



Red Hat Enterprise Linux – Executive Buyer's Guide

Abstract

The objective of this paper is to provide IT executives with a basic value analysis model to determine the business and economic opportunity associated with a migration from proprietary UNIX to Red Hat Enterprise Linux. To understand the benefits and costs of a migration to a Red Hat Enterprise Linux solution, it's important to consider the value of, and relationship among, open source, Linux and Red Hat. In this paper, we will look at the intrinsic value of each, and conclude with a cost/benefit analysis of a typical UNIX-to-Red Hat Enterprise Linux migration.

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The value of open source

One of the more straightforward definitions of open source in use today is: “*Open source software is software whose source code can be obtained, viewed, changed and redistributed without royalties or other limitations.*” Open source uses a fundamentally different, community based development model. An open source community forms around each software solution and continually makes modifications and bug fixes. This community can consist of developers from academia, commercial enterprises, or open source solution providers. (Merrill Lynch analyst report, 2001)

Open source offers four unique characteristics that provide value for our customers:

- 1. An active, very large community of development in which customers can participate:* The number of individuals developing in the open source community has been estimated to be anywhere in the range of 250,000 to 750,000. Linux, as the largest open source project, features more than 30 million lines of code, and has an estimated replacement R&D cost, using conventional development, of over \$1 billion USD (Merrill Lynch, 2001). The value of this development community conveys to our customers through access to, and participation in, the ongoing development, and roadmap of the software, in a way that isn't possible with proprietary software development models.
- 2. A large, global community of use(rs):* Linux continues to gain market share in server and client markets. According to IDC, Linux accounted for 22.4% of new server operating system shipments last year, while Microsoft accounted for 55%. Linux is the fastest growing operating system year over year (IDC, May 2003). The size and global nature of the open source installed base results in the acceleration of innovation in open source software (OSS) technologies, and is driving widespread support for OSS among the largest enterprise software and hardware vendors.
- 3. The associated network effects of these communities--the ability to hire qualified IT resources, training, innovation, and quality of code:* As a result of large communities of development and use, IT managers are guaranteed a growing pool of OSS skilled developers and IT support staff. The rate of innovation is greater due to larger numbers of developers and users associated with OSS, and the quality of the code is increasingly higher, again due to the large scale associated with OSS communities.
- 4. Flexibility of code ownership and access:* Open source software enables timely access to source code and a constant stream of upgrades, security patches and source code enhancements. Open source software is the most rapidly evolving software ever with patches and fixes constantly available. (Merrill Lynch, 2001)

For the large communities of developers and users it fosters, and its flexibility of code ownership, open source generates a network effect of value for customers. This value extends beyond an enterprise's income statement—including the highest levels of performance, the latest technology, and access to an ever-expanding knowledge base—creating a significant competitive advantage.

The value of Linux

Linux inherits this value of open source software. In addition, it provides the functionality of UNIX on commodity hardware. It enables platform independence, which enables lower hardware costs and greater flexibility.

Red Hat Enterprise Linux is a modern implementation of UNIX functionality that delivers high performance on commodity hardware architectures. The broad community of development and use associated with the open source development model provides an extraordinary rate of innovation, high quality code, and a wide range of complementary hardware, software, and service providers from which to choose.

Because Linux was designed to provide UNIX functionality on commodity hardware, customers benefit from higher performance and lower price for a given hardware deployment. For compute-intensive workloads, such as C/C++ and Java applications, Linux will deliver at least two to four times the application output for a given number of commodity CPUs when compared to proprietary UNIX RISC CPUs. The reason for this extraordinary level of enhanced performance is the clockspeed differences between proprietary RISC and IA32 Opteron, etc. A typical Xeon processor will run at 4GHz, compared to 1GHz for a SPARC processor. It is unlikely that any of the proprietary RISC vendors will match the performance lead of the IA32 architectures in the foreseeable future, because the economies of scale are not available to the proprietary vendors. CPU performance is a function of the number of engineering design and simulation cycles applied to the architecture along with the gross amount of chips manufactured by the vendor. The learning curve effect associated with engineering and manufacturing volumes of semiconductor technology is well documented.

Because proprietary RISC CPUs cost two times the purchase price of IA32 CPUs, the total price/performance benefit for a UNIX to Linux migration of compute-intensive applications is typically on the order of 4–8x. Customers can choose whether they want to buy 12% to 25% of the planned UNIX hardware spend, or get 400%-800% of the application performance for an equivalent planned hardware spend. More details on the economic benefits of a UNIX-to-Linux migration can be found in the last section of this paper, “The Cost/Benefit Analysis of a Red Hat Solution.”

The value of Red Hat

Red Hat inherits the value of open source and Linux, and provides a convenient, accountable entity through which customers realize the benefits of Linux and open source. Red Hat ensures a predictable return/result for a Linux investment at a predictable price. Red Hat provides a managed way to make that investment. Investing in Red Hat minimizes a customer's risks associated with:

- Technology obsolescence
- Recovery from unplanned outages
- Technology integration and optimization
- Staff turnover, through a standardized approach and platform

The single greatest misconception customers have regarding Red Hat's value is the notion that Red Hat provides technical support for an implementation of Linux that is downloaded from the Internet. Nothing could be further from the truth. Linux as it is available from Internet sites such as kernel.org and fsf.org is unsupported, not integrated, and largely unusable for enterprise computing. These sites represent development projects and research and development, not enterprise solution projects. Red Hat is able to provide unique value to customers because Red Hat engineers a world-class operating system.

The Red Hat Enterprise Linux product line benefits from the innovations provided by an open source development model, but Red Hat has no dependency whatsoever on the open source community to service customers. Red Hat assumes complete responsibility for bug fixes, maintenance updates, new features, system management technology, and technical support. The value of a relationship with Red Hat is a single point of accountability for Linux and related open source technology. Hardware OEMs and other technology distributors cannot make this claim for Linux because they do not provide an engineered release of the OS.

Through a relationship with Red Hat, customers gain:

- **Insights regarding product direction for the Red Hat Enterprise Linux platform.** These insights enable effective planning to maximize the value of the Linux deployment.
- **Influence on product direction.** Through their feedback on feature requirements and technology challenges, customers establish the development priorities for Red Hat.

- **Reducing the risks associated with uncertainty.** Red Hat adheres to strict contractual guidelines when responding to customer requirements for technical services. A community of users cannot be held to that same standard.
- **Compatibility benefits associated with market share.** ISVs and hardware OEMs are more likely to provide support for the leading market share OS as opposed to a weak or niche provider. Red Hat has 55-80% of the enterprise market for Linux, and this overwhelming market share provides Red Hat significant leverage with ISVs and hardware OEMs.
- **Fast and thorough resolution to difficult problems.** Red Hat has more experience and capability with Linux than any other provider. This is critical for customers who demand fast and complete responses to critical situations involving the technology and customer-facing systems.
- **Independent advice regarding hardware and software compatibility.** If organizations want to commoditize the hardware and software associated with their infrastructure, Red Hat can provide unbiased advice regarding the hardware and software with the best track record with Linux, and those that are likely to be better supported in the future based upon new developments.

Engaging with Red Hat early in the decision-making process is critical to understanding the technical and business value Red Hat brings to Linux. Linux that is pieced together from disparate parts on the Web is not Red Hat Enterprise Linux. It will lack critical ISV support, may lack security and errata updates, will not come with support nor the system management capabilities of Red Hat Network, and will have virtually no assurance of quality.

Making the Case: Weighing the Costs of a Migration to Linux

When is a migration from UNIX to Linux well-timed for your organization? The size of a pending UNIX hardware purchase justifies an examination of Linux as an alternative. If a pending UNIX hardware purchase is less than \$50,000, the savings from using commodity hardware instead of proprietary UNIX is unlikely to justify the switching costs associated with staff training and new platform management processes and systems.

Concerns about dependence on Microsoft, and/or the future viability of Sun and other proprietary UNIX vendors are also prompting customers to begin due diligence on migration opportunities with Linux.

Migration from UNIX to Linux: A cost/benefit analysis

The following model is intended to introduce the relevant, common considerations in a migration cost/benefit analysis, and can be used as a framework for more in-depth analysis. In the case where the company wants to make a strategic investment in Linux technology, but the choice of a candidate project is not obvious, Red Hat can help with a Linux Migration Assessment. In the assessment, Red Hat will work with a company to characterize the benefits and risks/costs of migrating to Linux for each of the significant applications a company has deployed. For more information on Linux Migration Assessment services, visit <http://www.redhat.com/services/>.

Cost savings of a migration

- Intel systems are less expensive than comparably equipped proprietary UNIX systems. Typical cost savings for hardware purchases are 60–70%.
- Linux on Intel is higher performing than proprietary UNIX, so variable costs associated with system deployments are lower due to server consolidation. Only one Intel system will be required for every two to three proprietary UNIX systems. This higher performance is attributable to higher clock speeds for Intel systems and the greater efficiency of the Linux kernel. Variable costs associated with per system or per CPU third-party software licenses and system administration will be lower due to the reduced system count (most organizations budget about one system administrator per 30-40 systems).
- Future costs associated with infrastructure software will be lower because of the rapid innovation of open source development and the tight integration of these new capabilities with Linux. Licensing costs associated with file systems, backup software, application servers, and related components will be eventually eliminated by open source alternatives that provide acceptable functionality relative to proprietary alternatives.
- Future costs associated with system administration will be lower because of the exposure that students will have to Linux. Linux is the technology of choice in universities because of the learning opportunity provided by the non-restrictive licensing of source code. A greater supply of Linux talent will reduce the cost of that talent relative to other alternatives.

Costs associated with supporting and maintaining Linux

- **Technology maintenance**

Customers should budget between \$100 and \$1000 per system for annual technology maintenance expenses, depending on the complexity of the deployment. Red Hat bundles technology maintenance charges with its workstation and server products, which range in price from \$200-\$2500 per system per year. Customers that choose to implement the technology independent of a relationship with Red Hat should nonetheless anticipate expenses in this range associated with OS staff engineers charged with maintaining the Linux technology to suit their requirements.

- **Technical support**

Customers should budget between \$300 and \$3000 per system per year for support costs, depending on the service level anticipated for the application deployment. Red Hat bundles technical support charges with its workstation and server products, which range in price from \$200-\$2500 per system per year. Customers that choose to implement the technology independent of a relationship with Red Hat should nonetheless anticipate expenses in this range associated with OS staff engineers and incremental system administrators required to respond effectively with broad capability and knowledge required for OS troubleshooting and development.

- **Management infrastructure**

Customers should budget \$100-\$500 per system per year for maintaining an effective capability to manage their systems. This expense accounts for ongoing work associated with software configuration, monitoring, provisioning, and security. Red Hat provides these capabilities with Red Hat Network, which are well integrated with the Red Hat Enterprise Linux product line. Customers can choose to purchase this capability from Red Hat, develop their own systems, or purchase competitive products from IBM, BMC, CA, and HP among others.

- **Incremental hardware maintenance costs**

Intel hardware is not yet as reliable as proprietary UNIX hardware, and Intel OEMs have shorter product life cycles when compared with UNIX vendors (every six months vs. every two years). To maintain a consistent operating environment over a long deployment cycle, customers will incur higher maintenance expenses as a percentage of the hardware purchase price for Intel gear. Fortunately, the initial purchase price is much lower, and the maintenance items are therefore generally lower in absolute terms.

- **Staff training**

As with any rapidly evolving technology, ongoing training will be required to maintain skills and maximize value from new innovations. Customers should expect about \$1000 per system administrator per year.

Migration costs

The costs associated with a migration to Linux infrastructure can be classified into two categories: switching costs, which are a one-time investment, and annual technology maintenance and support expenses. The one-time switching costs associated with a Linux migration include:

- **Staff Training**

Customers should anticipate one-time training costs of about \$3000 per SA for UNIX staff and about \$6000 per SA for Windows staff.

- **Management Infrastructure**

Customers should anticipate spending between \$50K and \$100K up front to effectively establish the process and procedures related to management of their Linux systems. This expense is for Red Hat Network servers, validating a core build against existing security and management requirements, documenting Linux specific procedures, and migrating the necessary management tools from UNIX.

- **Application Porting**

The porting and testing of applications from proprietary UNIX to Linux is typically straightforward, but it is not trivial. Various issues associated with non-availability of particular versions of third party software on Linux and peculiarities of Linux system features as compared with UNIX will result in developer and system administration investments. Customers should expect \$50K-\$200K of incremental expense associated with each application that is ported from UNIX to Linux.

While migrating to Red Hat Enterprise Linux from UNIX provides obvious initial cost advantages, enterprises need to look beyond software acquisition alone to gain a complete understanding of their overall investment and potential for cost savings. Customers initiating a broad migration strategy that combines technology maintenance, technical support, staff training, infrastructure management, and application porting can often realize even more value, and a greater, faster return on their overall IT investment. The following provides a basic model for determining specific costs related to a Linux migration from UNIX.

A simple financial model for Linux deployment savings

Compelling Event - Lease renewal on 50 UNIX systems

Application Architecture - Custom Java running on IBM WebSphere platform

Current Hardware - Sun 4500 2CPU with 8GB RAM

Planned HW Lease Expense for UNIX - \$10K/yr. per system

Planned HW Units for capacity requirements – 50

Planned Annual Lease Expense - $50 \times \$10K = \$500K$

Annual Maintenance and Support (HW + OS) = \$225K

(15% of HW purchase price = $.15 \times 3 \times$ annual lease expense)

Total Yearly Outlay for UNIX capability = \$725K

Comparable Intel system HW Lease Expense = \$3K/yr per system

Comparable Intel Units required = 30 (a little over $\frac{1}{2}$ to be conservative)

Comparable Lease Expense = $30 \times \$3K = \$90K$

Annual Intel Maintenance - \$54K

(20% of HW purchase price = $.2 \times 3 \times$ annual lease expense)

Switching Costs

Staff Training - 4 SAs \times \$3K = \$12K

Application Porting/Testing = \$50K (low end of range due to Java)

Management Infrastructure (core build) = \$75K

Total one time switching costs = \$12K + \$50K + \$75K = \$137K

Annual Technology Maintenance and Support Expenses

Advanced Server Premium = $30 \times \$2300 = \$69K$

RHN Satellite = \$24K

Total Year 1 Investment:

$\$90K + \$54K + \$137K + \$69K + \$24K = \$374K$

Year 1 ROI = $\$725/\$374 = 194\%$

Building blocks of a Red Hat solution

Harnessing the power of Red Hat Enterprise Linux for mission-critical computing requires an investment in Linux skills and expertise. This includes training and consulting to get a project up and running, and it requires an ongoing investment in maintenance, management, and support to maximize administrator and developer productivity while maintaining security and reliability as the technology evolves.

Red Hat invests significant engineering effort to provide a high-performing implementation of Linux. We apply thousands of patches to the “free code” from the Internet in order to deliver a high-performing implementation of the technology that is compatible with the hardware and software enterprises rely upon. We also continually improve the code during its life cycle, and deliver these improvements in the form of errata or updates addressing important new features, security alerts, and error corrections. Customers pay Red Hat to sustain the benefits of the engineering we provide.

Red Hat offers a comprehensive portfolio of services and partnerships to meet the unique requirements of our customers:

Training and Certification enables your people to be productive using the technology. Linux is not UNIX. It has its nuances along with a significantly different implementation of features. With appropriate training, enterprises will not waste a great deal of time making mistakes and chasing answers on the Web. Red Hat is the industry leader in training for open source technologies, and the RHCE curriculum is recognized as a world-class technology certification curriculum. Our training programs are available directly from Red Hat, as well as through training partners worldwide.

Red Hat Consulting enables enterprises to realize greater value from open source technology much more quickly. Our consultants bring the total capability and expertise of Red Hat to avoid mistakes that result in significant delays and costly wasted time. Through a migration assessment, we help customers select the application domains that will yield the greatest return, and build a business case for implementation based on lower TCO and higher performance. Through our Core Build Design Service, we'll help build out the scalable deployment and management infrastructure that is critical for managing production systems efficiently. Customers are able to build on initial success and a scalable management infrastructure, and will be able to take on significant projects involving open source technology.

Developer Services enables a development staff to quickly port custom applications and management infrastructure from proprietary UNIX platforms to Red Hat Enterprise Linux. Developer resources are expensive, and enterprises cannot afford for them to waste time climbing a steep learning curve without expert resources leading the way. Red Hat will augment a development staff for certain well-defined development tasks that can be outsourced, and the Red Hat developer support staff will provide expert advice and troubleshooting expertise so developers don't waste time solving problems that can be resolved quickly by Red Hat.

Red Hat Enterprise Linux provides the mature, stable platform that maximizes the availability and performance of business applications. The included maintenance and support helps enterprise system administrator staff quickly solve problems associated with a production infrastructure. From tips and tricks that simplify administration to a critical response in the middle of the night to resolve issues created by a security breach, Red Hat Enterprise Linux and the associated services from Red Hat provides the top expertise in the industry.

Red Hat Network (RHN) is an easy-to-use systems management platform for the Linux infrastructure. It is built on open standards and uses an Internet-based GUI. RHN provides administrators with the tools to efficiently manage the Red Hat Enterprise Linux systems. It also features a modular design—as networks grow, administrators can add enhanced capabilities for system updates, management, and provisioning of their entire infrastructure. Deployment of RHN yields increased productivity for administrators, reduced system life-cycle costs and enhanced security.

Determining if Red Hat Enterprise Linux is right for you

Answering these questions can help your Red Hat representative determine if a Red Hat solution is ideal for your company:

- What new IT projects are planned for this year? What is the business driver for these new projects: Increased revenue? Lower cost? Better customer service?
- What applications are currently running on UNIX? What programming language is utilized for these programs? What third-party applications are required?
- What are the plans for new hardware purchases or lease renewals?

- How many UNIX systems are currently deployed?
- Is your IT budget expanding or contracting? What amount of savings is required this year relative to prior-year spending?
- What are the current plans for Linux and open source? What is the CIO's view of Linux?

WANT MORE INFORMATION?

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