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The Value of Standardizing on Red Hat Infrastructure Solutions

EXECUTIVE SUMMARY

The IT industry has long been conflicted between the technical advantages associated with using a collection of best-of-breed solutions and the efficiency and relative simplicity associated with using a smaller number of vendors and products. The latter approach of reducing the vendor count and driving less product diversity helps a company enjoy improved out-of-the-box integration and can effectively deploy IT with increasingly consistent configurations.

While it would be inaccurate to suggest that there is no longer any place for a mix-and-match integration of best-of-breed IT solutions, the reality is that the payback for that type of activity has been moving steadily up the stack, closer to the application layer. The most meaningful difference that onsite IT staff can make in application performance and functionality has moved above infrastructure software. More than 10 years ago, it was reasonable to argue that IT staff could deliver better infrastructure solutions through customization. But for most organizations, that is no longer the case.

Instead, a standardized infrastructure software stack that increasingly mimics the standardized infrastructure that cloud providers deliver to customers is becoming the preferred approach to delivering cost-effective on-premises IT today. This trend is effectively a pivot on IT optimization and modernization.

In real terms, this renewed focus means standardizing on a small number of operating systems vendors — typically Microsoft and a Linux distribution vendor — and embracing the products of those vendors without unique variations in each deployment. It's all about embracing a standardized and consistent approach to management, patching, and updating as well as a well-defined life cycle that effectively moves all systems to new operating system releases as soon as those new versions have been qualified by IT.

Business Value Highlights

373%
average five-year ROI

$16,633
average annual benefits per 100 users per year

42%
less IT staff time required

74%
less unplanned downtime

44%
faster deployment of new applications and features

To understand the operational and business impact of investing in a commercial Linux subscription with supporting management software, IDC interviewed seven organizations that have largely standardized their Linux environments on the Red Hat Enterprise Linux (RHEL) operating system and are using the Red Hat Satellite (Satellite) management system. These organizations reported that their investment in Red Hat enables them to maintain efficient, reliable, and scalable Linux environments for their most important business operations. IDC projects that as a result, these organizations will achieve average annual business benefits worth $16,633 per 100 users per year over five years compared with using another Linux distribution, which equates to an average five-year return on their investment (ROI) in Red Hat of 373%, by:

- Needing substantially less IT staff time to deploy, manage, and support servers running Linux operating systems
- Minimizing the impact of unplanned outages on employees and business operations
- Reducing certain datacenter-related costs, such as licensing costs
- Achieving better business outcomes through strong application performance and greater agility in their Linux server environments

These results show that interviewed organizations are achieving strong benefits from making the investment in standardized infrastructure with management tools, showing the substantial value of investing in RHEL and Satellite management software for these organizations.

Situation Overview

Optimization and modernization, at their highest level, are about replacing aging hardware and software solutions with current versions, but they can, and should, also be about embracing new solutions that make it possible to meet new customer demands. An organization adding development tools and infrastructure software along with updating its decision support and analytics solutions to empower it to collect, analyze, and make business decisions from Internet of things data is a common example seen today in the industry.

IT modernization is not a project that starts and finishes on a finite schedule. Indeed, modernization is a task that is ongoing as long as a datacenter is expected to have value. To stop investing in the modernization of a datacenter is to ensure its obsolescence. On the other hand, there are waves of technology that require more investment and replacement and/or updating.

Today, the industry is in a strong investment cycle, with significant change standing on the doorstep that just needs to be adopted and deployed. Change is being accelerated by a confluence of technologies and business transitions, such as a mature x86 platform, growth of public service providers building out a suite of platform and application services on the x86 platform, the proliferation of the Linux operating system, and the need to change the approach to application development and deployment.

Modernization and optimization efforts often will include a focus to enable more flexible IT solutions, including adding support for modern applications built with a microservices architecture, possibly packaged in a container format for use in a clustered and orchestrated deployment model.

Both new web-scale applications and traditional applications benefit from these deployment options, although there is some divergence for what applications go where.

Deployment itself is no longer locked into a classic server/software/application deployment model. Virtualization freed workloads from the underlying hardware, which proved a boon for existing installed applications and systems. While virtualization software remains the most widely used deployment technology that delivers significant optimization and business benefit, moving to a scenario where customers consume both private and public cloud resources is becoming common as well. Both new web-scale applications and traditional applications benefit from these deployment options, although there is some divergence for what applications go where. A modern infrastructure is more likely to support a comingling of on-premises and public infrastructure resources in a platform-as-a-service (PaaS) model, while a classic application is more likely to move to a virtualized private infrastructure or a public infrastructure-as-a-service (IaaS) solution.

Finally, modern infrastructure is becoming increasingly dependent upon software intended to handle provisioning, automation, and orchestration. Customers modernizing, as well as those building new infrastructure today, are likely to look for tools specific to provisioning such as Red Hat Satellite in a Red Hat shop (and use native tools in public cloud infrastructure), automation software (Ansible, Puppet, and Chef), and orchestration (Kubernetes, Mesosphere, and CloudForms).

Red Hat Enterprise Linux and Red Hat Satellite

We have seen time and again that customers that manage their internal IT diversity to the least amount of variation, then surround those standardized configurations with operational and change management, can enjoy the best return on that investment. Key steps for many organizations are as follows:

- Create a corporate-standard server configuration (or several configurations) for common workloads. Establish a robust plan for life-cycle management, day-to-day operational management, and patches and security updates. Establish a way to deliver those patches and updates quickly and efficiently.
- Inventory existing servers, and determine what systems meet that corporate standard and what systems are close and can be brought into compliance with the corporate standard.
- Establish a road map to consolidate outlier systems to the corporate-standard system.
- Continue to optimize and improve the standard configuration and the surrounding management infrastructure.

The reality for most Linux shops is that they have multiple distributions in use. Even shops that are highly standardized on one commercially supported distribution still will have a mix of nonpaid Linux distributions in use (often CentOS and Ubuntu). In other cases, these shops may have additional commercial Linux distributions in use and under support subscription.

Today, we are seeing more Red Hat shops that are doing a round of standardization as described in this White Paper and are deriving benefits from reduced diversity and complexity. This White Paper places some specific metrics on the value that customers enjoy from adopting this modern approach to managing their server infrastructure.

The Business Value of Standardizing on RHEL with Red Hat Satellite

Study Demographics

IDC interviewed seven Red Hat customers that have largely standardized their Linux servers on the Red Hat Enterprise Linux operating system. In addition, all seven of these organizations have invested in supporting these RHEL servers with Red Hat Satellite systems management software. Interviews covered a variety of topics intended to obtain quantitative and qualitative information regarding the impact of the organizations' investment in Red Hat compared with using other Linux distributions. Interviewed organizations have extensive operations, with an average of 30,700 employees (median 10,000) and 2,041 physical servers supporting 366 business applications. Interviews covered the experiences with organizations in a number of verticals and in North America and EMEA (see Table 1).

TABLE 1

Demographics of Interviewed Organizations

	Average	Median
Number of employees	30,700	10,000
Number of IT staff	451	250
Number of IT users	30,700	10,000
Total number of business applications	366	200
Total number of physical servers	2,041	200
Countries	United States, Canada, Liechtenstein, and Sweden	
Industries	Education, government, manufacturing, retail, and technology	

n = 7

Source: IDC, 2016

Interviewed organizations rely on servers running the RHEL operating system and Satellite management software to support significant parts of their overall IT operations. Every interviewed organization characterized the workloads it is running on RHEL servers as among its most critical business applications, with one organization describing its criticality as "super high, as high as it can get." These organizations have an average of 1,160 physical servers running on Red Hat Enterprise Linux, constituting more than half of their physical server environments on average (see Table 2). Virtualization levels on RHEL infrastructure varied by organization, but density of virtualization averaged 3.9 virtual servers per physical host. All seven interviewed organizations are using Red Hat Satellite management software to support their Red Hat Enterprise Linux operations and were able to speak to how Satellite is supporting their IT and business operations.

TABLE 2

Red Hat Enterprise Linux and Red Hat Satellite Environments

	Average	Median
Number of RHEL servers	1,160	75
Number of RHEL users	20,500	10,000
Number of RHEL business applications	159	113
Number of Red Hat Satellite servers	2	1

n = 7

Source: IDC, 2016

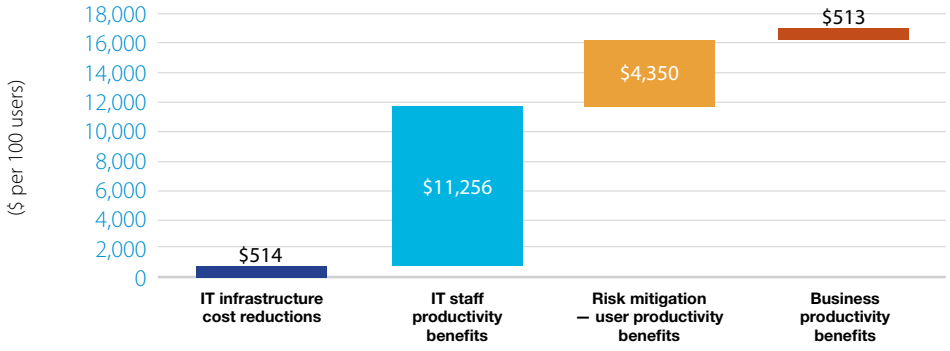
Business Value Analysis

Interviewed organizations explained that they chose to invest in the Red Hat Enterprise Linux operating system and Red Hat Satellite management system — rather than using another, potentially free Linux distribution — because their Linux environments must be efficient and robust enough to run their most critical business workloads. IDC's interviews show that the organizations are meeting these requirements: According to these organizations, as a result of standardizing on Red Hat Enterprise Linux and using Red Hat Satellite management software, their Linux environments are more cost effective, efficient, reliable, and agile. IDC projects that these organizations will realize average annual business benefits worth $16,633 per 100 users per year ($5.10 million per organization) through their investment in these commercial Red Hat solutions in the following areas (see Figure 1):

- **IT staff productivity benefits:** Standardized RHEL environments supported by Satellite require significantly less IT staff time to manage, extend, and secure compared with other Linux distributions. Interviewed organizations attributed efficiencies to automation, centralization of patching and updating, and ease of provisioning with Red Hat. IDC puts the value of IT staff efficiencies at an average of $11,256 per 100 users per year over five years ($3.45 million per organization).
- **Risk mitigation — user productivity benefits:** Standardized RHEL environments are more reliable and robust. This means that interviewed organizations experience fewer user- and business-impacting unplanned outages and limit the impact of outages on users and their businesses. IDC calculates that they will save employee productive time and lose less revenue at an average of $4,350 per 100 users per year over five years ($1.33 million per organization).
- **IT infrastructure cost reductions:** Standardizing with Red Hat Enterprise Linux enables organizations to optimize licensing and training costs. IDC puts the value of these cost avoidances at an average of $514 per 100 users per year over five years ($157,800 per organization).
- **Business productivity benefits:** Having a robust, high-performing, and scalable Red Hat–supported infrastructure can lead to better business outcomes. IDC projects that by better addressing business opportunities, interviewed organizations will achieve higher operating margins worth an average of $513 per 100 users per year over five years ($157,400 per organization).

FIGURE 1

Average Annual Benefits per 100 Users



Average annual benefits per 100 users: $16,633

Source: IDC, 2016

IT Staff Productivity Benefits

According to interviewed organizations, the most substantial benefit of having a standardized RHEL environment supported by Satellite compared with using another Linux distribution is the ease of deploying, managing, and supporting their RHEL servers. As a result, the organizations require less staff time to support their Linux server environments. Interviewed Red Hat customers reported needing an average of 42% less IT staff time (see Table 3). One organization noted the benefit of standardizing on the Red Hat Enterprise Linux operating system: *"To run the RHEL servers, we have around 15–20 people. If we were not standardized on RHEL and used a variety of Linux servers, we would most likely need a lot more people. I would say that we'd need probably double the number of staff on server management."*

Another organization echoed this sentiment, also citing its investment in Satellite: *"The benefits for us of RHEL and Red Hat Satellite are the time to provision systems and just the overall automation and centralized management of RHEL. Five people are directly saving time — about 20% on average."*

Interviewed organizations cited the following IT operational efficiencies attributable to standardizing on RHEL and using Satellite:

» **A common platform.** Having servers running the same operating system builds staff knowledge and experience, which can be translated into more efficient support.

The benefits for us of RHEL and Red Hat Satellite are the time to provision systems and just the overall automation and centralized management of RHEL. Five people are directly saving time — about 20% on average."

- **Ease of patching and security.** Automated and timely patches reduce staff time spent, ensuring the robustness and reliability of Linux server environments. One organization described this benefit: *"The major benefit for us of using Red Hat Satellite is being able to offer a consistent patch set to all of our systems so that we have a more predictable environment."*
- **Ease of provisioning and configuration.** Automated provisioning of server configuration and compute resources — which several organizations attributed to Satellite in particular — means less staff time spent on configuration and deployment.
- **Pass-through of innovation.** Best practices and experiences passed through the Red Hat open source community can be reapplied within each organization's RHEL environment.

TABLE 3

IT Staff Productivity Benefits

Time per 100 Users per Year (Hours)	Other Linux	RHEL	Difference	Change (%)
Server management	123.5	55.6	67.9	55
System setup and configuration	10.3	7.6	2.7	26
System management	38.1	23.7	14.3	38
Change management	10.8	7.1	3.7	34
Configuration management	10.6	7.1	3.5	33
Application management	6.1	4.4	1.7	28
Maintenance	17.5	14.2	3.3	19
Incident management	8.1	7.1	1.0	12
Problem management	8.4	7.1	1.3	16
Storage management	2.5	1.9	0.6	21
Total	**235.8**	**135.9**	**99.9**	**42**

Source: IDC, 2016

Risk Mitigation and Availability

Interviewed organizations reported that the combination of standardizing on the Red Hat Enterprise Linux operating system and using Red Hat Satellite helps them ensure availability of many of their most mission-critical business applications and limit the impact of outages on their users and business operations. They cited standardization as beneficial by establishing more unified server environments that are supported by Red Hat. One

"If we had free Linux, from my experience, I'd expect unplanned outages to occur 10 time as often. The stability and reliability isn't the same as with RHEL — I think it's because of the standardization and the certification of the hardware against various releases. So we don't have the problems that can lead to outages."

organization cited Red Hat certification of hardware as a contributor to its ability to limit Linux server–related outages. Meanwhile, interviewed organizations reported that Satellite contributes to limiting downtime by providing a centralized management environment for their RHEL server environments, making it more likely that potential problems will be resolved before causing impactful outages.

Interviewed organizations are experiencing an average of 74% less unplanned downtime by standardizing on RHEL with the support of Red Hat Satellite. One interviewed organization commented on how its investment in Red Hat pays off handsomely: *"If we had free Linux, from my experience, I'd expect unplanned outages to occur 10 time as often. The stability and reliability isn't the same as with RHEL — I think it's because of the standardization and the certification of the hardware against various releases. So we don't have the problems that can lead to outages."*

Table 4 shows the extent to which these organizations have kept unplanned outages from impacting their business operations with RHEL and Red Hat Satellite.

TABLE 4

Risk Mitigation and Unplanned Downtime

	Other Linux	RHEL	Difference	Change (%)
Unplanned downtime productivity impact				
Number of instances of unplanned downtime per year	13.9	5.1	8.8	63
MTTR (hours)	3.9	3.0	0.9	24
Productive time lost per 100 users per year (hours)	164	42	122	74
FTE impact	27	7	20	74
Revenue impact of unplanned downtime				
Unplanned downtime instances impacting revenue (%)	14.6	10.3	4.3	30
Revenue impact per hour ($)	34,300	13,100		
Total revenue impact per year ($)	269,400	20,200	249,200	93

Source: IDC, 2016

Total Cost of Operations

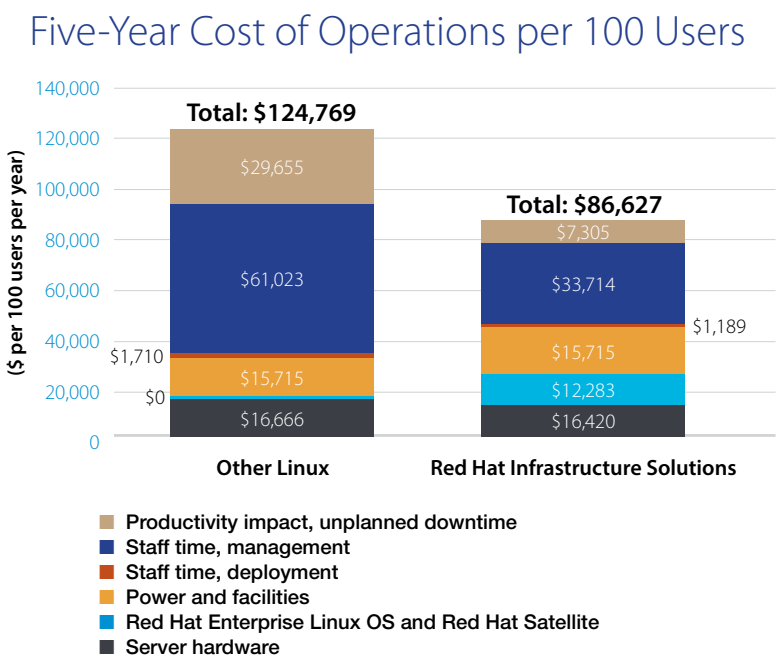
Interviewed organizations reported that the overall cost of operating their Linux environments is considerably lower with a standardized RHEL environment supported by Satellite, despite the licensing costs associated with the commercial Red Hat solutions. In particular, their investment in RHEL and Satellite helps them make their IT staff operations more efficient and reduce the cost of unplanned outages, both of which are often as

substantial if not more of a component of overall operating costs than hardware, licensing, and associated datacenter operating expenses. These efficiencies are at the core of the value that standardizing on RHEL with Satellite provides to these organizations.

IDC calculates that on the basis of these operational efficiencies, as well as by avoiding some licensing- and training-related costs, interviewed organizations will have an average of 31% lower cost of operations over five years, despite incurring costs related to Red Hat hardware and licensing.

Figure 2 demonstrates that for these organizations, the benefits of investing in a Linux environment supported by Red Hat software — including the Red Hat Enterprise Linux operating system and Red Hat Satellite management software — rather than in an alternative Linux distribution to support business-critical applications that demand support and high availability substantially outweigh the initial and ongoing investment costs.

FIGURE 2



Source: IDC, 2016

"Red Hat Satellite affects our ability to provision server resources through automation, which accelerates our delivery timeline. We can now deploy a virtual server in 10 minutes the same day — it's very quick. If we didn't have Satellite, it would be probably 8 hours over 2 days."

Business Productivity Benefits

In addition to the operating cost advantages of standardizing on RHEL with Satellite, interviewed organizations have gained greater IT agility. In particular, automation provided by Satellite enables faster deployment of virtual compute resources, which leads to more timely deployments and updates of business applications, including the mission-critical business applications these organizations are running on their Red Hat Enterprise Linux servers. This means that that they can better serve their lines of business by standardizing on RHEL and Satellite (see Table 5).

Interviewed organizations provided numerous examples of these efficiencies:

- **Less time to upgrade business applications.** One organization commented: *"To upgrade a mission-critical business application can take a lot of lead time for preparation and scheduling. In terms of staff time, it takes us 8 hours of 2 days with RHEL, which would take triple the staff time and 2 weeks with another version of Linux."*
- **Automated provisioning of virtual compute resources.** One organization explained: *"Red Hat Satellite affects our ability to provision server resources through automation, which accelerates our delivery timeline. We can now deploy a virtual server in 10 minutes the same day — it's very quick. If we didn't have Satellite, it would be probably 8 hours over 2 days."*

TABLE 5

Agility and Application Development Impact

	Other Linux	RHEL	Difference	Change (%)
Time to deploy new business application (hours)	83.9	46.8	37.1	44
Time to develop/deploy new business application (weeks)	5.3	3.6	1.7	32
Staff time to deploy new virtual machine (hours)	2.5	1.0	1.5	62
Staff time to upgrade mission-critical business application (hours)	22.4	13.5	8.9	40

Source: IDC, 2016

"Yes, Red Hat Enterprise Linux affects our business in a good way. The way that we design the system, we get economies of scale per physical host, and people can spend their time on revenue-generating activities — over a million dollars a year in additional revenue because of RHEL."

Organizations can leverage this IT agility, as well as strong performance of applications running on their RHEL servers, to achieve better business results. Several interviewed organizations reported delivering new services in less time, which has supported their business strategies and enabled them in some instances to win more businesses. Even though several interviewed organizations were governmental or educational institutions, and thus less focused on the business impact of standardizing on Red Hat, the potential impact on business operations came through in interviews. One interviewed enterprise customer commented: *"Yes, Red Hat Enterprise Linux affects our business in a good way. The way that we design the system, we get economies of scale per physical host, and people can spend their time on revenue-generating activities — over a million dollars a year in additional revenue because of RHEL."* IDC calculates that interviewed organizations will gain almost $1.05 million of additional revenue per year over five years, or $157,400 per year in additional operating margin after taking into account an assumed 15% operating margin.

ROI Analysis

IDC interviewed seven organizations that have standardized most of their Linux servers on the Red Hat Enterprise Linux operating system. In addition, all of these organizations are using Red Hat Satellite management software to support their RHEL server environments. IDC recorded results from interviews covering the impact of investing in the Red Hat Enterprise Linux operating system and Red Hat Satellite to inform this study's analysis. IDC used the following three-step method for conducting the ROI analysis:

1. **Gathered quantitative benefit information during the interviews using a comparative assessment.** In this study, the benefits included staff time efficiencies and higher productivity levels, increased revenue, and server-related cost efficiencies.

2. **Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the annual costs of using Red Hat Enterprise Linux operating system and Red Hat Satellite management system and can include additional costs related to the solution, such as migrations, planning, consulting, configuration or maintenance, and staff or user training.

3. **Calculated the ROI and payback period.** IDC conducted a depreciated cash flow analysis of the benefits and investments for the organizations' use of Red Hat Enterprise Linux and Red Hat Satellite over a five-year period. ROI is the ratio of the net present value (NPV) and the discounted investment based on benefits these organizations achieved compared with another Linux environment. The payback period is the point at which cumulative benefits equal the initial investment.

Table 6 presents IDC's analysis of the average discounted benefits, discounted investment, and ROI for the Red Hat customers interviewed for this study. IDC calculates that these organizations will invest an average discounted total of $12,480 per 100 users per year ($3.83 million per organization) over five years in Red Hat Enterprise Linux operating system and Red Hat Satellite management system. IDC projects that these organizations will realize average discounted business benefits worth $59,055 per 100 users per year ($18.11 million per organization) over five years compared with using another Linux distribution. These organizations would achieve an average five-year ROI of 373% and break even on their investment in an average of five months.

TABLE 6

Five-Year ROI Analysis

	Per Organization	Per 100 Users
Benefit (discounted)	$18.11 million	$59,055
Investment (discounted)	$3.83 million	$12,480
Net present value (NPV)	$14.28 million	$46,575
Return on investment (ROI)	373%	373%
Payback period	5 months	5 months
Discount rate	12%	12%

Source: IDC, 2016

Challenges/Opportunities

The payback associated with standardizing on Red Hat Enterprise Linux is well stated (refer back to Table 6), but the theoretical nirvana is, for many customers, juxtaposed with the reality that they can't necessarily get to the level of standardization that some of their industry peers have been able to achieve.

The challenges and opportunities associated with these scenarios include the following:

- **Challenge:** Migration alone often provides inadequate payback to justify the risk associated with the movement. This justification is absent until the migrated system is brought into the same organized management plane that supports the rest of the installed base. The reality is that a distribution-to-distribution migration in itself requires time and investment and includes some level of possible risk. This creates a perceived barrier to starting a migration process in the first place, prolonging the inability of organizations to benefit from standardization.

- **Opportunity:** While the perception may be that there is no immediate payback associated with a migration from a competitive distribution (and in some cases, that assumption may be true), it is this very action that opens up the door for the ROI benefits described in this White Paper to begin, thanks to the ability to bring the migrated system into a larger structured life cycle and management process that is centrally orchestrated. Further, modernization activities help prepare an organization for moving to a private or public cloud infrastructure at some point in the future.
- **Challenge: M**odernization and standardization require current IT skills. Some organizations, especially those that have not aggressively embraced new technologies in their datacenter, may find skills and staffing to be a barrier to modernization and standardization.
- **Opportunity:** The world is changing very quickly as we move toward a cloud-centric compute model. Organizations should use this sea change as both motivation and justification to invest in employees and skills (i.e., modernize not only their IT but also their people.)

Summary and Conclusion

Organizations using Linux operating systems to support critical business applications may face challenging decisions about which distribution to use or even which version of which distribution to use.

Organizations using Linux operating systems to support critical business applications may face challenging decisions about which distribution to use or even which version of which distribution to use. They may ask themselves whether an investment to migrate from one community or commercial distribution to another commercial distribution will return sufficient value to justify the investment.

This IDC study demonstrates that organizations that have largely standardized their Linux environments with the Red Hat Enterprise Linux operating system supported by Red Hat Satellite management system are recouping their investment several times over. In particular, organizations require much less staff time to support RHEL servers and can ensure the reliability and agility required for mission-critical business applications that they are running on RHEL servers with the support of Red Hat Satellite.

As a result, customers avoid inefficiencies in their business and IT operations that are sometimes less readily visible but can carry significant ongoing costs, thereby creating more value for their organizations. Even better, standardization prepares these customers to move into the next phase of computing if and when the time is right.

Appendix

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from current users of servers with the Red Hat Enterprise Linux operating system and Red Hat Satellite as the foundation for the model. Based on these interviews, IDC performs a three-step process to calculate the ROI and payback period:

- Measure the savings from reduced IT costs (staff, hardware, software, maintenance, and IT support), increased user productivity, and improved revenue over the term of the deployment.
- Ascertain the investment made in deploying the solution and the associated migration, training, and support costs.
- Project the costs and savings over a five-year period and calculate the ROI and payback for the deployed solution.

IDC bases the payback period and ROI calculations on a number of assumptions, which are summarized as follows:

- Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and manager productivity savings.
- Downtime values are a product of the number of hours of downtime multiplied by the number of users affected.
- The impact of unplanned downtime is quantified in terms of impaired end-user productivity and lost revenue.
- Lost productivity is a product of downtime multiplied by burdened salary.
- Lost revenue is a product of downtime multiplied by the average revenue generated per hour.
- The net present value of the five-year savings is calculated by subtracting the amount that would have been realized by investing the original sum in an instrument yielding a 12% return to allow for the missed opportunity cost. This accounts for both the assumed cost of money and the assumed rate of return.

Because every hour of downtime does not equate to a lost hour of productivity or revenue generation, IDC attributes only a fraction of the result to savings. As part of our assessment, we asked each company what fraction of downtime hours to use in calculating productivity savings and the reduction in lost revenue. IDC then taxes the revenue at that rate.

Further, because IT solutions require a deployment period, the full benefits of the solution are not available during deployment. To capture this reality, IDC prorates the benefits on a monthly basis and then subtracts the deployment time from the first-year savings.

Note: All numbers in this document may not be exact due to rounding

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