A Forrester Total Economic Impact™
Study Commissioned By Red Hat
June 2019

# The Total Economic Impact™ Of Red Hat OpenShift Dedicated

## Cost Savings And Business Benefits Enabled By OpenShift Dedicated

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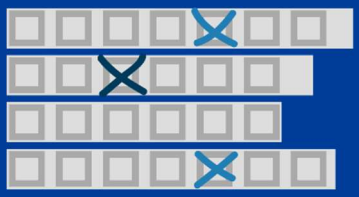
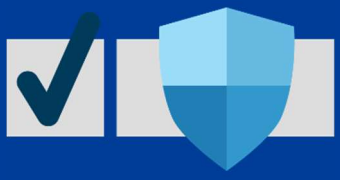
## Benefit Highlights

Developer productivity lift:
**$2.2M**



Scaling and load-balancing savings:
**$693K**



Security, maintenance, and management efficiencies:
**$332K**

Ongoing administrative cost savings:
**$974K**

# Executive Summary

Red Hat OpenShift Dedicated (OSD) is an enterprise-grade Kubernetes application platform that is delivered as a hosted service and fully managed by Red Hat. OpenShift Dedicated 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. OpenShift Dedicated provides a powerful on-ramp for organizations to a hybrid cloud model by running OpenShift Container Platform on-premises and seamlessly extending workloads to leverage the scale of a public cloud. With a consistent Kubernetes foundation and a common fabric between public cloud and data centers, IT leaders can quickly innovate with new computing models while preserving existing investments. 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 deploying OpenShift Dedicated. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of OpenShift Dedicated on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed three customers with years of experience using OpenShift Dedicated. Prior to using OpenShift Dedicated, multiple interviewed customers were unfamiliar with the benefits of container platforms and relied heavily on point-to-point integration middleware. One customer previously used the on-premises Red Hat solution, OpenShift Container Platform. At each interviewed company, organizationwide digital transformation efforts were hindered by instability, lack of scalability, and rising operational costs of the legacy architecture they previously relied on.

Forrester developed a composite organization based on data gathered from customer interviews to reflect the Total Economic Impact that Red Hat OpenShift Dedicated could have on an organization. The composite, *Auxois, Inc.*, is representative of the organizations that Forrester interviewed and is used to present the aggregate financial analysis in this study. All values are reported in a risk-adjusted and three-year present value (PV) unless otherwise indicated. The composite organization in this study has the following characteristics:

- Revenue: $5 billion.
- Employees: 10,000.
- Designers, developers, DevOps team size: 100.
- Strategic initiatives: improved customer experience, accelerated service delivery, and simplified cloud-native app development.

## Key Findings

**Quantified benefits.** The following risk-adjusted present value (PV) quantified benefits are representative of those experienced by the companies interviewed and are modeled by the composite organization:



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"OpenShift Dedicated aligns with our digital transformation aspirations companywide. At the time, we wanted to be a more agile organization, especially when it comes to delivering new products to market and resolving software issues that affect our customers. One of the reasons why we picked Red Hat was because it helps us to meet this larger organization goal."

*Senior engineering manager, telecommunications*

- **Developers experience a 90% productivity lift for initial application development, testing, and deployment.** Developers use OSD's templated runtime images, saving days of time and effort for both greenfield projects and legacy application modernization projects. Over three years and a cumulative total of 454 applications, shorter development cycles are worth more than $2.2 million in productivity gains to the composite organization.
- **OSD reduces elapsed wait time for environment creation by 98%.** Red Hat's automated management of environment creation reduces the amount of downtime developers faced before using OSD. Over three years and a cumulative total of 454 applications developed or modernized, developers save 78 hours per application. The organization recaptures 10% of this productivity and establishes a shorter environment creation cycle, worth a cumulative $121,000 over three years.
- **Automatic scaling and load balancing managed by Red Hat relieve DevOps and operations teams, providing a 20% lift in operational efficiency.** OpenShift Dedicated customers no longer worry about manual scaling by monitoring memory and CPU utilization because the platform autoscales services/pods to fit their computing needs efficiently. Over three years and a cumulative total of 45 employees, the managed services-driven operational benefit is worth $693,000 to the organization.
- **Red Hat secures and maintains the OpenShift Dedicated platform, saving over 3,000 hours of customer labor per year.** Red Hat is responsible for the security, maintenance, and major upgrades of the OpenShift Dedicated platform. Over three years and a cumulative total of 9,270 hours and 24 events, this managed services-driven benefit is worth $332,000 to the organization.
- **Operations and administrative costs decrease by 2 FTEs each year.** Migrating and modernizing legacy applications using OSD improve their availability and performance, reducing the amount of administrative and operational time the organization spent managing legacy applications in place. The shift away from internally managed legacy solutions to OSD deployments is worth more than $974,000 to the organization.

**Unquantified benefits.** The interviewed organizations experienced the following benefits, which are not quantified for this study:

- **Reduced time-to-market.** Organizations using OpenShift Dedicated can develop revenue-driving products more quickly. One organization reduced the time-to-market for a product from 6 to 8 months down to 10 weeks.
- **Portability and hybrid access.** Customers can set up OpenShift instances on a variety of cloud providers or on-premises, providing access to workloads seamlessly across multiple cloud infrastructure services and providers.
- **Avoided hiring costs.** Finding and hiring top talent with Kubernetes development or deployment skills is a daunting task. Red Hat provides organizations with experts on both Kubernetes and infrastructure managed services, allowing customers to supplement their existing workforce and avoid the need to hire new internal resources.

**ROI**
**343%**

**Benefits PV**
**$4.3 million**

**NPV**
**$3.4 million**

**Payback**
**<6 months**

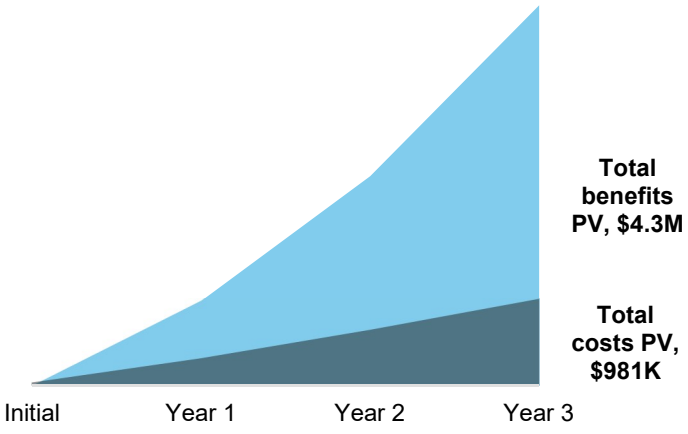
- **Talent retention.** According to interviewees, the leading features and innovations ("bells and whistles") of Red Hat's container development tools and platforms help them attract and retain talented designers, developers, and DevOps employees.
- **Great partnership.** Interviewees described Red Hat as "more than a typical" managed service and attributed their successful use of OpenShift Dedicated to the great partnership and customer service that they receive from Red Hat.
- **Increased prototype momentum.** The ease and flexibility of OSD lets developers build prototypes with less concern of the cost and time involved. This accelerates innovation cycles and the agility of the DevOps group.

**Costs.** The interviewed organizations experienced the following risk-adjusted PV costs, modeled by the composite organization:

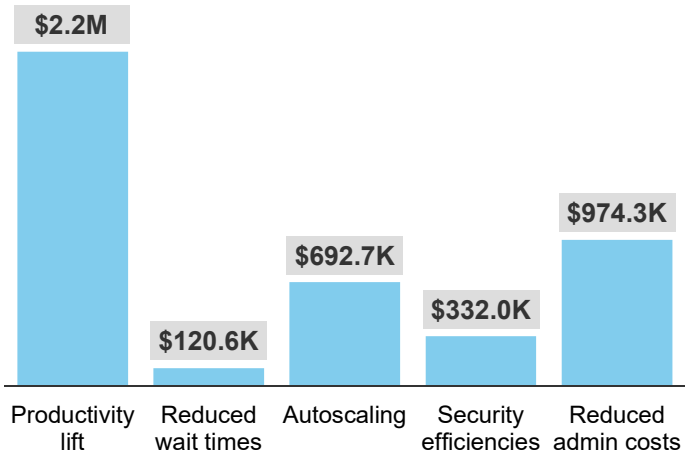
- **Red Hat fees including implementation services, multizone cluster, custom node sizes, middleware, and a technical account manager under $500K each year.** Red Hat fees for the composite are $36K per year and can be customized to the needs of the user starting as low as $18K per year. The composite employs additional add-ons to fit its requirements and grows the custom node sizes each year as it grows. Over three years, several add-ons, and year-to-year growth, the risk-adjusted present value of Red Hat fees is $859K.
- **Labor costs of $12K for OpenShift training.** Ten employees participate in several days of training for the OpenShift platform during the implementation of the platform.
- **Ongoing administration of OpenShift Dedicated platform.** The composite organization assigns one FTE as a project owner. The project owner dedicates 40% of their time to leading the project and serving as the day-to-day contact for Red Hat.

**Synopsis**. Forrester's interviews with three existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of $4.3M over three years versus costs of $981K, adding up to a net present value (NPV) of $3.4M and an ROI of 343%.

**Financial Summary**




**Benefits (Three-Year)**



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## TEI Framework And Methodology

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing Red Hat OpenShift Dedicated.

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 Dedicated can have on an organization:

The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

**DUE DILIGENCE**
Interviewed Red Hat stakeholders and Forrester analysts to gather data relative to OpenShift Dedicated.

**CUSTOMER INTERVIEWS**
Interviewed three organizations using OpenShift Dedicated to obtain data with respect to costs, benefits, and risks.

**COMPOSITE ORGANIZATION**
Designed a composite organization based on characteristics of the interviewed 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 interviewed organizations.

**CASE STUDY**
Employed four fundamental elements of TEI in modeling Red Hat OpenShift Dedicated's impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

# The OpenShift Dedicated Customer Journey

**BEFORE AND AFTER THE OPENSHIFT DEDICATED INVESTMENT**

## Interviewed Organizations

For this study, Forrester conducted three interviews with Red Hat OpenShift Dedicated customers. Interviewed customers include the following:

| INDUSTRY | INTERVIEWEE | REVENUE | EMPLOYEES |
|---|---|---|---|
| Satellite telecommunications | Senior manager, SDT solution management | $1.4 billion | 1,600 employees; 100 developers, designers, and DevOps |
| Government agency | Director of cloud technologies | N/A | 6,000 employees; 300 developers, designers, and DevOps |
| Telecommunications | Senior engineering manager | $19 billion | 32,000 employees; 50 developers, designers, and DevOps |

## Key Challenges

Before investing in OpenShift Dedicated, interviewees struggled with several pain points that hindered their ability to operate effectively.

- **Aging technology.** The director of cloud technologies of a governmental department of innovation and science voiced concerns of impending obsolescence, saying, "If we look at our [legacy] application server right now, it's around 3.5% of market share. It's dying. Maybe 20 years ago, it was the leading — not anymore."
- **Point-to-point legacy architecture.** The senior manager, SDT solution management of a satellite telecommunications company was subject to difficulties with the company's prior application architecture, which was integrated through a point-to-point model and prone to single points of failure. He described his challenge: "One thing that we didn't have was the capability of decoupling our applications. So, we were very much in a very point-to-point coupled space where we couldn't move something without impacting most of our solutions around it. It became very difficult for us to change anything."
- **Missing expertise.** The senior engineering manager of a telecommunications company described his challenge to both develop and maintain structure with his teams' skill sets: "We had two pain points. The first, running a DevOps team. That means we develop and operate. So I must put on the development hat and the operations manager hat. From a DevOps point of view, we found that the internal skill sets [for operations management] were just not there. We had issues with the stability of our platform and the underlying infrastructure, and when it comes to patching, we had to bring down the platform because of the lack of skill sets from the infrastructure teams."
- **Limited scalability.** The senior engineering manager continued to describe his second pain point: "On the operations side, I don't think we were able to scale with that particular on-prem instance. And that's pretty much why we wanted to move away from it and hand the platform management to the experts, which is the Red Hat OpenShift Dedicated team. We have struck all that complexity from my development team."

> "We had issues with the stability of our platform, and the underlying infrastructure and when it comes to patching, we had to bring down the platform because of the lack of skill sets from the infrastructure teams."
>
> *Senior engineering manager, telecommunications*



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## Why OpenShift Dedicated?

While searching for a solution to address the challenges noted above, the interviewed organizations conducted due diligence and developed a list of functional and nonfunctional requirements on which to evaluate vendors. The senior manager, SDT solution management looked for a solution that:

- Was flexible and scalable.
- Avoided any single point of failure.
- Offered developer tools and coding flexibility.
- Run on high-availability infrastructure modules.
- Had load-balancing capabilities.

The organizations specified the following reasons for choosing OpenShift Dedicated over an alternative:

- **Kubernetes container orchestration empowers a microservice deployment model.** Modern developers are writing applications that run across various, multiple systems, and Kubernetes gives them the flexibility to write containerized cloud-native applications regardless of infrastructure. The senior engineering manager of a telecommunications company told Forrester: “We picked Red Hat because they had a solid Kubernetes story. It aligned very well with the microservices deployment architecture model and the deployment model that I wanted to move my team towards whereas [the alternative] did not have a solid Kubernetes story at that time."
- **Managed services drive automation and acceleration.** Red Hat is responsible for the installation and ongoing management of clusters, augmenting the customers’ existing operations staff and freeing them to focus on development. The senior manager, SDT solution management described how OpenShift Dedicated differentiated itself from alternative options, saying: “Not only the speed but their skills in maintaining the clusters. If you think about the OpenShift Dedicated technologies that are included and just how they load balance and keep that infrastructure stable, they do it in an automated way and do it very quickly. We weren’t skilled in our IT ops area to be able to take that on to build up a Kubernetes container-type cluster.”
- **OSD supports an agile organization better suited to address customer needs and deliver leading products.** The senior engineering manager told Forrester: "OpenShift Dedicated aligns with our digital transformation aspirations companywide. At that time, we wanted to be a more agile organization, especially when it comes to delivering from production market and resolving software issues that affect our customers. One of the reasons why we picked Red Hat was because it helps us to meet a larger organization goal.”

> “The main reasons we went with Dedicated was that we could outsource the implementation of an integration cluster, utilize the benefits of containers, and get it into production and available to our programs that were in delivery more quickly.”
>
> *Senior manager, SDT solution management, satellite telecommunications*

> “We picked Red Hat because they had a solid Kubernetes story. It aligned very well with the microservices deployment architecture model and the deployment model that I wanted to move my team towards whereas [the alternative] did not have a solid Kubernetes story at that time.”
>
> *Senior engineering manager, telecommunications*

## Key Results

The interviews revealed several key results from the OpenShift Dedicated investment:

- **Containerized platform of images provides developer productivity lift.** Teams using OSD templated images "save days for each application," increasing developer productivity and reducing the cost for initial application development, testing, and deployment.
- **Spinning up new environments within OSD shortens the turnaround time from weeks to hours.** OSD managed services reduces the elapsed wait time for environment procurement, allowing developers to avoid downtime and continue progressing on projects.
- **The autoscaling, load-balancing, and self-healing platform reduces stack monitoring.** Customers have reduced their worries on monitoring CPU power and memory for their stacks as Red Hat monitors the core cluster for availability, automating the pod/services to fit customer needs.
- **Security upgrades and minor updates performed by Red Hat relieve burden on customers.** Customers rely on Red Hat to manage security on their OSD clusters, saving them hours of labor and coordination time.
- **Legacy platform footprint reduction results in lower operational and maintenance costs.** As organizations shift their application stacks to the microservices architecture, reliance upon the legacy platform diminishes, resulting in fewer employees tasked with the ongoing maintenance and administration of the maturing platform.

## Composite Organization — Auxois, Inc.

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

**Description of composite.** Auxois, Inc. has 10,000 employees and an annual revenue of $5 billion. Auxois has a hybrid cloud strategy and 100 designers, developers, and DevOps staff. Prior to the investment in OpenShift Dedicated, Auxois had no experience with container technology.

Concurrently with OSD, Auxois maintains a legacy solution for existing applications and is limiting its footprint by building all new applications within OpenShift Dedicated and modernizing existing applications each year. Within OSD, Auxois maintains applications such as web portal, back-end service orchestrations, and a service domain manager.

**Technology objectives.** Auxois purchased Red Hat OpenShift Dedicated with the following business objectives in mind:

- **Simplify architecture.** Reduce integration activities by simplifying integration architecture while providing flexibility and scalability.
- **Modernize architecture.** Focus on adopting modern architectural models like APIs, containers, and microservices.
- **Support partner.** Utilize Red Hat as the behind-the-scenes expert support.

### Key assumptions

- Revenue: $5B
- Employees: 10K
- Hybrid cloud strategy

### Technology objectives

- Simplify architecture
- Modernize architecture
- Support partner



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# 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 | Developer productivity lift | $248,832 | $877,133 | $1,698,278 | $2,824,243 | $2,227,056 |
| Btr | Day one — reduction in developer wait time for environment creation | $13,478 | $47,511 | $91,990 | $152,980 | $120,632 |
| Ctr | Day two — automatic scaling and load balancing | $189,696 | $284,544 | $379,392 | $853,632 | $692,654 |
| Dtr | Security upgrade, maintenance, and management efficiencies | $133,488 | $133,488 | $133,488 | $400,464 | $331,965 |
| Etr | Ongoing operations and administrative costs | $475,000 | $380,000 | $304,000 | $1,159,000 | $974,267 |
| | Total benefits (risk-adjusted) | $1,060,494 | $1,722,676 | $2,607,148 | $5,390,319 | $4,346,574 |

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of more than $4.3 million.

### Benefit 1: Developer Productivity Lift

**Before** investing in OSD, customers were not using a microserver-based architecture; applications were large, burdensome, and expensive to manage. Customers tackled tasks that were time-intensive and often created synchronicity issues. Building images required days of effort to create and secure.

**After** the investment in OpenShift Dedicated, customers experienced a reduction in costs for the initial application development, testing, and deployment of applications. Moving to the container-based architecture, customers began to break down legacy applications into smaller components that were independent of one another. This reduced synchronicity issues and created a more flexible environment.

Interviewees are now able to develop net-new or greenfield applications within OpenShift Dedicated more quickly using templated images, which speeds up the entire process. The senior manager, SDT solution management told Forrester: “If we had to build these images ourselves, pass these through security, we’re talking days of effort whereas now we can get a template up and running in minutes. Now our teams build on top of those. Using their images and injecting some of our own, we can actually provide that functionality within minutes as well. After a day’s work, we don’t have to recreate things over and over. So, moving to a containerized platform of images where we can build on top of those images, I would say it saves days for each application.”

To capture this benefit for the composite organization, Forrester assumes:

- In the first year of using OSD, Auxois has a stack of 300 applications in its legacy environment, 10% of which will be modernized. In addition to modernization, Auxois will create 10 greenfield applications within OSD.
- In Year 2, Auxois modernizes 30% of remaining legacy applications and develops 60 greenfield applications.

> “The challenge we have is finding resources on the market seasoned in legacy infrastructure solutions. By adopting OpenShift Dedicated as a target platform we were able to start migrating applications from the legacy software to modern and recent ones.”
>
> *Director of cloud technologies, governmental department of innovation and science*

- In Year 3, Auxois modernizes 60% of remaining legacy applications and develops 160 greenfield applications.
- Prior to the investment in OSD, building images, testing, maintenance, and security required 160 hours per application developed. Auxois experiences a 90% reduction in the time required for these tasks by relying on templated images provided within OSD.
- The annual salary of a developer is $100,000.

When estimating the impact this benefit may have on an organization, consider the following risks, which could affect this benefit total:

- Number of legacy applications and intention to modernize them.
- Number of greenfield applications to be created annually within OSD.
- Time and effort dedicated to building, testing, maintaining, and securing images prior to the investment in OSD.
- Annual salary of a developers.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of $2,227,056.

Impact risk is the risk that the business or technology needs of the organization may not be met by the investment, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

**Developer Productivity Lift: Calculation Table**

| Ref. | Metric | Calculation | Year 1 | Year 2 | Year 3 |
|---|---|---|---|---|---|
| A1 | Total number of full-stack applications on legacy environment | Composite | 300 | 270 | 189 |
| A2 | Percentage of legacy apps modernized using containers | Composite | 10% | 30% | 60% |
| A3 | Number of applications modernized | A1*A2 (rounded) | 30 | 81 | 113 |
| A4 | Number of new applications created in containers | Interviews | 10 | 60 | 160 |
| A5 | Hours dedicated to building images, testing, maintenance, and security in legacy environment | Interviews | 160 | 160 | 160 |
| A6 | Reduction in time using OpenShift Dedicated | Interviews | 90% | 90% | 90% |
| A7 | Hours saved using managed services and templated images | A5*A6 | 144 | 144 | 144 |
| A8 | Hourly rate of developer FTE | $100,000/2,080 hours (rounded) | $48 | $48 | $48 |
| At | Developer productivity lift | (A3+A4)*A7*A8 | $276,480 | $974,592 | $1,886,976 |
| | Risk adjustment | ↓10% | | | |
| Atr | Developer productivity lift (risk-adjusted) | | $248,832 | $877,133 | $1,698,278 |

## Benefit 2: Day One — Reduction In Developer Wait Time For Environment Creation

**Before** moving to OSD, procuring a new environment was a manual process that could take weeks and involve multiple stakeholders. The senior engineering manager of a telecommunications company described the process: "In our typical environment, you would have to raise a ticket and ask the team responsible for permission to create a virtual machine and then, when the old backlog item reached the correct queue and they picked it up, there was a lot of manual fiddling involved to spin up a VM (virtual machine). That whole process could take two weeks."

During the new environment spin-up, developers were limited in their ability to progress further on projects. The senior engineering manager described, "The developer needs some capacity to progress further, but because this capacity takes about two weeks to come true, essentially the project that they are working on is blocked."

**After** moving to OSD, the senior engineering manager said: "We have the capability to communicate with OSD using the APIs and script environment and project provisioning. When we want to spin up new microservices on our projects, we just execute that script and then that script will set up OpenShift projects for the application. That script execution can be completed within half an hour to one hour at the most. So that's the amount of time it takes for us to spin up a new environment in OSD, and then the rest is application microservices code development."

When OSD spins up new environments, it reduces the amount of downtime that face the developers. The senior engineering manager told Forrester: "In OSD, the developer can still proceed. That developer progresses on a daily basis because they are not blocked; they can cut code; they can deploy to the dev environment and the test environment."

For the composite organization, Forrester assumes that:

- Auxois has a 1-to-1 ratio between environments and number of applications.
- In the prior environment, spinning up a new environment occurred over an elapsed time of two weeks or 80 hours.
- OSD reduces the elapsed time by 98%.
- In the prior environment, developers were not at a complete productivity standstill and performed some value-added activities during the elapsed wait time. To conservatively estimate the incremental productivity lift that developers experienced, Forrester assumes a 10% productivity recapture.

The benefit from reduced developer wait times will vary by organization. When estimating the impact of this benefit, consider:

- Annual number of environments created and the time required to spin up environments before investing in OSD.
- Productivity recapture of developer.
- The fully loaded compensation of software developers.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of $120,632.

Day one — reduction in developer wait time for environment creation: 3% of total benefits

"All the developers do is commit code and then test that code in the dev environment for integration. That maybe takes 10% of their time. Other than that, there is minimum involvement with OpenShift from my software developers."

*Senior engineering manager, telecommunications*



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| Benefit 2: Day One — Reduction In Developer Wait Time For Environment Creation: Calculation Table | | | | | |
|---|---|---|---|---|---|
| **Ref.** | **Metric** | **Calculation** | **Year 1** | **Year 2** | **Year 3** |
| B1 | Number of development environments created annually | A3+A4 | 40 | 141 | 273 |
| B2 | Elapsed hours to build environment prior to OSD | Interviews | 80 | 80 | 80 |
| B3 | Percentage of time saved using OpenShift Dedicated | Interviews | 98% | 98% | 98% |
| B4 | Hours saved | B2*B3 (rounded) | 78 | 78 | 78 |
| B5 | Hourly rate of developer | $100,000/2,080 hours (rounded) | $48 | $48 | $48 |
| B6 | Productivity recapture | Assumption | 10% | 10% | 10% |
| Bt | Day one — reduction in developer wait time for environment creation | B1*B4*B5*B6 | $14,976 | $52,790 | $102,211 |
| | Risk adjustment | ↓10% | | | |
| Btr | Day one — reduction in developer wait time for environment creation (risk-adjusted) | | $13,478 | $47,511 | $91,990 |

## Benefit 3: Day Two — Automatic Scaling And Load Balancing

Each interviewee noted that the time and effort were greatly reduced as a result of Red Hat's monitoring of the core cluster for availability and scaling the pods/services to fit customer needs. The senior manager, SDT solution management described, "Moving to Red Hat means that we don't have to worry about monitoring a stack to make sure that there's enough memory and CPU power, because the platform can autoscale what it needs to self-heal itself."

To capture this benefit for the composite organization, Forrester assumes:

- In Year 1, there are 10 DevOps team members. Each year, five new members join the team as more business segments begin to use OSD.
- Using OSD, the team reduces the time spent monitoring availability by 20%.
- The salary for a DevOps employee is $100,000 per year.

This benefit will vary by organization. Consider the size of the existing DevOps or infrastructure team, how much of their time is dedicated to monitoring and managing load, and the burdened salaries of the employees.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year risk-adjusted total PV of $692,654.

| Benefit 3: Day Two — Automatic Scaling And Load Balancing: Calculation Table | | | | | |
|---|---|---|---|---|---|
| **Ref.** | **Metric** | **Calculation** | **Year 1** | **Year 2** | **Year 3** |
| C1 | DevOps team FTEs | Composite | 10 | 15 | 20 |
| C2 | Time spent on managing load | Interviews | 20% | 20% | 20% |
| C3 | Work hours | | 2,080 | 2,080 | 2,080 |
| C4 | Hourly rate of FTE | $100,000/2,080 hours (rounded) | $48 | $48 | $48 |
| Ct | Day two — automatic scaling and load balancing | C1*C3*C4*C2 | $199,680 | $299,520 | $399,360 |
| | Risk adjustment | ↓5% | | | |
| Ctr | Day two — automatic scaling and load balancing (risk-adjusted) | | $189,696 | $284,544 | $379,392 |

## Benefit 4: Security Upgrade, Maintenance, And Management Efficiencies

**Before** the investment in OpenShift Dedicated, customers were using internal resources to manually update security for their environments and conduct regular maintenance updates.

**After** partnering with Red Hat, organizations saved time on security. "We do not spend time on security patching of the RedHat OpenShift instance. We get notified about vulnerabilities and threats and timelines on when their teams will fix it. We are informed, but we are not required to spend time on that," said the senior engineering manager of a telecommunications company.

To capture the value of this component of managed service, for the composite organization Forrester assumes:

- Major upgrades.
  - Upgrades occur three times per year.
  - Eight FTEs perform each upgrade with 100 hours of labor each.
  - The salary of each FTE is $100,000.
- Maintenance updates.
  - Updates occur five times per year.
  - Three FTEs perform each upgrade with 30 hours of labor each.
  - The salary of each FTE is $100,000.
- Coordination of upgrades.
  - Each upgrade requires coordination across the organization to ensure collaboration and minimal disturbance during downtime. During the updates, a coordinator is on duty to monitor the process.
  - There are 30 hours of coordination labor per upgrade event. The salary of the coordinator is $100,000.

The benefit from security upgrades, maintenance, and management efficiencies will vary by organization. Consider how many updates are performed each year and the number of employees required to perform each upgrade.

> "Security is a headache that we don't have to worry about. We have our security certifications and assessments done in collaboration with Red Hat and our security groups. Other than that, we don't worry about it."
>
> *Senior engineering manager, telecommunications*

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of $331,965.

| Benefit 4: Security Upgrade, Maintenance, And Management Efficiencies: Calculation Table | | | | | |
|---|---|---|---|---|---|
| **Ref.** | **Metric** | **Calculation** | **Year 1** | **Year 2** | **Year 3** |
| D1 | Number of annual major upgrades | interviews | 3 | 3 | 3 |
| D2 | Labor hours per major upgrade | | 100 | 100 | 100 |
| D3 | FTEs tasked with upgrade | | 8 | 8 | 8 |
| D4 | Hourly rate of developer | $100,000/2,080 hours (rounded) | $48 | $48 | $48 |
| D5 | Annual cost of major upgrades | D1*D2*D3*D4 | $115,200 | $115,200 | $115,200 |
| D6 | Number of maintenance upgrades | Interviews | 5 | 5 | 5 |
| D7 | Labor hours per maintenance upgrade | Interviews | 30 | 30 | 30 |
| D8 | FTEs tasked with upgrade | Interviews | 3 | 3 | 3 |
| D9 | Hourly rate of developer | $100,000/2,080 hours (rounded) | $48 | $48 | $48 |
| D10 | Annual cost of maintenance upgrades | D6*D7*D8*D9 | $21,600 | $21,600 | $21,600 |
| D11 | Hours spent coordinating across organization per upgrade event | | 30 | 30 | 30 |
| D12 | Number of upgrade events | D1+D6 | 8 | 8 | 8 |
| D13 | Hourly rate of coordinator | $100,000/2,080 hours (rounded) | $48 | $48 | $48 |
| D14 | Labor for approvals coordination to perform upgrades | Interviews | $11,520 | $11,520 | $11,520 |
| Dt | Security upgrade, maintenance, and management efficiencies | D5+D10+D14 | $148,320 | $148,320 | $148,320 |
| | Risk adjustment | ↓10% | | | |
| Dtr | Security upgrade, maintenance, and management efficiencies (risk-adjusted) | | $133,488 | $133,488 | $133,488 |

## Benefit 5: Operations And Administrative Costs Reduction

**Before** their investment in OpenShift Dedicated, customers relied on legacy platforms and had staff on hand to maintain the platforms.

**After** moving to OSD, customers halted the expansion of the legacy platforms. The senior engineering manager told Forrester: "We are not in a position to completely move away from our legacy platforms due to various reasons, but we have kept our legacy footprint from growing further. We have stopped increasing that footprint by not adding more applications to that legacy stack." Interviewees spoke of their intentions to continue to migrate applications onto OpenShift and described how doing so has reduced their administrative load.

To model this benefit for the composite organization, Forrester assumes:

- In the first year, there are 10 FTEs tasked with operating an on-prem legacy platform. This decreases by two headcount each year as the legacy platform maintenance requirements are reduced.
- Fifty percent of operational FTEs' time is dedicated to operational and administrative tasks.
- The burdened salary of an FTE is $100,000.

The rate at which legacy solutions are retired and the intention to halt the expansion of legacy solutions are key components to the extent of this benefit. The value of the benefit will also vary based on the number of employees and the percentage of their time spent on administrative tasks. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year risk-adjusted total PV of $974,267.

**Benefit 5: Operations And Administrative Costs Reduction: Calculation Table**

| Ref. | Metric | Calculation | Year 1 | Year 2 | Year 3 |
|---|---|---|---|---|---|
| E1 | Number of FTEs tasked with operating on-prem solution | 20% fewer each year | 10 | 8 | 6 |
| E2 | Percent reduction in time dedicated to operational tasks | Interviews | 50% | 50% | 50% |
| E3 | Burdened salary of IT operations | Composite | $100,000 | $100,000 | $100,000 |
| Et | Ongoing operations and administrative costs | E1*E2*E3 | $500,000 | $400,000 | $320,000 |
| | Risk adjustment | ↓5% | | | |
| Etr | Ongoing operations and administrative costs (risk-adjusted) | | $475,000 | $380,000 | $304,000 |

## Unquantified Benefits

Beyond the benefits calculated above, the interviewed organizations experienced the following unquantified benefits.

- **Reduced time-to-market.** The senior engineering manager of a telecommunications company gave an example of how OpenShift has reduced the time-to-market for a project. He told Forrester: "Two years ago, the business wanted to develop a new web portal for one of our network products. In the old pre-OSD world, it would have required spinning up a large project team and a timeline of about six to eight months before we can see something that we can deliver to the customer. It would cost close to $1 million for that entire project. Now, it would take 10 weeks. I'm not saying that's its 100% because of OSD. It also involves implementing agile ways of working, the way you structure your teams, and the software architecture."
- **Increased speed and ability to prototype.** Customers described how the ease and flexibility of OpenShift Dedicated changed the way they think about trying new things, presenting opportunities that were previously too onerous and expensive to execute. The senior engineering manager described the impact on his organization, saying: "I think the key benefit that I see is the speed that we can protype software. This is a radically new way of operating for us. We can move faster now because we are not afraid of spinning up environments and deleting them and trying new things out. The cost of trying new things is less for the business as a unit. Because we don't have to spin up major projects and the risks that comes with multiple infrastructure groups to get an environment set up to deploy an application — because of that, we are moving faster."
- **Avoided hiring costs**. As a result of using a managed service, customers could avoid hiring employees to maintain an on-prem platform. The senior engineering manager told Forrester, "If you think about the on-prem instance and if we had gone live and productized it, our team would have gone to about 10 to 20 people just to manage our own instance and the underlying infrastructure." The senior manager, SDT solution management considered the hiring impact as a part of his decision-making process, saying: "One of the reasons we actually went with Dedicated was that at that time, our resources were limited, and we couldn't get them scaled up, and we didn't need to worry about that with OSD. This has helped us to avoid recruiting internally or hiring Kubernetes-type of engineers."
- **Talent retention.** In addition to avoiding the need to hire new employees, customers voiced that moving to OSD helped them retain existing employees. The director of cloud technologies told Forrester: "First of all, I'm benefiting off all the bells and whistles that come with the technology, but also, I'm benefiting from the people who will stay with me because of it. Otherwise, they are going to start moving outside."
- **Portability and hybrid access.** The director of cloud technologies told Forrester: "One of the advantages of the platform is it allows me portability. I have 200 applications running on OpenShift, and if for some reason, I decided that now, in addition to [Cloud Computing Platform "A"], I would like to upload some of my workload to [Cloud Computing Platform "B"], for example, nothing stops me from setting up my master OpenShift instance on one cloud and decide that there's going to be a slave part of my container management platform on

> "We feel that Red Hat is much more than a typical managed service; they are very much more a partner with us. They will sit with us, they will listen, they will gladly come in and educate. They're listening to us, they're making changes, they're taking our feedback, and we're seeing them adding this to Dedicated. We feel like we're being listened to."
>
> *Senior manager, SDT management, telecommunications*

> "I want 80% of my teams' time spent on solving problems for the business and our customers. I do not want them to be Kubernetes experts."
>
> *Senior engineering manager, telecommunications*

another cloud provider or even on-premises. This allows me to shift workload wherever I want seamlessly."

- **Great partnership.** Each of the interviewed customers spoke highly of their relationship with Red Hat. The senior engineering manager told Forrester: "I think part of our success is because of the way Red Hat approaches customer service. They are very, very helpful and very open when it comes to product road maps and accepting suggestions from myself and my team. It's a very good partnership."

## Flexibility

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. There are multiple scenarios in which a customer might choose to implement OpenShift Dedicated and later realize additional uses and business opportunities, including:

- **Development of new products.** With Red Hat OpenShift Dedicated, teams are able to shift their efforts from configuring and maintaining systems to creating and delivering value to their customers. There are new opportunities to improve and create new products, which could provide additional revenue to customers.
- **Retire legacy hardware.** While the organizations interviewed were not able to cite any benefit from retiring or reducing existing infrastructure, there are cost savings opportunities for organizations that are able to do so.

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

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for a future additional investment. This provides an organization with the "right" or the ability to engage in future initiatives but not the obligation to do so.

# 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 |
|---|---|---|---|---|---|---|---|
| Ftr | Red Hat fees | $19,800 | $258,500 | $346,500 | $423,500 | $1,048,300 | $859,345 |
| Gtr | Labor costs for OpenShift training | $12,096 | $0 | $0 | $0 | $12,096 | $12,096 |
| Htr | Dedicated program lead | $0 | $44,000 | $44,000 | $44,000 | $132,000 | $109,421 |
| | Total costs (risk-adjusted) | $31,896 | $302,500 | $390,500 | $467,500 | $1,192,396 | $980,862 |

The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total costs to be a PV of under $1.0 million.

## Cost 1: Red Hat Fees

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; the base licensing fee for a non-bring-your-own-cloud (non-BYOC) package is based on single- versus multizone clusters and range from $36K to $81K. The costs below are for the composite organization.

- **Professional services implementation consulting.** The senior manager, SDT solution management described how his organization used the Red Hat consultants: “We needed a little bit of tweaking and some help from a Red Hat consultant. They worked with us for about two or three weeks, and then they helped here and there until we had our processes in place and documented.”
- **Multi-availability zone base cluster.** Each new OSD cluster is installed in a single region, with the option to deploy in a single availability zone or across multiple availability zones. Auxois purchases the multi-availability zone base cluster to fit its needs.
- **Custom node sizes.** OSD can scale for customers that have greater needs, as in the case of the satellite telecommunications organization interviewed. The senior manager, SDT solution management said: “Because of our increased use, we’ve had to increase our capacity; that meant procuring and installing new infra nodes. We’ve done that twice each year, and I would say the same thing again.” Auxois purchases an increasing number of nodes each year to scale with its increased use of the platform. The price of custom nodes can vary based on node size and type.
- **Technical account manager.** The technical account manager (TAM) is a dedicated Red Hat employee who serves as an escalated support liaison and is personalized to each company. Auxois purchases this add-on as part of its OSD package.
- **Middleware.** One of the interviewed organizations uses a Red Hat middleware product to provide development templates and images. Auxois purchases this add-on as part of its Red Hat package.

Implementation risk is the risk that a proposed investment may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.



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The cost categories above can vary greatly for each organization. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of $859,345.

**Cost 1: Red Hat Fees: Calculation Table**

| Ref. | Metric | Calculation | Initial | Year 1 | Year 2 | Year 3 |
|---|---|---|---|---|---|---|
| F1 | Professional services implementation consulting (add-on) | Interviews | $18,000 | | | |
| F2 | Multiple availability-zone base cluster | | | $81,000 | $81,000 | $81,000 |
| F3 | Custom application node sizes | Composite | | $42,667 | $116,267 | $177,947 |
| F4 | Technical account manager (add-on) | Interviews | | $90,000 | $90,000 | $90,000 |
| F5 | Middleware | 30% growth each year | | $21,333 | $27,733 | $36,053 |
| Ft | Red Hat fees | F2+F3+F4+F5 | $18,000 | $235,000 | $315,000 | $385,000 |
| | Risk adjustment | ↑10% | | | | |
| Ftr | Red Hat fees (risk-adjusted) | | $19,800 | $258,500 | $346,500 | $423,500 |

## Cost 2: Labor Costs For OpenShift Training

Red Hat offers online learning modules that the interviewed organizations 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 in which developers can experiment and learn OpenShift with a preconfigured instance. Interviewees noted that the training provided to their employees was on how to use OpenShift Dedicated and not on how to manage the platform.

> "There're enough training resources online, and there's quite a bit of Red Hat material available for developers."
>
> *Senior engineering manager, telecommunications*

The director of cloud technologies said, "When my staff have time, I put them on training, so they become superstars on OpenShift Container Platform themselves." The senior manager, SDT solution management had his team undergo training as well, saying, "We did get two or three separate sessions in training on using Dedicated for the people that will be supporting some in operations and specifically the integrations team to understand how it works."

To capture the labor costs of training for the composite organization, Forrester assumes the following:

- As part of the implementation, 10 developers spend several days learning how to use the platform. Ongoing training after the initial implementation is on an ad hoc basis and minimal in nature.
- The salary for a developer is $100,000 per year.

The cost of training will vary by organization. When estimating the cost of training, consider the burdened rate of and number of employees participating in trainings. Developers already familiar with OpenShift will require fewer hours of training, reducing costs, while developers unfamiliar with OpenShift and Kubernetes may require additional training.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted total PV of $12,096.

| Cost 2: Labor Costs For OpenShift Training: Calculation Table | | | | | | |
|---|---|---|---|---|---|---|
| **Ref.** | **Metric** | **Calculation** | **Initial** | **Year 1** | **Year 2** | **Year 3** |
| G1 | Number of FTEs participating in free training | Composite | 10 | | | |
| G2 | Hours of training | 3 days | 24 | | | |
| G3 | Hourly rate of developer FTE | $100,000/2,080 hours (rounded) | $48 | | | |
| Gt | Labor costs for OpenShift training | G1*G2*G3 | $11,520 | $0 | $0 | $0 |
| | Risk adjustment | ↑5% | | | | |
| Gtr | Labor costs for OpenShift training (risk-adjusted) | | $12,096 | $0 | $0 | $0 |

## Cost 3: Dedicated Program Lead

Active relationship management and oversight of the OpenShift Dedicated platform are ongoing efforts that require organizations to assign at least one FTE to act as the dedicated admin.

To capture this cost for the composite organization, Forrester assumes:

- One FTE is a dedicated program lead.
- Forty percent of his or her time is spent on OSD-related tasks.
- His or her annual salary is $100,000.

Actual ongoing OpenShift Dedicated operations, management, and administrative costs will vary depending on each organization's strategy, team structure, oversight practices, and unique needs. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of $109,421.



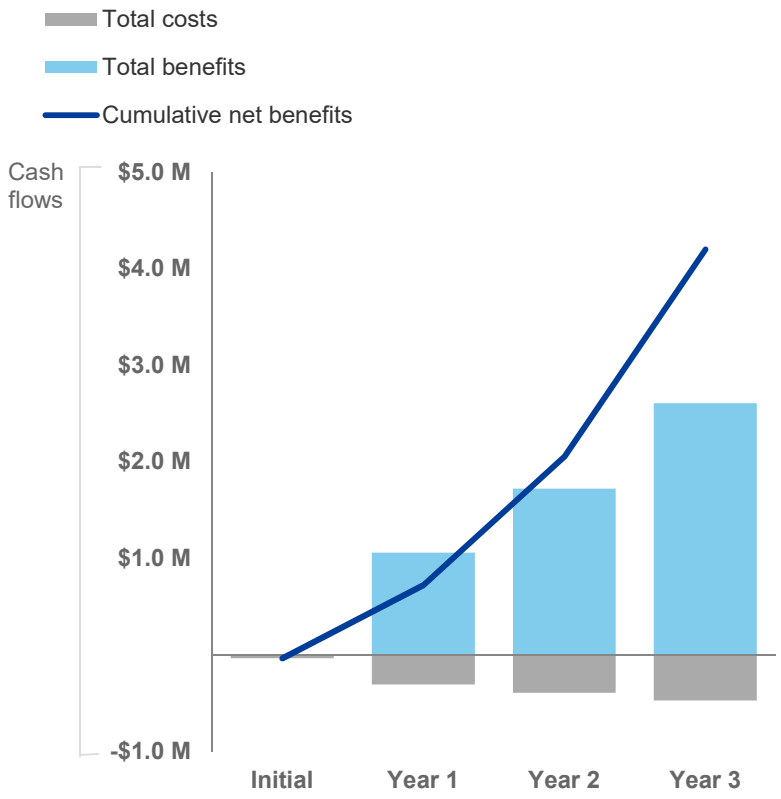
**One FTE**
spends 40% of their time on ongoing management of OpenShift Dedicated.

| Cost 3: Dedicated Program Lead: Calculation Table | | | | | | |
|---|---|---|---|---|---|---|
| **Ref.** | **Metric** | **Calculation** | **Initial** | **Year 1** | **Year 2** | **Year 3** |
| H1 | Number of FTEs to manage OSD | | | 1 | 1 | 1 |
| H2 | Percentage of time spent on OSD | | | 40% | 40% | 40% |
| H3 | Burdened salary of FTE | | | $100,000 | 100,000 | 100,000 |
| Ht | Dedicated program lead | H1*H2*H3 | $0 | $40,000 | $40,000 | $40,000 |
| | Risk adjustment | ↑10% | | | | |
| Htr | Dedicated program lead (risk-adjusted) | | $0 | $44,000 | $44,000 | $44,000 |

# 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 | ($31,896) | ($302,500) | ($390,500) | ($467,500) | ($1,192,396) | ($980,862) |
| Total benefits | $0 | $1,060,494 | $1,722,676 | $2,607,148 | $5,390,319 | $4,346,574 |
| Net benefits | ($31,896) | $757,994 | $1,332,176 | $2,139,648 | $4,197,923 | $3,365,712 |
| ROI | | | | | | 343% |
| Payback period (months) | | | | | | <6 months |



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# Red Hat OpenShift Dedicated: Overview

The following information is provided by Red Hat. Forrester has not validated any claims and does not endorse Red Hat or its offerings.

## RED HAT OPENSHIFT CONTAINER PLATFORM

Built by open source leaders, Red Hat OpenShift is a leading enterprise Kubernetes platform: a security-focused, consistent foundation to deliver applications anywhere, with streamlined developer workflows to get to market faster. Red Hat OpenShift is designed to run on any cloud, with advanced capabilities for hybrid cloud deployments. OpenShift Container Platform can be used across on-premises and public cloud infrastructures, enabling a hybrid approach to how applications can be deployed as a self-managed solution.

OpenShift provides customers with choice of consumption models, self-managed or managed by Red Hat. All OpenShift platform variants are available to help accelerate developer productivity and deliver application portability on a consistent foundation across the hybrid cloud.

## RED HAT OPENSHIFT HOSTED OFFERINGS

**OpenShift Dedicated**
OpenShift Dedicated is a complete OpenShift cluster provided as a cloud service, configured for high availability (HA). OpenShift Dedicated is managed by Red Hat SRE, providing increased security and years of operational experience working with OpenShift in both development and production. OpenShift Dedicated also comes with award-winning 24x7 Red Hat Premium Support.
Learn more about OpenShift Dedicated

**Azure Red Hat OpenShift**
Azure Red Hat OpenShift is a managed service that offers OpenShift clusters on Microsoft Azure. It is jointly engineered and operated by Microsoft and Red Hat with an integrated support experience.
Learn more about Azure Red Hat OpenShift

## DRIVE YOUR JOURNEY WITH RED HAT OPENSHIFT

Red Hat OpenShift has been built to deliver to the needs of both IT teams and application developers. Customers have wide choice in Kubernetes solutions, including do-it-yourself (DIY) platforms built on upstream projects, managed services on public clouds, and other self-hosted platforms. Red Hat OpenShift stands out as a leading choice for customers who want a more secure, supported Kubernetes platform guided by deep expertise. With nearly half of the top Fortune 100 companies using Red Hat OpenShift, a growing number of businesses and government agencies across the globe have trusted in Red Hat to support digital transformation efforts powered with containers and Kubernetes.

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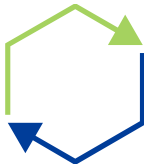
# Appendix A: Total Economic Impact

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 calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations 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.



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