WHITE PAPER

The Value of Proven Skills: The Impact of Red Hat Certified Engineers (RHCEs) on Enterprise IT Performance

Sponsored by: Red Hat

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IDC OPINION

Among the most critical priorities for enterprises and lines of business are controlling costs, meeting growth requirements, and managing risk. IT has been driven by corresponding trends that reflect those enterprisewide priorities, including the expanded use of Linux for core IT infrastructure and for application development. The success of these efforts largely depends on IT talent, and IDC believes that certifications that represent a rigorous and meaningful proof of skills and competencies are tremendously valuable to near-term organizational success. Specifically, IDC believes:

☑ Organizations that include certifications as a component of their IT staff development programs will see overall performance benefits.

☑ Meaningful performance-based certifications can help address what IDC has identified as an impending IT talent gap.

☑ Development opportunities must be available to IT professionals worldwide to ensure talent and skills are available at the point of need.

☑ Red Hat Certified Engineer (RHCE) certification, with a practical, performance-based test methodology, is an example of a meaningful certification that has demonstrated impact on organizational risk mitigation, improved operations, and staff productivity.

IN THIS WHITE PAPER

This white paper describes the impact of skills on project success and the impact of certified IT employees on risk management, staff efficiency, and productivity. Organizational success hinges on trained IT individuals who can leverage heterogeneous environments and open source technologies. The document concludes with a caution regarding the future availability of IT skills and the need for a robust IT skills development program.

SITUATION OVERVIEW

Key Priorities of Business and IT

While business is focused on cost, revenue, and risk, IT is focused on uniquely challenging issues that must be reconciled with the more straightforward needs of the broader business:

☑ A complex IT infrastructure that must support both business strategy and IT efficiency. This includes managing virtualization, data federation, software as a service, and composite applications.

☑ The proliferation of client devices and end-use devices at the network edge. The addition of billions of devices to the network edge will drive the need for more enterprise systems to deploy, manage, and make use of them.

☑ Managing IT as a service to the enterprise. Reducing complexity for internal and external users while ensuring enterprisewide security, availability, and scalability of applications, data, and services and creating IT as a utility.

☑ Convergence of the telephone network and the Internet; of communications and IT technologies; of storage, routing, and processing in the datacenter; and of voice, video, and data communications.

IT Staffing Is Key to Success of IT and Business

These key IT trends and demands require a staff with deep capability and understanding of the impact of technology on business. IT organizations will leverage these trends only to the extent that the IT staff can manage risk, balance IT staff productivity, implement projects successfully, and consistently use standards. These four key criteria are essential to ensure that businesses can effectively manage existing technologies and deploy new ones.

Red Hat's popular performance-based certifications for system administration, Red Hat Certified Technician (RHCT) and RHCE, are examples of credentials that have a demonstrated impact on these four essential priorities.

Linux Market Growth

Because of Linux's strong support of both business trends and IT trends, 2006 was another successful year for the Linux platform, as the server operating install base grew at over 15%. Focused on cost control while continuing growth and managing risk, IT organizations are also continuously focused on managing increasing customer expectations. For example, virtualization software, which allows many servers to become a single computing resource, and provisioning software, which allocates incoming workloads to an array, cluster, or grid of servers, will heavily rely on Linux in this "scale-out" server deployment.

The adoption of Linux worldwide reflects, in a single observable phenomenon, the key IT trends described previously because Linux is cost-effective, reliable, and component-based.

Linux computing continues to expand outward from high-performance computing (HPC), IT infrastructure, and Web infrastructure workloads, evolving over time to include a greater percentage of business processing workloads (e.g., enterprise resource planning, OLTP, decision support, and business intelligence).

The benefits of Linux resonate with enterprises of all types. Risk management, IT employee productivity, and the need for increased use of standards are important to companies that use technology to enable communication and coordination, finance companies that need highly reliable scalable systems, companies that leverage technology as the cornerstone of their business, and even to companies whose business is information technology services — and the adoption of Linux supports those goals.

IDC continues to believe the prospects for Linux growth are strong. While Linux is technically robust, IDC believes the combination of performance and price makes Linux-based systems attractive to enterprise workloads of all types. Therefore, IDC believes that the strong growth seen in 2005 and 2006 will continue in 2007 and beyond. To continue Linux adoption and for the value of Linux to be fully realized, IT staffs need to be capable of helping — and even certified to help — achieve the IT organization's overall goals. With the breadth and frequency of open source projects on the rise, it is critical for organizations to acquire the requisite skill sets for their project teams.

The Value of Skills in Enterprise Projects

Business trends (managing cost, growth, and risk) combined with IT trends (convergence, complex infrastructure, and proliferation of devices at the edge) hinge on IT talent, which must include both technical capabilities and the ability to manage projects and complex situations. To ensure those skills are credible, certifications must include practical, hands-on examinations, and the training must be available wherever the skills are required.

IT Talent Matters

In the December 2006 *CIO Magazine* Tech Poll (U.S. survey), 30.5% of respondents said that IT labor was "hard to find," up from a low of 3.5% in May 2003. IDC believes that 30 million people are working either for IT companies or as IT professionals in end-user companies around the world. While supply is growing at 2% a year, demand is growing at twice that rate. With the negative growth of computer science graduates in the United States and Western Europe, IDC believes the only significant source of entrants into the IT industry will be inexperienced workers wishing to begin IT careers after college.

The availability and skill level of talent have a direct impact on markets as diverse as network security and outsourcing. The lack of available skills may affect some markets or adoption rates, such as the advancement of service oriented architecture (SOA) or even the adoption of Linux. Skill of IT staff in the enterprise will remain the single biggest predictor of IT project success. "Training has an impact on system administration: The tools and techniques learned during the training courses lead to improved system administration," according to a senior system administrator at a financial services firm. In a recent study of more than 350 IT projects, IDC has directly correlated the likelihood of IT project success with IT team skill.

With the increasing shortage of IT experience, new talent will enter the IT industry without technical degrees or, in some cases, without experience in IT. Reliable, consistent, and robust training and measurement of skill are essential. IT specialists such as Rackspace, a leading hosting provider, take training very seriously. All of Rackspace's Linux administrators and support personnel are trained to ensure proficiency on all aspects of system deployment. This training helps the company ensure that its administrators don't learn "on a customer's box." Training helps give these administrators confidence, too: "There's a degree of 'I'm a certified troubleshooter'," confirmed Mike Roberts, RHCE and customer support manager at Rackspace. This effort at continuous preparation and training leads to high success, efficiency, and an excellent customer reputation. Rackspace's commitment to excellence is manifested in its trademarked "Fanatical Support" philosophy.

The shortage of IT experience is not localized to the United States or even Western nations; skill shortages in developing countries in Europe and Asia highlight a need for a worldwide solution to the skills gap.

Red Hat Performance-Based Certification Can Provide Relevant Skills to Help Ensure Project Success

Technicians and administrators need both technical experience and project management skills to play their role in the success of open source projects. Hands-on training to prepare for Red Hat certifications focuses IT staff on the key capabilities required for effectively managing an IT environment to achieve cost controls and growth while managing risk.

Red Hat Courses and Certifications

Designed as rigorous and practical training and certification programs, RHCT and RHCE certifications are demanding tests that cover the relevant skills that open source administrators need. The courses are designed to meet the demand of employers for useful measure of an individual's skills and competencies with Red Hat Enterprise Linux. RHCE certification, for instance, involves hands-on labs covering file management, logical volumes, start-up management, and user and group administration (see Table 1).

TABLE 1

Lab Elements in a Typical RH300 RHCE Rapid Track Certification Course

Hardware and Installation	System Administration Tools	Electronic Mail
Sequence of the Boot Process	Kernel Services and Configuration	Understanding the xinetd Daemon
Partitioning Hard Disks	HTTP Service & Apache Web Server	The Server/Client Relationship
RPM and Kickstart	Network File Sharing Services	Securing Services
Creating User Accounts	Domain Name Service	Troubleshooting Strategies

Source: Red Hat, https://www.redhat.com/training/rhce/courses/rhce_content.html, accessed February 2007

This practical training is mirrored in RHCE exams. A Linux system administrator who passes these realistic performance-based lab exams has demonstrated the ability to perform tasks on live systems. The exams accurately reflect the individual's ability to install, configure, and attach a new Red Hat Linux system to an existing production network. Specifically, the certification exams test the administrator's ability to install and configure Red Hat Enterprise Linux; configure basic networking and file systems for a network; and perform essential Red Hat Enterprise Linux system administration, security, and management of common enterprise networking (IP) services for the organization while understanding the limitations of the hardware platform.

Furthermore, Red Hat also offers two new senior-level performance-based certifications that build on RHCE skills and competencies. Red Hat Certified Security Specialist (RHCSS) supplements RHCE security knowledge with specialized skills in Red Hat Enterprise Linux, Red Hat Directory Server, and SELinux. Red Hat Certified Architect (RHCA) is intended for advanced Linux system administrators responsible for the deployment and management of many systems in large enterprise environments.

Project Management Skills

Because technical skills are only part of a successful project, IT teams also need to understand the principles of good project management, including how to identify and schedule project resources, produce critical path planning, and create project flow charts to help evaluate project progress and evaluation. Project management skills too are best taught by reviewing case studies and using a realistic, project-based method. In fact, this capability helps increase the overall value of an IT administrator. Chris Schneider of Rackspace said, "It's very beneficial to have RHCEs in project management discussions and implementation calls.… Having an RHCE on the front line in those conversations usually makes the implementation a whole lot easier." At Rackspace, project management and technical skills together have led certified technicians to grow and become sales engineers, network engineers, team leads, middle management, and support managers.

Performance Testing: A High-Impact Trend

Red Hat was one of the pioneers, along with Cisco and its Cisco Certified Internetwork Expert (CCIE) certification, when it began the RHCE program in 1998 as a performance-based exam on live systems. In the past 18–24 months, certification sponsors have been increasingly adopting technology to deliver simulation or performance-based testing environments. Performance-based tests, with their rigor and accuracy, are superior to traditional multiple-choice tests. Because simulations and performance-based tests involve multipath performance of tasks, adaptive tests that present different items as a result of right and wrong answers and the complexity of the test items make the exams nearly foolproof in assessing the competence of the test taker, especially with regard to problem solving and critical thinking.

Performance-based certifications prove competency more meaningfully and increase an administrator's confidence and competence. Moreover, all of Red Hat's certification tests are performance-based. According to several companies interviewed, RHCEs report greater confidence in their skills and better success at building and managing Linux servers after completing the performance-based exams and are able to take on more challenging assignments.

According to Doug Jaworski, director of systems engineering at Orbitz, "The key roles, where IT employees are responsible for developing the architecture … need to see eye to eye [with each other] to create solutions that meet the needs of technology [and] develop an efficient infrastructure." Performance-based testing ensures that certification candidates are capable of fixing problems and developing working solutions to complex challenges. The results are improved operations and better business.

International Availability

As the adoption of Linux increases, the demand of skilled technicians worldwide will also increase. Maintaining a solid, capable delivery ecosystem is important to vendors such as Red Hat to ensure that their clients can effectively deploy the most effective tools.

In Argentina, where Linux adoption outpaces the adoption of other operating systems, training is obviously important: "During … training, all of our technicians … obtained some important system administration tools and techniques that help on their everyday job, so we think these certifications are highly valuable to our organization," according to an official from the Argentinean revenue collection agency Administracion Federal de Ingresos Publicos (AFIP).

In areas as remote as Central Asia, business needs force IT staff to support more servers, more offices, and more employees remotely and with less staff. The International Bank of Azerbaijan (IBA), based in Baku, supports branches located throughout the Central Asian region and as far away as Moscow with extremely limited staff. For IBA, training and certification have provided benefits of efficiency, reliability, and increased security. "[Red Hat training prepares for] emergency situations, system restores, etc., and with knowledge, templates, and methods, problems are easier and faster to resolve," according to Alexsandr Tvaradze, senior specialist in the Information System Security department at IBA.

To support this worldwide adoption, vendors must develop worldwide training delivery capability. Red Hat, for instance, has 50 or more training sites in North America and hundreds of training centers and training partners worldwide. And while worldwide reach is important, quality is critical.

Credibility and Industry Acceptance

The true measures of the rigor and applicability of any body of knowledge that supports a certification are the adoption and the respect the certification receives in the marketplace. Red Hat has issued nearly 40,000 RHCT and RHCE certifications and has trained nearly a quarter of a million people around the world. Red Hat certifications have been highly sought after since their introduction and have been seen as meaningful by both industry observers and IT practitioners since their inception.

Certification critics such as CertCities.com have recognized Red Hat certifications as both popular and influential. RHCE even earned the top spot on the 2006 "CertCities.com Hot Cert" list. And the certification is important to technicians, too: "Having taken and passed the certification means that you've sat in the [exam room] for six hours of hands-on, real-world problem solving with broken machines in front of you, with things to configure and a finite amount of time. So it really proves itself out," said Tom Weeks, lead systems engineer for Rackspace.

"The training experience is excellent — for example, it uses scenarios to help explore risks or problems. The training was both academic and hands-on. The trainers are excellent and have experience in large network environments — the training isn't book-based," said Krisabelle Ramerez, system administrator and RHCT from Middle East construction giant Arabtec Holdings LLC (Arabtec).

Impact of Certification on Performance

Because skill is a key determinant to project success, the link between certification and skill is obviously important. Additionally, certification is tied to each of the business drivers, such as cost control, growth, managing risk, meeting increasing customer expectations, consolidation, and competition in the IT line of business.

As companies consider both Linux and certification of their IT staffs, it is important that they understand the range of benefits associated with employing professionals with demonstrated capabilities. According to interviews with several companies, Red Hat certification helps companies reduce risk and increase both system and administrator performance.

Risk Mitigation

Risk is inherent in most business and IT activities. Risk management is growing in importance to business. Reducing the risk associated with implementing a technology must be based in three areas: skills, practices, and system performance.

Using skills to reduce risk involves ensuring that all IT staff are fully able to perform the tasks and activities required of them. Solid, comprehensive, and practical training can create an IT organization that has the required skills to reduce risk. Jaworski at Orbitz agrees: "Inefficiency is particularly noticeable in a crisis. And certification helps lessen the impact of failures." Officials at the Argentinean revenue collection agency AFIP agree. "Training always reduces the risk of making mistakes or making wrong decisions," said Gerardo Fisanotti, system administrator at AFIP. Training increases skill and reduces risk.

Business practices can also reduce risk. Standard practices, consistently applied, help reduce variation and increase the reliability of installed systems. Certifications that include proven practices as a cornerstone to competence help maximize the impact of technologies. Certification of administrators results in "higher productivity and — even more important — higher overall service availability. Shorter implementation of new projects is also crucial," said Steffen Roegner, system administrator for IKEA subsidiary PLUS Finanzservice.

Roegner brings up the third area that must be addressed to reduce risk: system performance both during implementation and during normal operation. Organizations whose technology is unreliable are at an increased business risk. System administrators and their managers believe Red Hat certification reduces implementation time and both scheduled and unscheduled downtime.

Fisanotti from the Argentinean revenue collection agency agrees: "In our experience, very poor system administration may lead to project failure or delayed implementations. RHCE has improved our system administrators' skills, helping us reduce this risk…. [Because we are certified], we are now able to provision servers more quickly, correctly configured from the start; that reduces implementation time, and by reducing manual configuration, we avoid errors that could lead to unscheduled downtime."

Organizations that have well-trained staffs, who use consistent procedures and a reliable system, have a reduced exposure to risk. Additionally, well-trained staffs have capabilities and practices that help reduce the performance risks of other technologies. "Our Red Hat Certified Engineers can manage problems and systems beyond Red Hat. They have the nontechnical skills and the confidence to work well under pressure," said Kevin McDonald, a senior system administrator at Vanderbilt University.

One critical benefit of effective risk mitigation is maintenance of stakeholder or end-user satisfaction. Obviously, managing risk and reducing unscheduled downtime have a great impact on satisfaction. As mentioned earlier, skill is a great determinant of project success. Therefore, it is clear why system administrators focus on capability rather than certification: "If we can be better at system administration, the end users should be better served and possibly more satisfied," said Fisanotti of AFIP. The capability of an IT staff can be improved by targeted, effective training and ultimately validated by achievement of a certification and measured by project success.

Staff Efficiency and Productivity

According to Roegner of IKEA subsidiary PLUS Finanzservice, certification increases productivity in general and also makes better use of more advanced technology and more effective use of processes such as Red Hat Kickstart for bare metal setup. "Well-trained employees will produce fewer errors and at the same time leverage all OS capabilities to keep maintenance downtime as short as possible. These positive effects have definitely been noticeable in our company."

In many cases, certification exposes staff to the capability of the tools in use: "After certification, the staff could see ways to use RHEL [Red Hat Enterprise Linux] to benefit the business," pointed out Fisanotti of AFIP.

One key way to improve efficiency is to standardize processes — either by using established protocols built into server tools or by standardizing on processes developed by the organization itself. Several organizations interviewed described these benefits:

☑ "RHCE certified administrators are more likely to adopt standards and practices because standards are an integral part of the RHEL platform itself. [For instance], the time to production for new servers was drastically decreased, since bare metal setup is now fully script-controlled and no external staff needs to be involved," confirmed Roegner, of IKEA subsidiary PLUS Finanzservice.

☑ "With best practices in place, we prevent downtime" rather than just minimize it, said McDonald of Vanderbilt University.

- ☑ "Linux certified administrators have a better understanding of how pieces fit together. They can understand the risks and opportunities for standards…. Certification has a positive effect on system administration — when you have no problems, then you can plan. When you have problems, you can never improve things," said Muttia Marwan Al-Khayyat, IT manager at Arabtec.

- ☑ "[Our IT staff] have a common foundation in what the technology can do and in how to talk and describe that technology. This common understanding makes the team more efficient at developing a robust and effective solution," asserted Jaworski of Orbitz.

Besides adherence to functional processes, well-trained IT employees approach unfamiliar circumstances with a discipline and a confidence that increase the likelihood of a successful resolution: "Our [Red Hat] engineers are very deliberate when troubleshooting a problem," said McDonald of Vanderbilt University.

An obvious measure of efficiency is the number of servers each administrator can manage. Certification can help teams manage more servers because of the processes that are covered during training. Specifically, "a novice administrator might have to physically jump on a dozen boxes to manually fix the problem; an experienced technician with an RHCE is more likely to write a script to remotely manage 50 or 100 servers, or like we do around here, we have patching scripts that will fix a problem and that will go out and repair several thousand servers at once, saving hundreds of man-hours," claimed Weeks of Rackspace. Several other companies IDC interviewed agree that certification has a direct impact on administrator capacity:

- ☑ "Being certified improves the number of servers that can be managed by an administrator," said Jaworski of Orbitz.

- ☑ "The number of servers that can be managed by a staff person is more related to the complexity of the application. [But] the tools and techniques learned during the training courses lead to improved system administration," according to Fisanotti of AFIP.

- ☑ "Templates and methods for updating and restoring systems make administrators more proficient," said Tvaradze of IBA.

Each of these IT managers and IT administrators can describe certification's positive impact on their staffs, overall IT organizational performance, and ultimately, the achievement of business goals. To summarize, certification impacts risk, staff productivity, implementation time, and standards adoption. At the same time, each of these benefits helps support the achievement of one or several key business trends. Figure 1 illustrates this relationship.

Benefits of Certification Versus Business Trends

Certification Benefits	Manage Costs	Manage growth	Manage risk	Increase competitiveness	Meet customer expectations
Improve Risk Management		●	●	●	●
Increase IT Employee Productivity and Efficiency	●	●		●	●
Project Implementation Time	●			●	●
Reduce Scheduled and Unscheduled Downtime			●	●	●
Increase Use of Standards and Best Practices	●			●	●

Source: IDC, 2007

CHALLENGES/OPPORTUNITIES

All companies face an increasing reliance on technology — some use technology to manage their business; others make technology their business. This increased reliance on technology will create a dramatic increase in the demand for skilled IT professionals. As technology continues to become more prevalent in our businesses, effectively managing technology will also become more significant. During the next eight years, the number of IT professionals in some of the fastest-growing fields will grow by 30% or more. The skills of these technologists will be critical to their employers' success.

The technology industry has benefited from robust growth since 2003 (according to Tech Pulse Index from Federal Reserve Bank of New York), and while the unemployment rate for IT workers stabilized during 2005, it remains below the national average. At the same time, 6 of the 10 fastest-growing jobs in the United States are in the technology field. The combination of a low unemployment rate and a rising demand for skilled IT employees is a harbinger of a technology talent crisis. Technology specialists, administrators, and architects will be in increasingly high demand and short supply through 2014.

For the IT industry to manage the challenges of the change in labor dynamics, the IT training industry will need to reevaluate and possibly retool itself. This effort will include increasing IT staff efficiency, creating robust and efficient staff development programs, and developing a consistent way of validating IT talent. Increasing use of technical certifications appears to be one component of this solution. The rigorous and complete nature of Red Hat certified training is a good example:

"[Preparing for certification] provides a structured approach to employee development…. The key roles, where IT employees are responsible for developing the architecture … need to see eye to eye [with each other] to create solutions that meet the needs of technology [and] develop an efficient infrastructure," said Jaworski of Orbitz.

For Rackspace, certification is more than just development; it's a badge of honor. In an organization where nearly one in three technicians who work on Red Hat systems is certified, there is a very strong belief in its value: "There's a strong desire from all of our technicians [to be certified]. All our techs want to take RHCE training. It is really a reward…. Part of it is the employee enrichment; morale increases among the technicians when they know they can get paid to absorb this information, then get a valued industry certification. [It] increases employee loyalty," insisted Stacey Marshall, director of Rackspace University.

CONCLUSION

IDC believes that certifications that represent a rigorous and meaningful body of knowledge are tremendously valuable to near-term organizational success. At the same time, with an impending IT talent crisis, the use of certifications as a component of a talent development process will be critical to IT departments concerned with risk management, IT employee productivity, and the need for increased use of standards.

For that body of knowledge to be fully leveraged, training opportunities must be available worldwide to reflect both the global impact of the IT talent crisis and the worldwide deployment of new technologies.

Red Hat Certified Engineer certification, with its practical, performance-based test methodology, is an example of a meaningful certification that has demonstrated impact on organizational risk mitigation and improved operations.

Organizations that include certifications as a component of their IT staff development programs will see benefits ranging from risk mitigation to staff efficiencies as a result of the achievement of the underlying skills the certification measures.

"Our Red Hat Certified Engineers can manage problems and systems beyond Red Hat. They have the nontechnical skills and the confidence to work well under pressure," concluded McDonald of Vanderbilt University.

CASE STUDIES

Orbitz Inc.

Orbitz is a leading online travel company that enables travelers to search for and purchase a broad array of travel products, including airline tickets, lodging, rental cars, cruises, and vacation packages. Since launching its Web site **www.orbitz.com** to the general public in June 2001, Orbitz has become the third largest online travel site, based on gross travel bookings.

Orbitz requires its IT infrastructure to be flexible, yet low-cost so that it can provide a cost-efficient service to its customers. In addition to fiscal responsibility, technical agility is paramount to Orbitz, and it has leveraged Linux from the beginning. Impressed with the high-performance, low-cost capabilities of its Linux front end, Orbitz began to look for other areas in which to leverage those benefits. The next place the company looked was in the application layer. It compared price and performance per instance using BEA WebLogic on both Sun Solaris and Red Hat Linux and found that Linux would allow significant cost savings and not sacrifice performance.

Orbitz believes that certification has direct impacts:

- ☑ "Platform is easy to manage: Repeatable processes require very few people. The complexity we have is with our Java and workflow processes."

- ☑ "Certifications help in the employee development process."

- ☑ "Certification is a validation of skills."

- ☑ "Certification is both a recruiting and retention tool. It gets people out of the grind and gives them insight into why certain procedures are important. It also provides a common approach to administration."

- ☑ "Certifications help ensure common ways of doing things across the technology organization. Because the tool is so flexible, you are free to do a task 10 different ways … but certification helps create commonality and a repeatable, structured process."

- ☑ "Being certified helps the technicians see the impact of adhering to standards."

- ☑ "[Preparing for certification] provides a structured approach to employee development…. The key roles, where IT employees are responsible for developing the architecture … need to see eye to eye [with each other] to create solutions that meet the needs of technology [and] develop an efficient infrastructure."

- ☑ "They all have a common foundation in what the technology can do and in how to talk [about] and describe that technology. This common understanding makes the team more efficient at developing a robust and effective solution."

- ☑ "A company that certifies its employees is making an investment in its people."

- ☑ "Certification provides a common method and baseline for providing solutions."

- ☑ "Inefficiency is particularly noticeable in a crisis. And certification helps lessen the impact of failures."

- ☑ "Certified teams can manage more systems."

- ☑ "Being certified improves the number of servers that can be managed by an administrator. It has to do with level setting and a common approach for managing servers."

- ☑ "Certification improves employee credibility and increases an organization's trust in the decision made by the team."

Rackspace

Since its founding in 1998, Rackspace has provided managed hosting solutions to thousands of customers. Its approach to managed hosting is described as "simple": build extensive expertise in managed hosting and stay focused on the customer. The company's philosophy of Fanatical Support guides it to go beyond each customer's expectations when managing mission-critical hosting environments. Rackspace has been profitable since 2001 and offers a range of managed services based on the unique needs of each customer.

Approximately 400 IT personnel and 80 Red Hat certified staff are managing nearly 24,000 servers in seven datacenters in the United States and the United Kingdom. About half of the servers are Linux, and the other half are Windows and other operating systems. About 80% of the Linux servers run Red Hat, and the rest run other distributions of Linux, depending on client requirements.

The benefits of certification include the following:

☑ "The biggest benefit [for those who] have gone through the RHCE training and received the certification is being intimately familiar with Red Hat, but there's also a degree of 'I'm a certified troubleshooter.'"

☑ "When problems happen, I know where to look. I know what the most common resolutions are."

☑ "[Certification has] mitigated a lot of risk and reduced a lot of downtime. It's prevented a lot of problems before they've escalated to the point that they're causing downtime."

☑ "Achieving the certification serves as kind of a catalyst…. It creates a lot more opportunities for the individual [within the company]."

☑ "With an RHCE, some people are a whole lot more comfortable getting you involved in project management."

☑ "I've always thought of certification as an insurance policy; being certified allows you to prevent more from happening, and that makes you more efficient."

☑ "A novice administrator might have to physically jump on a dozen boxes to manually fix the problem; an experienced technician with an RHCE is more likely to write a script to remotely manage 50 or 100 servers, or like we do around here, we have patching scripts that will fix a problem and that will go out and repair several thousand servers at once, saving hundreds of man-hours."

☑ "An RHCE certified tech is more likely to set up something right the first time so there are no issues that pop up afterwards…. So they will handle more in a shorter amount of time because there's not a lot of patching or reworking that has to be done."

☑ "If a customer comes to us with a request [we don't get all the time], our guys don't have to do on-the-job learning. They've already touched it. They've already seen it. They are comfortable with it."

- "There's a strong desire from all of our technicians [to be certified]. All our techs want to take RHCE training. It is really a reward…. Part of it is the employee enrichment; morale increases among the technicians when they know they can get paid to absorb this information, then get a valued industry certification. [It] increases employee loyalty."

- "It's very beneficial to have RHCEs in project management discussions and implementation calls…. Having an RHCE on the front line in those conversations usually makes the implementation a whole lot easier."

- "Having taken and passed the certification means that you've sat in the classroom for six hours of hands-on, real-world problem solving with broken machines in front of you, with things to configure and a finite amount of time. So it really proves itself out."

Vanderbilt University

Ranked consistently in the top tier of U.S. colleges and universities, Vanderbilt University is internationally known for its cutting-edge technology and research programs coupled with the Vanderbilt University Medical Center. At Vanderbilt, technology leadership permeates every business decision. Four major IT organizations run IT management and infrastructure at the university and its medical center. Information Technology Services (ITS) is responsible for the delivery and maintenance of data, voice, and video services; academic computing support; email and collaboration services; Web services; help desks; software licensing and management; network security; and training for Vanderbilt University. ITS has responsibility for about 300 Web, mail, and application servers and other servers. With a complex operation, ITS faced a need for increasing reliability and stability for expanding datacenter commitments.

Red Hat Enterprise Linux has become the go-to platform for both business application and infrastructure requirements. Because open source technology is built with best practices of software development, it's appealing to the university. Vanderbilt has migrated more than 50% of its centrally managed servers to Red Hat Enterprise Linux over the past four years. Vanderbilt reports lower TCO in three areas: hardware acquisition, software licensing, and system administration. Vanderbilt also found that Red Hat Enterprise Linux running on inexpensive x86 hardware is faster than the university's legacy RISC hardware. For example, with three Red Hat server instances, ITS manages more than 20,000 SquirrelMail mailboxes with excellent performance.

Certification has had the following benefits:

- "With best practices in place, we prevent downtime" rather than just minimize it.

- "Our [Red Hat] engineers are very deliberate when troubleshooting a problem."

- "Our Red Hat Certified Engineers can manage problems and systems beyond Red Hat. They have the nontechnical skills and the confidence to work well under pressure."

Arabtec Holdings LLC

Arabtec Holdings LLC (Arabtec) is the leading construction company in the United Arab Emirates (UAE). Established in 1975, the company has undertaken a substantial program of construction projects, including high-rise developments, hotel interiors, residential complexes, office blocks, airport developments, offshore oil and gas installations, cinemas, and entertainment facilities.

Arabtec is a large developer that engages in leading-edge construction projects for clients worldwide, and technology is at the heart of its business. Arabtec boasts a large, multinational workforce in excess of 35,000, of which 320 are administrative staff. Email is critical for communication within the company and with Arabtec's clients and partners. However, its email service was hosted and maintained by a third-party international service provider based in the United States. Sending an email between two adjoining offices at Arabtec involved sending data to the United States and then back to the UAE. The company encountered poor performance, increased costs from unnecessary bandwidth use, poor reliability, and security risks over the exposure of sensitive data. With these issues in mind and the desire to be able to maintain the systems in-house, the IT department decided to perform a review to establish potential alternatives.

After testing, it found that Red Hat Enterprise Linux had cost, security, and reliability advantages over the current system and as a result would reduce the cost and risk to ongoing business operations.

Arabtec believes certification had several specific benefits:

- "It is always better to have internal people to work on your servers than to rely on vendors."

- "Certification has a positive effect on system administration — when you have no problems, then you can plan. When you have problems, you can never improve things."

- "Our Red Hat certified technicians "stay with the problem until it's solved. They are very reliable, mature, and capable."

- "Technically, Red Hat is stable and is reliable."

- "The training experience is excellent — for example, it uses scenarios to help explore risks or problems. The training was both academic and hands-on. The trainers are excellent and have experience in large network environments — the training isn't book-based."

International Bank of Azerbaijan

The International Bank of Azerbaijan's (IBA) assets grew by 31% last year and profits grew 41%. By early 2006, the IBA, which is headquartered in Baku, had about US$358.4 billion (330.150 billion AZN) in capital.

IBA feels that certification provided the following specific benefits to support its diverse branches with extremely limited staff:

- ☑ **Improved reliability.** "Certification has sections that describe emergency situations, system restores, etc., and with knowledge, templates, and methods, it is easier and faster to resolve. Being certified reduces downtime for service."

- ☑ **Increased efficiency.** "Templates and methods for updating and restoring systems make administrators more proficient."

- ☑ **Adherence to standards.** "Standard operating procedures ensure administrators and engineers speak the same technical language, reducing confusion and increasing efficiency."

- ☑ **Improved security.** "With additional software [Linux SCA], there is additional control of ports, for instance, that increases the security. Being certified helps administrators understand the opportunity these capabilities present."

Administracion Federal de Ingresos Publicos

The Argentinean revenue collection agency Administracion Federal de Ingresos Publicos (AFIP) is responsible for accurately and reliably collecting the nation's tax and other revenue. With mission-critical servers centralized in a datacenter and approximately 100 servers distributed throughout the country, this task requires high stability and low cost of operation. But as a government agency, AFIP constantly sought ways to reduce overhead.

Since AFIP was traditionally Unix-oriented and liked the Linux compatibility with Solaris/AIX, it considered Red Hat Enterprise Linux as a solution. The agency evaluated the stability of Linux servers and the ability to run Unix-type servers on less expensive hardware. Ultimately, it selected Red Hat Enterprise Server running Web servers (Apache) and application servers (JBoss/Tomcat) on 20 servers plus 40 more running Red Hat Linux 9.

Certification, too, has had a meaningful impact:

- ☑ "We liked the highly hands-on and practice-oriented [nature] of the training and exams; we think this is a much more effective way of learning and gives more value to the certification obtained."

- ☑ "The tools and techniques learned during the training courses lead to improved system administration."

- ☑ "During this training, all of our technicians have obtained some important system administration tools and techniques that help on their everyday job, so we think these certifications are highly valuable to our organization."

- ☑ "We observed the most improvement in the areas of server provisioning through a better understanding of the Anaconda/Kickstart tools and installation process, also in the area of diagnostic/troubleshooting due to a better understanding of RHEL implementation."

- ☑ "We are now able to provision servers more quickly and correctly configured from the start; that reduces implementation time, and by reducing manual configuration, we avoid errors that could lead to unscheduled downtime."

- ☑ "In our experience, very poor system administration may lead to project failure or delayed implementations. RHCE has improved our system administrators' skills, helping us reduce these risks."

- ☑ "In our experience, the number of servers that can be managed by a staff person is more related to the complexity of the application."

- ☑ "The tools and techniques learned during the training courses lead to improved system administration."

PLUS Finanzservice GmbH

PLUS Finanzservice GmbH in Wiesbaden, Germany, is a subsidiary of Scandinavian giants IKEA and IKANO that specialize in customized concepts in consumer loans and credit cards for retailers and mail order businesses. In Germany alone, more than 10 partners, including IKEA and Hornbach, rely on PLUS Finanzservice. More than 40 retailers use its services, including its European sister companies.

Problem

The company was migrating from Oracle 8i on Solaris 8/SPARC to Oracle 9i and wanted to reduce its implementation and ongoing costs. It decided to migrate to the x86 platform. PLUS runs two datacenters with nearly equivalent hardware resources, one for production and the other one for its disaster recovery site.

Solution

Red Hat Enterprise Linux was chosen because it was considered superior to Microsoft and Oracle in performance, stability, support, and cost of licenses.

Impact of Certification

- ☑ Certification results in "higher productivity and — even more important — higher overall service availability. Shorter implementation of new projects is also crucial."

- ☑ "High-availability installations [such as Oracle Real Application Clusters] are complex by nature. The main source of downtime in highly available configurations is [in my opinion] human error. Well-trained employees will produce fewer errors and at the same time leverage all OS capabilities to avoid maintenance downtime or keep it as short as possible. These positive effects have definitely been noticeable in our company."

- ☑ "Higher service availability as well as possible benefits in performance and the choice of the right technology [e.g., Samba versus NFS]."

- ☒ "RHCE certified people are more likely to adopt such standards and practices because they are an integral part of the RHEL platform itself — knowing and efficiently using that platform implies this goal."

- ☒ "In general, we face fewer problems caused by sys admin failure or absence. The time to production for new servers was drastically decreased, since bare metal setup is now fully script-controlled and no external staff needs to be involved."

- ☒ "Certification has raised security standards by introducing good practices knowledge as well as offering the know-how necessary to conform to them. After the RHCE certification, we were able to implement a hardened secure file transfer platform ourselves."

Related Research

- ☒ *Worldwide Linux Operating Environments 2007–2010 Forecast and Analysis: Linux Establishes Itself Aboard Client and Server* (IDC #205385, February 2007)

- ☒ *Open Source in Global Software: Market Impact, Disruption, and Business Models* (IDC #202511, July 2006)

- ☒ *Worldwide Clustering and Availability Software 2006–2010 Forecast* (IDC #201689, May 2006)

- ☒ *Macroeconomic and IT Spending Forecast Assumptions 1Q06* (IDC #201263, April 2006)

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IDC Opinion on the Court Decesion Obliging "Hraparak" daily to disclose its information source. On 29 March, 2015 the Information Disputes Council released its opinion On the verdict of the General Jurisdiction Court of Kentron and Nork-Marash Administrative Districts in Yerevan, on the case No. ÔµÔ¿Ô´/0032/08/14, obliging "Hraparak" daily to disclose its information source. more