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Business Value Highlights

348%

average three-year ROI

7 months

to breakeven

40%

lower three-year cost of operations

20%

lower IT infrastructure costs

45%

more efficient IT staff operations

68%

less unplanned downtime

26%

faster deployment of new business applications

The Business Value of Red Hat Enterprise Linux

EXECUTIVE SUMMARY

Linux has firmly established itself as a preferred delivery vehicle for modern applications; in addition to that role, it has become the preferred platform for cloud infrastructure. The credibility of Linux didn't just happen overnight; credibility has been cultivated from humble beginnings and by patiently building ecosystems and rich application portfolios. But most importantly, credibility comes from satisfied customers that have seen Linux meet their needs for a reliable environment that offers scale, security, and robust application support.

Within the broader Linux category, enterprise customers usually gravitate to enterprise distributions for the benefits those distributions deliver on — efficient operational costs, better reliability and availability, and better scalability in terms of both users per server and servers per administrator. These benefits typically translate into a better return on investment (ROI) for enterprise customers, which IDC's business value research measures and highlights.

IDC interviewed 12 organizations to understand how they are using Red Hat Enterprise Linux (RHEL) to support their business operations. These organizations reported that Red Hat Enterprise Linux servers provide a cost-effective, efficient, and reliable operating environment. IDC compared key performance metrics and costs for the interviewed organizations' server environments using the Red Hat Enterprise Linux operating system with those for servers running alternative operating systems and determined that the organizations are realizing substantial business value by using Red Hat Enterprise Linux. IDC projects that these organizations will achieve business benefits worth an average of \$29,517 per 100 users per year, which would provide a three-year return on investment of 348% through the following benefits:

- » Optimizing IT infrastructure costs, including needing fewer servers to run the same workloads and lower software costs
- » Making IT staff operations more efficient through ease of management and virtualization
- » Reducing the impact of unplanned downtime and outages on users and business operations
- » Supporting business growth through scalability and high performance

Situation Overview

IT professionals have a pretty clear objective: to provide quality IT services that help organizations be successful and competitive and, ideally, outdistance their competitors while holding the line on IT capital and operational costs. To accomplish these seemingly conflicting objectives, most IT departments end up on a continual search for ways to reduce opex and capex costs.

The reality for most IT organizations is that the operational side of the equation generates a larger cost burden for the overall budget. As a result, anytime IT organizations can find a way to lower opex and extend ROI benefits — without causing a large increase in capex — they are likely to embrace those solutions and will often apply those same operational improvements elsewhere in their organization, where possible.

Open source software, and Linux in particular, has long been seen as a solution offering a better capex story, which is not surprising given that most open source technologies are available in a variety of packages ranging from no-cost, community-supported implementations to commercially supported products, all of which are generally less expensive than closed source alternatives. However, given the heavy impact that opex has on the overall budget, without a stellar opex story, a strong capex story still can fall short of meeting the requirements of most customers. So when a story can be told that offers both capex and opex benefits, resulting in a real ROI calculation, customers tend to take notice.

The results of this IDC ROI study highlight a scenario of that type where servers running Red Hat Enterprise Linux are compared with competitive servers (running other open source–based software stacks or other open and closed source x86 operating systems). The results of the comparative acquisition and operational costs, and for the ROI, are presented in the sections that follow.

Red Hat Enterprise Linux Solutions

A long-time provider of open source–based solutions for large and medium-sized enterprises, Red Hat develops, commercially packages, and provides support for its products on a subscription basis.

The company's products are designed for easy installation by customers, with multiple versions available for different deployment options such as virtualized and nonvirtualized environments.

Red Hat's product stack begins with the company's operating system product, Red Hat Enterprise Linux, which is the core Red Hat product included in this IDC ROI study. Red Hat Enterprise Linux customers often use multiple products from Red Hat. IDC research has found that Red Hat Enterprise Linux customers often use Red Hat Satellite for systems management and/or Red Hat Virtualization. Although outside the scope of this particular study, these same customers may also use Red Hat JBoss Middleware and OpenShift Enterprise by Red Hat Platform as a Service for application development products.

The Business Value of Red Hat Enterprise Linux

Study Demographics

IDC interviewed 12 organizations supporting workloads with servers running both Red Hat Enterprise Linux and other operating systems to better understand the impact of using Red Hat Enterprise Linux on their IT and business operations. Interviews were designed to obtain quantifiable and qualitative information about how Red Hat Enterprise Linux supported the operations of the interviewed organizations. On average, these were large enterprises and organizations, with an average employee size of 130,200 and median employee size of 19,000. The substantial IT and business operations of these organizations was reflected in the average of 324 business applications they are running on 1,556 physical servers and 3,080 virtual servers in their overall datacenter environments (see Table 1).

TABLE 1

Demographics of Interviewed Organizations Using Red Hat Enterprise Linux		
	Average	Median
Number of employees	130,200	19,000
Number of IT staff	3,166	225
Number of IT users	61,100	11,435
Total number of business applications	324	160
Total number of physical servers	1,556	503
Total number of virtual servers	3,080	415
Industries	Education, pharmaceutical, government, manufacturing, healthcare, software, services provider, telecommunications, financial services	

n = 12

Source: IDC, 2016

Red Hat Enterprise Linux servers account for an average of 38% of the interviewed organizations' physical server environments, with 592 Red Hat Enterprise Linux servers per interviewed organization on average. These organizations also use Red Hat Enterprise Linux to run an average of 56% of their total virtual machines, which is 1,715 virtual machines on average (see Table 2). Interviewed organizations are running a variety of workloads on servers with Red Hat Enterprise Linux, with all interviewed organizations using Red Hat Enterprise Linux servers to support database and information management workloads, 82% of the organizations using them to develop applications, and about half of the organizations using them to run systems and network management, business analytics, customer relationship management (CRM), and enterprise resource management (ERM) applications.

TABLE 2

Red Hat Enterprise Linux Environments of Interviewed Organizations		
	Average	Median
Number of RHEL physical servers	592	180
Number of RHEL virtual servers	1,715	145
Number of RHEL users	22,200	3,175
Number of RHEL applications	110	38

n = 12

Source: IDC, 2016

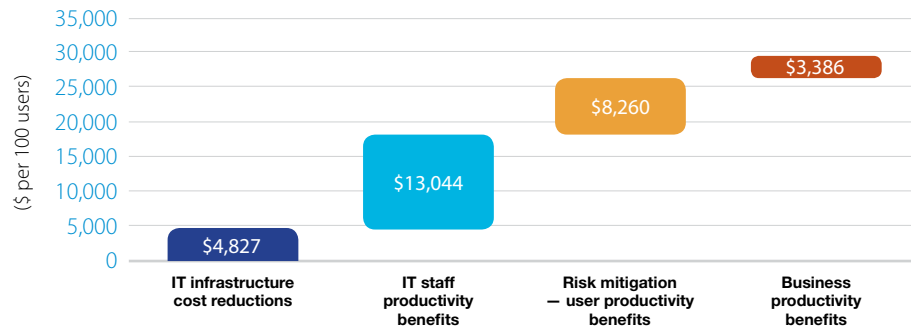
Business Value Analysis

Interviewed organizations reported that Red Hat Enterprise Linux provides a cost-effective, efficient, and reliable foundation for running important business applications. As a result, they are achieving strong value with Red Hat Enterprise Linux compared with running the same workloads on servers running alternative operating systems. IDC projects that these organizations will realize average annual business benefits worth \$29,517 per 100 users (\$18.04 million per organization) with Red Hat Enterprise Linux in the following areas (see Figure 1):

- » **IT infrastructure cost reductions.** Red Hat Enterprise Linux servers are cost effective because interviewed organizations using them need fewer servers to support equivalent workloads. In addition, servers running the Red Hat Enterprise Linux operating system have lower maintenance and software costs. IDC calculates that interviewed organizations will save an average of \$4,827 per 100 users per year over three years (\$2.95 million per organization) using Red Hat Enterprise Linux servers.
- » **IT staff productivity benefits.** Red Hat Enterprise Linux servers require less IT staff time to deploy, maintain, and manage for the same workloads. IDC projects that interviewed organizations will realize IT staff time savings and productivity gains worth an average of \$13,044 per 100 users per year over three years (\$7.97 million per organization).
- » **Risk mitigation — user productivity benefits.** Red Hat Enterprise Linux servers are more reliable, minimizing the cost of system and application outages on users and business operations. IDC projects that interviewed organizations will achieve value worth an average of \$8,260 per 100 users per year over three years (\$5.05 million per organization) by minimizing lost productive time for users and revenue losses due to outages.
- » **Business productivity benefits.** Red Hat Enterprise Linux servers provide the agility and performance that interviewed organizations need to support their business operations. IDC projects that these organizations will bring in additional revenue of \$3,386 per 100 users per year over three years (\$2.07 million per organization) with Red Hat Enterprise Linux servers supporting their businesses and services.

FIGURE 1

Average Annual Benefits per 100 Users



Average annual benefits per 100 users: \$29,517

Source: IDC, 2016

IT Infrastructure Cost Reductions

For the interviewed organizations, many of the efficiencies and benefits of using Red Hat Enterprise Linux servers tie back to needing an average of 22% fewer servers compared with other operating systems to run the same workloads. Interviewed organizations attributed this efficiency to Red Hat Enterprise Linux being optimized for demanding workloads in terms of performance and capacity and supporting virtualization. The organizations provided several examples of maintaining consolidated and streamlined server environments with Red Hat Enterprise Linux:

- » **Performance.** An IT manager at an organization in the education sector explained, “Based on performance tests that we’ve done on our applications, we’d need maybe 70% more servers to use other servers for the applications we’re running on RHEL.”
- » **Virtualization.** An IT manager at a technology manufacturer noted, “If we were using these applications on other servers, we’d need more servers because we can virtualize more efficiently on RHEL. So for every two RHEL servers, we’d need three of another server.”

In addition to cost savings for physical server infrastructure, the interviewed organizations are realizing savings in associated areas such as power, facilities, and network hardware. They also reported spending less on ongoing operating system and server maintenance (43% less per server) and software (14% less per 100 users) with Red Hat Enterprise Linux. To a significant extent, they attributed these cost efficiencies to Red Hat Enterprise Linux being open source (see Table 3). The IT manager at the technology manufacturer explained, “Application license costs are less with RHEL because there’s a lot of free open source software. We’re saving close to \$1,000 per server per year for application software.”

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TABLE 3

IT Infrastructure KPIs				
	Other Servers	RHEL Servers	Difference	% Change
Number of servers	762	592	170	22%
Cost per server	\$11,250	\$10,308	\$942	8%
Server replacement cycle (years)	4.63	4.96	0.33	7%
Cost of maintenance per server per year	\$734	\$422	\$313	43%
Number of users per server	29	37	8	27%

Source: IDC, 2016

“For server administration with RHEL, we have five people spending probably 60% of their time; if we were using other servers for these workloads, we would need 100% of their time. These time savings are in part because it’s easier for us to administer server virtualization efforts with Red Hat Enterprise Linux.”

IT Staff Productivity Benefits

For the interviewed organizations, Red Hat Enterprise Linux environments require an average of 40% less IT staff time to deploy, manage, and administer (not including help desk support) per 100 users. Interviewed organizations attributed efficiencies with Red Hat Enterprise Linux to a number of factors, such as the ability to maintain a more consolidated server environment, ease of virtualization, fewer issues with hardware and software compatibility, and the ability to carry out patching operations more efficiently. By saving time on day-to-day IT staff operations, the organizations free up IT staff time to support lines of business and IT innovation. An IT manager at a healthcare organization explained, “For server administration with RHEL, we have five people spending probably 60% of their time; if we were using other servers for these workloads, we would need 100% of their time. These time savings are in part because it’s easier for us to administer server virtualization efforts with Red Hat Enterprise Linux.”

Because of the stability of the operating system, Red Hat Enterprise Linux servers require less time for ongoing user support and maintenance compared with alternative servers. Interviewed organizations reported that their help desk staffs spend an average of 73% less time supporting users who experience application-related problems.

IDC calculates that as a result of these efficiencies, interviewed organizations require 45% less IT staff time, including help desk support, per 100 users to support equivalent workloads running on Red Hat Enterprise Linux servers (see Table 4).

TABLE 4

IT Staff Productivity Benefits <i>Hours per 100 users per year</i>	Other Servers	RHEL Servers	Difference	% Change
Server management	193	123	70	36%
Storage management	62	38	24	38%
Network management	130	69	61	47%
Security management	42	26	17	40%
Helpdesk	74	20	54	73%
Total	500	276	225	45%

Source: IDC, 2016

“We can apply update patches better with RHEL, and we don’t have all of the glitches that come with our other server environment.”

Risk Mitigation — User Productivity Benefits

Red Hat Enterprise Linux provides the resiliency and uptime that business operations require. Interviewed organizations said that this results in less frequent unplanned downtime and outages and a substantially reduced impact on their users and business operations compared with industry-standard servers. The organizations attributed higher uptime to Red Hat Enterprise Linux not only due to the ability to achieve a more consolidated server environment but also due to fewer problems experienced and more efficient maintenance. An IT manager at a government agency reported experiencing up to 75% fewer incidents of unplanned downtime, noting, “*We can apply update patches better with RHEL, and we don’t have all of the glitches that come with our other server environment.*” As a result, interviewed organizations reported experiencing unplanned downtime an average of 56% less often and put the revenue impact of unplanned downtime on their employees using IT services at an average of 68% lower (see Table 5).

In addition to minimizing the impact of outages on users, Red Hat Enterprise Linux helps maintain business continuity. This minimizes the likelihood of unplanned downtime impacting revenue-generating operations. More than half of interviewed organizations said that reducing the frequency of unplanned downtime enables them to avoid revenue losses that average \$328,600 per hour of unplanned downtime.

TABLE 5

Risk Mitigation and Unplanned Downtime				
	Other Servers	RHEL Servers	Difference	% Change
Unplanned downtime productivity impact				
Number of instances of unplanned downtime per year	22.7	10.0	12.7	56%
MTTR (hours)	5.1	2.8	2.3	46%
Productive hours lost per 100 users per year	606	195	411	68%
FTE impact				
Revenue impact of unplanned downtime	71	23	48	68%
Percent of unplanned downtime instances impacting revenue	31.8%	29.4%	2.4%	8%
Revenue impact per hour	\$328,600	\$328,600	-	-
Revenue impact per 100 users per year	\$19,966	\$4,366	\$15,600	78%
Revenue impact in total per year	\$12.2 million	\$2.7 million	\$9.5 million	78%

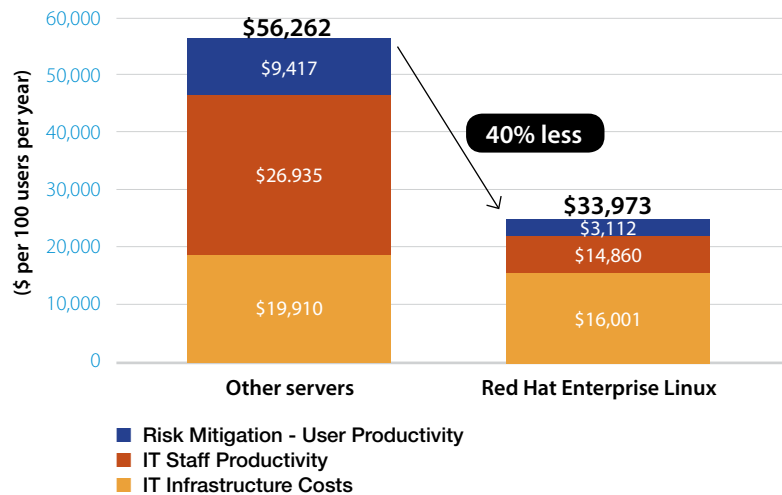
Source: IDC, 2016

Total Cost of Operations

IDC projects that on the basis of lower costs, staff time efficiencies, and higher availability, servers running the Red Hat Enterprise Linux operating system have an average cost that is 40% lower on a per-100-user basis than the average cost of alternative servers for equivalent workloads. These savings include 20% lower IT infrastructure costs, 45% more efficient IT staff operations, and 67% less productive time lost to “risk mitigation” defined as unplanned downtime and time lost with help desk support (see Figure 2).

FIGURE 2

Annual Cost of Operations per 100 Users



Source: IDC, 2016

Business Productivity Benefits

In addition to the cost and staff time efficiencies discussed previously, interviewed organizations described how Red Hat Enterprise Linux supports their business operations with scalability and high performance. Interviewed organizations provided a number of specific examples:

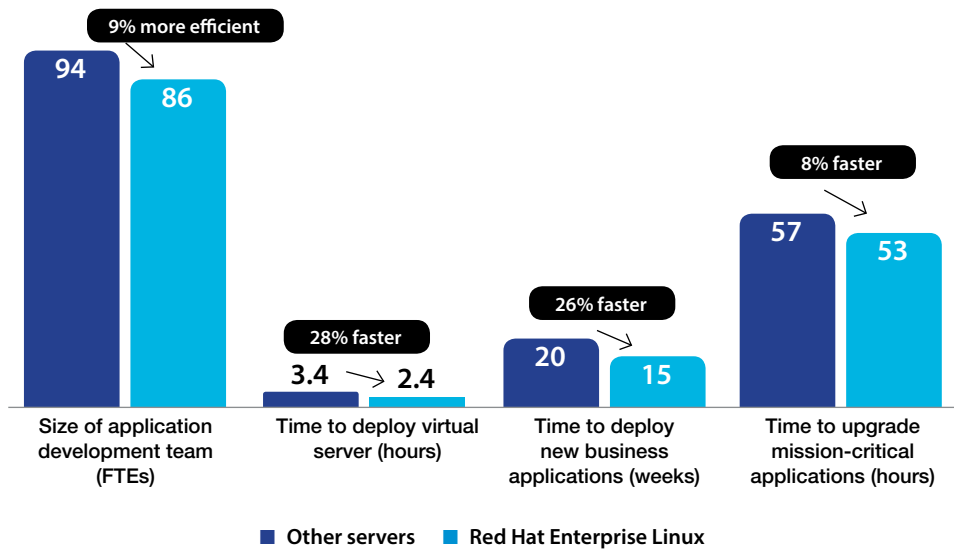
- » **Platform for application development.** Some application developers prefer the Red Hat Enterprise Linux platform, and interviewed organizations indicated that using Red Hat Enterprise Linux servers has increased the efficiency of their application development teams by an average of 9%.
- » **Time to deploy virtual server.** Virtual servers take less time to provision (28% faster on average) with Red Hat Enterprise Linux, giving application developers the compute resources they need in less time and helping them keep up with business demand.
- » **Time to market for applications.** More efficient application development efforts and reduced time to provision help reduce the time of the overall average application development life cycle by 26%. As a result, users can begin generating value with business applications sooner, and services are delivered to customers sooner.
- » **Time to upgrade mission-critical business applications.** Faster upgrades to key business applications (8% faster on average) with Red Hat Enterprise Linux servers means improved application performance and higher productivity of application users.

These advantages of the Red Hat Enterprise Linux platform translate to improved business results.

For example, one organization reported growing its business by being better able to use data analytics on Red Hat Enterprise Linux, and another attributed the development of new revenue-generating services to speeding up batch jobs on Red Hat Enterprise Linux. Interviewed organizations reported increasing their revenue by an average of \$21,498 per 100 users per year (\$13.1 million per organization). IDC applies a 15% assumed operating margin to this revenue, meaning that this study attributes business value worth an average of \$3,225 per 100 users through increased operating margin per year to the organizations' use of Red Hat Enterprise Linux (\$1.97 million per organization) (see Figure 3).

FIGURE 3

Application Development and Business Agility KPIs



Source: IDC, 2016

ROI Analysis

IDC interviewed 12 organizations that run workloads on servers with Red Hat Enterprise Linux and other operating systems. These organizations were asked to compare the costs and operations of their Red Hat Enterprise Linux servers with those of alternative servers. IDC recorded these results 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 of Red Hat Enterprise Linux servers with servers running other industry-common operating systems. In this study, the benefits included IT infrastructure cost reductions, IT staff and user productivity gains, and increased revenue.

2. Created a complete investment (three-year total cost analysis) profile based on the interviews. Investments go beyond the initial and annual costs of deploying Red Hat Enterprise Linux and can include additional costs, 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 servers over a three-year period. ROI is the ratio of the net present value (NPV) and the discounted investment. 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 return on investment for interviewed organizations' investment in, and use of, Red Hat Enterprise Linux servers instead of using servers running other operating systems for the same workloads. IDC calculates that these organizations will spend an average three-year discounted total of \$15,697 per 100 users (\$9.6 million per organization) on Red Hat Enterprise Linux servers and can expect to achieve \$70,391 in three-year discounted business benefits (\$43.0 million per organization). This would result in an average three-year ROI of 348% and breakeven on their investment in Red Hat Enterprise Linux servers in an average of seven months.

TABLE 6

Three-Year ROI Analysis		
	Per Organization	Per 100 Users
Benefit (discounted)	\$43.0 million	\$70,391
Investment (discounted)	\$9.6 million	\$15,697
Net present value (NPV)	\$33.4 million	\$54,694
Return on investment (ROI)	348%	348%
Payback period	7 months	7 months
Discount rate	12%	12%

Source: IDC, 2016

Challenges/Opportunities

The lower costs and ROI benefits associated with a Red Hat Enterprise Linux solution are articulated well in this study. However, even with clear ROI benefits, some customers face challenges that may obstruct them from achieving longer-term efficiency. Some of the challenges that customers face, and the benefits that they could enjoy if they can resolve the challenges, are as follows:

- » **Challenge:** Achieving ROI requires standardization of server deployments with like software stacks, same release versions, and consistent management methodologies.
- » **Opportunity:** Standardization has long been identified as one of the key enablers of better operational costs and a more attractive ROI. Customers that have a great deal of diversity in their IT infrastructure will see benefits from standardization. Remember that standardization applies to all layers of the software stack, not just to the operating system level.
- » **Challenge:** Server sprawl continues to hamper efficient IT operations, and many organizations still see utilization rates that are below 50%.
- » **Opportunity:** Cost optimization starts with the consolidation of servers to a smaller number of more highly utilized machines. Return on investment associated with efficient management and lower-cost software infrastructure can layer benefits on top of the cost savings associated with a reduced number of physical servers in an organization's datacenter.

Summary and Conclusion

Organizations increasingly require their IT organizations to lead efforts to embrace digital transformation and compete effectively with the broader digital transformation occurring around them. This means that IT organizations must use an IT infrastructure that offers scale, reliability, and performance — and flexibility — for their business applications. However, the imperative to match IT infrastructure resources to business demand does not mean that cost is not a consideration; IT organizations remain under pressure to optimize operational costs in terms of infrastructure and IT staff time costs.

This IDC study demonstrates that organizations can leverage Red Hat Enterprise Linux to achieve the agile, high-performing server infrastructures they need while maintaining cost-effective and efficient server environments. In particular, organizations benefit from having a robust open source Linux platform to run business applications, which enables them to

support these transformational workloads with fewer servers, less IT staff time, and higher availability compared with servers running other operating systems.

IDC calculates that as a result, organizations interviewed for this study will achieve substantial benefits with Red Hat Enterprise Linux compared with alternative server approaches — needing an average of 40% less time to operate their Red Hat Enterprise Linux environments over three years and realizing an average three-year ROI of 348%.

Appendix

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from current users of Red Hat Enterprise Linux servers 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) and increased user productivity over the term of the deployment compared with other, industry-standard servers in the organizations' datacenter environments.
- » Ascertain the investment made in deploying Red Hat Enterprise Linux servers and the associated migration, training, and support costs.
- » Project the costs and savings over a three-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.
- » The net present value of the three-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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