

Solution Brief

Intel® Xeon® Processor
E7 Family

Red Hat Enterprise Linux* 6

Mission-Critical Enterprise
Computing



“Red Hat Enterprise Linux running on Intel Xeon-based servers is truly a rock-solid platform. We absolutely trust Red Hat Enterprise Linux and Intel with our most mission-critical systems.”

– Brad Massey, director,
IT Support Services,
Odyssey Logistics and
Technology¹

Breakthrough Capability for Mission-Critical Computing

Intel and Red Hat have been supporting mission-critical computing environments for years, helping companies achieve the highest levels of performance and reliability, while increasing their vendor options and optimizing their cost models. Many of the world's largest businesses rely on the combined platform to support core business applications, including high-volume financial trading companies with their extreme performance, security and uptime requirements.

Recent breakthroughs from Intel and Red Hat take the mission-critical capability of the combined platform to new heights.

- **The Intel® Xeon® processor E7 family** delivers top-of-the-line performance in large, highly resilient server configurations designed to support today's most demanding enterprise workloads. These processors extend the world-record performance² of the previous-generation Intel® Xeon® processor 7500 series by as much as 40 percent.³ They also support up to twice the memory capacity and extend the mainframe-inspired features of the previous generation to enable even more robust reliability, security, and availability for mission-critical computing applications.
- **Red Hat Enterprise Linux* 6** is highly optimized for these new servers, providing scalable performance, high availability, and comprehensive enterprise functionality in one of the world's most secure operating environments. It represents the most comprehensive release in the history of Red Hat Enterprise Linux, providing thousands of enhancements to improve performance, scalability, reliability, security, and data-center operational flexibility in bare-metal, virtualized, and cloud deployments.

These advances mark a true tipping point in the computing industry. Innovation is happening first and fastest on industry-standard computing architectures, and leading enterprise software vendors, such as SAP and SAS, are certifying their entire solution stacks on Red Hat Enterprise Linux and Intel Xeon processor-based servers.

Enterprise IT organizations can address their most demanding computing requirements on a flexible, widely supported, standards-based computing infrastructure. The reasons for continuing to invest in costly, proprietary computing solutions have all but disappeared, even for the largest and most mission-critical of enterprise applications.



The Platform of Choice for Enterprise Computing

A major shift is underway in the computing industry. Sales for UNIX*/RISC architectures continue to decline, while sales for industry-standard solutions are rising fast.⁴ Intel and Red Hat have been driving forces behind these developments, working independently, together, and with the broader open-source community to deliver comprehensive, enterprise-ready solutions and support that meet the most demanding requirements.

Innovation continues at an unprecedented pace, and Intel and Red Hat are leading the way. Red Hat is the number one commercial contributor to the upstream Linux kernel and Intel is number three. Together they account for nearly 20 percent of the total work done to advance open-source Linux.⁵ Even more importantly, Intel and Red Hat devote substantial resources to integrating, optimizing, and hardening their combined platform to provide comprehensive, enterprise-ready solutions and support. Through these efforts, they deliver a trusted enterprise computing platform that can be deployed with confidence. Thousands of enterprise customers, including industry leaders such as Gap, Inc.,⁶ NYSE Euronext,⁷ Sabre Holdings,⁸ Salesforce.com,⁹ and Wall Street Systems,¹⁰ are running mission-critical applications on Red Hat Enterprise Linux and Intel Xeon processor-based servers today, and view it as their strategic computing platform moving forward.

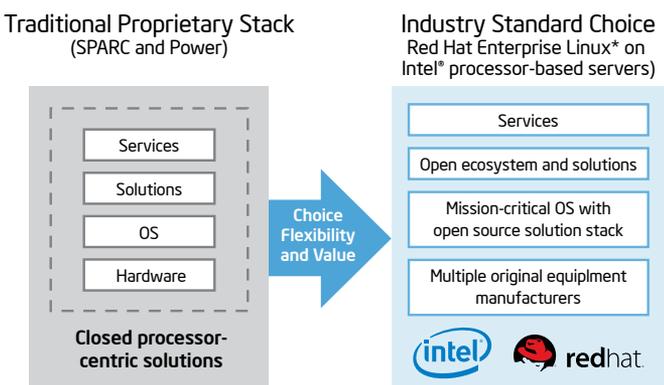


Figure 1. Red Hat Enterprise Linux* running on Intel® Xeon® processor-based servers deliver leadership capability for mission-critical computing.

Table 1. Industry-leading performance on key industry benchmarks.

Benchmark	Processor (Platform)	Software Details	Result	Importance
Technical Computing • SPECfp*_rate_base2006	Intel® Xeon® processor 7560 (HP ProLiant* DL980 G7)	Red Hat Enterprise Linux* 5.5	1,020 base score ^a	World record for 8-socket x86 servers
General-Purpose Computing • SPECint*_rate_base2006	Intel Xeon processor 7560 (HP ProLiant DL980 G7)	Red Hat Enterprise Linux* 5.5	1,380 base score ^b	World record for 8-socket x86 servers
Virtualization • SPECvirt_sc2010*	Intel Xeon processor 7560 (IBM System x* 3850 X5)	Red Hat Enterprise Linux* 5.5 (KVM)	1,369.23 @ 84 VMs ^c	World record

^a Platform: Hewlett-Packard ProLiant* DL980 G7 server platform with eight Intel® Xeon® processors X7560 (24M cache, 2.26 GHz, 6.40GT/s Intel® QPI), 256GB memory, Red Hat Enterprise LINUX* 5.5, Intel C++ and Fortran Compiler 11.1. Referenced as published baseline score of 1020. Source: <http://www.spec.org/cpu2006/results/res2010q3/cpu2006-20100816-12949.html>.

^b Platform: Hewlett-Packard ProLiant* DL980 G7 server platform with eight Intel® Xeon® processors X7560 (24M cache, 2.26 GHz, 6.40GT/s Intel® QPI), 256GB memory, Red Hat Enterprise LINUX* 5.5, Intel C++ and Fortran Compiler for LINUX. Referenced as published baseline score of 1380. Source: <http://www.spec.org/cpu2006/results/res2010q3/cpu2006-20100816-12950.html>.

^c Platform: IBM System x*3850 X5 server platform with the two Intel® Xeon® Processor X7560 (24M Cache, 2.26 GHz, 6.40GT/s Intel® QPI —32 cores/4 chips/8 cores per chip), WebSphere® Application Server 7.0.0.7, DB2 v9.5, Dovecot* 1.2.11, Apache* 2.2.3, Red Hat Enterprise LINUX* 5.5 on all VMs. Referenced as published at 1369.23@84VMs. Source: http://www.spec.org/virt_sc2010/results/specvirt_sc2010_perf.html.

Industry-Leading Performance

Previous-generation Intel Xeon processor 7500 series-based servers running Red Hat Enterprise Linux 5.5 have already demonstrated industry-leading performance across critical industry benchmarks (see Table 1, below). Additional benchmark tests are underway using the Intel Xeon processor E7 family and Red Hat Enterprise Linux 6, and these tests are expected to deliver another major leap in performance across a wide range of enterprise workloads. To view the latest results as they become available, visit the Intel Web site at www.intel.com/performance/server/index.htm.

Exceptional Scalability

Intel and Red Hat technologies scale easily to support today's largest workloads. A single eight-socket server based on the Intel Xeon processor E7 family provides up to 80 cores, 160 threads, and 4 TB of memory, and larger servers are available. With support for up to 4,096 processors, 64 TB of memory per server, and file systems as large as 100 TB, Red Hat Enterprise Linux 6 offers optimized support for these servers—and much larger systems to come. Combined with Intel's robust technology roadmap, customers can be confident their business solutions will scale as needed to handle future increases in users, workloads, and data sets.

Advanced Reliability and Security

Intel and Red Hat support high-end reliability in one of the world's most secure operating environments. Intel® Advanced Reliability Technology lays the hardware foundation for optimizing uptime and data integrity in mission-critical environments through extensive error-checking across all critical components and pathways, silicon-level redundancy and failover, and advanced logging and recovery capabilities.

Red Hat Enterprise Linux 6 supports and extends this hardware foundation with a complete array of integrated capabilities for mission-critical environments, including policy-based resource management, high-availability clustering, advanced error management, and predictive failure analysis.

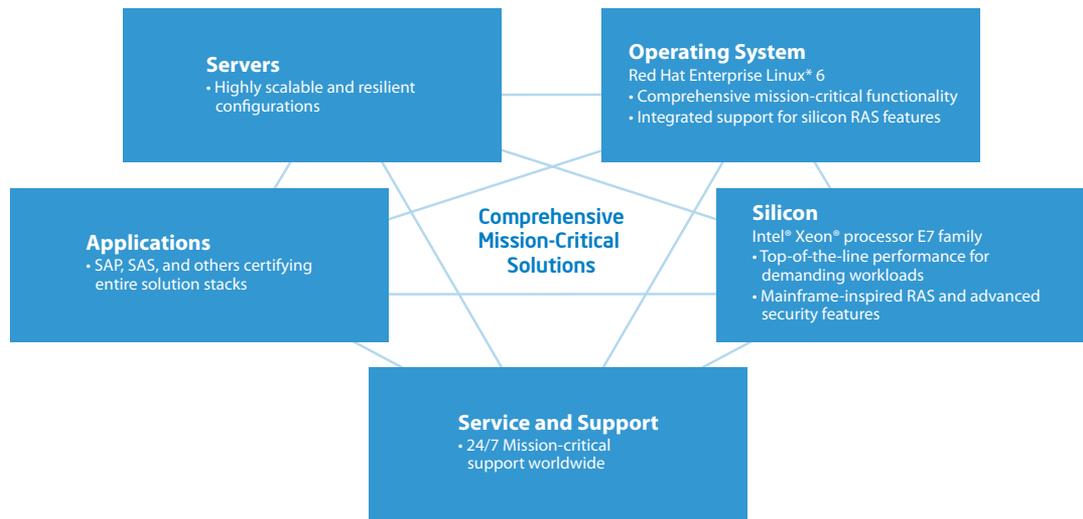


Figure 2. Comprehensive mission-critical solutions.

Intel and Red Hat are also delivering leadership security capabilities across bare-metal, virtualized, and cloud computing environments. Security Enhanced Linux (SELinux) was jointly developed by Red Hat and the United States National Security Agency (NSA) to meet high-end security requirements in today's increasingly threat-filled world. New Intel® technologies in the Intel Xeon processor E7 family offer additional support for addressing growing security requirements more easily and cost-effectively.

- Intel® Advanced Encryption Standard-New Instructions¹¹ (Intel® AES-NI) dramatically reduces encryption overhead, so customers can implement encryption pervasively to protect valuable business data.
- Intel® Trusted Execution Technology¹² (Intel® TXT) verifies the integrity of the computing platform at launch to enable stronger security in virtualized and cloud computing environments. It also lays the foundation for comprehensive, real-time, compliance monitoring in public and private cloud environments.

Mission-Critical Stability, Service, and Support

Intel and Red Hat collaborate closely to deliver synchronized innovations rapidly and continuously, while ensuring that new technologies are fully integrated and extensively tested for backward compatibility. Customers benefit from a stable hardware and software environment that can be upgraded at anytime and at their own discretion, with minimal cost and disruption.

Red Hat offers end-to-end support for mission-critical implementations with comprehensive consulting services and mature tools for planning, implementing, and supporting both new deployments and migrations from UNIX/RISC and other computing platforms. Expert, 24/7 technical support with fast response times is available worldwide, and Red Hat collaborates with many third-party hardware and software vendors to deliver integrated solution support with a single point of contact.

“Our clients are completely comfortable knowing that they can run their largest, most critical systems on Red Hat Enterprise Linux* and that they’ll get enterprise-class support.”

– Mark Tirschwell, chief technology officer, Wall Street Systems¹³

Rapid Innovation on a Trusted Enterprise Platform

Given the rapid pace of technology innovation, businesses should be evaluating every new IT investment in light of current and future cloud computing solutions. Intel and Red Hat are leading the industry in this respect, breaking down the barriers to cloud computing by delivering industry-leading virtualization performance¹⁴ with the scalability, reliability, and security needed to support the full range of enterprise applications. Importantly, they are delivering these industry-leading capabilities with cost models that make end-to-end virtualization truly affordable.

The wide interoperability of Intel and Red Hat technologies adds to these advantages, simplifying the integration of diverse hardware and software components to help companies preserve the value of their investments and move forward with greater flexibility. Companies such as Amazon,¹⁵ DreamWorks Animation,¹⁶ and NTT Communications¹⁷ have chosen the combined platform for large-scale cloud deployments, and many others are using it to consolidate infrastructure and extend the benefits of virtualization and automation into the heart of their data centers.

Moving Forward with Confidence

Intel and Red Hat are uniquely positioned to address today's and tomorrow's rapidly growing business computing requirements. Together, they harness the power of the vast open-source software community and the world's most widely supported server architecture to deliver comprehensive, enterprise-ready solutions that can be deployed with confidence from the desktop to the back-end of the data center.

The recent advances from both companies offer a quantum leap in mission-critical capability, while preserving the tremendous flexibility and value of the combined platform. As businesses strive to compete in a global marketplace, there is no better foundation for delivering always-on IT support that can be scaled, extended, and adapted quickly and cost-effectively as requirements change.

Learn More

For more information about Intel technologies, solutions, and resources for mission-critical computing, go to www.intel.com/itcenter/topics/missioncritical.htm

For more information about Red Hat technologies, solutions, and resources for mission-critical computing, go to www.redhat.com/promo/Red_Hat_Enterprise_Linux6/

Solution provided by:



¹ Source: Odyssey Logistics & Technology Migrates from UNIX to Red Hat Enterprise Linux on Intel Xeon Processor-based Servers to Run Mission-critical Supply Chain Operations, an Intel and Red Hat case study, 2009, http://rhcustomers.files.wordpress.com/2009/08/rh_odysseylogistics.pdf

² The Intel Xeon processor 7500 series set more than 30 world-records across a range of industry-standard benchmarks. For details, visit the Intel Web site at http://www.intel.com/performance/server/xeon_mp/summary.htm

³ Based on Intel internal measurements, typical gains range from 20 to 40 percent. For the latest published benchmark results as they become available, visit <http://www.intel.com/performance/server/index.htm>

⁴ "Now that the fourth-quarter figures are out, the UNIX drop is 18.1 percent year-over-year. That adds up to worldwide UNIX revenues of \$3.9 billion for the quarter, representing 29.9 percent of the total server spend — down from 36.2 percent in 4Q08. In comparison, x86 grew 12.6 percent in the same quarter to \$7.3 billion." Source: RISC to x86 Server Migration Buyer's Guide, by Drew Robb, ServerWatch, March 4, 2010. <http://www.serverwatch.com/hreviews/article.php/3868681/RISC-to-x86-Server-Migration-Buyers-Guide.htm>

⁵ Source: eWeek.com. <http://www.eweek.com/c/a/Linux-and-Open-Source/Red-Hat-Novell-IBM-Among-Top-Contributors-to-Linux-Development-527696/>

⁶ Download the complete Red Hat case study at http://www.redhat.com/fi/pdf/customers/Red_Hat_Likewise_Gap_Inc_Direct.pdf

⁷ Download the complete Red Hat case study at http://www.redhat.com/videos/customers_nyse.html

⁸ Download the complete Red Hat case study at http://www.redhat.com/fi/pdf/blog/RH_SabreHoldings_CS_734891_0808_cw_web.pdf

⁹ View the complete Red Hat video at http://www.redhat.com/videos/customers_salesforce.html

¹⁰ Download the complete Red Hat case study at http://www.redhat.com/fi/pdf/customers/RH_CS_WallStreetSystems_web.pdf

¹¹ Intel® AES-NI requires a computer system with an AES-NI enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on Intel® Core™ i5-600 Desktop Processor Series, Intel® Core™ i7-600 Mobile Processor Series, and Intel® Core™ i5-500 Mobile Processor Series. For availability, consult your reseller or system manufacturer. For more information, see <http://software.intel.com/en-us/articles/intel-advanced-encryption-standard-instructions-aes-ni/>.

¹² No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer system with Intel® Virtualization Technology, an Intel TXT-enabled processor, chipset, BIOS, Authenticated Code Modules and an Intel TXT-compatible measured launched environment (MLE). Intel TXT also requires the system to contain a TPM v1.s. For more information, visit <http://www.intel.com/technology/security>.

¹³ Source: Wall Street Systems Boosts Revenues, Cuts Costs by Migrating to Red Hat Enterprise Linux, an Intel and Red Hat case study, 2009, http://www.redhat.com/fi/pdf/customers/RH_CS_WallStreetSystems_web.pdf

¹⁴ Red Hat® Enterprise Linux® 5 running on Intel Xeon processor-based servers delivered world record SPECvirt2010 benchmark. For complete information about the benchmark, the test setup and the results, visit the SPEC Web site at http://www.spec.org/virt_sc2010/. Tests currently underway with Red Hat Enterprise Linux 6 are expected to demonstrate another leap forward in performance.

¹⁵ For more information, visit the Red Hat Web site at <http://www.redhat.com/solutions/cloud/amazon/>

¹⁶ For more information, read the Red Hat press release at <https://www.redhat.com/about/news/prarchive/2009/derek-chan.html>

¹⁷ For more information, view the Red Hat video at http://www.redhat.com/videos/customers_ntt.html

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