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The Business Value of Red Hat CloudForms

EXECUTIVE SUMMARY

IDC's research shows that the majority of enterprise-scale organizations are developing hybrid IT architectures that match the needs of individual user groups and workloads with unique capabilities provided by virtualized on-premise and hosted infrastructure, private cloud environments, and shared public cloud infrastructure. Many of these organizations rely on more than one virtualization vendor and make use of multiple cloud services. As a result, IT operations teams are investing in heterogeneous, automated management solutions to help optimize and simplify configuration and deployment activities while enabling more agile, continuous delivery and self-service DevOps life-cycle strategies.

Red Hat CloudForms offers customers a unified vendor-agnostic platform for automating self-service provisioning and workload life-cycle management across hybrid multivendor virtualized, private cloud, public cloud, and container-based environments. CloudForms supports Red Hat Virtualization, VMware, and Hyper-V environments as well as OpenStack and Microsoft Azure, Amazon, and Google Cloud Platform public cloud infrastructure services. Tight integrations with Red Hat's configuration automation Ansible Tower, Red Hat Satellite for Red Hat Linux systems management, and Red Hat Insights for proactive security and performance monitoring allow CloudForms to act as the anchor of hybrid multivendor virtualization and cloud infrastructure environments.

To understand how CloudForms can enable more efficient management and operations of heterogeneous IT environments, IDC interviewed seven organizations that are using the hybrid cloud management software from Red Hat. These organizations reported that CloudForms has given them the ability to deliver services with agility and speed across their IT environments while helping manage these environments more efficiently. Based on the organizations' experiences with CloudForms, IDC calculates that they will realize

Business Value Highlights

Five-year ROI of
436%

Annual benefits of
$11,937
per 100 users

20x more
service requests fulfilled

92%
less staff time per delivery of service request

37%
faster application development life cycle

55%
less staff time discovering and optimizing IT resources

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benefits with an average value of $11,937 per 100 users per year over five years, which would result in a return on investment (ROI) of 436%, by:

- Enabling their IT organizations to deliver services and infrastructure resources in much less time and with greater frequency by minimizing the amount of staff time required to carry out these actions
- Enhancing user productivity by supporting self-service capabilities for certain users and decreasing the time spent waiting for services to be delivered
- Improving business outcomes by making DevOps and application development teams more effective and supporting more reliable and robust IT operations
- Freeing up IT staff time from discovering, tracking, and optimizing IT resources
- Optimizing certain costs related to their diverse IT environments, including chargebacks and third-party support costs

Situation Overview

The shift to more open multivendor hybrid IT architectures forces IT operations teams to change the way they work and interact with developers and line-of-business (LOB) users. Agile development and DevOps strategies mean that infrastructure requirements change more and more frequently. Developers have learned to expect instant access to robust infrastructure from using public cloud services, and modern applications are being built with an expectation that infrastructure will be available on demand as needed to support constant changes in configuration and capacity requirements.

At the same time, the business risk related to downtime from configuration errors and lack of resources rises every day. As a result, IT teams are finding that they need to simplify and standardize infrastructure configuration and operational processes to support rapid changes in demand.

In the past, these organizations might have invested in domain-specific automation tools — one for physical systems, another for virtual, and another for cloud or containers. Unfortunately, as enterprise IT environments become more diverse, the cost and operational inefficiencies related to the use of fragmented tools and workflows become intolerable.

IDC's research shows that three-fourths of enterprise IT team believe they need a unified set of management and automation tools to effectively manage their increasingly hybrid, multicloud environments as well as to meet business and developer requirements for

speed and agility. Fully 85% of these organizations believe they will need to invest in new management solutions including automated self-service provisioning, analytics, and capacity optimization solutions that will allow both developers and production IT environments to constantly adjust to changing workload requirements — reclaiming unused resources and redeploying assets as needed while maintaining alignment with corporate and industry data protection, access control, and change management requirements.

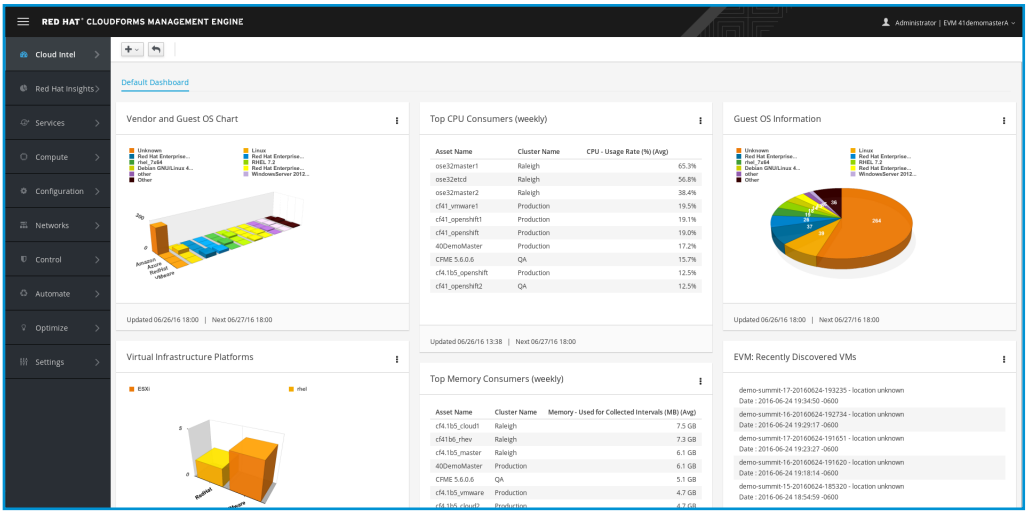
Recognizing the need for consistent, heterogeneous infrastructure management and automation, the open source community continues to make automation, orchestration, and infrastructure management top priorities. The disruptive potential of open source solutions is very real. These products can evolve rapidly while using open APIs and widely published standards to allow for deeper integrations across multivendor products and platforms. The availability of enterprise-grade, vendor-supported open source management software allows IT decision makers to consider these technologies for their most mission-critical workloads. Red Hat's management software portfolio, anchored by CloudForms, is positioned to support agile, dynamic, heterogeneous infrastructure strategies that most organizations are planning for their mission-critical workloads and emerging cloud-native applications.

Red Hat CloudForms

Based on cloud management technology acquired from ManageIQ in December 2012, Red Hat CloudForms orchestrates and automates self-service workload provisioning and life-cycle performance across a heterogeneous mix of physical, virtual, container-based, and cloud environments, including OpenStack, VMware, Red Hat Virtualization, and Microsoft Hyper-V, as well as Microsoft Azure, Amazon, and Google Cloud Platform public cloud services (see Figure 1). Red Hat recently introduced CloudForms support for the OpenShift container platform, based on Kubernetes, to ensure that customers will be able to use the same self-service and workload life-cycle management tool kit to support container-based microservices environments as well as virtualization and cloud.

FIGURE 1

Red Hat CloudForms



Source: Red Hat, 2016

In addition to cloud self-service provisioning automation, CloudForms supports tag-based event monitoring, analytics, and correlations that can be used to drive policy-based workload placement, capacity optimization, and quota enforcement as well as chargeback and showback. CloudForms is sold as a standalone product for advanced virtualization management of existing virtual infrastructures and as part of the Red Hat Cloud Suite, which includes Red Hat OpenStack Platform and the Red Hat OpenShift Container Platform. Red Hat continues to actively support the ManageIQ open source community, which includes Booz Allen Hamilton, Cirba Turbonomics, VMTurbo, and Chef as members.

Red Hat CloudForms customers report that they experience significant IT productivity and business agility benefits from implementing CloudForms across their multivendor hybrid IT environments.

The Business Value Of Red Hat CloudForms

Study Demographics

IDC interviewed seven Red Hat customers that have deployed Red Hat's CloudForms cloud management software for their heterogeneous IT environments. Interviewed organizations included several larger enterprises as well as several small to medium-sized organizations, with an average of 34,700 employees and a median of 6,000 employees (see Table 1). Interviews captured the experiences of using CloudForms to support operations for a number of industries,

with several of the interviewed organizations using CloudForms to more efficiently provide services and infrastructure resources to their customers.

Interviewed organizations reported with near unanimity that they are using Red Hat CloudForms in the context of complex and heterogeneous IT environments. They are running workloads across physical and virtualized on-premise infrastructure and have substantial private cloud footprints. In addition, they have begun to make use of containerized environments for some workloads and are using public cloud solutions in certain cases. The diversity and heterogeneity of these environments put pressure on these organizations to manage, operate, and provision as efficiently as possible. The organizations cited the pressure to manage environments effectively as a key driver for adopting Red Hat CloudForms.

TABLE 1

Firmographics of Interviewed Organizations

	Average	Median
Number of employees	34,700	6,000
Number of IT staff	1,409	600
Number of IT users	29,000	4,800
Number of business applications — total	1,399	100
Number of business applications — virtualized	629	95
Number of business applications — containerized	293	4
Number of business applications — cloud	612	22
Countries	United States	
Industries	Energy, food and drink, healthcare, managed services, manufacturing, nonprofit, telecommunications	

n = 7
Source: IDC, 2016

Interviewed organizations indicated that they are supporting significant parts of their IT environments with CloudForms, using it for more than 600 business applications running on just under 200 servers and more than 2,000 virtual machines on average (see Table 2). Most organizations described CloudForms as supporting primarily virtualized and private cloudlike environments, but several organizations noted that they are looking at extending its use for other parts of their heterogeneous environments, including infrastructure that makes greater use of containers. DevOps and application development teams are among

the most significant users of CloudForms, and interviewed organizations had extended self-service capabilities through CloudForms to an average of 341 users at the time of the interviews. Before deploying CloudForms, interviewed organizations were primarily relying on homegrown point-to-point solutions for managing what have become their CloudForms environments.

TABLE 2

Red Hat CloudForms Environments of Interviewed Organizations

	Average	Median
Number of physical servers	187	25
Number of virtual servers	2,151	400
Number of business applications	603	75
Number of users of business applications supported by CloudForms	18,500	2,500
Number of DevOps and application developers	49	18
Number of other IT staff	24	15
Number of self-service internal users	341	35

n = 7
Source: IDC, 2016

"We got to the point where the team that managed our virtual infrastructure was the bottleneck to getting work done, whether it was provisioning VMs or just day-to-day life-cycle management. So we wanted a system to get that team out of the way and let people do what they needed to do when they needed to do it, which was why we deployed Red Hat CloudForms."

Business Value Analysis

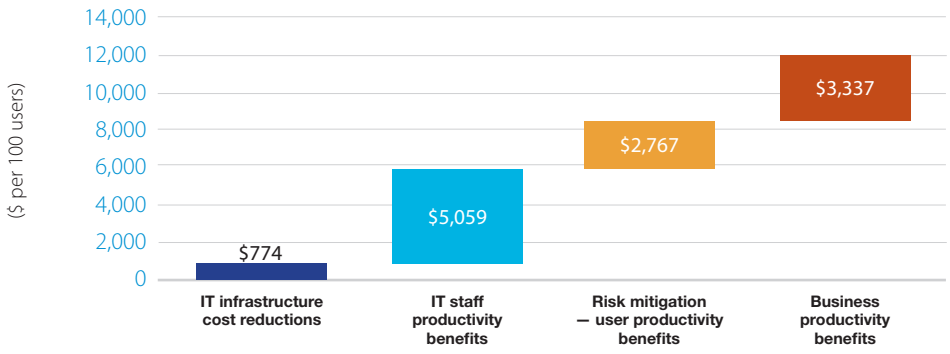
Interviewed organizations evinced common themes in explaining their decision to begin using CloudForms. They realized that their IT environments had become sufficiently complex and heterogeneous as to require a solution for managing and ensuring the effectiveness of infrastructure based on solutions from both Red Hat and other vendors. They regarded CloudForms as a logical choice for helping them ensure open, flexible IT environments that would enable them to better serve their users and customers. One interviewed organization explained: *"We got to the point where the team that managed our virtual infrastructure was the bottleneck to getting work done, whether it was provisioning VMs or just day-to-day life-cycle management. So we wanted a system to get that team out of the way and let people do what they needed to do when they needed to do it, which was why we deployed Red Hat CloudForms."*

Interviewed organizations noted that they are achieving value with CloudForms by being able to more effectively and efficiently serve their users and customers across their heterogeneous IT environments. As a result, they are providing better, more cost-effective IT services. Based on interviews with these Red Hat customers, IDC projects that the customers will achieve benefits with a value of $11,937 per 100 users per year ($3.46 million per organization) in the following categories (see Figure 2):

- **IT staff productivity benefits:** Red Hat CloudForms enables faster delivery of services and infrastructure resources to users and customers and also reduces the time needed for discovering and tracking heterogeneous IT environments. As a result, IT teams deliver more value to their organizations through higher productivity and better support business and operational strategies. IDC calculates that these organizations will achieve IT staff time savings and enable IT staff productivity gains worth an annual average of $5,059 per 100 users ($1.47 million per organization) over five years.
- **Business productivity benefits:** Red Hat CloudForms supports higher user productivity through self-service capabilities and faster delivery of services and helps organizations achieve better business results through increased business flexibility and agility. IDC puts the value of higher operating margin and improved end-user productivity at an average of $3,337 per 100 users ($0.97 million per organization) per year over five years.
- **Risk mitigation — user productivity benefits:** Red Hat CloudForms helps minimize the impact of unplanned application outages by improving configuration and increasing visibility across heterogeneous IT environments. IDC projects that, as a result, interviewed organizations will lose less productive employee time due to such outages, which will be worth an average of $2,767 per 100 users per year over five years ($0.80 million per organization).
- **IT infrastructure cost reductions:** Red Hat CloudForms helps organizations monitor chargebacks more effectively and reduces the need for external support, thereby reducing their IT-related costs. IDC puts the value of these cost reductions at an average of $774 per 100 users per year over five years ($0.22 million per organization).

FIGURE 2

Average Annual Benefits per 100 Users



Average annual benefits per 100 users: $11,937

Source: IDC, 2016

Enabling Agility in IT Environments

According to interviewed organizations, a core value of their use of Red Hat CloudForms is the agility it provides them within their heterogeneous IT environments. In particular, it enables them to deliver services and resources to users and customers more easily, efficiently, and cost effectively. Before using CloudForms, many of these organizations found that IT became a bottleneck when delivering on requests for IT services, requiring too much staff time to deliver requests, which meant that they could handle only a limited number of requests, and those they handled often took too long.

CloudForms has had a significant effect on the organizations' ability to serve their users and customers by delivering on these types of service requests. As shown in Figure 3, automation, orchestration, and self-service enabled by CloudForms mean that these organizations now take 89% less time on average to deliver on such requests and need 92% less staff time. As a result, interviewed organizations can now deliver significantly more value by meeting such requests for service and resources from users and customers; on average, they are meeting more than 20 times more requests than before, with several organizations leveraging CloudForms to achieve especially substantial increases, but even the median increase was more than three times across these organizations.

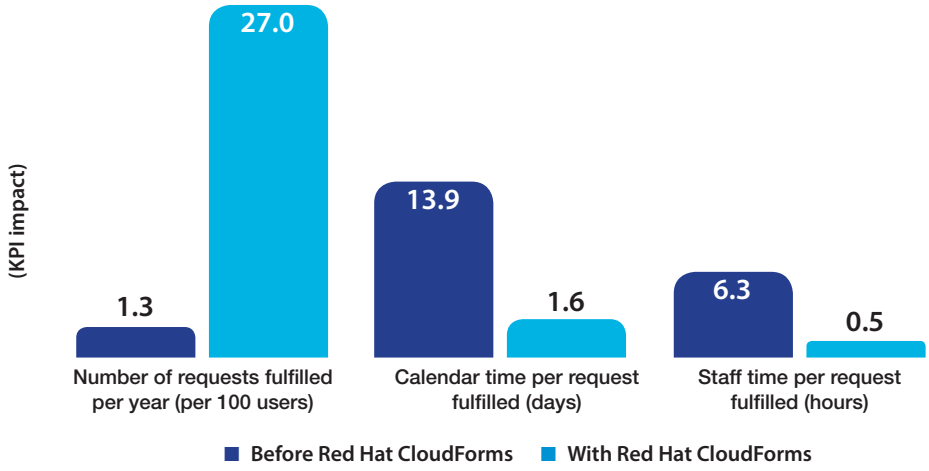
"CloudForms has definitely sped up service provisioning for us. Before, a customer would request a VM, and it would take us two days to provision because it would sit in someone's queue — now, they have the VM in about 30 minutes, and it would be very little work done afterwards to get it to the same spot that would have taken five days to do before."

Interviewed IT managers substantiated these improvements with additional details:

- *"With CloudForms, we're handling about 1,000 service requests per week compared with 10-20 before — that was all we had the time to do. For automated solutions, it now takes less than an hour, compared with more than a week."*
- *"CloudForms has definitely sped up service provisioning for us. Before, a customer would request a VM, and it would take us two days to provision because it would sit in someone's queue — now, they have the VM in about 30 minutes, and it would be very little work done afterwards to get it to the same spot that would have taken five days to do before."*

FIGURE 3

Service Delivery KPIs: Red Hat CloudForms



Source: IDC, 2016

IT Staff Efficiencies

Red Hat CloudForms has enabled IT staff efficiencies and effectiveness for interviewed organizations in several respects. Taken together, they represent significant value, especially for teams responsible for delivering services and resources and tracking and optimizing IT resources (see Figure 4).

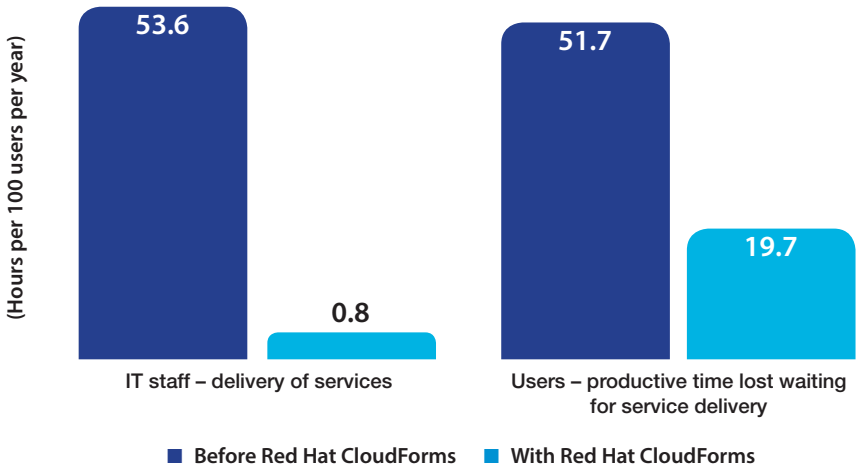
The relative ease with which IT teams at organizations using CloudForms can now deliver services and IT resources means that they are significantly more productive and contributing more value. Before deploying CloudForms, interviewed organizations reported that it could be challenging to find the staff time necessary to support the number of service and resource requests generated by their users and customers. However, with CloudForms enabling

"CloudForms is helping us to reduce IT staff for on-call support because users go directly to the self-service portal and deploy solutions and requests for service. CloudForms helps us do that because we deploy a portal that is helping us to virtualize and deploy solutions faster."

automation and self-service across their heterogeneous IT environments, organizations can now deliver substantially more services in the same amount of time. As shown in Figure 4, IDC calculates that on average, these organizations can now do in less than one hour what previously would have taken almost 54 hours of staff time. One organization explained: *"CloudForms is helping us to reduce IT staff for on-call support because users go directly to the self-service portal and deploy solutions and requests for service. CloudForms helps us do that because we deploy a portal that is helping us to virtualize and deploy solutions faster."*

FIGURE 4

Service Delivery Impact on IT Staff and Users: Red Hat CloudForms



Source: IDC, 2016

"I would say that on a day-to-day basis, our DevOps team is saving two to three hours each. It changes their day because there is easy integration between services with CloudForms — we are integrating other cloud services like AWS and Azure, so it's faster deployment and replication between those. That team is doing this all of the time."

For interviewed organizations, these benefits in efficiency of provisioning, as well as increased visibility and improved integration capabilities across heterogeneous IT environments, mean that CloudForms also makes their DevOps and application development teams more effective. Improved integration is especially beneficial because these teams are often developing applications and features across diverse environments that include on-premise and cloud-based solutions from a number of vendors. These benefits of CloudForms result in efficiencies that speed up application development life cycles (37% faster on average) and support delivery of more services and applications (93% more on average) (see Table 3). One interviewed organization commented on how CloudForms has made its DevOps team more effective: *"I would say that on a day-to-day basis, our DevOps team is saving two to three hours each. It changes their day because there is easy integration between services with CloudForms — we are integrating other cloud services like AWS and Azure, so it's faster deployment and replication between those. That team is doing this all of the time."*

TABLE 3

DevOps and Application Developer Impact: Red Hat CloudForms

	Before Red Hat CloudForms	With Red Hat CloudForms	Difference	% Benefit
DevOps and application developer time per 100 users per year (hours)	332.5	292.1	40.4	12
Number of new applications and services per year	262.5	506.2	243.7	93
Time to deliver new application (weeks)	12.1	7.6	4.5	37

Source: IDC, 2016

CloudForms has also helped interviewed organizations achieve efficiencies for IT staff related to day-to-day activities, such as tracking and optimizing heterogeneous IT environments, as well as tasks, such as incident and configuration management. Thanks to increased visibility across their IT environments, as well as improved configurations and automation, these organizations reported needing 55% less staff time on average for these activities. These types of efficiencies can provide additional downstream benefits by freeing up IT staff time to work on developing services and pursuing core IT strategies, including greater use of containerized and cloud environments. One interviewed organization explained: *"CloudForms has helped us reduce the cost of providing IT services by reducing the hours spent provisioning and fixing mistakes that require rework. Across 25 engineers, I would say they are saving 5% on average — not a huge amount, but enough to make life a lot easier."*

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Business Productivity Benefits

Benefits related to IT agility and more timely delivery of IT services can also help organizations improve business results. In particular, the ability to provision with more agility and meet customer demand, as well as having more effective DevOps teams, can help organizations better meet business demand and achieve better business results. About half of interviewed organizations reported capturing more revenue with CloudForms, with the average revenue increase being almost $4 million per year, or $13,284 per 100 users. IDC applies a 15% operating margin to revenue increases, which means that these organizations will achieve an average of $578,000 in additional operating margin per year, or $1,993 per 100 users (see Table 4). One organization succinctly described how CloudForms supports its business-facing operations: *"CloudForms enables us to interact with customers more easily and allows them to customize their orders — so we can now do this for between 500–600 customers."*

TABLE 4

Business Impact: Red Hat CloudForms

	Per Organization	Per 100 Users
Additional revenue per year	$3.85 million	$13,284
Operating margin	15%	15%
Additional operating margin per year	$578,000	$1,993

Source: IDC, 2016

Interviewed organizations also benefit from operational efficiencies in the form of higher employee productivity for staff members who request services or resources to be provisioned. Thus, because CloudForms has helped organizations reduce the average time to deliver from about two weeks to fewer than two days (refer back to Figure 3), these individuals benefit from having their requests fulfilled at an earlier time. Self-service provisioning enabled by CloudForms also serves to enhance productivity for certain groups of employees by reducing the friction associated with having these requests fulfilled. As a result, users lose less productive time waiting for service delivery. IDC calculates that the organizations have gone from losing about 52 hours per 100 users per year of productive time to just about 20 hours per 100 users per year of productive time with CloudForms (refer back to Figure 4).

"CloudForms has helped minimize unplanned outages by only allowing people to stay within the bounds of what should be done, which reduces human error and minimizes outages related to misconfiguration. We've gone from two outages per month, impacting thousands of users, with many resulting in revenue loss, to one every three months."

Risk Mitigation and Availability

Interviewed organizations indicated that CloudForms is also helping them maintain more reliable IT environments by bettering configurations across their varied platforms and reducing the time required to resolve issues when they arise. As a result, they are losing 26% less productive time due to outages within their CloudForms environments (see Table 5). One interviewed organization commented: *"CloudForms has helped minimize unplanned outages by only allowing people to stay within the bounds of what should be done, which reduces human error and minimizes outages related to misconfiguration. We've gone from two outages per month, impacting thousands of users, with many resulting in revenue loss, to one every three months."*

In addition, enhanced visibility and more timely provisioning are helping interviewed organizations better meet internal service-level agreements (SLAs), as shown in Table 5, which means that they are providing better levels of service and more value to their line-of-business users.

TABLE 5

Risk Mitigation, Unplanned Downtime, and SLAs: Red Hat CloudForms

	Before Red Hat CloudForms	With Red Hat CloudForms	Difference	% Benefit
Unplanned downtime productivity impact				
Number of instances of unplanned downtime per year	9.5	6.7	2.9	30
MTTR (hours)	3.7	2.1	1.6	44
Productive hours lost per 100 users per year	324	241	83	26
SLA impact				
Percentage of internal SLAs met (%)	79	90	11	14

Source: IDC, 2016

ROI Analysis

IDC conducted in-depth interviews with seven organizations managing their heterogeneous IT environments with Red Hat CloudForms to understand its impact on their IT and business operations. IDC recorded results from these interviews and used them to inform this study's analysis regarding the impact of Red Hat CloudForms on these organizations. 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 IT environment-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 CloudForms cloud management software 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 these organizations' use of Red Hat CloudForms 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 their pre-Red Hat CloudForms IT 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 return on investment for the organizations using Red Hat CloudForms that were interviewed for this study. IDC projects that these organizations will invest an average of $7,795 per 100 users ($2.26 million per organization) in Red Hat CloudForms cloud management software. IDC projects that in return, these organizations will achieve benefits worth an average of $41,785 per 100 users ($12.12 million per organization) in the areas of value presented in this study. Given this level of investment and benefits, IDC projects that these organizations will achieve an average five-year ROI of 436% and break even on their investment in an average of eight months.

TABLE 6

Five-Year ROI Analysis

	Per Organization	Per 100 Users
Benefit (discounted)	$12.12 million	$41,785
Investment (discounted)	$2.26 million	$7,795
Net present value (NPV)	$9.86 million	$33,990
Return on investment (ROI)	436%	436%
Payback period	8 months	8 months
Discount rate	12%	12%

Source: IDC, 2016

Challenges And Opportunities

Many organizations report that the process and people issues associated with heterogeneous infrastructure and cloud automation can be just as challenging as mastering the use of the automation technologies. Often, LOB and developer teams need to be convinced that the shift to a shared, standardized set of templates, policies, governance, and self-service tools will improve productivity and agility rather than slow down the process. In many cases, these organizations opted to purchase public cloud services because of the perception that they were cheaper and faster than relying on corporate IT. Now, as corporate IT moves to increase consistency and enable better integrations across different workloads and platforms, developer and LOB leaders will need proof that their concerns will be addressed.

Implementing an automation and monitoring solutions that is extensible, flexible, and multivendor in nature is important to ensuring that the organization can continue to adapt and evolve its infrastructure as needed without fear of being locked into a single vendor

solution. Many customers applaud the innovation provided by open source communities and value the enterprise-grade support and validation provided by Red Hat to help bring open, hybrid automation into their enterprise. To increase adoption of its full hybrid cloud management portfolio, Red Hat will need to help customers effectively address the business, process, and people transformations created by these innovative automation solutions and continue to demonstrate the value and benefits of using a commercially supported open source solution to disrupt the status quo and improve business agility.

Summary And Conclusion

Enterprise-scale organizations are increasingly moving to hybrid IT architectures to meet the demands of individual user groups and support workloads with unique capabilities provided by virtualized

on-premise and hosted infrastructure, private cloud environments, and shared public cloud infrastructure. Although a hybrid approach delivers benefits, it also creates challenges: in particular, ensuring that configuration and delivery of services across these heterogeneous approaches match the agility, scalability, and flexibility demanded by business operations. In response to these challenges, more organizations have chosen to invest in management solutions to make operations of their complex IT environments as efficient as possible.

IDC's research for this study demonstrates the value that organizations can achieve in managing their heterogeneous IT environments with Red Hat CloudForms, which provides a unified vendor-agnostic platform for hybrid multivendor virtualized, private cloud, public cloud, and container-based environments. These organizations reported that Red Hat CloudForms has given them the ability to manage and deliver services across their heterogeneous IT environments with efficiency, speed, and agility. This means that CloudForms is helping them provide open, flexible, and reliable hybrid IT environments to serve their employees and customers. As a result, IDC's research finds that these CloudForms customers are realizing significant value by enabling DevOps and application development teams, supporting users with self-service capabilities, responding faster to business demand, and making their IT environments more efficient and cost effective.

Appendix

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from organizations currently using Red Hat CloudForms cloud management software 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 IT staff and 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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