 2008 on SUSE Linux Enterprise Server with Xen. The knowledgebase article that talks about this is here: http://support.microsoft.com/kb/897615 Novell provides a set of paravirtualized drivers for Windows that deliver near-native performance of the Windows guest OS. The set contains 32-bit and 64-bit paravirtualized network, bus and block drivers for the following platforms: <ul style="list-style-type: none">■ Windows Server 2003 on Xen■ Windows 2000 on Xen■ Windows XP on Xen■ Red Hat Enterprise Linux 4 on Xen■ Red Hat Enterprise Linux 5 on Xen SUSE Linux Enterprise Server and Xen can provide a significant TCO advantage over VMware. Red Hat can run virtualized Windows guests, but customers will not receive support from Microsoft.
SystemTap	No ⁶	Yes	Maintenance tools to compete with UNIX* : ⁶ Red Hat is including SystemTap as technology preview with no support. Note : Novell released SystemTap in a maintenance update in the fall of 2006. Novell updated SystemTap in SP1, which significantly improved our ability to gather data about a system and provide diagnostic assistance.
OProfile	Yes	Yes	System-wide profiling tool : Oprofile is included in SUSE Linux Enterprise Server SDK, but not in the base. Red Hat Enterprise Linux 5 will include it in the base. Support from Novell is available.
Frysk	Yes	No	Frysk is a new real-time debugging tool that Red Hat supplies and supports for command line, only in Red Hat Enterprise Linux 5. See: www.redhat.com/magazine/023sep06/features/frysk?sc_cid=bcm_edmsept_007
kexec/kdump	Yes	Yes	Novell supports over-the-wire network core dumps.
Large SMP support	No	Yes	We are not aware of Red Hat doing any work with SGI for 1024 CPU support certifications. NASA has been running 20 512 processor machines with SUSE Linux Enterprise Server for some time now.
Multi-core support	Yes	Yes	Multi-core support is available from Mainline. Support and pricing policies may differ.
IPv6 Level I Certification	Yes	Yes	IPv6 Level I Certification is available from Mainline.
IPv6 Level II Certification	Unknown	Yes	Neither SUSE Linux Enterprise Server nor RHEL have this certification. Both Novell and Red Hat are working on it with Novell expected to have it with SUSE Linux Enterprise Server 10 SP2 in May or June of 2008.
Open SLP	No	Yes	IP discovery : This tool is required by certain applications/services.
Application protection	Yes (SELinux)	Yes (AppArmor)	AppArmor is much easier to use, and improvements were made for SP1 (June, 2007). SELinux includes some updates to make it easier to use and troubleshoot with SELinux troubleshooter daemon.
Audit framework	Yes	Yes	Red Hat's Lightweight Auditing Framework was added to SUSE Linux Enterprise Server 10 SP1.
EAL4+, CAPP, LSPP, RBACPP	Yes	No	Novell has EAL 4+, CAPP with SUSE Linux Enterprise Server 9. SUSE Linux Enterprise Server 10 is in the process of being certified at EAL 4+, CAPP. RHEL 5 has been certified at EAL 4+, CAPP, LSPP, RBACPP.
Non-Uniform Memory Access (NUMA)	Yes (New)	Yes	NUMA support is new for Red Hat.

continued on next page

Feature	Red Hat Enterprise Linux 5/Red Hat Enterprise Linux 5 Advanced Platform	SUSE Linux Enterprise 10 SP1	Notes
General—Technical Features <i>continued</i>			
Partner driver process: Third-party driver support	Unknown ⁷	Yes	<p>The Novell Partner Linux Driver Process (driver process) allows vendors to provide Linux drivers and driver updates via driver kits that are completely integrated with the SUSE Linux Enterprise Software Updater. Details can be found at: http://developer.novell.com/wiki/index.php/Partner_Linux_Driver_Process_Introduction</p> <p>⁷Red Hat has indicated that it will roll out a new driver process for Red Hat Enterprise Linux 5, which will allow for better third-party driver support. Details are yet unknown. See the following two links for more information:</p> <p>www.kerneldrivers.org/RedHatKernelModulePackages http://fedoraproject.org/wiki/Packaging/KernelModules</p> <p>Red Hat had studied our driver process, but decided to roll out its own.</p>
Storage Foundation			
Ext3	Yes, default	Yes	
ReiserFS	No	Yes, default	ReiserFS is the default FS in SUSE Linux Enterprise Server.
XFS	No	Yes	Novell offers commercial support for XFS. While available for Red Hat, Red Hat Enterprise Linux doesn't offer commercial support.
OCFS2	No	Yes	Novell offers OCFS2 pre-certified with Oracle* RAC. Red Hat does not offer OCFS2, even though it is in Mainline.
GFS	Available via Red Hat Enterprise Linux Advanced Platform (AP) at no extra cost; otherwise, US\$2,200.	Yes	Novell has OCFS2, and in SUSE Linux Enterprise Server 10 SP2, it will be very similar to GFS2.
File system online expansion	Yes	Yes	
Parallel cluster file system online expansion	Yes ⁸	Yes ⁹	⁸ Red Hat's GFS file system supports online expansion and is included with Red Hat Enterprise Linux AP or available as a separate subscription. ⁹ Novell offers GFS support upon customer request. It is not in the SUSE Linux Enterprise 10 base.
General-purpose cluster file system, including support for scalable NFS	Yes ¹⁰	Yes ¹¹	¹⁰ Red Hat's GFS file system is included with Red Hat Enterprise Linux Advanced Platform or available as a separate subscription and supports general-purpose workloads. OCFS2 from Novell is specific to Oracle and only a very few selected other workloads. ¹¹ Novell offers GFS support upon customer request. It is not in the SUSE Linux Enterprise 10 base.
Single node cluster FS	Yes ¹²	Yes ¹³	¹² Red Hat's GFS file system is available as a separate subscription. ¹³ Novell offers GFS support upon customer request. It is not in the SUSE Linux Enterprise 10 base.
LVM2	Yes	Yes	Included from Mainline. Red Hat is the maintainer.
EVMS	No	Yes	Included from Mainline. IBM is the maintainer.
C-LVM	Yes	No	Integrated with Cluster Suite
iSCSI initiator	Yes	Yes	Same core component. No evidence of rich, user-friendly UI to configure from Red Hat. (A rich UI experience is available via YaST modules in SUSE Linux Enterprise 10.)
iSCSI target	Yes ¹⁴	Yes	¹⁴ Indications are Red Hat plans to include, but we have no definitive information yet. Novell provides YaST UI to configure both target and initiator.
rsync	Yes	Yes	
rsync with extended metadata	No	Yes	Novell added the xattr patches into rsync in SP1
DRBD	No	Yes	Block level replication, integrated with Heartbeat.
File System Audit (LAF project)	Yes	Yes	Yes (LAF support added with SUSE Linux Enterprise 10 SP1)
Block Device Encryption Support	Yes (New)	Yes	New for Red Hat, has been in SUSE Linux Enterprise Server for some time now.

continued on next page

Feature	Red Hat Enterprise Linux 5/Red Hat Enterprise Linux 5 Advanced Platform	SUSE Linux Enterprise 10 SP1	Notes
Storage Foundation <i>continued</i>			
MPIO Root device support	Yes	Yes	MPIO Root device support is available from Mainline.
Dynamic I/O queues	Yes	Yes	
FS-Cache	Yes (New)	No	FS-Cache adds an intermediate memory cache for existing file systems to improve performance. Novell has not included this, as our experience shows that these types of systems can have problems in shared environments (timing windows for cache poison and flush—think of all the problems opportunistic locking has caused).
autofs	Yes	Yes	
NFS v4	Yes	Yes	
Samba (CIFS support)	Yes	Yes ¹⁵	¹⁵ Novell will be offering advanced directory integration with Active Directory* and Novell eDirectory via add-on products.
AppleTalk (Netatalk)	Yes	Yes	(Very poor implementation—only good for 1–2 machines connecting)
WebDAV	No	Yes	WebDAV server in SUSE Linux Enterprise 10, included in the Apache package. Not sure about RHEL, but likely has the same since it includes Apache.
FTP data channel encryption	No	Yes	Included to bring to parity with Novell Open Enterprise Server.
Advanced storage management	Yes (Conga)	No	SUSE Linux Enterprise Server still uses YaST with no graphical storage representations. Conga is a new project from Red Hat that graphically illustrates storage provisioning and management, including simple cluster and storage deployment
Management/Applications			
Patterned deployments	Yes (New)	Yes	Red Hat is adding "Puppet," which allows for patterned deployments of Red Hat Enterprise Linux. This is a feature Novell introduced with SUSE Linux Enterprise Server 9.
Satellite network for VM management	Yes	Yes	Red Hat Network is being revamped for Red Hat Enterprise Linux 5 to support virtual machines (updating DOM 0 and DOM U Red Hat Enterprise Linux guests).
Quality of service (QoS) per application monitoring tools	Yes	No ¹⁶	¹⁶ Novell intends to deliver QoS monitoring and enforcement tools through the DataCenter Automation tool set (DCA 2.0) in early 2008.
Automated deployment	Yes	Yes	Enhancements will be seen in both distributions. AutoYaST from Novell tends to be seen as more user friendly, and Red Hat kickstart tends to be seen as simpler and quicker.
CIM enabled	Yes (Partly)	Yes	Novell is leading in CIM enablement, especially with the OMC project.
Firewall	Yes	Yes	Differences between the two products are primarily in what is configured by default.
Advanced Intrusion Detection Environment (AIDE)	Yes (New)	Yes	AIDE for security. This features has been included in SUSE Linux Enterprise Server since SUSE Linux Enterprise Server 8. It is new in Red Hat Enterprise Linux 5.
CUPS (IPP Printing)	Yes	Yes ¹⁷	¹⁷ Enhanced iPrint management capabilities with Novell Open Enterprise Server add-on.
Web applications server	No ¹⁸	Yes ¹⁹	¹⁸ Separate subscription for Red Hat Applications Stack. ¹⁹ IBM's WebSphere Community Edition (CE) is included.
Mono	No ²⁰	Yes	Mono, the open source development platform based on the .NET framework, allows developers to build Linux and cross-platform applications with improved developer productivity. Mono's .NET implementation is based on the ECMA standards for C# and the Common Language Infrastructure. Sponsored by Novell, the Mono project is used by developers worldwide to create cross-platform server and client applications. In Feb. 2007, Novell announced that it had developed a Visual Basic* compiler that will enable software developers who use Microsoft Visual Basic to run their applications across multiple platforms without any modifications to the code. ²⁰ Red Hat Enterprise Linux will not be including Mono in Red Hat Enterprise Linux 5, choosing to focus on JBoss for application development.

continued on next page

Feature	Red Hat Enterprise Linux 5/Red Hat Enterprise Linux 5 Advanced Platform	SUSE Linux Enterprise 10 SP1	Notes
Product Add Ons—Additional Products That May Be Added on As Separate Subscriptions or Licenses			
Real-time extensions	Yes	Yes	The Novell real-time offering is based on the 2.6.22 Linux kernel, and includes the open source community's latest real time patch set—preempt_RT—a set of patches that supports preemption with sleeping spinlocks, thread run interrupts and priority inheritance. SUSE Linux Enterprise Real Time also includes support for CPU shielding and assignment, high resolution timers, the latest open source InfiniBand stack, OFED 1.2.5, and is instrumented for Concurrent Computer Corporation's NightStar tools.
Point of Sale (POS)	No	Yes	Novell offers a POS solution suite to OEMs.
Management suite	Yes (Red Hat Network)	Yes (Novell Customer Center and Novell ZENworks Linux Management breakout)	Novell Customer Center was first introduced with SUSE Linux Enterprise Server 10, so it is behind Red Hat's offerings in the market. Technical issues with the Novell ZENworks Linux Management patch/update and management system should be rectified by SP1. Novell DCA will include heterogeneous management in future revisions, which will significantly add value to SUSE Linux Enterprise over time compared to Red Hat Enterprise Linux.
Cluster suite	Included with Red Hat Enterprise Linux 5 AP	Included in base	Included in Red Hat Enterprise Linux 5 AP, but not included in base Red Hat Enterprise Linux 5 server version. Additional US\$499/yr. SUSE Linux Enterprise 10 includes clustering at no additional charge via Heartbeat.
GFS parallel Cluster File System (pCFS)	Included with Red Hat Enterprise Linux 5 AP	Yes ²¹	Included in Red Hat Enterprise Linux 5 AP, but not included in base Red Hat Enterprise Linux 5 server version. Additional US\$2,200/yr. ²¹ Novell has OCFS2, and in SUSE Linux Enterprise Server 10 SP2, it will be very similar to GFS2.
Application stack	Yes	Yes, WebSphere Application Server Community Edition	Red Hat includes a separate package of JBoss, Apache, MySQL or Postgres server for Web services application stack. Novell provides a support offering for WebSphere Application Server Community Edition integrated with SLES SP1 and future releases: www.novell.com/wasce
Directory server	Yes, Red Hat Directory Server, various pricing options	Yes, Novell eDirectory, various pricing options, including added Microsoft Active Directory integration	Both Red Hat and Novell sell separate directory servers. Red Hat's is open source.
Workgroup suite	No	Yes, Novell Open Enterprise Server, US\$128/User	Novell Open Enterprise Server 2 offers rich solutions for the productivity worker, which Red Hat's solutions do not offer. This solution competes with Microsoft Windows Server 2003 and Longhorn Server. Red Hat doesn't compete effectively in the enterprise productivity worker solutions space.
Miscellaneous			
AutoBuild service			The openSUSE- Build Service, an innovative framework that provides an infrastructure for software developers to easily create and compile packages for multiple Linux distributions, has extended its support to now build packages for CentOS and Red Hat Enterprise Linux. The openSUSE Build Service already supports several Linux distributions including openSUSE, Ubuntu, SUSE Linux Enterprise, Debian and others. Details can be found at: http://en.opensuse.org/Build_Service

Appendix B: Detailed Comparison of Red Hat Enterprise Linux 5 Desktop and SUSE Linux Enterprise Desktop 10 SP1

Feature	Red Hat Enterprise Linux 5 Desktop	SUSE Linux Enterprise Desktop 10 SP1	Notes
Core Platform Components			
GNOME	Yes, 2.16	Yes, 2.12 (see notes)	There are many backports from GNOME versions between 2.12 and 2.16 for SUSE Linux Enterprise 10 SP1.
Virtualization: Xen	Yes	Yes	Xen virtualization will be included with SUSE Linux Enterprise Desktop 10 SP1. Novell will also include a second virtualization solution for customers without the latest hardware required for Xen. Red Hat will have an installation pattern for clients, called Dual OS, for enabling virtualization.
Virtualization: VMware and vmx-manager	No	Yes	vmx-manager is an image creation utility created by Novell using VMware's VMDK. VMware player is included with SUSE Linux Enterprise Desktop 10 SP1.
Stateless Linux	Yes ²²	No	²² Currently a technology preview and not officially supported
AIGLX	Yes ²³	Yes	SUSE Linux Enterprise Desktop supports AIGLX with new drivers from NVIDIA and ATI. ²³ Currently a technology preview and not officially supported.
Xgl	No	Yes	
Compiz (desktop effects)	Yes ²⁴	Yes	²⁴ Currently a technology preview and not officially supported
Third-party driver support	Yes	Yes	Red Hat indicates in its beta 2 release notes that it will have a new process for third-party driver integration, but the details were not disclosed.
Mono	No	Yes	Red Hat Enterprise Linux will not be including Mono in Red Hat Enterprise Linux 5, choosing to focus on JBoss for application development. This will have a major impact on the availability of desktop applications. Click on the following link for an article relating to Mono and Red Hat Enterprise Linux 5: www.devxnews.com/article.php/3644981
Desktop Applications			
OpenOffice.org 2.0	Yes	Yes	OpenOffice.org Novell Edition provides performance enhancements and better document interoperability with Microsoft Office formats.
Helix Banshee™ (music management)	No ²⁵	Yes	²⁵ Red Hat Enterprise Linux 5 uses Rhythmbox as its default music player. The iPod* support is disabled by default. It uses GStreamer as its media framework without support for MP3 or any other major format other than OGG. SUSE Linux Enterprise Desktop10 SP1 provides iPod support.
F-Spot (photo management)	No	Yes	Dependency on Mono. No alternative in Red Hat Enterprise Linux
Beagle. (integrated search)	No	Yes	Dependency on Mono. No alternative in Red Hat Enterprise Linux
NetworkManager	Yes	Yes	Not installed by default on Red Hat Enterprise Linux 5 Beta 2
Novell Evolution™	Yes	Yes	
Gaim (instant messaging)	Yes	Yes	Gaim can be upgraded to Pidgin via a download: http://software.opensuse.org
Ekiga (VoIP, video conferencing)	Yes	Yes	
Mozilla Firefox*	Yes	Yes	
Tomboy (integrated note taking)	No	Yes	Dependency on Mono

continued on next page

Feature	Red Hat Enterprise Linux 5 Desktop	SUSE Linux Enterprise Desktop 10 SP1	Notes
Desktop Technologies			
Desktop lockdown: alacarte	Yes	Yes	Allows administrators and users to organize (add/modify/delete) applications' menu entries and categories to the applications' browser and/or traditional menu.
Desktop lockdown: Sabayon	Yes	Yes	Sabayon is a system administration tool to manage GNOME desktop settings. Sabayon provides a sane way to edit GConf defaults and GConf mandatory keys.
Smart card integration	Yes	Yes	
Samba	Yes	Yes	
Directory integration	Yes ²⁶	Yes	²⁶ Novell work on eDirectory and Active Directory integration was not available to Red Hat at the time of the Red Hat Enterprise Linux 5 release.
KDE	Yes	Yes	Red Hat Enterprise Linux 5 Beta is based on KDE 3.5.4. The packages are delivered directly from the Fedora Core 6 project.
Hard drive encryption	Yes	Yes	
Third-party Components			
DVD playback	N	No	
RealPlayer* from RealNetworks*	No	Yes	Provides MP3 support
Support for WMA/WMV formats	No	Yes	Contracts are in place to receive and bundle the next release of RealPlayer for Linux with support for WMA and WMV.
Adobe* Acrobat* Reader	No	Yes	
Adobe Flash Player	No	Yes	
Agfa Fonts	No	Yes	
BrainStorm "Quick Start Tour"	No	Yes	
Citrix* ICA Client	No	Yes	
VPN connectivity	No	Yes	Very limited IPsec VPN support in Red Hat Enterprise
Nortel* VPN connectivity	No	Yes	Proprietary development by Novell

www.novell.com



Contact your local Novell
Solutions Provider, or call
Novell at:

1 800 714 3400 U.S./Canada
1 801 861 1349 Worldwide
1 801 861 8473 Facsimile

Novell, Inc.
404 Wyman Street
Waltham, MA 02451 USA