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Business Value Highlights

531%

average five-year ROI

\$1.29 million

average annual benefits per 100 developers per year

66%

faster application development life cycles

35%

less IT staff time required per application developed

\$7.42 million

higher revenue per organization

38%

lower IT infrastructure and development platform costs per application

The Business Value of Red Hat OpenShift

EXECUTIVE SUMMARY

Industries are being disrupted with unexpected competition requiring IT departments to become agile in responding to meet evolving business needs. Enterprise IT is transforming by taking a fresh approach and leveraging modern tools to help developers become more efficient in delivering innovative solutions. Leveraging analytics from increasing volumes of data to automate common processes is increasingly becoming the new normal for intelligent applications. Application platforms supporting an architecture that gives developers a wide choice of components across hybrid cloud infrastructure are a preferred path in the enterprise cloud adoption journey.

IDC interviewed nine organizations that are using Red Hat OpenShift as their primary application development platform. These organizations reported that OpenShift helps them deliver timely and compelling applications and features across their complex and heterogeneous IT environments and supports key IT initiatives such as containerization, microservices, and cloud migration strategies. As a result, the OpenShift platform is yielding significant value to these Red Hat customers, which IDC projects will be worth an average of \$1.29 million per 100 application development team members per year over five years, by:

- » Enabling developers to deliver more timely, robust, and functional applications and features
- » Improving business results and operational efficiency by meeting customer and user demand
- » Requiring less staff time for ongoing management of applications
- » Reducing the proportion of application development costs associated with infrastructure and development platforms

Situation Overview

Introduction

Businesses are increasingly expecting technology to be a cornerstone of every new initiative. IDC surveys of line-of-business representatives show that more organizations expect the IT department to help identify which parts of the business could be digitally transformed through the use of technology. Traditional approaches to leveraging technology are too slow in delivering innovation at the pace at which business ecosystems are changing. Automation requires decision making based on analyzing streams of data in real time, leading to better results from digital marketing campaigns. Professional developers leveraging new tools are helping deliver solutions for enterprises to keep up with disruptive competitors.

Deployment-centric application platforms and DevOps initiatives are driving benefits for organizations in their digital transformation journey. IDC considers cloud application platforms to be the foundation of the overall platform-as-a-service (PaaS) portfolio supported by a wide range of cloud services abstracting the complexity of developing applications. As demand for applications increases, the main business driver for PaaS solutions is the agility gained with which a developer can take a concept and deliver value to the user. While still early in maturity, Docker format container packaging and Kubernetes container orchestration are emerging as industry standards for state-of-the-art PaaS solutions.

Red Hat's OpenShift Container Platform provides a set of container-based open source tools enabling digital transformation, which accelerates application development while making optimal use of infrastructure. Professional developers utilize fine-grained control of all aspects of the application stack, with application configurations enabling rapid response to unforeseen events. Availability of highly secure operating systems assists in standing up an environment capable of withstanding continuously changing security threats, helping deployment with highly secure applications in industries like finance and healthcare. The availability of multiple consumption options of OpenShift, such as OpenShift Online and OpenShift Dedicated offerings, gives customers choices for ramping up adoption of PaaS appropriate for their environment.

Red Hat Openshift

Organizations are in different stages of their cloud adoption journey, and IDC's CloudView Survey shows higher interest among respondents in open source standards at advanced organizations. Red Hat OpenShift is an open source container application platform primarily built on Docker containers and orchestrated using Kubernetes container cluster

management. OpenShift supports a broad range of programming languages and services ranging from web frameworks, databases, or connectors to mobiles and external back ends. The OpenShift platform supports both cloud-native, stateless applications and traditional, stateful applications.

OpenShift is the cornerstone of Red Hat's comprehensive set of container-optimized solutions such as Red Hat JBoss Middleware and application services, business process management (BPM) software, API management, Red Hat Mobile, Red Hat Gluster container storage, and Red Hat CloudForms for unified container and cloud infrastructure management.

The primary IT initiatives that Red Hat OpenShift targets are as follows:

- » **Accelerate application delivery with agile and DevOps methodologies:** OpenShift offers a common platform for development and operations teams to ensure consistency and standardization of application components, eliminate configuration errors, automate deployment and controlled rollout of new capabilities into production, and rollback in the event of a failure. For environments with a high degree of security and regulatory requirements, additional capabilities are provided to enforce policies and role-based access control.
- » **Modernize application architectures toward microservices:** OpenShift provides a common platform for cloud-native, microservices applications alongside the existing traditional and stateful applications. Broad choice of application frameworks, programming languages, and developer tools enables customers to prototype innovative applications more quickly. OpenShift also enables access to a broad range of Red Hat and third party-provided application and middleware services, API management, and storage services.
- » **Adopt a consistent application platform for hybrid cloud deployments:** IT organizations that want to decouple application dependencies from the underlying infrastructure are adopting container technology as a way to migrate and deploy applications across multiple cloud environments and datacenter footprints. OpenShift provides a consistent application development and deployment platform, regardless of the underlying infrastructure, and provides operations teams with a scalable, secure, and enterprise-grade application platform and unified container and cloud management capabilities.

OpenShift is delivered in primarily two consumption models: OpenShift Container Platform, for enterprise customers that want to deploy and manage OpenShift in their own datacenter or at a public cloud provider, and a cloud-based service. OpenShift Online is a multitenant, cloud-based service targeted at individual developers, and OpenShift Dedicated is a single-tenant, cloud-based service for enterprise customers.

The Business Value of Developing on the Red Hat OpenShift Platform

Study Demographics

IDC interviewed nine organizations with production deployments of the Red Hat OpenShift platform to understand its impact on the organizations' development of business applications and services as well as the organizations' business outcomes and IT cost structures. These organizations provided experiences from a variety of countries and industry verticals ranging from service providers with fewer than 100 employees to multinational enterprises with worldwide operations and more than 100,000 employees (see Table 1).

TABLE 1

Demographics of Interviewed Organizations		
	Average	Median
Number of employees	44,000	10,000
Number of IT staff	2,913	975
Number of IT users	38,800	8,000
Countries	United States, France, Ireland, Switzerland, and United Kingdom	
Industries	Communications, education, financial services, hosting, IT/technology, retail, and transportation	

n = 9

Source: IDC, 2016

Selection and Use of Red Hat OpenShift

Despite diversity in size and industry of the customers, similar challenges and initiatives drove interviewed Red Hat customers' selection of the OpenShift platform. The customers moved to OpenShift from different legacy environments, including competing vendor platforms and homegrown tools, but acknowledged that they were finding it challenging to achieve the agility, scalability, and quality in application development that their organizations required. With OpenShift, they sought a robust, flexible open source development platform that would also support important broader IT initiatives such as public and hybrid cloud migrations, containerization, and the use of microservices. One organization commented:

“OpenShift gives us a multitenant platform for deploying microservices so [that] we can layer them on top of each other. We’re running a private cloud that includes IaaS, PaaS, and container as a service — those are all different resources that can be used to build apps. OpenShift provides the ability for us to follow the microservice architecture paradigm as opposed to more traditional monolithic applications.”

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Interviewed organizations’ use of OpenShift reflects the diverse IT environments of the organizations and their need for a platform that can accommodate and support varied initiatives and technologies. Unsurprisingly, eight out of nine interviewed organizations reported using OpenShift most frequently in virtualized environments, with several organizations using it in public cloud and OpenStack environments. All interviewed organizations reported that OpenShift supported containerization, DevOps, and private cloud initiatives, and eight of nine organizations said that they were making greater use of microservices with it. Two of the organizations were already using OpenShift in their hybrid cloud environments, with others noting their intention to use it to develop in hybrid cloud environments.

Table 2 demonstrates the significant scope of the use of the OpenShift platform at these organizations. More than 650 DevOps and application development team members are developing an average of 386 new applications and major features per year. With such a scope of development activities, having a robust, efficient, and reliable development platform is imperative for these organizations.

TABLE 2

Red Hat OpenShift Development Environments		
	Average	Median
Number of new business applications/major features per year	386	35
Number of DevOps team members	285	50
Number of other application developers	164	90
Number of other staff using OpenShift	181	25
Number of self-service users of OpenShift	434	100

n = 9
 Source: IDC, 2016

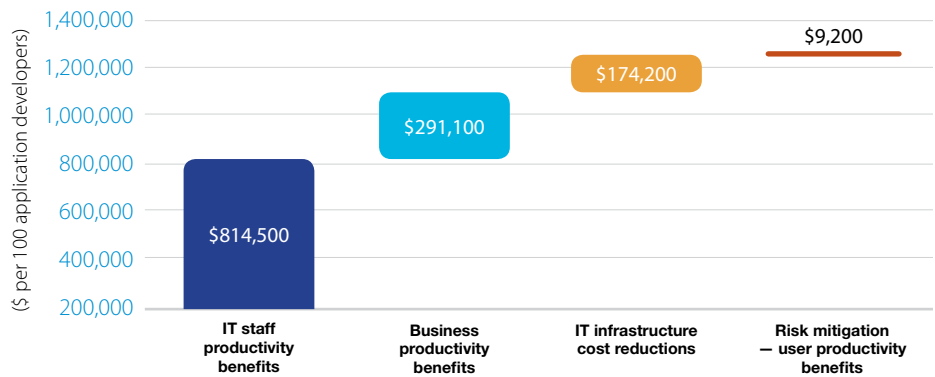
Business Value Analysis

Interviewed Red Hat customers reported that the OpenShift platform is creating significant value by enabling the timely and flexible delivery of compelling applications and services across their heterogeneous IT environments. As a result, the development teams of the organizations can better meet business demand and support important IT initiatives, even as they have shifted development cost structures away from IT infrastructure and platform-related costs. IDC projects that interviewed organizations will realize average annual benefits worth \$1.29 million per 100 application developers per year over five years (\$5.78 million per organization) in the following areas (see Figure 1):

- » **IT staff productivity benefits:** Application developers, including DevOps team members, deliver more applications and major features and need less time to deliver on the OpenShift platform, meaning that they contribute substantially more value to their organizations. In addition, applications developed on the OpenShift platform require less staff time to manage once in production. IDC calculates that these organizations will realize IT staff time savings and productivity benefits at an average of \$814,500 per 100 application developers per year over five years (\$3.65 million per organization).
- » **Business productivity benefits:** Meeting demand for compelling and high-quality business applications and services on the OpenShift platform leads to improved business results and enhanced employee productivity levels. IDC puts the value of higher operating margin and employee productivity attributable to developing on OpenShift at an average of \$291,100 per 100 application developers per year over five years (\$1.31 million per organization).
- » **IT infrastructure cost reductions:** Developing on the OpenShift platform requires fewer testing and production servers due to its support of containerization, microservices, and multitenancy, contributing to lower infrastructure costs for interviewed organizations even as their application development efforts expand. IDC calculates that interviewed organizations will save infrastructure- and platform-related costs at an average of \$174,200 per 100 application developers per year over five years (\$0.78 million per organization).
- » **Risk mitigation — user productivity benefits:** Applications developed on the OpenShift platform experience fewer user- and business-impacting outages. IDC projects that interviewed organizations will save productive time at an average of \$9,200 per 100 application developers per year over five years (\$0.04 million per organization).

FIGURE 1

Average Annual Benefits per 100 Application Developers



Average annual benefits per 100 application developers: \$1.29 million

Source: IDC, 2016

IT Staff Productivity Benefits

Interviewed Red Hat organizations reported that moving to the OpenShift platform has enabled them to provide more timely, efficient, and cost-effective business applications and services to their employees and customers. For these organizations, the impact of OpenShift has been most apparent in its significant impact on their application development efforts, but the platform is also delivering efficiencies for IT staff responsible for administering and managing applications on an ongoing basis.

Application Development Enablement

Interviewed Red Hat customers were unanimous in crediting the OpenShift platform with enabling their application development efforts. Their DevOps teams and other developers benefit from the simplicity of developing across their heterogeneous IT environments with OpenShift, including using it for virtualized, cloud, and containerized environments. This flexibility means that the customers have a common platform with OpenShift for developing across their IT ecosystems, which reduces inefficiencies attributable to using different tools and approaches for different types of applications. Further, the fact that OpenShift is container based enables developers to carry out development faster, and the developers' ability to move toward a microservices approach to application development enhances flexibility.

Beyond these technological initiatives, interviewed organizations cited the following capabilities of the OpenShift platform that are enabling their development teams to be more agile, faster, and more effective: self-service provisioning of infrastructure resources and application components, abstracting applications from the underlying hardware, leveraging automation and orchestration for releases, and the support of OpenShift for a variety of development languages and suite of developer tools. The net result for developers at these organizations is that they benefit from having a highly functional, unified platform for use in developing applications and services efficiently and effectively.

According to interviewed organizations, their DevOps teams and other developers are much more effective on the OpenShift platform. Interviewed Red Hat customers have sped up the delivery cycle for applications and major feature releases by an average of 66%, by enabling both application developers and IT infrastructure teams to support development efforts in a timely and effective manner. In turn, these efficiencies have also enabled the release of more applications and features (36%) that resonate with users and customers (136% higher user adoption) (see Table 3). Interviewed IT managers provided the following examples of the impact of OpenShift:

- » **Faster development life cycles.** “The real value for us of using OpenShift is that we can get to market really fast ... it’s really hard to create a community around a platform, and OpenShift has a great community of users and contributors to the project ... because of that, we are seeing it help us move faster than our competitors, with creating new features and fixing bugs.”
- » **Delivering more applications and features.** “We’re releasing apps 20 times a year with OpenShift, and that would be 10 tops without it. We’re moving 4 times faster now — two weeks compared with six to eight weeks. The quality is higher because we’re not reinventing the wheel, and it’s supporting our business growth. We have more revenue because of OpenShift — probably at least hundreds of thousands of dollars per year.”
- » **Increasing application quality.** “OpenShift has increased the quality of our applications because we have more environments where we can test. So we can do various stages of tests from dev, QA, and UAT. It’s also more agile to spin up the environment and less prone to error, especially on the deployment and releases, so it has had a huge impact.”

As these metrics indicate, development teams are able to deliver more applications and features in less time on the OpenShift platform. Stated somewhat differently, development teams are able to take on more projects and meet more requests for enhanced functionality, without requiring a commensurate increase in team size. With unyielding demand from their businesses and employees for new applications and new functionality, these efficiencies

for development teams attributable to the OpenShift platform bring substantial value to interviewed organizations. Interviewed organizations reported that each new application or feature they develop requires 35% less staff time on average, a significant efficiency for these organizations that have on average hundreds of developers working on the OpenShift platform to support their business operations (see Figure 2).

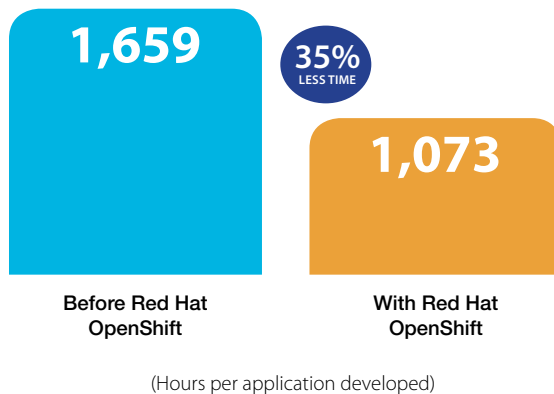
TABLE 3

Application Development Key Metrics				
	Before Red Hat OpenShift	With Red Hat OpenShift	Difference	Change (%)
Number of applications/major features developed per year	284	386	102	36
Application development life cycle (weeks)	28	10	18	66
User adoption of applications (%)	28	66	38	136

Source: IDC, 2016

FIGURE 2

IT Staff Efficiencies — Application Development and Management



Source: IDC, 2016

“What we like about OpenShift is that our infrastructure team can move apps around so that we can upgrade the underlying infrastructure without disrupting the application; that layer of abstraction between the applications and the infrastructure that they run on is made possible by container portability that OpenShift provides.”

Application Management Efficiencies

In addition to enabling application development teams, interviewed organizations attributed more efficient management and support of applications to their OpenShift platforms. The interviewed organizations reported needing an average of 19% less staff time for day-to-day management of such applications. One organization linked efficiencies in managing applications to its ability to leverage containerization with OpenShift: *“What we like about OpenShift is that our infrastructure team can move apps around so that we can upgrade the underlying infrastructure without disrupting the application; that layer of abstraction between the applications and the infrastructure that they run on is made possible by container portability that OpenShift provides.”*

Interviewed organizations provided the following examples of how OpenShift has supported efficient management and administration of applications:

- » **The ease of applying patches** without causing disruptions or needing to work closely with development teams
- » **Release automation**, which promotes consistency and means fewer errors in release, saving time for these teams
- » **Support of applications across diverse IT environments**, which saves staff time in ensuring service levels and managing application configurations
- » **The quality of the applications** created on the OpenShift platform, which equates to less staff time spent fixing errors and responding to app-related issues. Interviewed organizations reported requiring an average of 49% less help desk staff time for applications and services in their Red Hat OpenShift production environments

Business Productivity Benefits

By delivering more functional applications and services in less time on the Red Hat OpenShift platform, interviewed organizations are better supporting their business operations and lines of business. The business-related benefit of enabling application development efforts had the following positive effects on these organizations:

- » **Delivering applications and services faster.** Faster delivery of applications and services means that business opportunities are better addressed and employees have the tools they require to do their jobs with maximum effectiveness.

“We’re generating more revenue with OpenShift because we’re more efficient. It enables us to launch more business-critical products quickly, which enables us to respond to market requirements.”

- » **Freeing up developer’s time.** Freeing up developer’s time translates through to innovation and enhanced functionality for applications and services, which can drive additional business and enhance employee productivity.
- » **Improving business operations.** Business prospects of the organizations developing customer-facing services and interfaces are closely linked to their ability to meet customer demand. Interviewed organizations provided a number of examples of how they are leveraging the advantages of the OpenShift platform to improve their business operations and enable employees.
- » **Meeting business demand with speed.** One organization stated: *“We’re generating more revenue with OpenShift because we’re more efficient. It enables us to launch more business-critical products quickly, which enables us to respond to market requirements.”*
- » **Meeting business demand with new services.** One organization commented: *“We’ve been able to expand into new market segments with the OpenShift platform where we’re already making more revenue.”*
- » **Accelerating time to market for applications and services.** According to one organization: *“We’ve really decreased time to market with new applications and services with OpenShift. So we have the ability to deliver new applications faster — both internal facing and external facing. We aren’t necessarily earning more revenue, but we’re getting the revenue faster.”*
- » **Improving customer adoption and engagement.** *“It’s more than just time being saved; it’s about delivering capabilities. Users can do things now that they could not do — they’re not necessarily saving time, but they’re getting better solutions with OpenShift.”*

Table 4 shows that moving to the OpenShift platform has had a substantial impact on interviewed organizations’ business results; they attributed \$1.65 million per 100 application developers per year over five years (\$7.42 million per organization) to better addressing business opportunities and delivering the applications and services demanded by their customers. In addition to these revenue gains, interviewed organizations have benefited from providing lines of business with more timely delivery of applications and improved user experience. This has resulted in higher productivity for certain groups of employees, an operational efficiency noted in Table 4.

TABLE 4

Business Operations Impact — Revenue and User Productivity		
	Per Organization	Per 100 Application Developers
Revenue impact		
Total additional revenue per year	\$7.42 million	\$1.65 million
Assumed operating margin	15%	15%
Total operating margin impact per year	\$1.11 million	\$248,100
User productivity		
Productive time gained per year	5,186 hours	1,156 hours
Value of productivity gains	\$193,100	\$43,040

Source: IDC, 2016

IT Infrastructure Cost Savings

Interviewed organizations are optimizing costs associated with their application development efforts with OpenShift, enabling them to reduce costs on a per-application basis and shift more of their budgets for application development to staff costs. Nearly every interviewed organization attributed a shift in its software development budgets away from the cost of infrastructure and platform solutions to the OpenShift platform, reporting an average reduction of 38% (see Figure 3). At base, interviewed organizations are achieving these cost savings by requiring fewer servers to support development efforts and migrating away from more expensive development platforms.

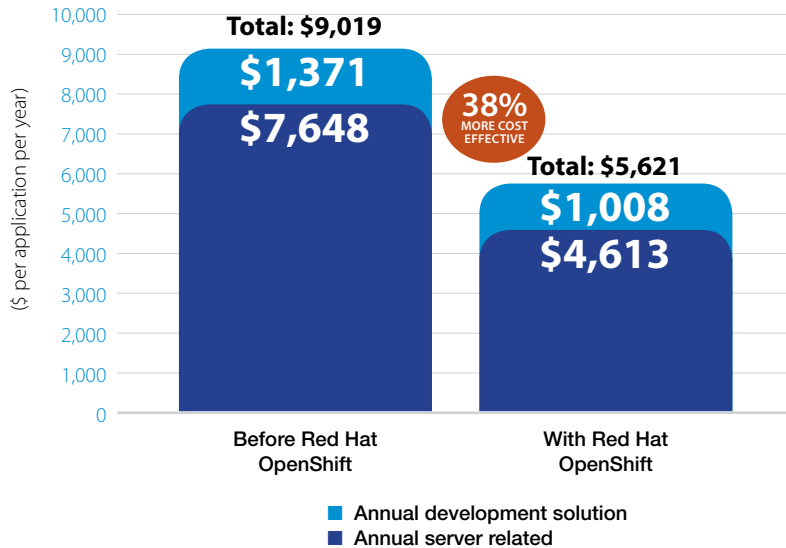
As a result, interviewed organizations are reducing the cost of infrastructure and application development platforms by an average of 38% per application per year. One organization cited its ability to consolidate with OpenShift: *"We've been able to deploy more applications on the same number of servers. I think, of our total footprint, we've probably deployed the same number of applications on 200 fewer virtual machines, which is probably in the neighborhood of maybe 40 or 50 physical machines, which cost tens of thousands of dollars each."*

Another organization cited multitenancy with OpenShift as being cost effective: *"By using OpenShift and its multitenancy capabilities, we can deploy five times as many customers on one host. It has quite a significant impact on our cost structure — I would estimate the infrastructure cost per customer has gone from 80% down to 20%."*

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FIGURE 3

Annual Infrastructure and Development Solution Costs



Source: IDC, 2016

ROI Analysis

IDC interviewed nine organizations that are using the Red Hat OpenShift platform to develop and deliver applications and features to their employees and customers. IDC recorded results from these interviews to provide the basis for this study's analysis. IDC used the following three-step method for conducting the return-on-investment (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 and application development platform-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 OpenShift 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 OpenShift 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 previous application development platforms and environments. The payback period is the point at which cumulative benefits exceed investment costs.

Table 5 presents IDC's analysis of the average discounted benefits, discounted investment, and return on investment for the Red Hat customers interviewed for this study based on their use of the OpenShift platform. IDC projects that these organizations will invest an average discounted total of \$0.72 million per 100 application developers per year over five years (\$3.22 million per organization). In return, these organizations are projected to achieve average discounted business benefits worth \$4.53 million per 100 application developers per year over five years (\$20.31 million per organization). This would equate to an average five-year ROI of 531% for their investment in OpenShift, with breakeven occurring in an average of eight months.

TABLE 5

Five-Year ROI Analysis	Per Organization	Per 100 Application Developers
Benefit (discounted)	\$20.31 million	\$4.53 million
Investment (discounted)	\$3.22 million	\$0.72 million
Net present value (NPV)	\$17.09 million	\$3.81 million
Return on investment (ROI)	531%	531%
Payback period	8 months	8 months
Discount rate	12%	12%

Source: IDC, 2016

Challenges/Opportunities

With enterprises' preference for open source tools in cloud adoption, Red Hat stands to gain having built a business model delivering supported open source software. Despite all the gains shown by born-in-the-cloud companies, enterprises lack the skills to adopt the path to handle disruption leveraging emerging technology. While Red Hat has changed the OpenShift architecture to take advantage of portability and infrastructure optimization with the container approach, the company still faces a difficult task of driving awareness on how enterprises can adapt culture to take advantage of new application delivery models.

Summary and Conclusion

Organizations must deliver applications, features, and services at the speed their businesses require across increasingly diverse IT environments as technological initiatives such as cloud migration, containerization, and microservices take hold. These technologies offer the promise of more efficient and effective IT services, but it can be challenging for organizations to realize such benefits without the right technological platforms and solutions in place.

This IDC study shows that Red Hat customers are leveraging OpenShift as a unified development platform across their heterogeneous IT environments that enables the customers' application development efforts. With the OpenShift platform, organizations are delivering more applications and features in less time and providing the functionality required by their customers and lines of business. As a result, these organizations are deriving significant additional value from higher productivity of their DevOps and application development teams, generating more revenue and making their application development efforts more cost effective by reducing server hardware and other development tool costs.

Appendix

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from current users of the Red Hat OpenShift Container Platform 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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