



The Business Value of Red Hat Runtimes

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```
elif _operation == "MIRROR_X":  
    mirror_mod.use_x = True  
    mirror_mod.use_y = False  
    mirror_mod.use_z = False  
elif _operation == "MIRROR_Z":  
    mirror_mod.use_x = False  
    mirror_mod.use_y = False  
    mirror_mod.use_z = True  
  
#selection at the end -add back the deselected mirror modifier  
mirror_ob.select= 1  
modifier_ob.select=1  
bpy.context.scene.objects.active = modifier_ob  
print("Selected" + str(modifier_ob)) # modifier ob is the active ob  
mirror_ob.select = 0  
bpy.context.selected_objects[0]  
bpy.data.objects[mirror_ob.name].select = 0
```



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BUSINESS VALUE HIGHLIGHTS



Click on highlights below to navigate to related content within this PDF.

482%

three-year ROI

6 months

to payback

19% higher

developer productivity

31% faster

to build and test, new release

>2x new

applications

38% faster

to deploy, new features

56% less

unplanned downtime

15% lower

cost of application services platform

Executive Summary

IDC spoke with organizations that have deployed Red Hat Runtimes solutions as a foundation for developing and running applications across hybrid and multicloud environments. Study participants reported achieving substantial value through their investment in Red Hat by increasing the agility and performance of these environments that house business-critical applications and development activities.

Based on interviews, IDC projects that this sample of Red Hat customers will achieve value worth an annual average of \$67,500 per 100 internal IT users (\$5.23 million per organization) by:

- ▶ **Empowering DevOps and development teams** to deliver timely, robust, and functional applications and features
- ▶ **Improving business results and reducing operational risk** through greater flexibility and improved performance in addressing customer demand
- ▶ **Optimizing direct platform and infrastructure costs as well as staff time requirements** for running and maintaining IT infrastructures through deeper use of container and cloud technologies

Situation Overview

Customers chose Red Hat Runtimes for developing business-critical applications for several reasons. There was broad recognition that moving from monolithic applications to microservices is a prerequisite to speed up development and innovation. Some customers were challenged by the substantial size and complexity of the monolithic applications' portfolio and needed the tooling provided by Red Hat Runtimes to expedite the migration of legacy Java code to microservices.

All customers interviewed were attracted to a value proposition that combined lower cost on a pure licensing basis as well as improved developer and operational efficiency because Red Hat Runtimes provided:

- ▶ Unified development capabilities across common frameworks and runtimes for building both the back end and front end of cloud-native applications
- ▶ Automated provisioning of Red Hat Runtimes onto Red Hat OpenShift containers
- ▶ Integration with DevOps tooling and best practices

During migrations, customers also found Red Hat Runtimes enabled them to save costs on maintenance and day two operations compared with more expensive application servers.

Adoption of Red Hat Runtimes was also linked to the benefits of OpenShift. One customer told us it would have spent \$24 million more annually on IT if it had not adopted the Red Hat combination of Red Hat Runtimes and Red Hat OpenShift. Another customer cited its organization's ability to increase its speed of development by at least 25% while cutting deployment costs in half through use of Red Hat OpenShift as the deployment platform on each of the three public clouds used to run its applications.

Aside from the shift to developing microservices, a healthcare provider established a strategy to reorient how to run its business by becoming more data centric in its decision making. This changed both the healthcare provider's application design requirements and how it approached application adoption. To support running its business with support for data-driven decision making, the healthcare provider shifted away from adopting packaged SaaS applications and began building custom applications to align more closely with how it wants its business to run.

Reduced time to value was often cited as a primary value of Red Hat Runtimes adoption. Aside from the automation-related benefits, one organization validated the time to value benefits of a microservices architecture. The application designers spent time upfront defining the microservices and were able to send the definition documents to different development groups to have them work just on their services. The parallelization shaved 25–30% off the time to build an application, aided by the speed of automated provisioning of Red Hat Runtimes and Red Hat OpenShift.

In addition to the shift to developing microservices and composing applications from the microservices, time to value also factored in through Red Hat Runtimes' point and select configuration and auto-generation of development, testing, and production environments to run on Red Hat OpenShift containers. Integration with DevOps to speed up moving microservices into production sped up deployment of new capabilities.

Another way to look at time to value was expressed by a customer as rapid changes and short implementation windows with the introduction of new government regulations. With a microservices architecture, it had to be prepared to implement, test, and deploy changes rapidly.

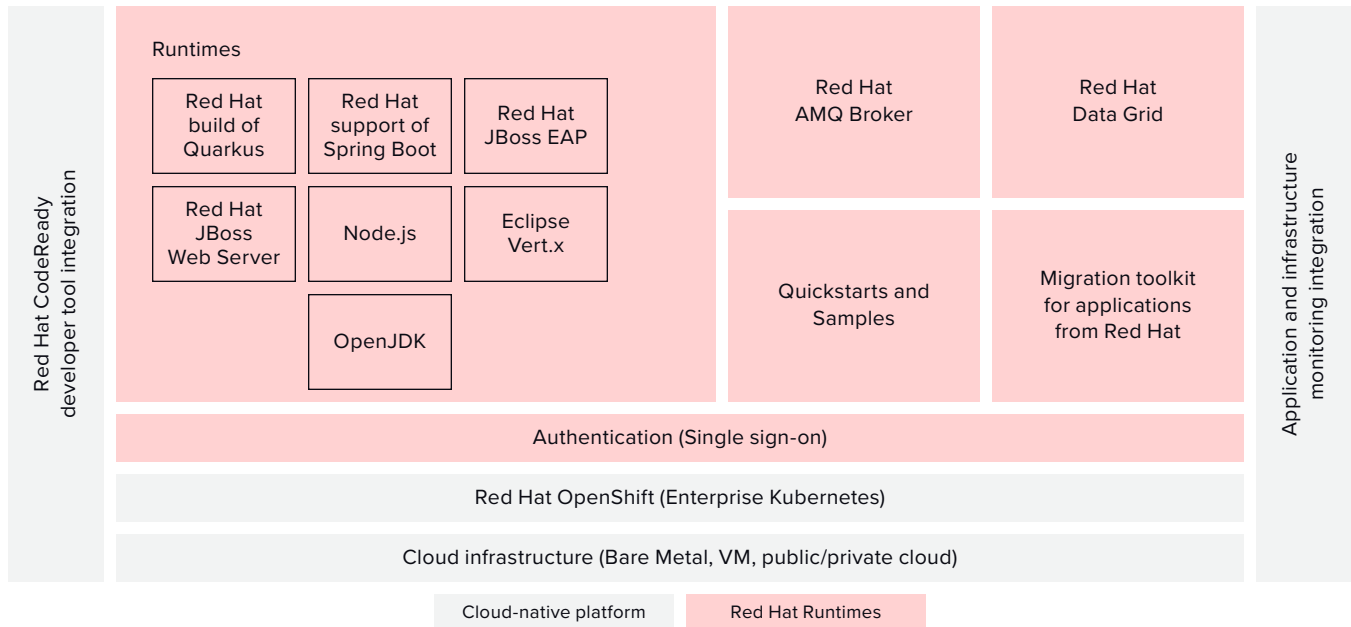
Red Hat Runtimes

Red Hat Runtimes is a collection of cloud-native and enterprise standard runtimes for developing Java and JavaScript applications. The goal of Red Hat Runtimes is to offer a simple developer experience for developing containerized and non-containerized Java and JavaScript applications to run on Kubernetes through the use of automation and simple configurations to stand up, begin using, and integrate with DevOps.

Core capabilities shown in Figure 1 (next page) include:

- ▶ Red Hat build of Quarkus, which optimizes Java for containers and enables Java to run in serverless, cloud, and Kubernetes environments
- ▶ Red Hat build of Eclipse Vert.x, for developing distributed and reactive Java applications using an asynchronous, non-blocking development model
- ▶ Red Hat build of Node.js, providing a trusted platform for building, hosting, and scaling server-side JavaScript applications
- ▶ Red Hat support for Spring Boot to create standalone, production-grade Spring-based applications
- ▶ Red Hat JBoss Enterprise Application Platform, an open source Jakarta EE–based application runtime for building, deploying, and executing highly transactional Java applications and services
- ▶ Red Hat JBoss Web Server, which simplifies the development and management of open source web applications and includes a certified, production-ready distribution of Apache Tomcat
- ▶ Red Hat build of OpenJDK, a free and open source implementation of the standard Java Platform
- ▶ Standardized messaging through the use of Red Hat AMQ Broker
- ▶ Distributed, in-memory caching using Red Hat Data Grid
- ▶ Authentication with single sign-on
- ▶ Migration toolkit for applications, which is an assembly of tools that support large-scale Java application modernization and migration projects

FIGURE 1
Red Hat Runtimes Overview



Source: Red Hat 2021

The Business Value of Red Hat Runtimes

Study Demographics

IDC conducted research that explored the value and benefits for organizations in using Red Hat Runtimes for development activities and IT infrastructure across their on-premises and cloud-based environments. The project included 10 in-depth interviews with individuals at organizations with experience of and knowledge about the benefits and costs of using the Red Hat offering. These interviews covered quantitative and qualitative questions about the impact of Red Hat Runtimes on development efforts, IT costs, and business results.

Table 1 (next page) presents study demographics. The significant scale of participants' business operations is reflected in an average employee base of 26,915 and annual revenue of \$9.09 billion (medians of 9,750 and \$2.38 billion, respectively). Study participants were mostly located in the United States but provided perspectives from various industry verticals, namely, financial services (2), healthcare (2), IT services, media, natural resources, pharmaceutical, software, and utilities.

TABLE 1
Demographics of Interviewed Organizations

| Demographics | Average | Median |
|---------------------------------|--|---------|
| Number of employees | 26,915 | 9,750 |
| Number of IT staff | 1,801 | 508 |
| Number of developers (total) | 387 | 100 |
| Number of business applications | 393 | 113 |
| Revenue per year | \$9.09B | \$2.38B |
| Countries | United States (9), Uruguay | |
| Industries | Financial services (2), healthcare (2), IT services, media, natural resources, pharmaceutical, software, and utilities | |

n = 10, Source: IDC In-depth Interviews, January 2021

Choice and Use of Red Hat Runtimes Solutions

Interviewed companies discussed their selection criteria for adopting Red Hat Runtimes for developing, running, and updating their business applications as well as how they use the platform to support business operations. They described multiple reasons for their decisions to adopt the platform, including its ability to easily integrate with Red Hat OpenShift, which allows them to develop innovative new applications faster and more efficiently to create a competitive edge for their businesses. Study participants also stressed the advantages of using an open source solution, which avoids the downsides of being locked into a single vendor. The cost-effective nature of Red Hat Runtimes was another key consideration.

Study participants offered detailed comments:

▶ **Need to remain competitive, Financial Services:**

“We chose Red Hat Runtimes because of how it integrates into OpenShift and to stay competitive and because it allows us to do things a lot quicker and respond to customer needs Red Hat Runtimes lowers our costs through expediency, and the less time it takes to do things, the more competitive we are.”

▶ **Improve development capabilities and support cloud migrations, Healthcare:**

“With Red Hat Runtimes, we can develop applications faster and more efficiently, and we can roll them out faster because there’s less trial and tribulation with streamlined validation activities It also helps us move from an on-premises environment to the cloud for applications by streamlining the process.”

► **Cost, ease of management, integration, Software:**

“The number 1 reason we chose Red Hat Runtimes is cost and number 2 is ease of management, which leads to operational efficiencies. Also, it integrates across our environments, including Apache, while still having the JBoss Web server as well.”

Table 2 provides detailed data on how interviewed organizations were using Red Hat Runtimes at the time of interviews. The data shows that study participants were supporting substantial application development efforts with Red Hat Runtimes for a variety of customer-facing and internal applications and services. On average, study participants had teams of 181 developers, including 117 dedicated to DevOps projects working on the Red Hat Runtimes platform. These developers were responsible for 115 applications used across their businesses.

Study participants also stressed that they are using Red Hat Runtimes across various IT infrastructure environments and view its flexibility and adaptability to hybrid and multicloud environments as a key benefit. Interviewed Red Hat customers indicated that they are using the platform across varied environments, with workload distribution at an average of 44% on premises (bare metal and virtual) infrastructure, 32% private cloud, 22% public cloud, and 2% at edge locations.

TABLE 2
Red Hat Runtimes Use by Interviewed Organizations

| Use | Average | Median |
|--|---------|--------|
| Number of applications | 115 | 39 |
| Number of VMs | 1,693 | 63 |
| Number of internal users of applications | 7,759 | 1,500 |
| Number of direct users of Red Hat Runtimes | 1,664 | 47 |
| DevOps | 117 | 12 |
| Other application developers | 64 | 28 |
| Other IT staff | 72 | 9 |
| Self-service business users | 1,411 | 0 |

n = 10, Source: IDC In-depth Interviews, January 2021

Business Value Results

IDC's research demonstrates the substantial value that study participants are achieving by enhancing their development capabilities and ability to manage and run their IT infrastructures across on-premises and cloud-based environments with Red Hat Runtimes solutions. Interviewed Red Hat customers linked use of Red Hat Runtimes to demonstrable improvements in development metrics and results, which translates to business gains in the form of higher revenue, even as they optimize direct and staff time costs associated with running their platforms and IT environments.

Study participants provided more details about these core benefits of using Red Hat Runtimes:

▶ **Higher revenue through competitive advantage linked to faster delivery, Financial Services:**

"We end up with higher revenue with Red Hat Runtimes because reducing time to deliver new features and functionality helps in terms of not only customer retention but also adding new customers. If we can deploy new functionality faster than competitors, it gives us a competitive advantage, which drives revenue."

▶ **Lower-cost application services platform that drives digital transformation, Healthcare:**

"We are trying to become more data driven, and Red Hat Runtimes has helped us in terms of digital transformation. There's been a push for us to develop applications that better meet our needs and to move away from off-the-shelf applications in certain areas. It definitely helps with that."

▶ **Suited for cloud-native environments, Media:**

"Red Hat Runtimes is suited for multi-cloud and hybrid cloud environments, so we can have a cloud-native build using our Java technology We can support DevOps deployment including testing, and if something goes wrong, application resilience has improved."

IDC calculates that interviewed Red Hat customers will realize benefits worth an annual average of \$67,500 per 100 users (\$5.23 million per organization) in the following areas (see Figure 2):

▶ **IT staff productivity benefits:**

Study participants reported that the primary driver of value has been enablement of their DevOps and other development teams working across their on-premises and cloud IT environments. They cited achieving value in higher developer productivity, along with efficiencies for IT infrastructure and help desk teams, that IDC quantifies at an annual average of \$54,700 per 100 users (\$4.24 million per organization).

▶ **Business productivity benefits:**

Study participants described delivering new services, features, and functionalities to customers and lines of business in a timely manner has generated improved business results. IDC puts the value of higher net revenue at an average of \$5,000 per year per 100 users (\$389,500 per organization).

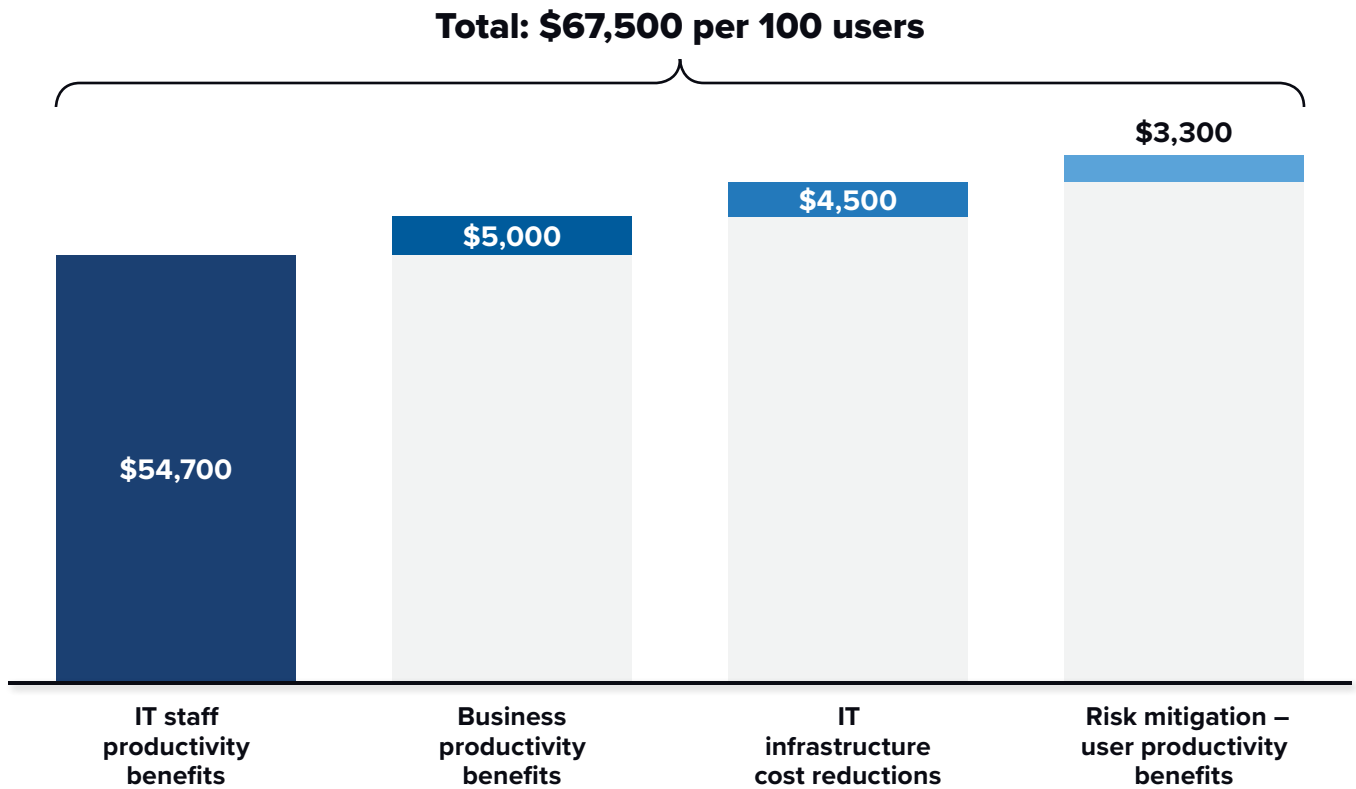
▶ **IT infrastructure cost reductions:**

Study participants lowered direct platform subscription costs and optimized hardware requirements through increased use of container- and microservices-based approaches. IDC estimates that they will realize cost savings worth an annual average of \$4,500 per 100 users (\$346,500 per organization).

▶ **Risk mitigation – user productivity benefits:**

Study participants benefit from having more robust and reliable applications and infrastructure. As a result, they experience fewer and shorter impactful outages, resulting in higher productivity for line-of-business users that IDC quantifies as worth an average of \$3,300 per year per 100 users (\$257,000 per organization).

FIGURE 2
Annual Average Benefits per 100 Users
 (\$ per 100 users)



n = 10, Source: IDC In-depth Interviews, January 2021

Enabling Development Activities

IDC projects that more than 500 million new applications will be created worldwide by 2023. While many of these will be built by business users and trained nonprofessional developers using no code software, the types of applications built by professional developers are steadily growing in number, scope, and complexity. Application developers must manage the development life cycle with the goal of accelerating delivery cycles, enhancing innovation, and improving resiliency. Red Hat Runtimes seeks to address these challenges with a portfolio of application services designed to create a unified environment for application development, delivery, integration, and automation across on-premises and cloud environments. The offering includes comprehensive frameworks, integration solutions, process automation, runtimes, and programming languages.

Study participants agreed that Red Hat Runtimes improved their development activities by streamlining activities related to integration and deploying new applications and features. These efficiencies enabled teams to better focus on application logic and compressing development life cycles that speed time to market for new applications and features. Study participants noted that Red Hat Runtimes has allowed their development teams to deliver higher-quality applications and features to their businesses with greater frequency and agility.

Examples cited of these benefits included:

▶ **Enable focus on application logic, Financial Services:**

“The [developer tooling] within Red Hat Runtimes allows the user to select a front-end application so they can take a React or Angular view, and then pick back-end support like Node.js or Spring Boot, and then the back-end capability. This helps developers build and deploy a new application by creating the application’s scaffolding, so they can focus on writing the logic and developing faster.”

▶ **Faster to implement changes, Pharmaceutical:**

“Non-feature changes happen a lot more often with Red Hat Runtimes—we’re now on a weekly cycle with Red Hat Runtimes, whereas earlier it was like every six months. With Red Hat Runtimes, we’ve increased our agility, and through the DevOps and agile approach to development, we can implement changes much faster.”

▶ **More agile and standardized platform for various types of business applications, Media:**

“We pretty much previously used a legacy-driven platform focused on the message queue. With cloud-native Red Hat Runtimes, we can focus on JavaScript and open source integration at pretty much the same time. Due to Red Hat Runtimes, we are very clearly able to standardize the pattern for certain business applications.”

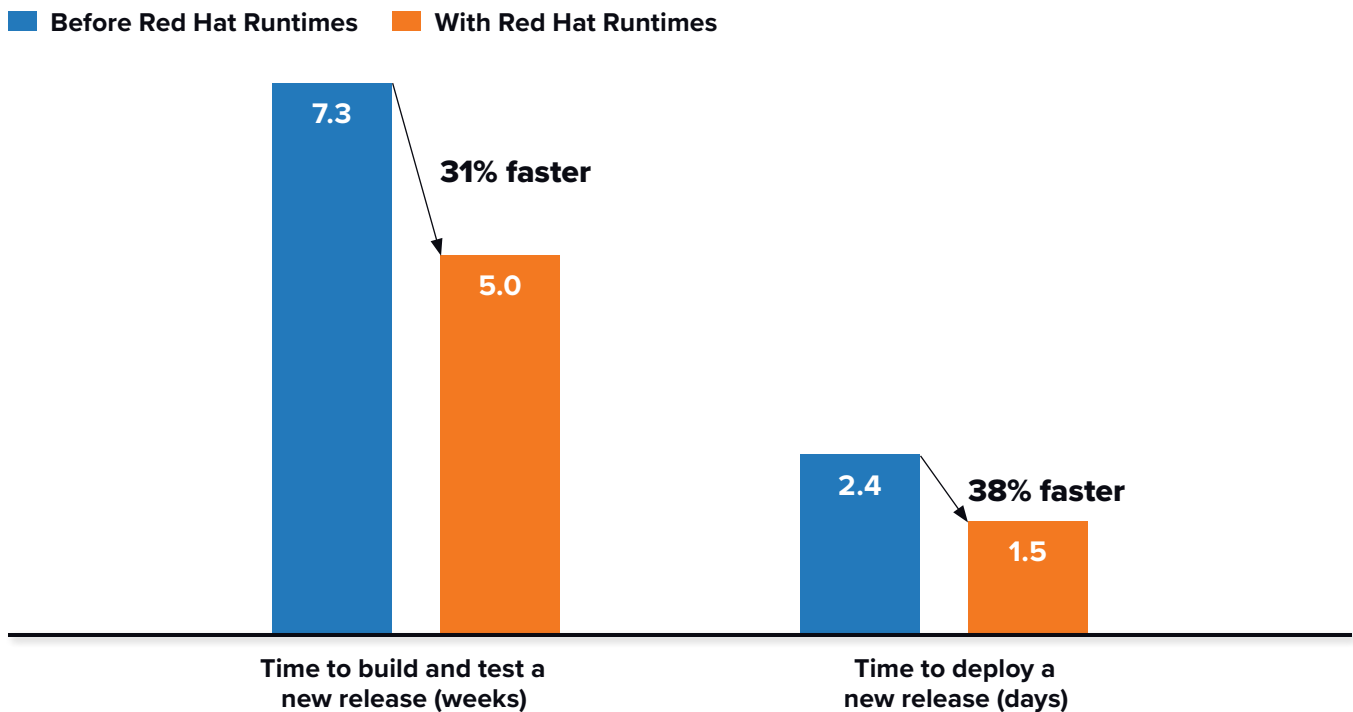
The efficiencies that study participants attributed to Red Hat Runtimes for their application development activities center around the time required to build and test new releases and then to subsequently actually deploy new releases. They linked their use of Red Hat Runtimes to substantial efficiencies in both areas, thus speeding up overall development processes.

Figure 3 (next page) demonstrates the important impact of Red Hat Runtimes; study participants reported building and testing new releases in an average of 31% less time and deploying new releases 38% faster. These efficiencies alone from Red Hat Runtimes save between two and three weeks in terms of time to deliver new features and functionalities to customers and line-of-business users.

FIGURE 3

New Release Building, Testing, and Deployment

(Number of weeks/days required)



n = 10, Source: IDC In-depth Interviews, January 2021

IDC drilled down further to evaluate the overall impact of using Red Hat Runtimes on development key performance indicators (KPIs). Study participants reported that Red Hat Runtimes has had a significant impact on a development team's ability to bring new functionality and features to their businesses in a timely and meaningful way. As one study participant working in financial services noted: *"Our product development life cycle is better because we know we have the right code with Red Hat Runtimes and testing is integrated. We used to average 90 days to market, now it's no more than 45 days Overall, Red Hat Runtimes has increased our development efficiency by at least 20%, and we can make changes or address customer requests faster with an integrated platform."*

As shown in **Table 3** (next page), study participants have both significantly increased overall development volume with Red Hat Runtimes and streamlined development life-cycle times. They linked the use of Red Hat Runtimes to more than doubling the number of new applications they can deliver (126% more on average) as well as more frequently providing the business with new features (54% more on average). Meanwhile, they are delivering application and feature functionality to their businesses considerably faster. Development life cycles were shortened for new applications by an average 24% and for new features by 39%.

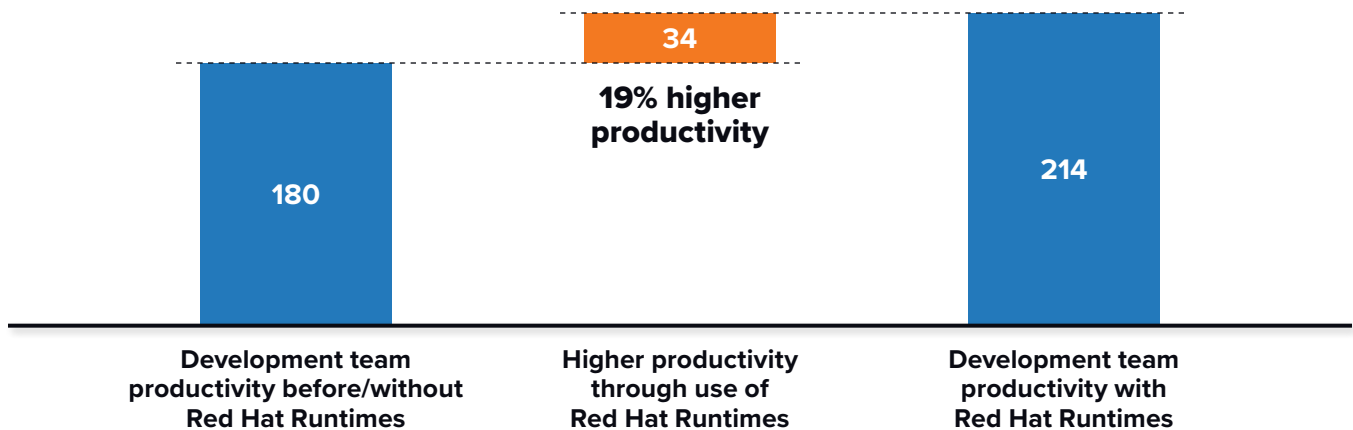
TABLE 3
Application Development KPIs

| KPIs | Before/ Without Red Hat Runtimes | With Red Hat Runtimes | Difference | Benefit |
|---------------------------------------|---|-----------------------------|------------|---------|
| Development volume | | | | |
| Number of new applications per year | 7 | 15 | 8 | 126% |
| Number of new features per year | 77 | 118 | 41 | 54% |
| Development life cycle (weeks) | | | | |
| New applications | 26 | 20 | 6 | 24% |
| New features | 8.4 | 5.1 | 3.3 | 39% |

n = 10, Source: IDC In-depth Interviews, January 2021

These types of KPI improvements reflect the increased overall value that development teams are bringing to their organizations with Red Hat Runtimes. **Figure 4** shows an average productivity gain of 19% for DevOps and development teams using Red Hat Runtimes, reflecting the much improved ability of these teams to deliver functional and robust software in a timelier manner.

FIGURE 4
Impact on Development Team Productivity
(Equivalent productivity, FTEs per organization)



n = 10, Source: IDC In-depth Interviews, January 2021

Business and Performance Impact

Study participants reported that they have translated application development efficiencies previously described into verifiable business gains. **Table 4** quantifies improvements in business performance in terms of additional revenue gained from better addressing business opportunities. Interviewed organizations linked business gains to improved ability to meet customer demand in terms of both responsiveness and performance. An interviewed financial services organization explained: “We end up with higher revenue with Red Hat Runtimes because reducing time to deliver new features and functionality helps in terms of not only customer retention but also adding new customers. If we can deploy new functionality faster than competitors, it gives us a competitive advantage, which drives revenue.” A technology company noted how Red Hat Runtimes allows it to deploy faster: “We’ve been deploying faster with fewer bugs and in a more standard way with Red Hat Runtimes. Implementation time has been dramatically reduced—we used to deploy overnight over around eight hours, and now we’re doing this in two to three hours instead.”

As shown in **Table 4**, after adoption of Red Hat Runtimes, study participants reported increasing revenue by an average of \$2.94 million per year.

TABLE 4
Business Productivity Benefits: Increased Revenue

| Benefits | Per Organization | Per 100 Users |
|-----------------------------------|------------------|---------------|
| Total additional revenue per year | \$2.94M | \$38,000 |
| Assumed operating margin | 15% | 15% |
| Total recognized revenue per year | \$441,700 | \$5,700 |

n = 10, Source: IDC In-depth Interviews, January 2021

In addition, having more robust and reliable applications and enhanced visibility results in fewer unexpected outages and lower risk for Red Hat Runtimes customers. IDC quantified these improvements as shown in **Table 5**. These calculations showed measurable reductions in the number of unplanned outages experienced (35% fewer) as well as time required to remediate outages (52% faster). As a result, study participants reduced the overall impact of unplanned outages by an average of 56%, yielding average value in productivity gains of \$291,500 per organization.

TABLE 5
Impact of Unplanned Downtime

| Impact | Before/ Without Red Hat Runtimes | With Red Hat Runtimes | Difference | Benefit |
|--|---|-----------------------------|------------|---------|
| Number of unplanned outages per year | 1.1 | 0.7 | 0.4 | 35% |
| Mean Time To Repair (MTTR) (hours) | 3.2 | 1.5 | 1.6 | 52% |
| Lost productivity per user per year (hours) | 0.5 | 0.2 | 0.3 | 56% |
| Value of lost productive time per organization per year (FTEs) | 7.5 | 3.3 | 4.2 | 56% |
| Equivalent value of lost productive time per organization per year | \$521,900 | \$230,400 | \$291,500 | 56% |

n = 10, Source: IDC In-depth Interviews, January 2021

Cost of Operations Impact

Study participants also reported that Red Hat Runtimes has proven to be a cost-effective application services platform in several respects, including direct costs, IT infrastructure, and staff time requirements for management and support. They connected cost and staff efficiencies to Red Hat Runtimes being an open source solution that supports and encourages use of containers and varied on-premises and cloud infrastructure environments that best meet the requirements of specific applications.

For study participants, cost efficiencies begin with their ability to move off more expensive legacy platform solutions to the more cost-effective, open source Red Hat Runtimes. A healthcare organization commented: *“Our costs have been hugely reduced with Red Hat Runtimes in terms of both the cost of labor development and vendor payments, which have gone down by 30%.”* On average, study participants reported reducing their platform costs by 15%, saving an average of more than \$100,000 per year.

Interviewed Red Hat customers also reported achieving efficiencies in terms of infrastructure requirements with Red Hat Runtimes through greater use of containers and optimized deployment scenarios, including use of more cloud-based solutions. One study participant in the financial services sector noted: *“We have lowered infrastructure costs with Red Hat Runtimes by deploying more applications on VMs and in containers, which allows us to do more with the hardware we have. We are saving a minimum of 10%.”*

Importantly, study participants reported making incremental gains in use of technologies such as containers and public cloud resources that help them optimize IT requirements. For example, they reported increasing use of containers by an average of 18% and using

14% more public clouds with Red Hat Runtimes. An interviewed healthcare organization commented: *“Red Hat Runtimes definitely lowers infrastructure costs because it helps us move to the cloud. The ‘big bang’ is for our applications. A lot of these are homegrown on premises and have moved to the cloud and developed them with the help of Red Hat Runtimes. That’s a huge savings in the reduction of hardware support and reducing the need to buy hardware by a good 25%.”*

These solution and infrastructure cost savings have combined with IT staff efficiencies to allow Red Hat customers to run and operate their development and IT activities at a substantially lower cost. IT teams also benefit from enhanced virtualization and use of containerization enabled by Red Hat Runtimes, allowing IT infrastructure and support teams to handle their responsibilities more efficiently. An interviewed healthcare organization reported: *“Our costs have been hugely reduced with Red Hat Runtimes in terms of both the cost of labor development costs and vendor payments, which have gone down by 30% We have 50 people managing applications who are saving quite a bit of time—around 50%—with Red Hat Runtimes.”*

Table 6 shows the average impact across the IT and help desk teams that run and support these organizations’ environments connected to the applications they are developing and running with Red Hat Runtimes. These efficiencies quickly add up to significant value for study participants, with 15% average efficiencies for teams that average over 90 staff members per organization.

TABLE 6
IT Staff Impact

| Impact | Before/ Without Red Hat Runtimes | With Red Hat Runtimes | Difference | Benefit |
|--|---|-----------------------------|------------|---------|
| Staff time to manage infrastructure (FTEs) | 93.3 | 79.6 | 13.7 | 15% |
| Staff time for help desk support (FTEs) | 5.6 | 4.7 | 0.9 | 16% |

n = 10, Source: IDC In-depth Interviews, January 2021

ROI Analysis

Table 7 presents IDC's return on investment (ROI) and analysis for study participants' use of Red Hat Runtimes solutions. IDC projects that they will achieve three-year discounted benefits worth an average of \$12.39 million per organization (\$159,700 per 100 users) through development productivity gains, higher revenue, and IT cost savings and staff efficiencies. These benefits compare with total three-year discounted costs of \$2.13 million per organization (\$27,400 per 100 users). IDC calculates that these levels of benefits and investment costs will result in an average three-year ROI of 482% and a six-month average break-even point in use of Red Hat Runtimes.

TABLE 7
ROI Analysis

| Analysis | Three-Year Average per Organization | Three-Year Average per 100 Users |
|----------------------------|-------------------------------------|----------------------------------|
| Benefit (discounted) | \$12.39M | \$159,700 |
| Investment (discounted) | \$2.13M | \$27,400 |
| Net present value (NPV) | \$10.26M | \$132,300 |
| Return on investment (ROI) | 482% | 482% |
| Payback period | 6 months | 6 months |
| Discount rate | 12% | 12% |

n = 10, Source: IDC In-depth Interviews, January 2021

Challenges/Opportunities

Vendors are increasingly concerned with the usability of their software in a variety of ways, and this shows in feedback from customers about what they found most valuable about Red Hat Runtimes. They liked all of the features that automated the complicated elements of getting started and integrating with DevOps. And customers also appreciated the migration tools that helped them analyze code and accelerate code migration to improve the speed of successfully migrating their portfolio of client/server applications to a cloud-native architecture.

We learned from our discussions with Red Hat customers that the opportunities customers have to leverage Red Hat Runtimes is significant.

As the design of applications change to incorporate artificial intelligence (AI), customers face challenges with integrating newer functionality that is not built on Java or JavaScript. While calling AI and machine learning services via APIs is acceptable for some use cases, the latency of real-time data-intensive AI systems running outside a JVM may pose challenges. We expect customers to increasingly challenge Red Hat to incorporate AI features into Red Hat Runtimes to support the new era of AI modernization.

Conclusion

Customers involved with this business value assessment of Red Hat Runtimes presented classic reasons why customers adopt Red Hat application platforms as well as validating the value propositions of the newer capabilities:

- ▶ Ongoing value proposition of open source, Java-centric application platforms offered by Red Hat measured by the time to value of running consistent development, test, and deployment activities on an open standard application platform and favorable cost structure compared with more expensive alternatives (This has been a consistent value proposition for more than a decade of business value assessments performed by IDC covering this portfolio.)
- ▶ Reduced effort to deploy applications on a Kubernetes environment because of the Red Hat Runtimes-to-Red Hat OpenShift automation built into the Red Hat Runtimes offering
- ▶ The quickstart configurations that make it easy to select the frameworks and runtimes needed to develop and deploy the application
- ▶ Validation that using Red Hat Runtimes to migrate legacy applications to a microservices architecture will speed up development cycles through parallelization of initial development efforts across a team of developers as well as the ease of change by adding new microservices and updating existing ones (This is also linked to speed of standing up development and testing through the automation features of Red Hat Runtimes.)
- ▶ Ease of integration with DevOps tools and best practices

Interviewed customers' experiences validate the strong value proposition of Red Hat Runtimes. Study participants reported that use of Red Hat Runtimes has been important to minimizing friction associated with application testing, development, and release, which has enabled development teams to better serve their organizations and resulted in improved business results. Combined with lower direct platform costs and staff time requirements, IDC projects that these benefits will yield an average ROI of 482% over three years for interviewed Red Hat Runtimes customers.

Appendix: 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 using Red Hat Runtimes solutions to support their development and IT environments 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 Runtimes.

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 Runtimes 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 (three-year total cost analysis) profile based on the interviews. Investments go beyond the initial and annual costs of using Red Hat Runtimes 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 Runtimes over a three-year period. ROI is the ratio of the net present value (NPV) and the discounted investment. The payback period is the point at which cumulative benefits equal the initial investment.

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

About the Analysts



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Matthew 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.

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