



Migrating from Sun™ SPARC to HP ProLiant Servers with Intel® Xeon® processors

IT administrators running their networks on SPARC servers from Sun Microsystems can now turn to powerful, lower-cost options for their open-source infrastructures: HP ProLiant servers based on Intel® Xeon® processors. Migrating to the Intel Xeon-based HP ProLiant offers many advantages over SPARC systems, including lower total cost of ownership (TCO), higher performance, and more choices in both operating systems (Linux, Windows®, and Solaris™) and configurations (rack, tower, and blade).

The move from proprietary to open-source applications

Spurred by competitive and economic pressures to become more agile, productive, and cost-efficient, many enterprises are spurning the traditional proprietary hardware and software model based on reduced-instruction-set-computer (RISC) technology that has dominated IT architecture for years. Instead, they're looking to open-source operating systems like Linux and OpenSolaris™ running on standards-based HP ProLiant server platforms with Intel® Xeon® processors.

The reasons for this migration are as natural as geese flying south for the winter: the search for a more favorable environment. In a word, RISC-based systems—whether a Sun SPARC platform or one from another manufacturer—are limited. They offer limited hardware and software choices, limited vendor support, and are locked into limited proprietary technologies. Current RISC platforms are also more expensive to maintain than HP ProLiant with Intel Xeon solutions and underperform them as well.

Open platforms, on the other hand, give IT administrators much more flexibility with broad system hardware choices; proven, industry-standard technologies; and broad operating system and application support. As a result, they reduce the costs, risks, and limitations businesses incur when saddled with a restrictive proprietary architecture while improving performance, shortening times to market, and seamlessly supporting a variety of components from different manufacturers. What's more, as more companies discover the advantages of open-source architectures, processor, system, memory, and disk manufacturers will rush to catch the wave of open-source's momentum. As a result, the range of choices, information, resources, and support available to developers and managers will also grow.

Enhancing the attractiveness of open-source operating systems is the fact that implementing them is actually quite simple and cost effective. Rather than taking on the sometimes substantial overhead of time as well as the money needed to design, develop, and install their own proprietary applications, IT departments are integrating standard, commercial, out-of-the-box open-source software and hardware components into their networks. In this way, they achieve their goals of new products, new services, more efficient operations, faster sales fulfillment, and higher bandwidth while keeping procurement and maintenance costs down and operational efficiencies up.

The upshot of this new paradigm is that organizations preserve their current systems' high availability, scalability, reliability, and security while reducing the physical floor space needed to deliver it. At the same time, the revamped networks are easy to maintain, upgrade, and evolve. Given all these advantages and the high quality of the open-source operating systems themselves, it's hard to imagine those businesses that have made the switch ever returning to a RISC-based proprietary model.

The trend away from Sun Microsystems' SPARC servers

It's common knowledge that as their legacy Sun SPARC servers age, corporate IT departments are shifting to lower-cost, higher-performance open-source x86 systems. This trend is not surprising. As HP Director of Enterprise Servers and Storage Software Jeff Carlat points out, customers with retirement-age SPARC servers can "...easily move to a lower-cost platform and see a performance of two to four times with the new x86 servers. It's like moving them from an old car to a new Ferrari."² And while price and performance are powerful incentives, they're not the only reasons for SPARC's market erosion. Other factors include:

“Why run an old SPARC server when you can do the same work on x86?”

Charles King,
president and
principal analyst,
Pund-it, Inc.¹

- **Sun’s continued escalation of its prices.** IDC reported that sales of SPARC servers declined 14 percent between 2006 and 2007 while revenues from those sales actually held steady. Obviously, those who are still buying SPARC servers are paying more for them.
- **Sun’s ever-shifting technology roadmap.** Sun has cancelled the introduction of three highly anticipated processors: the UltraSPARC V, the Gemini, and the UltraSPARC IIIi, and has delayed production of its high-end chip, ROCK, for a full year.
- **Sun’s narrow new-product platform requirements.** A customer using a Sun Fire USIV/IV+ system who wants to upgrade to new Sun technology really has only one mid-to-high-end choice: the SPARC64 system built by Fujitsu, which requires a “forklift” upgrade to an entirely new hardware strategy (Sun hardware, it should be noted). When ROCK finally appears and if it delivers on its advertised performance, it will also require new operating system and application software upgrades due to the shift of the design approach its engineers took.
- **Solaris’s own market share growth on x86 servers.** Interestingly, the industry recognizes that the true growth potential for Solaris software is not in Sun’s own SPARC servers but in x86 servers.

Advantages of the HP ProLiant servers with Intel Xeon processors

More and more businesses are choosing HP ProLiant servers powered by Intel Xeon processors to improve operational effectiveness while managing network complexity and risk. Available in industry-standard blade, rack, and tower configurations, HP ProLiant servers with Intel Xeon processors support every major open-source operating system, including Windows, Linux and Solaris. Using ProLiant servers, your company can build a complete server infrastructure that supports your business objectives and growth.

Intel Xeon processors running Linux push ProLiant performance to its highest levels. Available on 45-nanometer (nm) high-k process technology, they enable you to build a scalable, flexible infrastructure that can grow and change to serve an expanding business. Intel Xeon processors provide the speed, energy efficiency, and reduced footprint today’s networks need, while reducing transistor gate leakage significantly. Businesses can do more and spend less in a smaller space with broad 64-bit choices across operating systems and applications.

HP also supports its ProLiant servers with an extensive line of management tools, virtualization software, accessories, storage, and networking products and services. HP Insight Management software enables you to oversee your network monitoring, deployment, and control needs from almost anywhere; and HP Virtual Connect Enterprise Manager simplifies the management of BladeSystem environments that use HP Virtual Connect to control LAN and SAN connectivity. Overall, HP ProLiant servers with Intel Xeon processors enable your business to run smoothly and securely, increase productivity, meet your current IT requirements, and absorb your future needs.

Figure 1. ProLiant* to SPARC comparison

	System	Result	Processor	Memory
SPECint2006rate	Sun SPARC Enterprise T5440	301.0	UltraSPARC T2 Plus	4x
SPECint2006rate	HP ProLiant DL580 G5	291.0	Xeon X7460	
SPECint2006rate	Sun SPARC Enterprise M5000	264.0	SPARC64 VII	2x
SPECint2006rate	Sun SPARC Enterprise T5240	157.0	UltraSPARC T2 Plus	

	System	Result	Processor	Memory
SPECfp2006rate	Sun SPARC Enterprise T5440	230.0	UltraSPARC T2 Plus	4x
SPECfp2006rate	Sun SPARC Enterprise M5000	223.0	SPARC64 VII	2x
SPECfp2006rate	HP ProLiant DL580 G5	156.0	Xeon X7460	
SPECfp2006rate	Sun SPARC Enterprise T5240	119.0	UltraSPARC T2 Plus	2x

	Product	JOPS	Processor	Memory
SPECjAppServer2004	Sun SPARC Enterprise T5440	6,334.86	UltraSPARC T2 Plus	2x
SPECjAppServer2004	HP ProLiant DL580 G5	4,410.07	Xeon X7460	
SPECjAppServer2004	Sun SPARC Enterprise T5240	3,331.31	UltraSPARC T2 Plus	

	Product	JOPS	Processor	Memory
SAP R 3 SD 2-Tier	Sun SPARC Enterprise T5440	7,520	UltraSPARC T2 Plus	2x
SAP R 3 SD 2-Tier	HP ProLiant DL580 G5	5,155	Xeon X7460	
SAP R 3 SD 2-Tier	Sun SPARC Enterprise T5240	4,170	UltraSPARC T2 Plus	2x

Information comes from <http://www.sap.com/benchmark>

* Please note that in order to achieve similar performance to the HP ProLiant DL580 Intel Xeon processor based server, Sun SPARC servers doubled or quadrupled their memory footprint. Add to that these same SPARC servers are often two to three times as expensive as the HP ProLiant DL580 Intel Xeon processor based server. For more information, visit <http://www.spec.org> (January 2009).

“x86 solutions are becoming more attractive, especially with virtualization.”

Charles King, president and principal analyst, Pund-it, Inc.²

RISC replacement advantages

At one time, RISC processing held the promise of extremely fast performance, but today it faces a number of challenges, including newer technologies—like Intel Xeon—that run faster, cost less, use less power, and are available in smaller footprints. As a result, many of RISC’s customers are migrating to these newer, more advanced technologies for the very reasons they first were attracted to RISC. In fact, IDC reports sales of Sun’s RISC-based SPARC servers declined 9.6% between 2007 and 2008, while Intel Xeon-based systems rose 9.6%.³

Higher performance

Current proprietary RISC platforms, like those running Sun SPARC servers, under-perform comparable Intel Xeon processors and are more expensive to maintain. They provide no flexibility in which operating systems or applications a company can use in conjunction with the hardware. On the other hand, industry-standard, open-source processors allow companies to choose from a broad array of solutions, enabling them to meet their specific needs best.

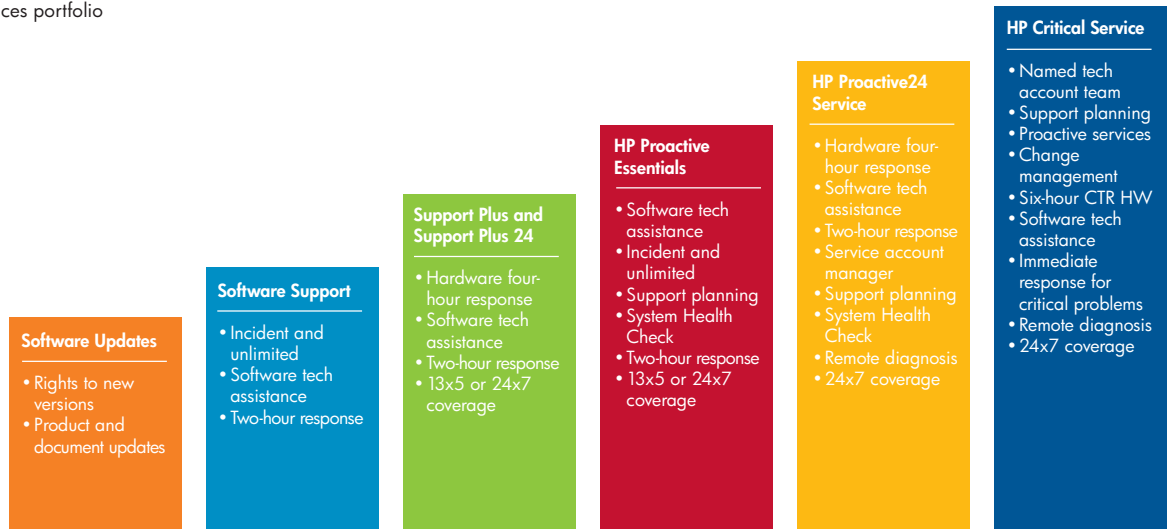
Lower costs

Standard-based x86 systems are also less expensive to own than RISC platforms. Over three years, total cost of ownership of an HP ProLiant server with Intel Xeon processors can be as much as 67 percent less than a comparable Sun SPARC server. See the HP Total Cost of Ownership Calculator example on page 7.

Investment protection

Intel Xeon processors can support several operating systems at the same time while proprietary RISC architectures support, for the most part, only one. For example, today’s SPARC architecture will run the Sun Solaris operating system (OS) but can’t—or won’t—run Windows or Linux natively. Today’s business growth demands that technology provide not only improved performance but the flexibility to integrate those applications and systems that best meet a company’s requirements, not the product that is most compatible with a manufacturer’s hardware.

Figure 2. Comprehensive Linux services portfolio



Solaris and Linux on ProLiant servers

Solaris on ProLiant

You can feel confident migrating your Sun Solaris operating system to an HP ProLiant server with Intel Xeon processors. Since 1996, HP has supported and certified Sun's Solaris x86 operating system on HP ProLiant servers. In fact, there are more than 40 HP ProLiant models on the Sun Solaris Hardware Compatibility List. This is no mere coincidence. HP and Sun engineers work closely testing, qualifying, and certifying current and future releases of the Solaris operating system on ProLiant servers. HP has also added a wide selection of management software for Solaris, including Insight Management Agents, Health Drivers, Integrated Lights Out (iLO) support, and System Insight Management Home Page.

At the same time, Sun has extended its support of Solaris Cluster Open Hardware to HP ProLiant servers. ProLiant customers who want to use the Solaris Cluster for application availability can do so seamlessly. Installing Solaris on ProLiant servers can be done easily with the HP Deployment Resource Kit for Solaris. It contains sample tools and deployment configuration files, including a JumpStart profile, a JumpStart finish script, a sysidcfg(4) file and an RDP job. Used in conjunction with the Sun Solaris 10 Deployment Guide of HP ProLiant Servers and the HP ProLiant PXE Installation Utility, it allows an administrator to create a Solaris x86 operating system net-install image to configure a dynamic host configuration protocol (DHCP) to install and boot servers on a single server running Solaris 10 x86.

Linux on ProLiant

HP ProLiant servers, Intel Xeon processors, and the Linux operating system were made for each other. Not only does the HP ProLiant server with Intel Xeon processors naturally offer a free-flowing environment in which Linux can thrive, but we're creating special applications and services specifically for Linux. For example:

- HP Factory Express supports HP ProLiant servers with Linux with a robust portfolio of flexible, pre-priced, pre-installed factory solutions and deployment services.
- HP support personnel are well versed in Linux. In fact, they solve more than 99 percent* of the Linux calls they receive before having to refer the call to a Linux vendor.
- HP Open Source Middleware Stacks helps reduce Linux roll-out complexity and risk while accelerating deployment and expediting its integration into heterogeneous, multi-OS environments.
- HP Serviceguard for Linux provides high-availability clustering for business-critical applications for enterprise customers who require 24/7 support. HP's unified infrastructure management support applications—including HP Systems Insight Manager and HP Insight Software—are supported on Linux.

As more and more businesses turn to Linux, HP gives them the tools to make one of the most powerful, most cost-effective servers available a valuable part of their open-source solution.

* Source: 2007 HP internal study

“We currently have half a million users on the platform. We are within our space and power budget and our financial budget as well. None of that would have been possible without the HP BladeSystem.”

Philip Buckley-Mellor, designer, BT Vision

Investing in the greatest value over time

While short-term bottom-line gains are popular at shareholder meetings, an informed vision of how your IT infrastructure complements—even strengthens—your company’s long-term business goals and strategies is vital to weathering challenging economic times and taking full advantage of the good ones. Fortunately, migrating from Sun SPARC servers to Intel Xeon-based HP ProLiant servers satisfies the financial views of just about everybody by:

- Decreasing up-front acquisition costs. ProLiant servers can save you up to 60 percent on comparable SPARC servers.
- Keeping operational costs down. Manufactured on industry-leading 45 nm process technology, Intel Xeon processors enable HP ProLiant servers to achieve a much smaller footprint. They also use less power, demand less cooling, and have lower maintenance requirements than SPARC servers.

- Getting big performance in a small package. Consolidating and streamlining your server infrastructure with HP ProLiant servers can actually improve its performance while taking up less floor space. What will you do with all that extra square footage? We suggest dedicating it to other purposes or plan for future infrastructure expansion without building out to accommodate it.

Sun SPARC versus HP ProLiant with Intel Xeon processors

Total cost of ownership example

Overview

We used a RISC Migration TCO Calculator* to demonstrate the potential return on investment (ROI) your company can realize by upgrading its existing RISC-server infrastructure to an HP ProLiant server with Intel Xeon processors instead of another RISC-based Sun SPARC server.

* Tool developed by Alinean for Intel

TCO comparison cumulative 3-year	Solution A: alternative RISC server	Solution B: Intel server solution	Difference (A - B)	Difference (A - B)%
IT costs				
Server hardware costs	\$130,903	\$32,400	\$98,503	75.2%
Server software costs	\$12,198	\$11,078	\$1,120	9.2%
Systems management labor	\$635,346	\$109,861	\$525,485	82.7%
Power and facilities costs	\$25,214	\$6,507	\$18,707	74.2%
Migration/project change cost	\$5,401	\$8,632	(\$3,231)	-59.8%
Total IT costs	\$809,062	\$168,478	\$640,584	79.2%
Total	\$809,062	\$168,478	\$640,584	79.2%

Findings

Under this scenario, migrating to the HP/Intel server solution rather than implementing another SPARC infrastructure results in a savings of \$1,148,130 or 67.4 percent over three years.

The migration process.

Migrating to an open-source operating system and server platform is not something to take lightly. Wise administrators recognize that following a disciplined process can be the most important part of the decision.

- **Evaluate your business needs.** Understand your motivations for implementing the migration from a business standpoint. Is your company bringing a new system online? Are you connecting outlying offices? Are you expanding your e-commerce efforts? Knowing the reasons and goals of the migration will inform the redesign of your infrastructure.
- **Evaluate your environment.** Closely examine your network infrastructure, not only in its present configuration but how it will look and meet your company's needs in the future. What hardware must be switched out? Which can be transferred to the new environment? What software applications will no longer be viable? Knowing can reduce costs and streamline the migration.
- **Evaluate your IT goals.** Obviously, your migration can't focus on business and infrastructure needs to the exclusion of the IT group's needs. Will migration result in an exponential increase in performance at a lower cost? Will you achieve greater power and cooling efficiencies? Will help-desk calls be reduced or resolved more quickly? Or not? Using the migration to address business, infrastructure, and IT issues at the same time can improve its effectiveness and your return on investment.
- **Choose the right HP ProLiant server with Intel Xeon processors to meet your needs.** A thorough evaluation process can also help you choose the right server/processor configuration. For example, an HP ProLiant BL460c G5 blade server with an Intel Xeon 5400 processor might be ideal as you adopt your first virtualization strategy. Or an HP ProLiant DL580 G5 rack-mount server with an Intel Xeon 7400 processor could double the number of web-based sales transactions you can make. Your HP sales associate can help you make the best decision for your needs.
- **Assess the source code for target workloads.** Evaluate your current source code in relation to the Evaluate and anticipate the environments in which your current source code will be functioning.
- **Assess independent software vendor (ISV) applications for compatibility and dependencies.** Verify that any legacy third-party software applications are compatible with the open-source operating system and that its interaction with the other program modules in the new environment will be stable.
- **Recompile.** Translate the source code from that used on the SPARC or other RISC-based server to the open-source language you're using on the Intel-based HP ProLiant server.
- **Test and deploy.** Verify that the translated source code performs as expected and distribute it throughout the network.

The HP/Intel team accomplishes the transition while preserving all your existing applications, enhancing your hardware and software support systems, improving your price/performance ratios, avoiding retraining personnel on new hardware or software and its associated costs, and making the most of your existing investments.

Migrate using one of the following options.

As illustrated on the previous page, a migration can be a challenging, lengthy endeavor. Relying on manual methods can result in an expensive, time-consuming project that may or may not prove fully successful. Fortunately, two factors can help you achieve a fast, cost-effective, seamless migration. The first is a modern end-to-end migration method and technology that fits your preferences and business model best. Among them: the Solaris to Linux Porting Kit's port-and-recompile system from HP; and replacing your existing outdated source code with new, fresh code written specifically for your environment.

The second factor is the HP/Intel team. Working with your internal IT and management groups, it can significantly reduce the complexities normally associated with your transition so you can migrate quickly and easily from your old Sun SPARC servers to new, more powerful, more compact HP ProLiant servers with Intel Xeon processors. This transition is accomplished while preserving all your existing applications, enhancing your hardware and software support systems, improving your price/performance ratios, avoiding retraining personnel on new hardware or software and its associated costs, and making the most of your existing investments. The resulting infrastructure better addresses your business needs, reduces costs, and improves the potential for revenue growth.

Migrating using Solaris to Linux Porting Kit

In 2001, the Linux operating system started getting people's attention, and, in turn, HP customers began asking us for a tool that would enable them to quickly and easily transfer their applications from their current proprietary Solaris operating system to Linux. In response, we developed the Solaris to Linux Porting Kit (SLPK). Almost 100 percent automated, the SLPK assesses the SPARC Solaris code to find and port only the exact lines the applications need to run on the new OS. Since the original Solaris code needs to change very little to run on Linux, the impact on performance is negligible, and technicians using SLPK need little domain or migration expertise, eliminating the need—and cost—to bring in migration specialists. Downtime is also reduced significantly as using SLPK is 85 percent to 95 percent faster than porting Solaris applications to Linux manually.



SLPK functions include:

- **Estimating migration effort.** SLPK's scanner tool scans C and C++ sources and lists out all the changes that must be made for the migration to Linux.
- **Addressing toolset differences.** SLPK's driver programs translate the differences between the Solaris and Linux compiler tools.
- **Addressing API differences.** SLPK provides an environment in which the differences between the application programming interfaces (API) in both Solaris and Linux can be mitigated.
- **Addressing makefile changes.** SLPK provides tools that reduce any manual modifications to makefiles the migration requires.

SLPK supports SUSE Linux Enterprise Server 10.x (SLEX 10.x) and Red Hat Enterprise Linux 5.x (RHEL 5.x) open-source platforms.

Migrating to Solaris on ProLiant

Running a Solaris operating system on HP ProLiant servers powered by Intel Xeon processors provides organizations with impressive performance, a space-saving profile, energy efficiency, and simplified manageability. However, when undertaking a migration to this environment—whether porting or compiling—a number of issues must be addressed.

Porting issues

Most porting-based issues confronted in a Solaris-to-Solaris migration can be classified as installation, device, build environment, executable locations, library locations, and run-time differences. For example, when porting, be aware of the following:

- Root partition in a standard installation procedure is often too small for development and should be increased to at least 20 gigabytes.
- Hardware-dependent scripts may have to be changed to accommodate HP ProLiant and Intel Xeon device names.
- Locate and correct all third-party utilities and libraries.
- Make sure all appropriate \$PATHs are available, including: /usr/bin, /usr/ucb, /usr/openwin/bin, /usr/ccs/bin, /usr/sfw/bin, and /opt/*/bin.
- The ucb functions inherent in Solaris operating systems should be avoided in favor of normal system routines.
- Be cognizant of software issues that may not be apparent until run-time.

Compiling issues

If you choose compiling as your migration strategy, the following factors may play a role.

- Determine which compiler best meets the idiosyncrasies of your programming language.
- If migrating to Sun Studio compilers, take note that they accept different command line options, which may require some parameterization of the existing makefiles.
- When migrating in C++, remember the ISO standard allows some features to be implementation-defined, and if they are used in the source code they must be addressed during migration.
- When using Sun Studio during a C++ migration, you must choose the steady C++ Standard Library or opt for the better-conforming, higher-performing stlport4 library.



Migrating to HP BladeSystem

What if your company relies on a SPARC blade server instead of a rack mounted server and you'd prefer to migrate to another blade system? Be assured, you can migrate to an HP ProLiant BladeSystem server as easily as to a rack server. All HP ProLiant c-Class server blades share the same features and design standards as traditional HP rack and tower servers. Each one supports hard drives, multiple I/O cards, multi-function network interconnects, and iLO, as well the Solaris to Linux Porting Kit. So your HP ProLiant BladeSystem with Intel Xeon processors will accept both Linux and Solaris as quickly and easily as a rack system, and you'll enjoy the savings in power and cooling costs, the smaller server footprint, and all the other advantages a BladeSystem server strategy provides.

HP ProLiant servers with Intel Xeon processors improve performance over Sun UltraSPARC servers.⁴

Intel Xeon processors: a better alternative

Lower costs

Acquisition costs of Intel Xeon-based servers are 54 percent less than comparable SPARC-based servers.

Investment protection

Business growth demands more performance with greater flexibility and low maintenance costs.

Higher performance

Intel Xeon-based servers have improved performance over SPARC-based servers at a lower cost.

Process technology

Intel's 45 nm process technology puts more transistors on a smaller processor for higher performance, lower power consumption, and a smaller server footprint.

Why HP?

HP sells more industry-standard servers than any other technology vendor in the world. There's a very good reason for that. We have the experience and expertise in developing solutions that meet the needs of some of the world's largest companies. We support all the stages of the purchasing cycle, from situational assessment to final delivery and on-going service. We have thousands of service experts with deep and broad migration experience. And we have close, cooperative relationships with Linux, Sun Microsystems, and other open-source vendors, which enable us to provide quality, compatible hardware and software products that ensure our customers will be extremely satisfied when their migration from their proprietary system to HP's open-source strategy is complete.

¹ "HP offers Sun SPARC shops ProLiant alternative," Bridget Botelho, SearchDataCenter.com, February 8, 2007.

² "Sun SPARC defectors tap Transitive for Linux migrations," Bridget Botelho, SearchEnterpriseLinux.com, August 16, 2007.

³ IDC Worldwide Quarterly Server Tracker, February 2009

⁴ Supporting performance benchmarks, system configurations, and system pricing.

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