IDC ANALYZE THE FUTURE

# The Business Value of Red Hat OpenShift

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## Navigating this White Paper

*Click on titles or page numbers to navigate to each section.*

## BUSINESS VALUE HIGHLIGHTS

*Click on highlights below to navigate to related content within this white paper.*

**636%**
five-year ROI

**10 months**
to payback

**20% higher**
DevOps and development team productivity

**Almost 3x**
more new features

**29% faster**
application development life cycles

**$21.62M**
in higher annual revenue

**22% fewer**
VMs required

**21% more efficient**
IT infrastructure teams

# Executive Summary

Digital innovation can be elusive. But enterprises that adopt technologies, processes, and platforms that drive efficiencies into the production of digital properties will find that they have the building blocks to sustain digital innovation on a continuous basis.

For instance, enterprises are building new applications in lightweight containers and migrating existing applications to container platforms such as Kubernetes. Containerized applications are portable across infrastructures and provide significant agility benefits. Kubernetes provides the underlying container platform that further drives efficiency into the software development process, with automation and orchestration functionality suited to today's fast-paced digital innovation. With a Kubernetes platform offering such as Red Hat's OpenShift, organizations can obtain additional benefits and gain a foundation for developing and running important business applications.

IDC conducted a study of 14 organizations of various sizes and industries about their use of Red Hat OpenShift and found that study participants achieved strong value by empowering DevOps and development teams to pursue business goals via digital products and services, while streamlining and optimizing IT environments.

**Based on the interviews with Red Hat customers, IDC projects that they will achieve value worth an average of $45,900 per 100 users ($10.59 million per organization) by:**

- Improving the productivity and effectiveness of DevOps and development teams, by providing a more functional, agile development platform
- Increasing revenue, by delivering higher-quality and more timely services to existing customers and better addressing business opportunities
- Reducing platform costs, by optimizing IT infrastructure requirements and enabling core IT teams to spend less time on day-to-day administrative and support activities

**Kubernetes provides the underlying container platform that further drives efficiency into the software development process, with automation and orchestration functionality suited to today's fast-paced digital innovation.**

# Situation Overview

While digital innovation was once considered the purview of start-ups intent on disrupting established markets, today, businesses of almost any size, age, and sector must take up the same approach to rapid digital innovation or be overtaken by the competition. Digital innovation — the strategic development and deployment of software products and services that help attain business goals — requires an alignment between business and technology teams, a smart approach to technology acquisition, and efficient software development practices.

**The benefits of container platforms for innovation are driving fast growth of containers, forecast by IDC to double in deployments year over year on average.**

To put the pieces in place to support digital innovation, enterprises must adopt technologies and practices that allow them to easily iterate and experiment, and ultimately deliver reliable digital products and services. For instance, modern application platforms powered by containers, along with an automated source code management to deployment toolchain, accelerate application development to increase the rate of new feature deployment. The benefits of container platforms for innovation are driving fast growth of containers, forecast by IDC to double in deployments year over year on average.

Containers are highly efficient at packaging applications, are portable, and have fast start-up and teardown times, making them a perfect fit to encapsulate cloud-native applications.

### Enterprises are adopting container platforms to enable several key use cases:

- Accelerating application delivery using agile development methods and tools such as agile continuous integration/continuous delivery (CI/CD) pipelines and automated testing
- Developing new microservice cloud-native applications
- Pursuing new business opportunities using emerging technologies such as AI/ML
- Modernizing existing applications by containerizing and refactoring them
- Automating operations at greater scale with immutable infrastructure, automated patterns such as blue/green and A/B testing, and reactive scalability and resiliency

Harder to quantify is the benefit of innovation itself. However, respondents in the study noted the impact of the adoption of Red Hat OpenShift on their ability to be digitally innovative. For instance, one study participant from a financial services company said that their developers can build and deploy applications more quickly, enabling more innovation and ultimately the potential to drive revenue. Another agreed, saying that the ability to quickly experiment "allows innovation to fly" and ultimately brings new products to market faster. These kinds of forward-leaning organizations recognize how central digital innovation is to the business itself, not just to technology teams. Where digital innovation is pursued as a means to drive business success, enterprises are discovering significant gains.

# Red Hat OpenShift

Red Hat OpenShift is a comprehensive, enterprise-ready container platform built around Kubernetes. It includes both infrastructure and operations tools as well as tools to enable a full developer experience.

## Red Hat OpenShift is built on Kubernetes and extends the open source platform in several ways to make it suitable for enterprise operations teams:

- Automated installation and operations for platform updates on the container host, the Kubernetes cluster, and application services
- A consistent Kubernetes platform portable across different infrastructures and clouds
- Built-in cluster and application monitoring using Prometheus and Grafana dashboards
- Centralized policy management and enforcement across clusters
- Built-in security checks for the entire container stack throughout the application life cycle

For developers, OpenShift also offers a full developer experience that includes automated container builds and CI/CD pipelines. Developer-oriented services include the ability to manage workloads with a range of platform services, maintaining a cloud-native posture with database and integration capabilities, and improving developer productivity with software development services.

For developers, OpenShift also offers a full developer experience that includes automated container builds and CI/CD pipelines.

## OpenShift is fully pluggable and works with a wide range of technologies:

- Languages including .NET, Java, Node.js, PHP, Python, Ruby, and Perl
- Databases such as MariaDB, MongoDB, MySQL, PostgreSQL, and Redis
- Red Hat JBoss Middleware as cloud-based OpenShift services
- The Red Hat OpenShift container platform components are represented in Figure 1 below

FIGURE 1

### OpenShift Container Platform

<table>
<tr><td colspan="2">Red Hat Advanced Cluster Management for Kubernetes</td><td colspan="4">Multicluster management<br>Observability/Discovery, Policy, Compliance, Configuration, Workloads</td></tr>
<tr><td colspan="2">Red Hat Advanced Cluster Security for Kubernetes</td><td colspan="4">Advanced Security<br>Declarative security, Vulnerability management, Network segmentation, Threat detection & response</td></tr>
<tr><td rowspan="4">Red Hat OpenShift Container Platform</td><td></td><td>MANAGE WORKLOADS<br>Platform services<br>• Service mesh<br>• Serverless builds<br>• CI/CD pipelines<br>• Log management<br>• Cost management</td><td>BUILD CLOUD-NATIVE APPS<br>Application services<br>• Language & runtimes<br>• API management<br>• Integration<br>• Messaging<br>• Process automation</td><td>DATA-DRIVEN INSIGHTS<br>Data services<br>• Databases<br>• Cache<br>• Data ingest & prep<br>• Data analytics, AI/ML<br>• Data management & resilience</td><td>DEVELOPER PRODUCTIVITY<br>Developer services<br>• Developer CLI, IDE<br>• Plug-ins & extensions<br>• CodeReady workspaces<br>• CodeReady containers</td></tr>
<tr><td rowspan="3">Red Hat OpenShift Kubernetes Engine</td><td colspan="4">Kubernetes cluster services<br>Automated ops, Over-the-air updates, Monitoring, Logging, Registry, Networking, Router, Virtualization, OLM, Helm</td></tr>
<tr><td colspan="4">Kubernetes (orchestration)</td></tr>
<tr><td colspan="4">Linux (container host OS)</td></tr>
</table>

Source: Red Hat

**Red Hat OpenShift is available in a variety of deployment models to meet the differing hybrid cloud needs of customers:**

- **Managed OpenShift cloud services:** Fully managed OpenShift models are offered and operated on a public cloud platform by Red Hat, or jointly by Red Hat and a cloud partner, such as AWS, Microsoft Azure, or IBM. These offerings provide a fully managed OpenShift experience that integrates natively with the cloud environments for billing, identity, and easy access to the entire suite of cloud services.
- **Self-managed on-premises:** Customers procure, install, and manage OpenShift software on their own datacenter infrastructure. OpenShift supports deployment on both virtualized servers and bare metal.
- **Self-managed on public-cloud IaaS:** Customers bring their own OpenShift software to install and manage on a public-cloud IaaS of their choice. Red Hat engineers and tests integrations in partnership with various public clouds to ensure enterprise-level support for this mode of operation. OpenShift provides reference architectures, templates, and built-in integrations to assist customers with deployment.

**OpenShift provides reference architectures, templates, and built-in integrations to assist customers with deployment.**

# The Business Value of Red Hat OpenShift

## Study Demographics

IDC conducted research that explored the value and benefits for organizations in using the Red Hat OpenShift platform for developing and running business applications. The project included 14 interviews with individuals at organizations who had experience and knowledge about the benefits and costs of using the OpenShift platform. Interviews covered quantitative and qualitative questions about the impact on IT/application development operations, costs, and business results.

Table 1 presents study demographics. The significant scale of study participants' business operations is reflected in an average employee base of 23,068, with average annual revenue of $5.29 billion (medians of 6,500 and $1.75 billion, respectively). These companies spanned vertical markets that included the financial services (3), healthcare, higher education, insurance software, IT services, manufacturing, media, pharmaceutical, retail (2), travel, and utilities sectors.

TABLE 1

## Demographics of Interviewed Organizations

| | Average | Median |
|---|---|---|
| **Number of employees** | 23,068 | 6,500 |
| **Number of IT staff, non-developers** | 1,750 | 550 |
| **Number of developers, total** | 700 | 375 |
| **Number of business applications** | 582 | 210 |
| **Revenue per year** | $5.29B | $1.75B |
| **Industries** | Financial Services (3), Healthcare, Higher Education, Insurance Software, IT Services, Manufacturing, Media, Pharmaceutical, Retail (2), Travel, Utilities | |

n = 14, Source: IDC In-depth Interviews, January 2021

# Choice and Use of Red Hat OpenShift

Interviewed companies discussed their selection criteria for and use of Red Hat OpenShift for developing, running, and updating their business applications. There were multiple reasons for their decisions to adopt the OpenShift platform, including the overall functionality and quality in the form of a container-based platform. They also strongly weighed the capability it provides for application development and innovation in hybrid/multicloud environments. Study participants also stressed the benefit of not being tied to any single cloud provider and the platform's support for the transition to use of a container-based infrastructure.

### Study participants offered detailed comments on these factors:

- **Flexibility and quality of platform (financial services):**
  *"We don't want to be tied to any single cloud provider and we want to be able to flexibly deploy solutions across different cloud platforms and move applications between them.... Red Hat OpenShift was the most mature platform and had all of the capabilities we were looking for."*
- **Supporting innovation in a hybrid cloud environment (retail):**
  *"With Red Hat OpenShift, we can utilize the underlying controls for containerization. We can also do integration across legacy apps and cloud-based apps, which facilitates innovation necessary to connect these different architectures while supporting our move to cloud."*
- **Broader move to containers for business responsiveness (higher education):**
  *"Our migration to containers was the first push for us to Red Hat OpenShift, along with our development workflow, specifically to containers, to make management easier in terms of moving away from virtual machines to be responsive to business needs."*

*"Red Hat OpenShift was the most mature platform and had all of the capabilities we were looking for."*

Table 2 provides details on the scope and scale of Red Hat OpenShift deployments at interviewed organizations. The data shows that study participants were supporting substantial application development projects and activities on Red Hat OpenShift. These development efforts were critical to their business efforts and included customer-facing applications and services. On average, teams of 231 developers worked on 134 projects, with 94 team members dedicated to DevOps activities.

TABLE 2

## Red Hat OpenShift Use by Interviewed Organizations

| | Average | Median |
|---|---|---|
| Number of OpenShift clusters | 108 | 12 |
| Number of OpenShift nodes | 506 | 72 |
| Number of OpenShift projects | 134 | 30 |
| Number of total active users of Red Hat OpenShift, including: | 231 | 102 |
| DevOps | 94 | 24 |
| Other application developers | 105 | 39 |
| Data scientists | 8 | 1 |
| IT operations | 8 | 3 |
| Linux/RHEL administrators | 14 | 6 |

n = 14, Source: IDC In-depth Interviews, January 2021

# Business Value Results

IDC's research demonstrates the strong value that interviewed organizations have achieved with the Red Hat OpenShift platform by delivering higher-quality and more timely applications and features to their businesses, while also optimizing their development and IT-related costs and staff time requirements.

**Study participants spoke about how the Red Hat OpenShift platform enabled these benefits through its strong functionality and container-based architecture that allows for greater agility and efficiency in infrastructure use, while supporting multicloud deployment:**

→ **Driving cloud-focused development practice (healthcare):**
*"Red Hat OpenShift has allowed us to improve our development practices so that it's more built-for-the-cloud versus having a monolithic application point of view.... This results in faster development cycles and makes it cheaper to build and faster to build projects."*

- **Faster to support new customer segments (pharmaceutical):** *"We can tap new customers with Red Hat OpenShift because of the speed to market; like when a new customer comes in, we already have the platform for onboarding it [and] we can address a new customer segment 33–50 percent faster."*
- **Development enablement, new technology use (retail):** *"Red Hat OpenShift has enabled containerization and DevOps…. We also have better development cycles, allowing us to have development be more dynamic in responding to the needs of the business. Red Hat OpenShift is also more cost-effective."*

*"Red Hat OpenShift has enabled containerization and DevOps…."*

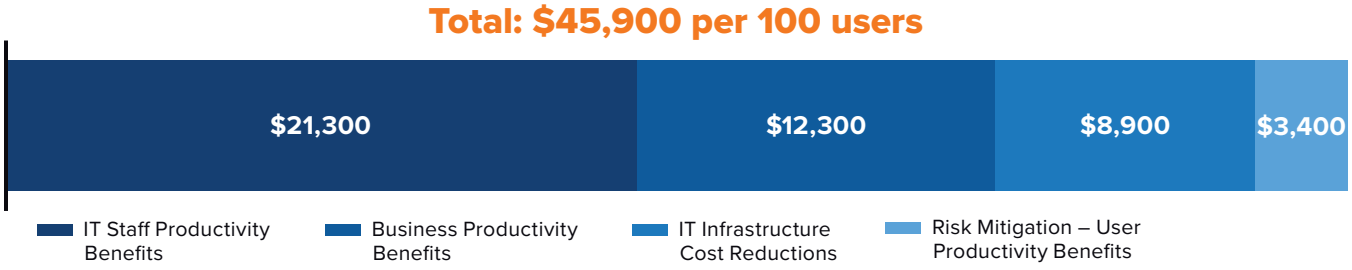
**IDC's analysis shows that study participants will realize strong value through their use of the Red Hat OpenShift platform, with value in the following areas that will be worth an average of $45,900 per 100 users ($10.59 million per organization) over five years (see Figure 2 as well as the appendix for additional details on average annual benefits):**

- **IT staff productivity benefits:** Study participants empower DevOps and development teams to deliver more timely and frequent new application functionality, and IT infrastructure and help desk teams spend less time on day-to-day administrative and support activities. IDC quantifies the value of productivity gains and efficiencies for these teams at an annual average of $21,300 per 100 users ($4.92 million per organization).
- **Business productivity benefits:** Study participants generate more revenue by addressing and winning new business opportunities and ensuring higher satisfaction for existing customers. IDC puts the value of higher net revenue at an average of $12,300 per 100 users per year ($2.85 million per organization).
- **IT infrastructure cost reductions:** Study participants optimize their infrastructure requirements for equivalent development activities and business applications, resulting in cost savings worth an average of $8,900 per 100 users ($2.05 million per organization).
- **Risk mitigation — user productivity benefits:** Study participants incur fewer user- and business-impacting outages, resulting in productivity and revenue gains that IDC calculates will be worth an annual average of $3,400 per 100 users ($0.78 million per organization).

FIGURE 2

## Average Annual Benefits per 100 Users

($ gains per 100 users)




n = 14, Source: IDC In-depth Interviews, January 2021

# Application Development Benefits

IDC projects that more than 500 million new applications will be created worldwide by 2023. As business applications grow in scope and complexity, application developers working closely with IT infrastructure teams must develop and manage them in increasingly complex environments with more rapid delivery cycles. As a result, state-of-the-art platforms and tools that improve developer effectiveness are now becoming a "must-have" rather than a "nice-to-have" resource.

Red Hat OpenShift is designed to address these challenges, with a flexible platform that automates installations, upgrades, and life-cycle management on any cloud platform and provides an agile foundation for developing and running applications on Kubernetes.

## A Streamlined Development Process

Study participants appreciated that OpenShift enabled their development activities across multiple cloud resources, while providing the flexibility to experiment with a variety of different approaches. They noted that their development teams can, as a result, deliver higher-quality applications and features to their businesses with greater frequency because OpenShift streamlines and accelerates various aspects of the development process.

### Interviewed Red Hat customers provided detailed comments:

- **More seamless and fluid development (insurance software):**
  *"Our development process before Red Hat OpenShift was quite different, because the last steps are now seamless.... We used to have less design time because we had to spend more time on test and deployment.... Red Hat OpenShift also impacts the quality of the apps because we can do more testing in less time and deploy more frequently in our pipeline."*

- **Ability to experiment in development (manufacturing):**
  *"With Red Hat OpenShift, we can try out different things — in the past, if we had an idea or concept, we couldn't just quickly try it, so the trial and error is good.... It's also a little bit easier to roll out new features because they don't get bogged down by the infrastructure."*

*"Our development process before Red Hat OpenShift was quite different, because the last steps are now seamless...."*

# Higher-Quality Applications, Faster Time to Market

Study participants reported gaining the ability to deliver more new applications and features while reducing development life cycles with Red Hat OpenShift. Table 3 quantifies these improvements. With Red Hat OpenShift, DevOps and development teams increased the number of new applications and features that they delivered to their businesses by 44% and 196%, respectively. Development life cycles were also shortened, meaning that development teams can be more responsive to both internal and external customers, with 29% and 33% faster development cycles for new applications and features, respectively.

**With Red Hat OpenShift, DevOps and development teams increased the number of new applications and features that they delivered to their businesses by 44% and 196%, respectively.**

## Study participants elaborated on these benefits:

- **Faster to market with new applications (media):**
  *"Red Hat OpenShift has helped with development; previously, when we did application upgrades, it took significantly longer, but with container-based and microservices-based development, we are able to deploy new applications, especially mobile apps for social media, for content delivery, at a faster rate."*

- **Agile development in support of customers (media):**
  *"Red Hat OpenShift fits very well with agile development with DevOps and container-based development and with the hybrid environments. We've been able to shorten our critical applications release cycles, which used to be monthly but can now be done weekly or in some extreme cases daily hot fixes. That's definitely a huge business benefit."*

TABLE 3

## Application Development, KPIs

| | Before/Without Red Hat OpenShift | With Red Hat OpenShift | Difference | % Benefit |
|---|---|---|---|---|
| **Development Volume** | | | | |
| Number of new applications per year | 9.3 | 13.4 | 4.1 | 44% |
| Number of new features per year | 245 | 723 | 479 | 196% |
| **Development Life Cycle, Weeks** | | | | |
| New applications | 31.7 | 22.4 | 9.3 | 29% |
| New features | 8.1 | 5.4 | 2.7 | 33% |

n = 14, Source: IDC In-depth Interviews, January 2021

Across the full spectrum of development operations, Red Hat OpenShift enabled substantial gains in productivity and value to the organizations that IDC interviewed. The achievement of higher developer productivity is quantified in Figure 3 and shows a 20% increase in productivity with the Red Hat OpenShift platform. This increase in productivity reflects DevOps' and other development teams' ability to deliver more value to their organizations' business efforts.

### Study participants discussed these benefits and how the platform has enabled their development teams:

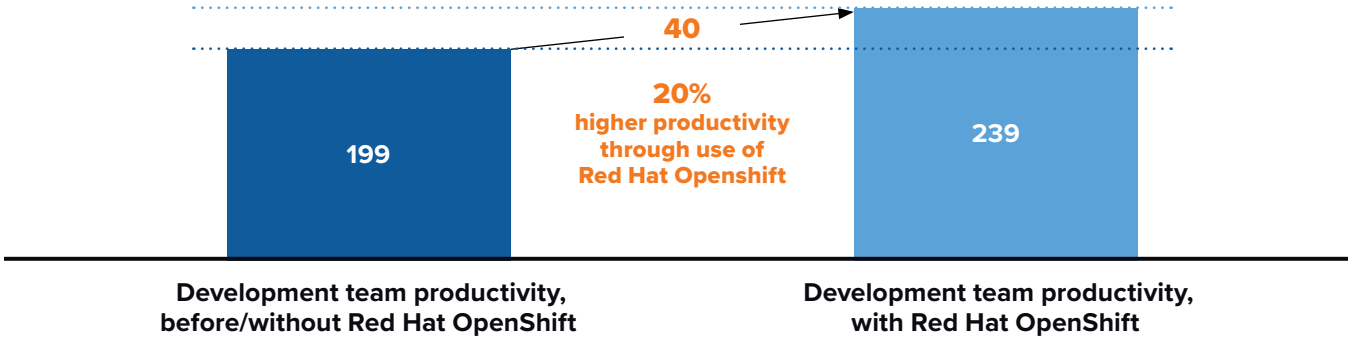
- **Significantly higher developer productivity (insurance software):**
  *"We have hundreds of DevOps and development team members who are more productive because of Red Hat OpenShift. We've done a study and found that they are 30–35% more productive using containers and OpenShift.... For example, we were able to deploy an important new feature in a five-week time frame, whereas without Red Hat OpenShift, it would have been six months."*

- **Driver of innovation and speed to market (financial services):**
  *"Red Hat OpenShift reduces complexity, which makes it easier for the development team to innovate. It allows us to move faster than the traditional release cycle. That ability to move faster and prove/disprove what you've created allows innovation to fly. For us, that translates into being able to develop new products and get them to market faster."*

FIGURE 3

**Impact on Development Team Productivity**

(Equivalent productivity, FTEs per organization)




n = 14, Source: IDC In-depth Interviews, January 2021

# Business Benefits

By improving the effectiveness of their overall application development activities with Red Hat OpenShift, study participants are better able to meet business demand and deliver higher-quality, more innovative, and more timely applications and features. This results in a better foundation of products and services that are responsive to ever-changing customer requirements and, ultimately, also results in increased revenue.

### Study participants provided examples of these business impacts:

- **End-to-end efficient development platform to drive business (financial services):** *"The expediency of getting products to market is the most significant benefit for us of Red Hat OpenShift, because it provides an end-to-end deployment environment for planning, building, and deploying cloud-native applications.... We're getting more revenue as a result — probably 10–20% more growth for the applications in our Red Hat OpenShift environment."*
- **Higher customer satisfaction driven by development (financial services):** *"Customer satisfaction has improved because we can deploy in more countries with Red Hat OpenShift. Our developers develop and deploy applications more quickly. This allows us to develop more applications and innovate more. Indirectly, these applications can help us drive more revenue."*

## $3.24 Million: Average Additional Annual Revenue from Faster Application Development

IDC looked at the direct link between these application development improvements and the actual business results experienced by Red Hat customers. Table 4 quantifies these business productivity benefits. IDC calculated the total average additional revenue that these companies received from better addressing business opportunities at $21.62 million per year, a sizable business impact for organizations operating in competitive business environments.

TABLE 4

### Business Productivity Benefits, Increased Revenue

| | Per Organization | Per 100 Users |
|---|---|---|
| **Business Impact: Revenue from Better Addressing Business Opportunities** | | |
| Total additional revenue per year | $21.62M | $93,700 |
| Assumed operating margin | 15% | 15% |
| Total recognized revenue per year (IDC model) | $3.24M | $14,100 |
| **Business Impact: Revenue from Reduced Unplanned Downtime** | | |
| Total additional revenue per year | $4.26M | $18,500 |
| Assumed operating margin | 15% | 15% |
| Total recognized revenue per year (IDC model) | $638,800 | $2,800 |

n = 14, Source: IDC In-depth Interviews, January 2021

In addition to better addressing business opportunities, applications developed on Red Hat OpenShift are also more reliable and resilient, which further boosts business results. Interviewed organizations reported that with the advantage of a more robust platform, they were able to minimize the frequency and impact of unplanned downtime, thereby reducing business and operational risk.

One study participant working in the retail sector noted how higher productivity and the ability to avoid impactful outages have driven business growth: "We've seen increased productivity across our in-store applications with Red Hat OpenShift. This has had an impact on revenue growth.... Our performance has gone up by 30–40%, and we enjoy a much more dynamic view into our development process, so we head off potential outages earlier."

**IDC calculates that study participants will gain back an average of $4.26 million in total additional annual revenue by minimizing the impact of unplanned downtime with Red Hat OpenShift.**

## Red Hat OpenShift Customers Reported 42% Fewer Unplanned Outages

Table 5 shows that study participants have reduced the number of unplanned outages by an average of 42% and have resolved outages 50% faster on the Red Hat OpenShift platform. As a result, they have reduced the impact of unplanned outages on employee productivity by an average of 61%, yielding annual average productivity-based business value of $251,200. Further, as shown previously in Table 4, minimizing the frequency and duration of unplanned outages results in greater business continuity and lower downtime-related revenue losses. IDC calculates that study participants will gain back an average of $4.26 million in total additional annual revenue by minimizing the impact of unplanned downtime with Red Hat OpenShift.

TABLE 5

### Impact of Unplanned Downtime

| | Before/Without Red Hat OpenShift | With Red Hat OpenShift | Difference | % Benefit |
|---|---|---|---|---|
| Number of unplanned outages per year | 10.4 | 6.1 | 4.3 | 42% |
| Mean time to repair (MTTR), hours | 3.4 | 1.7 | 1.7 | 50% |
| Hours of lost productivity per user per year | 0.5 | 0.2 | 0.3 | 61% |
| Value of lost productive time per organization per year, FTEs | 5.8 | 2.3 | 3.6 | 61% |
| Equivalent value of lost productive time per organization per year | $409,300 | $158,100 | $251,200 | 61% |

n = 14, Source: IDC In-depth Interviews, January 2021

# Platform Cost Savings and Staff Efficiencies

Study participants reported that use of Red Hat OpenShift has also fostered improved IT staff efficiencies in the day-to-day management and support of applications running on the platform. As one study participant noted: "Red Hat OpenShift has streamlined and given back our IT infrastructure team's lives, because they don't have to do manual deployment steps and worry about whether it worked or didn't work."

Another said: "We've reclaimed a bunch of our infrastructure with Red Hat OpenShift because we can now store code and boot it up on a container, and we don't have to set up a VM.... We've been able to shut down probably 10–15 VMs with cost savings and also staff time savings to deal with that infrastructure, including patching cycles."

These efficiency gains are shown in Table 6. The IT staff directly involved in managing infrastructure were 21% more productive after deployment of Red Hat OpenShift. In addition, help desk teams were able to reduce the time they needed to address trouble tickets and service problems by 33% as they benefit from applications that require less intervention and support.

TABLE 6

## IT Staff Impact

| | Before/Without Red Hat OpenShift | With Red Hat OpenShift | Difference | % Benefit |
|---|---|---|---|---|
| **Staff time to manage infrastructure, FTEs** | 22.3 | 17.5 | 4.8 | 21% |
| **Staff time for help desk support, FTEs** | 35.2 | 23.7 | 11.5 | 33% |

n = 14, Source: IDC In-depth Interviews, January 2021

The Red Hat OpenShift platform also delivered compute resource efficiencies for study participants. Interviewed organizations reported that greater use of containers helped optimize IT infrastructure costs for production environments. This has helped them reduce the IT infrastructure resources required to run and support equivalent application development environments.

One study participant noted that it had built a more secure environment while also reducing direct infrastructure costs: "Red Hat OpenShift helps us with data security because we can use micro-segmentation for containers so that we have security on each layer.... We are saving on physical testing servers. We're avoiding about half, which is about 50 servers at around $100,000 per server."

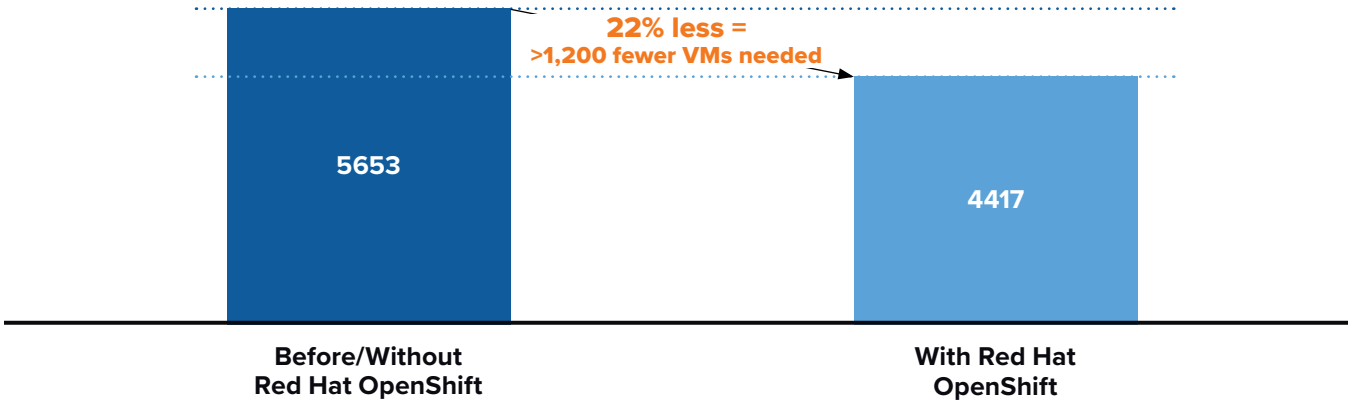
Another observed: "We've repurposed 25 production servers and also reduced our testing servers by about 10%, which is around 10 servers.... We've been able to consolidate our virtual servers with Red Hat OpenShift. We now have about 250, whereas before we had probably around 350."

As shown in Figure 4, study participants require an average of 22% less virtual servers with use of the Red Hat OpenShift platform — 1,200 fewer in total — to run and support equivalent application development operations and application environments.

FIGURE 4

**Number of Virtual Servers Required**

(Number of virtual servers required for equivalent workloads/activities)




n = 14, Source: IDC In-depth Interviews, January 2021

## Shifting Development Budget from Infrastructure to Development Staff

Interviewed companies have been able to optimize IT resources with Red Hat OpenShift, shifting development budgets away from hardware and software costs. This not only created substantial direct cost savings — an average of $2.34 million per organization annually — but also meant that budgetary resources could be reallocated to development staff, helping study participants invest in staff who generate value for the line-of-business units they work with in developing and delivering new and innovative applications.

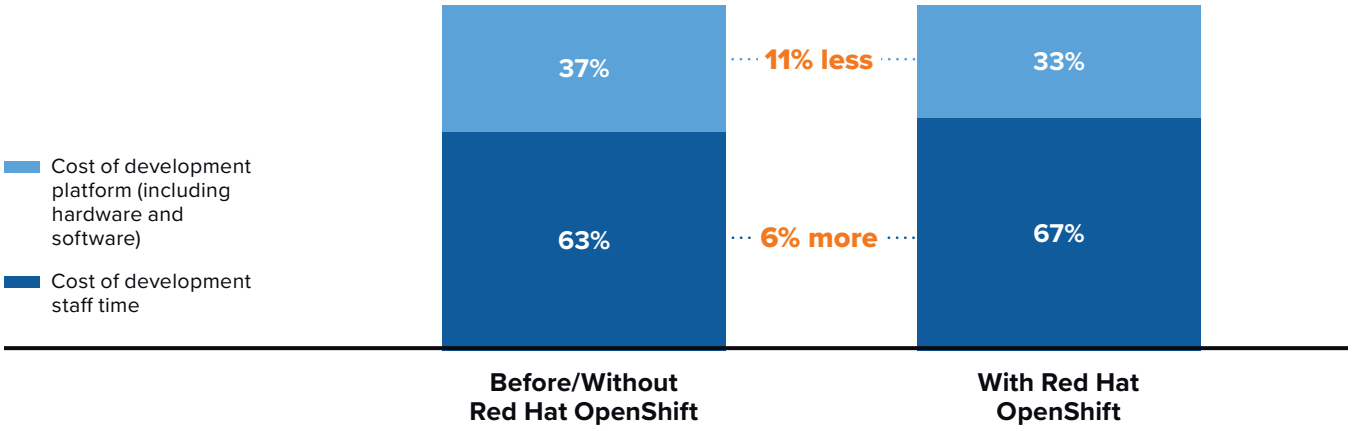
One study participant in the financial services sector discussed how it lowered costs by becoming operationally lighter: "Our development expenses have been reduced because our operations are leaner. We require 20% less staff time to do the same work now, and we've seen 15–20% cost reductions for infrastructure."

Figure 5 illustrates the impact on application development budgets. As shown, the costs associated with development platforms were reduced by an average of 11% with Red Hat OpenShift, compared with the use of legacy or alternative platforms. At the same time, it has allowed for greater focus of resources on application development staff, which has seen a 6% average boost in the relative share of development budgets with Red Hat OpenShift.

FIGURE 5

## Application Development Budget Impact

(Percent of budget)




n = 14, Source: IDC In-depth Interviews, January 2021

# ROI Analysis

Table 7 presents IDC's return-on-investment analysis for study participants' use of Red Hat OpenShift. As shown, IDC projects that they will achieve five-year discounted benefits worth an average of $36.91 million per organization ($160,000 per 100 users) through development productivity gains, higher revenue, user productivity gains, and IT cost savings and staff efficiencies. These benefits compare with total five-year discounted costs of $5.02 million per organization ($21,700 per 100 users). IDC projects that these levels of benefits and investment costs will result in an average five-year ROI of 636% and a break-even point in their investment in Red Hat OpenShift occurring in 10 months. (Please see the appendix for additional details of annual benefits by organization.)

TABLE 7

## ROI Analysis

| | 5-Year Average per Organization | 5-Year Average per 100 Users |
|---|---|---|
| Benefit (discounted) | $36.91M | $160,000 |
| Investment (discounted) | $5.02M | $21,700 |
| Net present value (NPV) | $31.89M | $138,300 |
| Return on investment (ROI) (%) | 636% | 636% |
| Payback period | 10 months | 10 months |
| Discount rate (%) | 12% | 12% |

n = 14, Source: IDC In-depth Interviews, January 2021

# Challenges/Opportunities

## Challenges

- **Skills:** One of the main challenges in adopting containers and all of the changes in application architecture, development methodology, and operational processes that it brings is the human element. Today, cloud-native skills, whether Kubernetes-specific knowledge or broader expertise in how to architect and develop cloud-native applications, are scarce and in high demand.
- **Organizational change:** There are significant challenges in organizational transformation that require rethinking team structures and processes to support agile and DevOps. These are often more challenging to implement than a new technology.
- **Portability:** Containers and Kubernetes have grown in popularity not only because they are an effective technology but because they are standardized and allow application portability between environments. However, containers and Kubernetes are not the final solution to multicloud portability. While these technologies provide a great foundation for more consistency, there are still issues of data gravity, network bandwidth and latency, and cloud services/API lock-in.

## Opportunities

- **Reducing IT sprawl:** As enterprises increasingly move to hybrid cloud and multicloud architectures, the sprawl of many disparate environments becomes a larger issue. Red Hat OpenShift is a platform that can go across on-prem and the public cloud, while also being available in self-managed and provider-managed models, providing an opportunity for an adaptable platform such as OpenShift.
- **Realizing the benefits of open source infrastructure:** The modern era of cloud infrastructure and cloud-native applications has been driven largely by open source technologies. A container platform such as OpenShift is much more than just Kubernetes; it is made up of a large number of separate open source projects. Enterprises that want to consume open source today still rely on a vendor to integrate, test, and support a complex web of open source software. IDC believes that open source will continue to drive the IT industry forward into cloud, containers, and modern applications, which will necessitate enterprises having a trusted provider of open source such as Red Hat.

# Conclusion

Building digitally innovative, software-driven products and services allows enterprises to better serve existing customers, attract new customers, create new revenue-generating offerings, disrupt the competition, boost efficiency, and reduce costs. True digital innovation comes not only from creating one-off custom software products but also by putting in place flexible platforms and repeatable processes that drive efficiencies into the production and delivery of products and services, so an enterprise can practice continuous innovation. Adoption of a common platform across an enterprise can drive a number of measurable benefits that accelerate the path to becoming a digital enterprise.

This IDC study collected feedback from customers that have chosen Red Hat OpenShift as the platform to embark on their transformation journey. Business users trusted the array of enterprise services of the platform in becoming agile enterprises to serve customers and grow revenue. The common user experience of the platform helped developers accelerate new application development and rapidly change existing products and services. IT operations used the hybrid capabilities of the platform to deliver a secure and consistent experience to developers while gaining visibility into consumption of resources. As a result, Red Hat OpenShift is helping organizations gain significant productivity benefits across different IT departments, resulting in the rapid delivery of functionality required by an agile business, which results in more cost-effective development and IT operations as well as improved business results.

**True digital innovation comes not only from creating one-off custom software products but also by putting in place flexible platforms and repeatable processes that drive efficiencies into the production and delivery of products and services, so an enterprise can practice continuous innovation.**

# Appendix

## IDC Business Value Methodology

IDC's standard Business Value and ROI methodology was utilized for this white paper. This methodology is based on gathering data from organizations currently developing and running business applications on Red Hat OpenShift as the foundation for the model. Based on interviews with these study participants, IDC has calculated the benefits and costs to these organizations of using Red Hat OpenShift.

### IDC used the following three-step method for conducting the ROI analysis:

1. **Gathered quantitative benefit information during the interviews using a before-and-after assessment of the impact of using Red Hat OpenShift to develop and run various business applications and workloads.** In this study, the benefits included staff time savings and productivity benefits, revenue gains, and IT infrastructure–related cost reductions.
2. **Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of using Red Hat OpenShift and can include additional costs related to migrations, planning, consulting, 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. The payback period is the point at which cumulative benefits equal the initial investment.

Table 8 provides IDC's calculations of the annual benefits that interviewed Red Hat OpenShift customers are projected to achieve over five years:

TABLE 8

## Average Annual Benefits by Organization

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Average per Year | Total, 5 Years |
|---|---|---|---|---|---|---|---|
| **IT Infrastructure Cost Savings** | | | | | | | |
| Red Hat OpenShift platform annual cost savings | $21,549 | $55,912 | $55,912 | $55,912 | $55,912 | $245,197 | $49,039 |
| IT infrastructure resources: initial cost savings, annualized | $674,853 | $1,750,969 | $1,750,969 | $1,750,969 | $1,750,969 | $7,678,730 | $1,535,746 |
| IT infrastructure resources: annual cost savings | $168,713 | $437,742 | $437,742 | $437,742 | $437,742 | $1,919,683 | $383,937 |
| Power annual cost savings | $18,934 | $49,127 | $49,127 | $49,127 | $49,127 | $215,441 | $43,088 |
| Facilities annual cost savings | $16,355 | $42,434 | $42,434 | $42,434 | $42,434 | $186,090 | $37,218 |
| **Total IT infrastructure cost savings** | **$900,404** | **$2,336,184** | **$2,336,184** | **$2,336,184** | **$2,336,184** | **$10,245,141** | **$2,049,028** |
| **IT Staff Productivity Gains** | | | | | | | |
| IT infrastructure team efficiencies | $183,805 | $476,900 | $476,900 | $476,900 | $476,900 | $2,091,405 | $418,281 |
| Help desk team efficiencies | $444,501 | $1,153,300 | $1,153,300 | $1,153,300 | $1,153,300 | $5,057,701 | $1,011,540 |
| DevOps team productivity gains | $611,232 | $1,585,900 | $1,585,900 | $1,585,900 | $1,585,900 | $6,954,832 | $1,390,966 |
| Other application development team productivity gains | $921,531 | $2,391,000 | $2,391,000 | $2,391,000 | $2,391,000 | $10,485,531 | $2,097,106 |
| **Total IT staff productivity gains** | **$2,161,070** | **$5,607,100** | **$5,607,100** | **$5,607,100** | **$5,607,100** | **$24,589,470** | **$4,917,894** |
| **Risk Mitigation Benefits** | | | | | | | |
| Reduced unplanned downtime: productivity gains | $96,817 | $251,200 | $251,200 | $251,200 | $251,200 | $1,101,617 | $220,323 |
| Reduced unplanned downtime: revenue losses avoided | $246,219 | $638,839 | $638,839 | $638,839 | $638,839 | $2,801,576 | $560,315 |
| **Total risk mitigation benefits** | **$343,036** | **$890,039** | **$890,039** | **$890,039** | **$890,039** | **$3,903,193** | **$780,639** |
| **Business Productivity Benefits** | | | | | | | |
| Increased revenue: business enablement | $1,250,179 | $3,243,708 | $3,243,708 | $3,243,708 | $3,243,708 | $14,225,012 | $2,845,002 |
| **Total business productivity benefits** | **$1,250,179** | **$3,243,708** | **$3,243,708** | **$3,243,708** | **$3,243,708** | **$14,225,012** | **$2,845,002** |
| **Total annual benefits** | **$4,654,689** | **$12,077,032** | **$12,077,032** | **$12,077,032** | **$12,077,032** | **$52,962,816** | **$10,592,563** |

n = 14, Source: IDC In-depth Interviews, January 2021

### 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. For purposes of this analysis, based on the geographic locations of the interviewed organizations, IDC has used assumptions of an average fully loaded $100,000-per-year salary for IT staff members and an average fully loaded salary of $70,000 for non-IT staff members. IDC assumes that employees work 1,880 hours per year (47 weeks x 40 hours).
- 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 interviewed organization 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: Numbers in this document may not be exact due to rounding.*

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Nancy Gohring is Research Director for IDC's Future of Digital Innovation market research service. She focuses on software innovation programs in the enterprise and their potential to drive efficiencies into corporate processes, generate new revenue streams, respond to customer demand, and improve competitiveness. Her research examines ways that enterprises can best execute on the four pillars of software innovation -- plan, source, develop, and distribute – and highlights leading enterprises that have developed successful new approaches to these competencies.

More about Nancy Gohring

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More about Gary Chen

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Matthew Marden is a Research Director in the IDC Business Value Strategy team. He is responsible for carrying out custom business value research engagements and consulting projects for clients in a number of technology areas with a focus on determining the return on investment (ROI) of their use of enterprise technologies. Matthew's research often analyzes how organizations are leveraging investment in digital technology solutions and initiatives to create value through efficiencies and business enablement.

More about Matthew Marden

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