FORRESTER®

The Total Economic Impact™ Of Red Hat OpenShift Cloud Services

Cost Savings And Business Benefits
Enabled By Red Hat

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Executive Summary

> Modern-day companies are expected to have the capabilities, skills, and tools to support evolving customer demand. As a result, development organization leaders seek container-centric, application developer platforms that can support their business process. As Forrester Research noted, "Container-based cloud-native technologies help firms build, run, and manage scalable applications with resiliency and observability in public and private cloud environments."[1]

Red Hat OpenShift cloud services is an enterprise-grade application development platform that is hosted and managed by Red Hat and public cloud providers. Red Hat OpenShift cloud services enables application developers to build, deploy, and run traditional and cloud-native applications at scale. This enables enterprise IT organizations to deliver innovative applications and business value much faster.

Red Hat commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by working with Red Hat OpenShift cloud services.[2] The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Red Hat OpenShift cloud services on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed six customers with experience using Red Hat OpenShift cloud services. For the purposes of this study, Forrester aggregated the experiences of the interviewed customers and combined the results into a single composite organization.

Prior to using Red Hat OpenShift cloud services, some customers already operated in the cloud, while several customers worked with on-premises, monolithic architectures. Developers at these organizations had to manually create and manage their environments, which meant allocating extra

KEY STATISTICS

Return on investment (ROI)
468%

Net present value (NPV)
$4.08M

time, while additional DevOps resources were assigned to manage the associated infrastructure. These processes led to lack of agility and slow upgrades due to the time and cost associated with new releases, ultimately slowing the organizations' innovation and time-to-market. Organizations struggled to respond to ever-changing business demands and incurred rising operational and infrastructure costs driven by their legacy architecture.

After the investment in Red Hat OpenShift cloud services, the customers cut down on operational overhead while gaining new flexibility from introducing containerization and the ongoing management of clusters and tools. Key results from the investment include having a scalable, more reliable application platform, without customers needing to invest in the core infrastructure or skills needed to maintain the platform. The reduced time-to-market and increased developer productivity

means organizations that use Red Hat OpenShift cloud services can do more with less.

KEY FINDINGS

Quantified benefits. Risk-adjusted present value (PV) quantified benefits include:

- **Improved development velocity.** Using Red Hat OpenShift cloud services allows organizations to shorten their development cycle by up to 70%. Waiting time is reduced and lines of code are shorter. The platform empowers teams to push a project along the process. Over three years and a cumulative total of 300 applications, the shorter development cycle is worth more than $1.5 million to the composite organization.

- **Twenty percent of developer time is recaptured from infrastructure maintenance work.** Interviewees noted that Red Hat OpenShift cloud services eliminated the need for developers to maintain the application development infrastructure, allowing them to fully focus on building the product or solution. Over three years, this developer time recapture is worth more than $2.3 million.

- **Improved operational efficiency by 50 percent.** Since Red Hat OpenShift cloud services is a managed service, interviewees noted that using the solution meant they can reassign 50% of DevOps employees who were previously responsible for managing the infrastructure to other work that is more productive. Over three years, this increased operational efficiency is worth more than $1.3 million.

Unquantified benefits. Benefits that are not quantified for this study include:

- **Developer satisfaction and retention.** Interviewees highlighted that developers benefited from Red Hat OpenShift cloud services by allowing them to break down updates into smaller pieces, reducing the pressure of

extensive testing in a very limited timeline and the need to respond to fire drills once in production.

- **Security and reduced risk.** Interviewees shared how Red Hat OpenShift cloud services automated certain features and security updates, eliminating the need for manual maintenance while still ensuring that their environment is secure.

- **Reliability.** Interviewees noted that using Red Hat OpenShift cloud services made their application platform more reliable over the long run, as there are fewer outages or system failures, even with an expanding environment.

- **Portability and business continuity.** Interviewees also noted that Red Hat OpenShift cloud services ensured business continuity and assisted with their disaster recovery strategy due to its portability, scalability, and flexibility.

Costs. Risk-adjusted PV costs include:

- **Red Hat fees.** The fees paid to Red Hat consist of the cost of consulting services, cluster cost, and cost of developer training. Over three years, accounting for year-to-year growth, the risk-adjusted PV of Red Hat fees is less than $526,000.

- **Labor costs of $96,000 for OpenShift training.** Thirty-five developers participated in several days of training for the OpenShift platform during implementation of the platform.

- **Ongoing administration of Red Hat OpenShift cloud services.** The composite organization assigns two FTEs to manage OpenShift. The project owner dedicates 40% of their time to leading the project and serving as the day-to-day contact for Red Hat. This represents $251,000 in costs to the organization.

The customer interviews and financial analysis found that a composite organization experiences benefits of

$4.95M over three years versus costs of $872,000, adding up to a net present value (NPV) of $4.08M and an ROI of 468%.

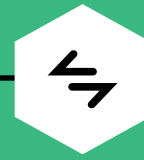**ROI**
468%

BENEFITS PV
$4.95M

NPV
$4.08M

PAYBACK
6 months

Benefits (Three-Year)

Development velocity	$1.5M
Offloaded infrastructure management	$2.1M
Operational efficiency	$1.3M

TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in Red Hat OpenShift cloud services.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that Red Hat OpenShift cloud services can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Red Hat and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in OpenShift Dedicated.

Red Hat reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

Red Hat provided the customer names for the interviews but did not participate in the interviews.

DUE DILIGENCE
Interviewed Red Hat stakeholders and Forrester analysts to gather data relative to Red Hat OpenShift cloud services.

CUSTOMER INTERVIEWS
Interviewed seven decision-makers at six organizations using Red Hat OpenShift cloud services to obtain data with respect to costs, benefits, and risks.

COMPOSITE ORGANIZATION
Designed a composite organization based on characteristics of the interviewees' organizations.

FINANCIAL MODEL FRAMEWORK
Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the decision-makers.

CASE STUDY
Employed four fundamental elements of TEI in modeling the investment impact: benefits, costs, flexibility, and risks. Given the increasing sophistication of ROI analyses related to IT investments, Forrester's TEI methodology provides a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

Red Hat OpenShift Cloud Services Customer Journey

■ Drivers leading to the Red Hat OpenShift cloud services investment

Interviewed Decision-Makers			
Interviewee	**Industry**	**Region**	**Number Of Applications On OpenShift**
IT innovation manager IT system manager	Nonprofit education	HQ in Germany, operational in 100 countries	12+
Director of engineering	Conglomerate	HQ in US, operational worldwide	Hundreds
Director for operations and infrastructure	Telecom	HQ in Canada, operational in Canada	300
Project coordinator	Higher education	HQ in Chile, operational in the Americas	2 large applications with multiple components and subprocesses
Developer for IT product and sourcing	Apparel	HQ in Europe, operational worldwide	4 large applications with 40 components
IT infrastructure manager	Logistics	HQ in Argentina, operational in Brazil and Uruguay	30 to 35

KEY CHALLENGES

There are variations in what a prior environment looks like for Red Hat OpenShift cloud services customers. Some had monolithic applications and supporting servers that required manual management. Others were already starting to move towards microservices and hybrid cloud strategies.

Nonetheless, the interviewees all struggled with common challenges, including:

- **Monolithic applications were costly and time-consuming to maintain and upgrade.** Interviewed customers noted that the operational overhead to maintain and upgrade their prior monolithic architecture was too costly and time-consuming. The director of engineering at a conglomerate shared: "[We had] a ton of applications running on our environment, which had to go through various test and validation sequences. Our environment had to be updated every quarter, so we were constantly upgrading. Eventually, it became very expensive and time-consuming to keep upgrading. From an operational standpoint, [we wanted] to give that ball to someone else."

- **Lack of in-house knowledge and experience with containers.** While professionals Forrester interviewed wanted to explore the microservice architecture and its benefits to their business, they did not have the necessary skills in-house or would rather dedicate those resources to other differentiating activities.

> **"One of our pain points is we don't want to do infrastructure. We just want to focus on building great experiences. We wanted to find somebody who could manage this for us, so we didn't have to."**
>
> *Director for operations and infrastructure, telecom*

- **Long application lifecycle and lack of agility.** With their legacy monolithic applications and

processes, organizations struggled to support global and ever-changing business requirements.

> **"For us, the direction is to be fully supported by a partnership [with Red Hat OpenShift cloud services], so we can concentrate on the core of our business. Our core is education. And education is supported by infrastructure, but I'm not in the business of the technology."**
>
> *Project coordinator, higher education*

SOLUTION REQUIREMENTS

While searching for a solution to address the challenges noted above, the interviewed decision-makers conducted due diligence and developed a list of functional and nonfunctional requirements with which to evaluate vendors. The interviewees searched for a solution that fit the following criteria:

- **A managed service with robust support so they can focus on build.** Interviewed customers said they specifically looked for solutions that were externally managed. The developer at an apparel firm shared: "We needed to have support because it was a fresh start, a new technology. We had to have someone who we can lean on, and that's why we picked the managed version and the support."

- **Flexibility and scalability.** Interviewees described looking for a solution that can adapt to their specific business needs, which can change over time. The IT infrastructure manager in logistics said, "[We looked for] the capability to

add and remove capacity depending on demand — something that can grow when our business grows or reduce capacity when it's not needed."

- **Speed of implementation and ease of use.** The innovation manager in non-profit education said, "There was a need for a platform that developers could easily use. Something they can interact with and be productive with their applications from the beginning."

- **Cost-effectiveness and ability to reduce operational overhead.** Finally, interviewed customers noted cost as a key factor when comparing Red Hat OpenShift cloud services with other alternatives. The director of engineering at a conglomerate explained, "With OpenShift [cloud services], we are saving hundreds of thousands of dollars in operational overhead in the process."

> **"We wanted to improve quality. We want to shorten release cycles and we wanted to avoid downtimes."**
>
> *Developer for IT product and sourcing, apparel*

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an ROI analysis that illustrates the areas financially affected. The composite organization is representative of the six companies that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The organization has an annual revenue of $10 billion to $15 billion. It has a global operation with 20,000 employees. Its development team has 70 developers working with containers and 10 DevOps professionals supporting this effort. The organization uses both Amazon Web Services (AWS) and Microsoft Azure clouds and has basic knowledge of containers. The organization has a cloud-first strategy for the future and is implementing a combination of migrating and replatforming applications to Kubernetes and creating new cloud-native applications.

Deployment characteristics. The organization starts with 100 applications on OpenShift in Year 1, and it builds more applications in Years 2 and 3. Implementation of Red Hat OpenShift cloud services involves training.

Key assumptions

- **20,000 employees**
- **$10 billion+ in annual revenue**
- **Global organization**
- **70 developers**
- **10 DevOps professionals**

Analysis Of Benefits

Quantified benefit data as applied to the composite

Total Benefits						
Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Development velocity	$280,800	$608,400	$982,800	$1,872,000	$1,496,475
Btr	Offloaded infrastructure management	$850,500	$850,500	$850,500	$2,551,500	$2,115,068
Ctr	Operational efficiency	$540,000	$540,000	$540,000	$1,620,000	$1,342,900
	Total benefits (risk-adjusted)	$1,671,300	$1,998,900	$2,373,300	$6,043,500	$4,954,443

DEVELOPMENT VELOCITY

Evidence and data. Before investing in Red Hat OpenShift cloud services, customers were not using a microservices-based architecture; applications were large, burdensome, and expensive to manage. Moving to container-based architecture, customers began to break down legacy applications into smaller components that were independent of one another. Interviewed customers shared that using Red Hat OpenShift cloud services allowed their application development and testing process to be much faster, which opened up time in their developers' day and can be recouped for further productivity.

- The developer in apparel said: "You reduce the line of code you have to monitor when you change things. This means smaller, faster release cycles, which means [the] business gets new features faster. We are more flexible in setting up new applications and new models because it's less code to get started."

- The IT infrastructure manager in logistics added, "We can now quickly scale up if needed, which opens up 50% of additional time in our development team."

- The project coordinator in higher education confirmed this acceleration, noting, "Our whole process is now 50% faster, which leads to our developers being more productive."

> **"Previously, we were only able to release every two weeks. Now, we do thousands of releases a day. We now do very fast releases of very small changes. Additionally, in the previous environment, the average developer would have had to wait two to three weeks just to get developers set up with workspaces. This would happen every two weeks."**
>
> *Director, telecom*

Modeling and assumptions. To capture this benefit for the composite organization, Forrester assumes:

- Over the course of three years, organizations went from 100 to 300 applications developed and managed on OpenShift.

- The average development time in the previous environment per application dedicated to building images, testing, maintenance, and security in the legacy environment is 160 hours.

- Using OpenShift allows a 60% reduction in development time in Year 1, 65% in Year 2, and 70% in Year 3.

- The hourly rate of an FTE developer in the US is $65.

- A 50% productivity recapture rate is introduced, which assumes that not all of the newfound free time will be reallocated as increased developer productivity.

Risks. The benefit of developer productivity lift from faster time-to-market may vary, and specific considerations include:

- The number of applications developed and managed in Red Hat OpenShift.

- The complexity of the applications developed and managed.

- The geographic region, which impacts the hourly rate of an FTE developer.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $1.5 million.

Development Velocity

Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Number of applications on Red Hat OpenShift	Composite	100	200	300
A2	Average development time in previous environment per application dedicated to building images, testing, maintenance, and security in legacy environment (hours)	Interview (original study)	160	160	160
A3	Reduction of development time due to Red Hat OpenShift cloud services	Composite	60%	65%	70%
A4	Hourly rate of developer FTE (rounded)	$135,000/2,080 hours	$65	$65	$65
A5	Productivity recapture	Assumption	50%	50%	50%
At	Development velocity	A1*A2*A3*A4*A5	$312,000	$676,000	$1,092,000
	Risk adjustment	↓10%			
Atr	Development velocity (risk-adjusted)		$280,800	$608,400	$982,800
	Three-year total: $1,872,000		Three-year present value: $1,496,475		

OFFLOADED INFRASTRUCTURE MANAGEMENT

Evidence and data. Beyond slowing down the development process, legacy environments also required developers to procure new environments manually, which could take weeks and involve multiple stakeholders. During the new environment spin-up, developers were limited in their ability to progress further on projects. Interviewed customers shared that with Red Hat OpenShift cloud services, they no longer needed their developers to allocate time for infrastructure maintenance work, which could be as much as 20% of their time in the previous environment. After implementing Red Hat OpenShift cloud services, that time can be repurposed for more productive work supporting application development.

- The innovation manager in nonprofit education shared: "With Red Hat OpenShift cloud services, we don't have to create new servers or install anything. We can focus on other things. The workload shifted from doing infrastructure maintenance to supporting application development."

- The director in telecom explained: "Previously, developers had to build the instances themselves. It would probably be a fifth of developer time [dedicated for infrastructure maintenance]."

- The project coordinator in higher education shared, "Developers can now spend more time with customers trying to figure out what they need."

Developer time recouped from elimination of infrastructure maintenance work with Red Hat OpenShift cloud services

20%

Modeling and assumptions. To capture this benefit for the composite organization, Forrester assumes:

- Seventy developers as part of the development team.

- Twenty percent of development time that was previously spent to maintain the infrastructure is recouped.

- The average developer fully burdened salary in the US is $135,000 per year.

- A 50% productivity recapture rate is introduced, which assumes that not all of the newfound free time will be reintroduced as increased developer productivity.

"Developers shouldn't care [about infrastructure]. They should press a button, and it should be in production."

Director, telecom

Risks. The benefit of recaptured developer time from infrastructure maintenance work may vary, and specific considerations include:

- The size of the development organization.

- The skill set and knowledge within the development organization.

- The geographic region, which impacts the average developer burdened salary.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $2.1 million.

Offloaded Infrastructure Management

Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Number of developers	Composite	70	70	70
B2	Percentage of developer time recouped from elimination of infrastructure maintenance work	Interview	20%	20%	20%
B3	Average annual fully burdened salary for a US developer	Assumption	$135,000	$135,000	$135,000
B4	Productivity recapture	Assumption	50%	50%	50%
Bt	Offloaded infrastructure management	B1*B2*B3*B4	$945,000	$945,000	$945,000
	Risk adjustment	↓10%			
Btr	Offloaded infrastructure management (risk-adjusted)		$850,500	$850,500	$850,500
	Three-year total: $2,551,500		**Three-year present value: $2,115,068**		

OPERATIONAL EFFICIENCY

Evidence and data. In addition to recouping developer time that previously was spent on infrastructure maintenance work, using Red Hat OpenShift cloud services also allows interviewed customers to repurpose full-time DevOps staff that were responsible for managing the infrastructure. Organizations now do not have to allocate as many DevOps staff to maintain the environment for application development.

- The IT infrastructure manager in logistics said, "Previously, we had three people internally, plus two people from our supplier partners, so five people [in] total managing our infrastructure."

- The project coordinator in higher education added, "We reassigned 25% [of] people out of operations and into development."

- The director in telecom said, "Before [OpenShift cloud services] we had 10 to 12 team members with the right experience managing infrastructure. Of the 10 to 12, three or for stayed doing what they were doing while the other team members took on lead positions within their application owners' teams."

- Within a conglomerate organization, two FTEs were previously tasked to support application development process for a team within the organization, and with the onboarding of Red Hat OpenShift cloud services, both of those were reassigned.

> **"We had two FTE engineers managing [legacy solution], building the clusters, [and] managing the clusters, including the day-to-day caring and feeding. Now, those folks get to focus more on the actual use of OpenShift in helping our development teams and operations teams leverage the capabilities within OpenShift"**
>
> *Director of engineering, conglomerate*

Modeling and assumptions. To capture this benefit for the composite organization, Forrester assumes:

- The organization's DevOps team supporting application development on containers consists of 10 professionals.

- Red Hat OpenShift cloud services takes on infrastructure management and thus allows the reassignment of 50% of these FTEs to other roles within the organization.

- The DevOps fully burdened annual salary in the US is $120,000.

Risks. The benefit of cost avoidance from increased operational efficiency may vary, and specific considerations include:

- The complexity of the application development environment, which impacts the number of DevOps professionals needed to maintain it.

- The training and change management required to get the organization quickly adopting and incorporating Red Hat OpenShift cloud into their process, which can impact how quickly DevOps professionals can be repurposed.

- The geographic region, which impacts the average DevOps burdened salary.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $1.3M.

Operational Efficiency

Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Number of DevOps FTEs	Interview	10	10	10
C2	Reduction in infrastructure management effort with Red Hat OpenShift cloud services	Interview	50%	50%	50%
C3	DevOps employees reassigned	C1*C2	5.0	5.0	5.0
C4	DevOps annual fully burdened salary (US)	Industry average	$120,000	$120,000	$120,000
Ct	Operational efficiency	C3*C4	$600,000	$600,000	$600,000
	Risk adjustment	↓10%			
Ctr	Operational efficiency (risk-adjusted)		$540,000	$540,000	$540,000
	Three-year total: $1,620,000		**Three-year present value: $1,342,900**		

UNQUANTIFIED BENEFITS

Additional benefits that customers experienced but were not able to quantify include:

- **Developer satisfaction and retention.** Organizations that transitioned to Red Hat OpenShift cloud services saw the impact of using this service on the happiness of their developers. The director in telecom said: "Well-being and retention of developers is another big benefit.

Developers are happier because there is less pressure for developers to get everything right in a small window. Now, we can do small changes more frequently."

- **Improved security and reduced risk.** Interviewees noted security improvements that Red Hat OpenShift cloud services enabled, which made their environment less risky than before. The developer at an apparel company explained:

"Before managed services, we ran major security updates twice a year. Now, we are able to use tools to automatically scan for used packages. Every time we deploy, the libraries are scanned for [vulnerabilities]."

- **Performance reliability.** Using Red Hat OpenShift cloud services made the system and overall application development infrastructure more reliable, with a noted lack of system failures and outages. The director in telecom said: "Previously, you had instances that were manually managed, and there was a high likelihood of those instances failing or something happening to them. In our previous environment, we would have interruptions at least once a week. Now, with our application scaled [and] a 10x increase in traffic to website, we never had any outages during that whole time."

> **"[With Red Hat OpenShift cloud services], business gets features faster. We are more flexible in setting up a new application [or] new models faster because it's less code to get started."**
>
> *Developer for IT product and sourcing, apparel*

maintaining environments to focusing on responding to business needs and delivering value to their customers. There are opportunities to improve and create new products, which could provide additional revenue to customers.

- **Portability and business continuity.** Interviewed customers noted that Red Hat OpenShift cloud services allowed a degree of flexibility and portability that ensured business continuity. OpenShift is based on open source Kubernetes, empowering developers with a broad community and variety of interoperable services. The IT infrastructure manager in logistics said, "We can keep our infrastructure running in different sites, which is helpful for our disaster recovery strategy."

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement Red Hat OpenShift cloud services and later realize additional uses and business opportunities, including:

- **Elimination of bottlenecks for innovation.** With Red Hat OpenShift cloud services, teams are able to shift their efforts from configuring and

Analysis Of Costs

■ Quantified cost data as applied to the composite

Total Costs							
Ref.	**Cost**	**Initial**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Etr	Red Hat fees	$394,800	$27,300	$54,600	$80,850	$557,550	$525,486
Ftr	Labor costs for OpenShift training	$95,550	$0	$0	$0	$95,550	$95,550
Gtr	Dedicated program lead	$0	$100,800	$100,800	$100,800	$302,400	$250,675
	Total costs (risk-adjusted)	$490,350	$128,100	$155,400	$181,650	$955,500	$871,711

RED HAT FEES

Evidence and data. Included in this cost category are a variety of components, all of which are paid to Red Hat. Many of the items noted below are considered add-ons to the platform.

- **Professional services implementation consulting.** This includes container adoption and application services implementation.

- **Multiple availability-zone base cluster**. Each new Red Hat OpenShift cluster is installed in a single region, with the option to deploy in a single availability zone or across multiple availability zones.

- **Red Hat-provided training.** Developers who planned to work with containers participated in training to become comfortable with the technology.

Modeling and assumptions. To capture this cost for the composite organization, Forrester assumes:

- The Red Hat fees for the composite consist of consulting services of $250,000 prior to full rollout.

- The composite organization also pays $26,000 to $77,000 per year for multiple availability-zone

base clusters (three master, two infrastructure, 24 worker).

- A Red Hat-delivered training has a one-time cost of $126,000.

Risks. The following factors could affect the total Red Hat fees for an organization:

- The use case of Red Hat OpenShift cloud services at the organization.

- The number of regions covered by the solution.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of $526,000.

Red Hat Fees

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
E1	Consulting services (container adoption, application services implementation)	List pricing	$250,000	$0	$0	$0
E2	Multiple availability-zone base cluster	List pricing		$26,000	$52,000	$77,000
E3	Red Hat delivered training	List pricing	$126,000	$0	$0	$0
Et	Red Hat fees	E1+E2+E3	$376,000	$26,000	$52,000	$77,000
	Risk adjustment	↑5%				
Etr	Red Hat fees (risk-adjusted)		$394,800	$27,300	$54,600	$80,850
	Three-year total: $557,550			**Three-year present value: $525,486**		

LABOR COSTS FOR OPENSHIFT TRAINING

Evidence and data. Red Hat offers online learning modules that the interviewees used to train their developers. Options include an online starter-tier training that provides a feel for how the platform works from a developer's perspective and an interactive learning portal where developers can experiment and learn OpenShift with a preconfigured instance. Interviewees noted that the training provided to their employees covered how to use Red Hat OpenShift cloud services and not how to manage the platform.

- The project coordinator in higher education noted: "We did a lot of training for our IT department and internal units to be able to work with OpenShift — to work with this more open agile system. Each training was about 20 to 25 people from the IT team. They spent about 40 hours in training."

- The developer at an apparel firm said: "We had two months of training and workshops involving two DevOps from our organization and one from our supplier, and then four developers from the supplier for one to two months."

Modeling and assumptions. To capture this cost for the composite organization, Forrester assumes:

- Thirty-five developers will participate in the training.

- The training will take 40 hours.

- The hourly rate of a developer is assumed to be $65.

Risks. The cost related to OpenShift training may vary depending on the following factors:

- The number of employees participating in training.

- The regions where the employees are located, impacting the burdened hourly rate of the employee.

- The complexity and use case of Red Hat OpenShift cloud at the organization, impacting the length of training required.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of $96,000.

Labor Costs For OpenShift Training

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
F1	Number of FTEs participating in free training	Composite	35			
F2	Hours of training	Interview	40			
F3	Hourly fully burdened rate for a developer FTE (rounded)	$135,000/2,080 hours	$65			
Ft	Labor costs for OpenShift training	E1*E2*E3	$91,000	$0	$0	$0
	Risk adjustment	↑5%				
Ftr	Labor costs for OpenShift training (risk-adjusted)		$95,550	$0	$0	$0
Three-year total: $95,550			**Three-year present value: $95,550**			

DEDICATED PROGRAM LEAD

Evidence and data. Active relationship management and oversight of the Red Hat OpenShift cloud services are ongoing efforts that require organizations to assign internal staff to act as the dedicated admin.

- The IT system manager in nonprofit education said, "We have two people responsible for maintaining OpenShift from our side."

- The director in telecom noted, "On an ongoing basis, we have one and a half to two people who are managing Red Hat OpenShift cloud services relationship today."

- The project coordinator in higher education said, "We have two people in charge of managing the relationship with Red Hat, but it doesn't take that much time."

- The developer at an apparel company explained, "Currently, we have four people maintaining two clusters but only deploying applications and configurations."

Modeling and assumptions. To capture this cost for the composite organization, Forrester assumes:

- Two FTEs as dedicated program leads.

- Forty percent of their time is spent on Red Hat OpenShift cloud services-related tasks.

- A DevOps's professional's fully burdened annual salary is $120,000.

Risks. The cost related to allocating a dedicated program lead for Red Hat OpenShift may vary depending on the following factors:

- The strategy and unique needs of each organization.

- Team structure.

- Oversight practice.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of $251,000.

Dedicated Program Lead

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	Number of FTEs to manage OpenShift	Composite		2	2	2
G2	Percentage of time spent on OpenShift	Interview		40%	40%	40%
G3	Burdened salary of DevOps FTE	Assumption		$120,000	$120,000	$120,000
Gt	Dedicated Program Lead	G1*G2*G3	$0	$96,000	$96,000	$96,000
	Risk adjustment	↑5%				
Gtr	Dedicated Program Lead (risk-adjusted)		$0	$100,800	$100,800	$100,800
	Three-year total: $302,400			Three-year present value: $250,675		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)
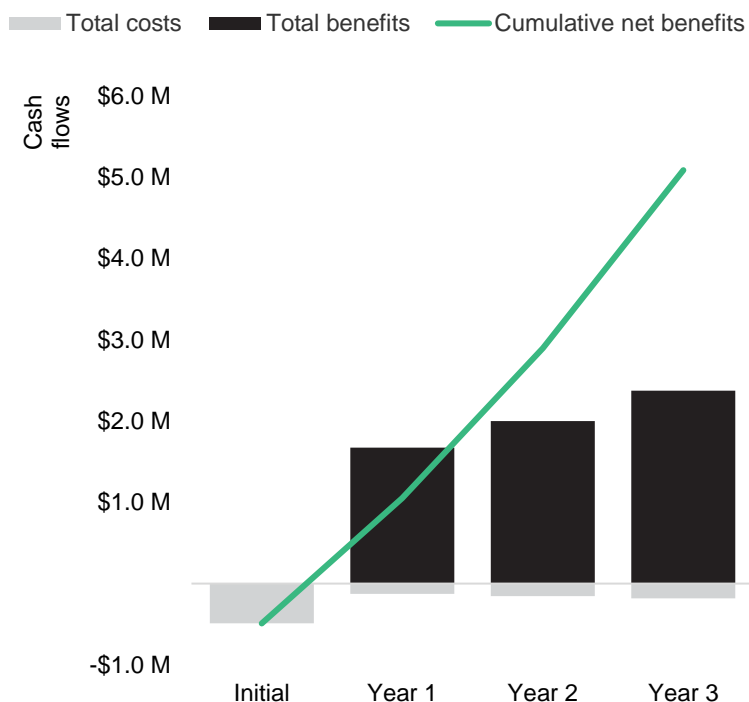
The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

These risk-adjusted ROI, NPV, and payback period values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

Cash Flow Analysis (Risk-Adjusted Estimates)						
	Initial	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Total costs	($490,350)	($128,100)	($155,400)	($181,650)	($955,500)	($871,711)
Total benefits	$0	$1,671,300	$1,998,900	$2,373,300	$6,043,500	$4,954,443
Net benefits	($490,350)	$1,543,200	$1,843,500	$2,191,650	$5,088,000	$4,082,732
ROI						468%
Payback						6 months

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

TOTAL ECONOMIC IMPACT APPROACH

Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.

Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.

Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.

Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV Sources are calculated for each total cost and benefit estimate. NPV Sources in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value Sources of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.

PRESENT VALUE (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

NET PRESENT VALUE (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

RETURN ON INVESTMENT (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.

DISCOUNT RATE

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.

PAYBACK PERIOD

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Appendix B: Endnotes

[1] Source: "Now Tech: Enterprise Container Platforms, Q2 2020", Forrester Research, Inc., June 25, 2020.

[2] Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders

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