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# Why You Should Put Red Hat Under Your SAP Systems

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# Introduction

Starting in 2002, at first in a slow trickle, and then in waves and sometimes floods, Linux became the pervasive operating system for enterprise computing, with Red Hat Enterprise Linux as the most common way it is deployed and managed.

But despite this progress, there are still some bastions of enterprise computing that have not yet been penetrated by Linux. In this paper, CITO Research explores the following questions about the world of business applications running on Linux:

- How and why has Linux conquered the enterprise?
- Why are people migrating their portfolio of SAP applications to Linux?
- Why has SAP so vigorously supported the adoption of Linux in general and Red Hat Enterprise Linux in particular?

The goal is to describe how Linux and Red Hat Enterprise Linux have become a platform for the highest performing and most operationally stable enterprise computing workloads. The paper will also describe the evolution of Linux, the drivers for running Linux on SAP, and how running SAP on Red Hat Enterprise Linux is a natural choice for mission-critical enterprise application workloads of all types.

# How Linux Conquered the Enterprise

What most people don't know about Linux is that it was essentially a placeholder. Linus Torvalds started the project as a way to use Unix while the world was waiting for Richard Stallman and the GNU Project to create an open source operating system.

Torvalds never intended to create a platform for mission critical enterprise computing. That task was taken up by Red Hat in 2002 when the company launched Red Hat Enterprise Linux.

The goal of Red Hat Enterprise Linux was to add the missing elements so Linux could be elevated to a platform for mission critical computing. These elements included improved testing and quality control, enterprise grade support with SLAs, engineering partnerships with key technology and application players, and software to help manage and operate Linux. Red Hat, working with the Linux Foundation, made sure that all of this happened.

The world of enterprise computing didn't adopt Linux from day one. First off, the platform needed to build an ecosystem that would guide its development to meet the needs of enterprise customers and supply an array of business applications that were certified on Linux.

The path to wide adoption happened through these stages:

- Enterprise developers were the first to get Linux running for development and testing
- Web applications that used a scale out architecture then used Linux for the most fault tolerant layers of the architectures such as web servers
- At this point, the application servers and databases of web applications started migrating, and sysadmin familiarity with Linux continued to rise
- With the availability of scalable x86 commodity hardware and the Linux ecosystem continuing to evolve the platform with enterprise capabilities, such as support for high availability and virtualization, more and more companies began deploying mission critical enterprise applications on the platform[1]

## Some Compelling Red Hat Enterprise Linux Benefits

The most obvious benefit of using Red Hat Enterprise Linux is **cost savings**. As we will discuss shortly, enterprise applications had typically been deployed on large proprietary Unix systems. Those classic centralized vertically scaled systems are very expensive in both hardware and labor costs. Red Hat Enterprise Linux enables an enterprise to deploy on x86-based commodity hardware.

The most obvious benefit of using Red Hat Enterprise Linux is cost savings

Secondly, a **distributed architecture** that runs on a large grid of computers (think Google) must be designed to handle failures gracefully. Compare this to a deployment of enterprise software on a single large Unix server, which requires round-the-clock "care and feeding" to ensure uptime. Distributed architectures can tolerate a failure and still deliver high levels of service to internal and external customers.

An underappreciated benefit of Red Hat Enterprise Linux is **performance**. Red Hat has published numerous benchmarks for CPU, memory, and disk I/O performance. When enterprise application vendors want to showcase their solution's performance, the majority choose to run benchmarks on Red Hat Enterprise Linux.

As the popularity of Red Hat Enterprise Linux and Linux grew, companies found they could leverage **sysadmin skills** already in house (since Linux in general and Red Hat Enterprise Linux in particular was already deployed on hundreds of web and application servers in house) and found it useful to put them to work in many ways. Ease of administration is reflected in the fact that sysadmins are able to run more servers per person.

[1] "Linux in the Mainstream: Growing Deployment of Business-Critical Workloads," IDC, 2011.

Organizations that standardize on Red Hat Enterprise Linux average 174 servers per sysadmin, while mixed shops average 115 servers per sysadmin and primarily nonpaid Linux shops average only 97 servers per sysadmin.[2]

Finally, the innovation and breadth of cooperation of the **open source model** surrounding Linux has resulted in an operating system that is robust and pervasively supported and used.

Segments of the technology industry most friendly to change, such as Wall Street, The Defense Department, leading Internet companies, and startups, have embraced Red Hat Enterprise Linux. There are still companies that have resisted. It is worth taking a closer took at why.

## Where and How SAP Was Run in the past?

SAP ERP is the canonical mission critical enterprise application. We will use it as a proxy for mission critical adoption of Linux.

The traditional SAP deployment of five or more years ago was a single large Unix server or a few servers. Those servers consumed enormous amounts of CPU and memory, disk storage and labor; after all, these mission-critical systems must be cared for around the clock to ensure continuous uptime.

But at the time that ERP was implemented and deployed, often before the year 2000, mission critical platforms were limited to Unix architectures purchased from IBM, Hewlett-Packard, Digital or Compaq or Sun, each of which had a proprietary RISC-based architecture.

The unfortunate results were expense and rigidity. You had a version of SAP R/3 for AIX, another for Solaris, for UX, for IRIX on SGI, for SCO Unix, and so on. That necessitated IBM, HP and so on to have multiple, dedicated engineering teams, and maintaining those engineering teams and the hardware architectures and operating systems that went with them became very expensive propositions. Those companies were forced to add features and charge top dollar to make maintaining their operating systems worthwhile.

This expensive island of proprietary technology has gradually been surrounded and in many companies overtaken by Linux. The x86 family of architectures provided unique economies of scale, and Red Hat took the approach of leveraging that economy.

[2] "Understanding Linux Deployment Strategies: The Business Case for Standardizing on Red Hat Enterprise Linux," IDC, 2011.

The cost of servers was a fraction of the proprietary hardware, availability was limited only by what the silicon foundries could turn out, and the learning curve was low. Red Hat further leveraged those economies of scale by offering one enterprise-ready Linux-based operating system that it ensured ran across all x86 standard architectures and that came with a guarantee to run compatibly for 10 years.

The market for and interest in proprietary Unix versions continue to decline. Webscale companies such as Google running their infrastructure on x86 architecture has further pushed the market in the direction of Linux. ISVs prefer Linux because of its interoperability across commodity hardware; proprietary Unix requires ISVs to do additional work to recompile their software, test it, and maintain separate versions. Revenue for Unix servers is going down fast, according to IDC, hitting an all-time low in 2013.[3]

## Drivers for Running SAP on Linux

For quite some time, companies could avoid migrating mission critical applications. It was possible to argue that Linux was not ready, that the risk was too high, that the cost savings wouldn't be significant, that performance would suffer.

But now the logic of moving SAP applications to enterprise-grade Linux has become quite compelling and Linux is rapidly becoming the norm. Even putting aside the strong Red Hat/SAP engineering partnership, there are four key reasons that SAP customers are increasingly choosing to deploy on Linux and specifically on Red Hat Enterprise Linux.

- **Mission-critical workloads** are ready for Linux, and Red Hat Enterprise Linux is ready for them. Enterprises can break down their monolithic, siloed application into component pieces and then scale it horizontally on multiple systems. You can have a larger database, get additional computing power, and get answers faster by running it in that distributed manner. This works both for enterprise applications and for grid computing applications like SAP HANA and Hadoop.

- **Enterprise-ready architecture**. When enterprises approach their three- to five-year refresh cycles for ERP, Linux is now a viable choice. Nonetheless, no serious enterprise will run its ERP backbone on freeware. They choose enterprise-grade Linux like Red Hat Enterprise Linux.

- **Distributed architecture**. SAP has ***always*** had a distributed architecture. In fact, one of the drivers of SAP's success in the early '90s was its push to get off of IBM mainframes and onto multiple servers handling various processes. SAP R/3 essentially "grew up" on Unix and is as friendly as could be to Linux.

[3] http://www.ibmsystemsmag.com/power/news/Worldwide-Server-Market-Revenues-Decline--6-2--in-/

- **SAP HANA**. A fourth and powerful driver is the relatively new SAP HANA in-memory database. Not only is HANA friendly to a grid computing architecture, it is the *only way it works*. HANA gains power in size and processes as it is distributed across more servers—commodity servers in which no single node is a point of failure or critical. This in-memory grid frees enterprises from the expense and risk of nursing one or two database servers around the clock, the traditional deployment of a data store.

To summarize, a modern distributed architecture minimizes both expense and risk, and SAP performs best in a distributed architecture. Linux is a natural choice for that architecture, but SAP users require the enterprise-grade support of a partner that guarantees its engineering, offers a full stack of capabilities and in particular support for the cloud, and a large partner and open source ecosystem, criteria that Red Hat Enterprise Linux best fills.

SAP performs best in a distributed architecture. Linux is a natural choice for that architecture

## SAP on Red Hat
## The Guaranteed Default Choice

Red Hat Linux dates back to 1994, and Red Hat Enterprise Linux to 2002. At that time, Linux was still considered a risk; cutting edge companies brought Linux into their environments, but certainly were not deploying their SAP systems on it yet.

But since 2002, Red Hat has demonstrated to enterprise customers that it understands the need for stability in their IT operations. That has driven Red Hat to guarantee compatibility across its entire product lifecycle, thus ensuring that an SAP application running on Red Hat Enterprise Linux 6.0 will run on version 6.1 and 6.2 and 6.3 and 6.4 and 6.5, without fail.

Further, Red Hat guarantees that it will maintain its products for 10 years—something Red Hat was the first in the industry to do. That is enormously beneficial to SAP customers that typically refresh their implementations on a five-year lifecycle; they are able to stay on the same stable platform they initially chose.

Finally, SAP sets a standard for support in its customer base and Red Hat lives up to that standard. Red Hat and SAP customers can benefit from the integration of SAP Solution Manager and Red Hat's customer support ticketing system by gaining a single point of contact for support issues, streamlined resolution of incidents, and continued collaboration for running SAP applications on Red Hat Enterprise Linux. With the integration of the ticketing systems, Red Hat and SAP are able to more easily expedite support issue resolutions, providing enhanced support services to customers. The combination of longevity, its commitment to stability for 10 years, and its support services are important factors that have made Red Hat a leader in the Linux space.

## The Advantage of Unconstrained Innovation

SAP customers running Red Hat Enterprise Linux are practically guaranteed innovation. Open source fosters innovation.

Commercial companies are constrained by pleasing the customers they have and by the market research they can conduct. They will only develop features for which there is a strong customer demand, or about which they have insights based on market research. On top of that they labor under the economic constraints of teams with finite resources and limited visibility into what's happening in the market.

Contrast that with Red Hat, which taps into the unbridled innovation of the open source community—from anyone who chooses to participate in building out Linux, which includes large companies such as Red Hat (the largest commercial contributor to the Linux kernel), Intel, and IBM as well as several thousand small and agile innovators. Red Hat is a connective hub in a global network of customers, partners, research and academic organizations, and open source communities. Bringing these innovative groups together fosters collaboration. And with a wide range of computing requirements, distinct approaches, and differing skills, the result is technology that meets the needs of today's computing environments more effectively than any one group could have created alone.

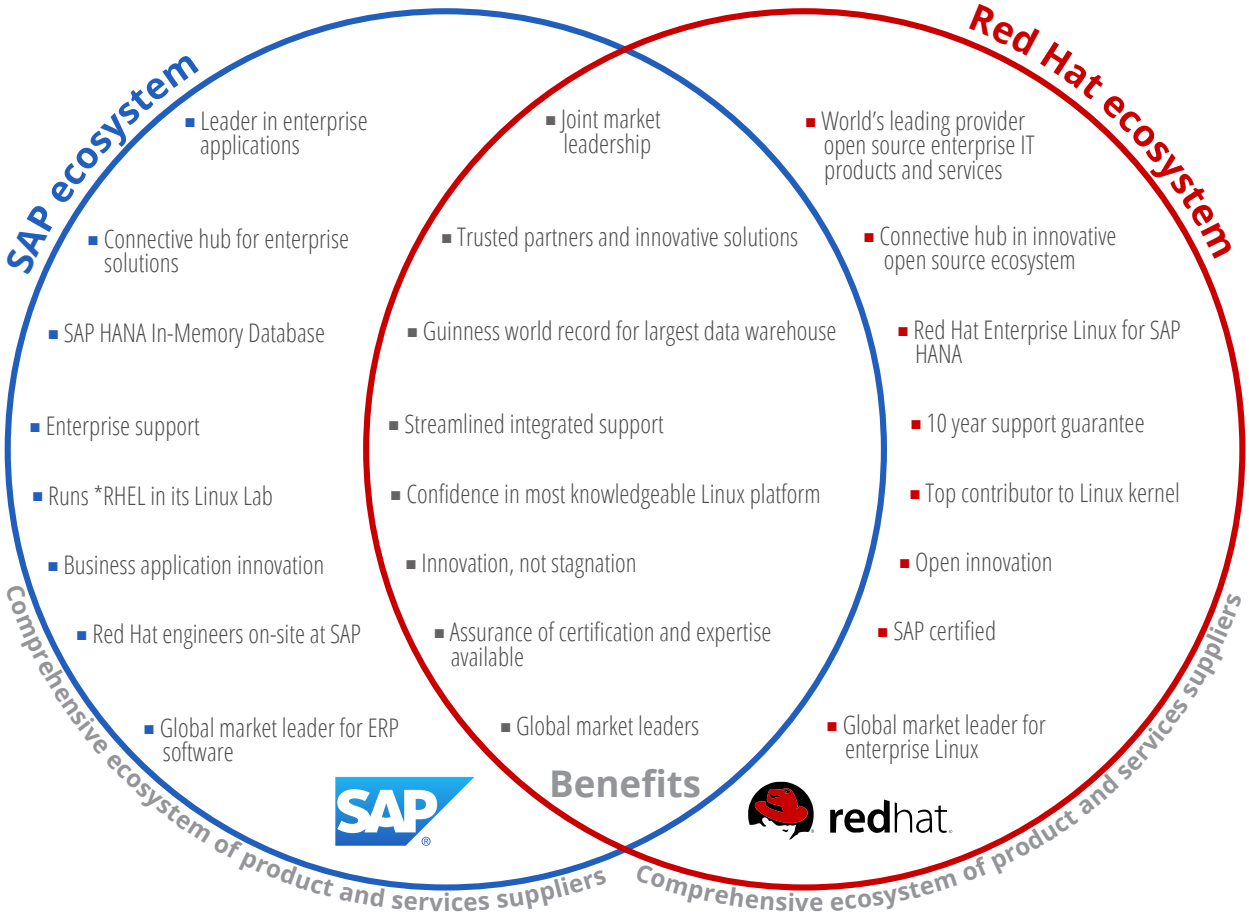
Compare it too to the wildly successful OpenStack cloud software for public and private clouds, with its community of nearly 17,000 people across about 140 countries; two Red Hat executives sit on its board, alongside representatives from HP, AT&T, IBM and other luminaries. OpenStack innovation is steered by ***thousands*** of people in an open, innovative community that drives requirements its participants feel are important; such an environment fosters unbridled innovation.

This collaborative model allows enterprise customers to enjoy technology innovation while remaining aligned with real-world business requirements. Red Hat delivers solutions in collaboration with its hardware and software partners. This collaborative model connects every aspect of the enterprise and help customers deploy integrated and certified configurations, which makes innovation secure, safe, and easy to consume in an enterprise environment. This in part explains Red Hat's track record of successfully commercializing open source products into fully supported enterprise grade product offerings.

## The Benefits of a Red Hat/SAP Partnership

Red Hat Enterprise Linux is tested and certified for SAP environments. In addition to such certifications, Red Hat collaborates directly with SAP's engineering group and vice versa. The customer sees only the result of that collaboration, in superior engineering. What they do not see is the testing, development and performance benchmarking; if one organization sees something that limits its performance or finds some bug, they are able to attack those problems together before release.

Red Hat offers an outstanding record of successful application deployments on SAP, SAS, Vertica, and many others, which has given it a competitive edge in new enterprise application deployment projects. Now Red Hat Global Support Services (GSS) and SAP are delivering integrated support for customers with active Red Hat Enterprise Linux for SAP Business Applications subscriptions.




*Red Hat Enterprise Linux

Customers know they're getting a configuration, like SAP HANA running on Red Hat Enterprise Linux, that is recognized, supported and certified. Through their collaboration, SAP and Red Hat can show the customer "This is the way you need to deploy this platform, here are the best practices, and here's the right way to optimize it."

The partnership brings with it joint implementers in terms of third parties. Red Hat and SAP share a number of partners, including some of the largest and best-recognized systems integrators. The companies are aligned so that those partners are in the best position to understand how to ensure efficient implementations.

# Considerations for Adopting an Enterprise Linux Platform

Considerations for adopting an enterprise Linux platform include scalability, security, and, at the other end of the spectrum, when comparing paid distributions with "free" Linux, price.

## Scalability

Some organizations that are considering coming off of commercial Unix systems worry that Linux is not scalable and not ready for mission-critical environments. To put it bluntly, Red Hat Enterprise Linux is scalable enough for Salesforce.com. Stock exchanges run on Red Hat Enterprise Linux, and it underlies numerous cloud service providers. Over 90% of the Fortune 500 run Red Hat.

As for the scalability of x86 systems, it is certainly true that a decade ago, Intel hardware was limited to small servers and desktop use, but Intel has driven its architecture substantially towards providing reliability, availability, and scalability, in terms of loading up large memory sizes into their systems, offering 16 or 32 processor boxes, and offering the ability to swap out CPUs or memory components or hard drives while the server is still running. A decade ago those features were typical only of high-end Unix systems or mainframes. Today x86 clusters power webscale companies.

**Guinness World Records Settle Scalability Question**

SAP, Red Hat, and other partners of SAP set multiple world records, including the world record for the largest data warehouse (12.1 PB) and the fastest loading and indexing of big data (34.3 Terabytes per hour, compared with their previous record of 14 TB per hour).

## Security

Some think that "open source" means open window—that anyone can have access to your core code.

The nature of open source is that thousands of Linux users worldwide hammer away at Linux every day; more eyes means more scrutiny, not less. On top of that scrutiny, Red Hat performs advanced certification testing against rigorous, recognized criteria. Among other standards, Red Hat Enterprise Linux meets Federal Information Processing Standards (FIPS), which are standards for hardware and software components used by the US federal government. It is also Payment Card Industry (PCI) compliant, which combats the identity theft that has plagued the retail industry.

Finally, Red Hat has incorporated features developed by the National Security Administration (NSA) in its Security-Enhanced Linux (SELinux), with tools to manage and secure servers.

## Price

At the other end of the spectrum we sometimes hear concerns about price. Why pay anything for open source when unpaid Linux distributions are available?

Research from IDC shows that while there is a cost to running Red Hat Enterprise Linux, the distribution saves companies money along other dimensions.

> IDC found that Red Hat Enterprise Linux shops spent "82% less time dealing with server downtime and 92% less time dealing with help desk activities associated with applications running on Linux servers."

# Red Hat JBoss, OpenShift by Red Hat Enhance SAP on Red Hat Enterprise Linux

An ERP installation is not an island with all the functionality that an enterprise needs—hence SAP has an ecosystem of partners. It is a system that interacts with other systems outside of the organization, and it serves as the foundation for integration, end-to-end business processes and new development.

Two Red Hat offerings further enhance the value of running SAP on Red Hat Enterprise Linux: **Red Hat JBoss Middleware** and **OpenShift by Red Hat**.

JBoss middleware is a family of lightweight, cloud-friendly, enterprise-grade products that help enterprises innovate faster, in a smarter way. The JBoss Suite enables accelerated development and performance of applications; integration of diverse applications, data and devices; and automated business processes and decisions. It provides the tools necessary to rapidly build connected systems linking people, processes and information across heterogeneous environments that include physical, virtual, mobile, and cloud resources. In essence, using JBoss middleware, SAP on Red Hat Enterprise Linux can reach any user, anywhere, and on any device. It further supports SAP integration using SAP NetWeaver Gateway. This unlocks interoperability, making SAP more available to Java developers and extending the reach of existing systems and investments to enhance efficiencies.

As SAP moves its focus more toward the cloud, they are choosing to partner closely with a leader in that space as well. Red Hat's support for open hybrid clouds is complemented by OpenShift by Red Hat, which is available as a hosted platform-as-a-service (PaaS) or as a private PaaS product for enterprises. SAP and Red Hat as part of their partnership offer custom development "cartridges" for the SAP Data Management portfolio, including SAP Adaptive Server® Enterprise (SAP ASE), SAP IQ software, and the SAP SQL Anywhere suite for use with the full OpenShift by Red Hat portfolio. The idea is to enable developers around the world to build next-generation applications. The database "cartridges" developed in collaboration with SAP make it easier for developers creating applications on OpenShift by Red Hat to access key SAP enterprise database technologies by automating the provisioning process.

## Conclusion

The SAP user base is ready for the performance and economy of scale that Linux provides, but it requires proven enterprise-grade Linux, such as Red Hat Enterprise Linux.

Red Hat Enterprise Linux offers key differentiators that make it extremely attractive for deploying SAP and other mission-critical enterprise applications, including:

- Joint market leadership. SAP and Red Hat have increasingly been engaged in joint engineering projects, and Red Hat is the platform of choice when SAP sets out to set (or break) world records for scalability and speed.

- Red Hat has a strong relationship with the open source ecosystem. Red Hat is the top contributor to the Linux kernel and has a robust cloud strategy. It offers a full stack of capabilities in addition to its cost-efficient, scalable, and interoperable version of Linux.

- When enterprise application vendors decide to establish performance benchmarks, they do so using Red Hat Enterprise Linux.

Many reasons can be brought forward for the market leadership of Red Hat in the enterprise, but SAP customers in particular will find Red Hat's support structure to be important to them. SAP and Red Hat offer single-ticket support through SAP Solution Manager. Given the size of enterprises running SAP and their security, availability, and scalability requirements, as well as their interest in real-time data solutions such as SAP HANA and in cloud architectures, Red Hat is unquestionably the best platform for SAP environments.

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