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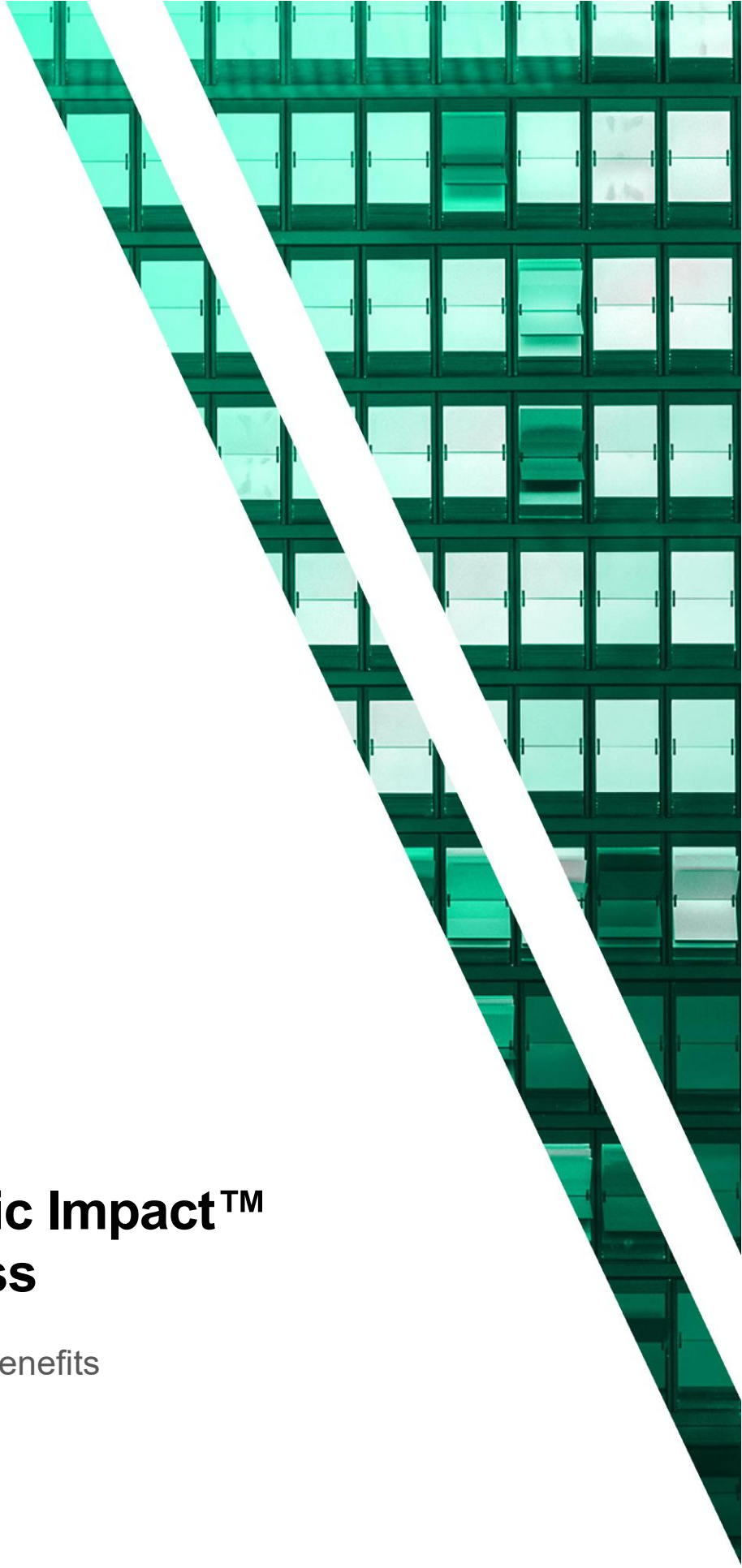

The Total Economic Impact™ Of Docker Business

Cost Savings And Business Benefits Enabled By Docker Business

December 2023

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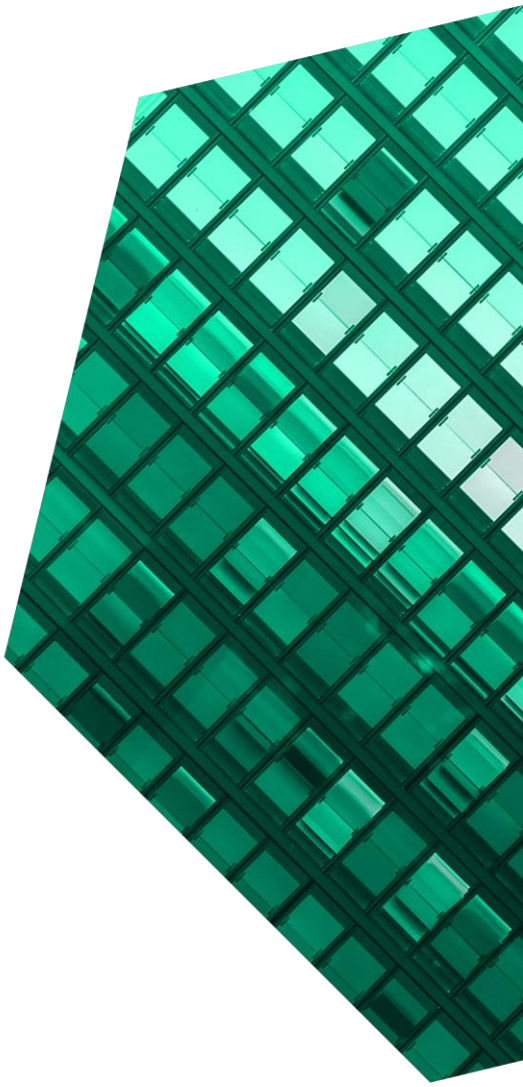


ABOUT FORRESTER CONSULTING

Forrester provides independent and objective research-based consulting to help leaders deliver key transformation outcomes. Fueled by our customer-obsessed research, Forrester's seasoned consultants partner with leaders to execute on their priorities using a unique engagement model that tailors to diverse needs and ensures lasting impact. For more information, visit forrester.com/consulting.

Executive Summary

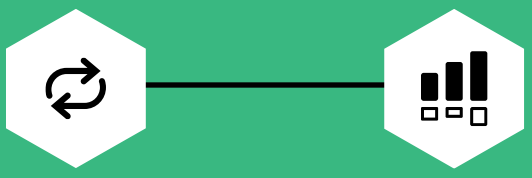
Docker Business offers a solution to the challenges posed by monolithic legacy applications that impede organizations' agility in responding quickly to market changes. By moving from thousands of virtual machines (VMs) to lightweight Docker containers, organizations can significantly reduce their data center footprint and maintenance costs. Docker enables IT teams to build, iterate, and deploy applications faster and more consistently. This agility helps organizations respond faster to business needs, and ultimately drive growth.

Docker Business presents a broad suite of applications and services tailored to improve the developer experience of single developers or engineering teams. Docker Business enhances workflows across different stages of the developer lifecycle, including DevOps and continuous integration (CI)/continuous deployment (CD), site reliability engineering, and IT. Through the innovative practice of containerization, Docker Business enables the seamless packaging, distribution, and execution of applications across diverse computing environments.

Encapsulating applications and their dependencies in lightweight containers eliminates the complexities and resource demands associated with traditional virtual machines (VMs), thereby optimizing data center efficiency. This streamlined development process accelerates application deployment and testing, fostering agility and innovation. Additionally, Docker Business prioritizes security with measures such as isolation and encryption, ensuring the protection of applications and data.

Docker commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Docker Business.[1] The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Docker Business on their organizations.

KEY STATISTICS



Return on investment (ROI)
126%

Net present value (NPV)
$66.9M

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed five representatives with experience using Docker Business. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single composite organization that is a global technology manufacturing organization with annual revenue of $25 billion and an internal software development team of more than 5,000.

Interviewees said that prior to investing in Docker Business, their organizations faced challenges with bloated and slow legacy systems that hindered their ability to respond quickly to market changes. Their IT infrastructures were heavily reliant on thousands of VMs, which resulted in high costs for data center space, hardware, maintenance, licensing, and energy. The time to market for customer-facing applications was slow, with developers taking weeks to build and iterate on apps. This sluggish pace

limited the organizations' agility, which made it difficult for them to keep up with the competition. Finally, the organizations lacked standardized approaches to deployment, which made it difficult to scale applications and automate delivery pipelines.

The shift to Docker Business and containers allowed interviewees' organizations to significantly reduce their data center footprints and accelerate the delivery of customer-facing applications. By moving from thousands of VMs to lightweight Docker containers, IT teams were able to increase server density and consolidate infrastructures without compromising environment consistency. Using fewer VMs translated directly to cost savings from reduced demands for data center space, hardware, maintenance, licensing, and energy.

At the same time, Docker Business improved release velocity, quality, reliability, and efficiency for both developers and IT operations workers. The platform provided the organizations with the ability to package simple or complex multicontainer applications into standardized units, which allowed for much faster deployment and scaling. Developers could build and iterate on mission-critical applications in hours rather than weeks, and automation enabled continuous delivery pipelines to push updates multiple times per day compared to monthly.

Together with a microservices architecture in which applications are built as a collection of small, independent services, this agility helped the interviewees' organizations respond more quickly to market changes. The accelerated time to market and higher release velocity led to receiving customer feedback more quickly, an increase in experiments and features, and higher revenues.

Reduction in servers due to improved VM density

3x

The organizations reinvested a portion of the cost savings from optimizing infrastructure into application innovation and talent to further drive business growth. Docker Business enabled them to transition from using slow legacy systems to using agile, scalable systems, and this positioned them for success in a rapidly changing market while reducing overall costs.

Improved DevOps engineer-to-developer ratio

1:20 to 1:60

KEY FINDINGS

Quantified benefits. Three-year, risk-adjusted present value (PV) quantified benefits for the composite organization include:

- **DevOps engineer-to-developer ratio increase from 1:20 to 1:60.** Docker Business, which includes Docker Desktop and Docker Hub, improves the composite organization's DevOps efficiency by automating and simplifying tasks, which results in resource reallocation or headcount reduction. The composite can complete deployments that once took days in a matter of hours, and it can also perform upgrades that previously required extensive weekend work from multiple engineers within a couple of hours. Docker Business provides the organization with automation, standardization, and enhanced capabilities in areas such as container builds, deployment speed, reliability, security, CI/CD, and scaling, and empowering IT operations personnel and DevOps engineers to focus on core service support. Over three years, the resulting improvement in the engineer-to-

Increased application developer productivity

6%

developer ratio is worth close to $10.1 million to the composite organization.

- **Application developer efficiency increase of 6%.** Docker Business improves the composite organization's developer productivity by providing a lightweight and consistent environment for creating and running applications. It also enables effortless sharing and collaboration among developers, which leads to quicker iteration, integration, and deployment and ultimately facilitates a more agile and efficient development workflow. Over three years, the efficiencies the composite's application development team realizes adds up to nearly $18.8 million.
- **Cost savings for newly containerized applications hosted in the data center due to increased application density.** By containerizing a subset of its monolithic applications, the composite organization achieves more efficient resource utilization and requires fewer VMs and servers to handle the same workload. This leads to reduced infrastructure costs, simplified management, and improved resource utilization in the data center. By reducing the number of servers required in its data center, the composite organization saves close to $3.9 million over three years.
- **Reduced need to increase data center capacity due to hosting newly developed containerized applications in the cloud.** By adopting a container-first approach with Docker Business for new applications and hosting containerized workloads in public cloud environments, the composite organization avoids additional investment in data center resources. This allows for the creation of modern and portable applications that are deployed across various cloud providers, which results in lower costs, simplified management, and three-year cost savings of more than $69.9 million for the composite organization.
- **Acceleration of time to market of revenue-generating applications by three months**. Docker Business accelerates application deployment and release cycles for the composite organization, leading to faster time to market for new applications, features, and enhancements. By simplifying deployment and ensuring consistency across environments, the composite organization packages and distributes applications more easily. This increased agility in application deployment allows the composite to innovate more quickly, deliver business value more efficiently, and improve its operating profit by close to $17.4 million over three years.

Improved time to market for revenue-generating applications

3 months

Unquantified benefits. Benefits that provide value for the composite organization but are not quantified in this study include:

- **Reduced downtime due to reliable service delivery**. Docker Business enables organizations to meet customer expectations of fast and reliable services without downtime. Through container techniques (e.g., automated deployments, easy rollbacks, and high availability

configurations), Docker Business allows for more reliable services and helps meet customer demands for uninterrupted and efficient service delivery.

- **Simplified audits due to enhanced security compliance.** Docker Business helps organizations enhance their security postures and confidence in security compliance. By providing processes that can be included in security compliance audits, Docker Business assures auditors of the security measures in place. The platform also facilitates security scans and vulnerability management, which allows developers to focus on delivering business value while ensuring security measures are taken care of centrally.
- **Attracting developer talent and improving developers' peace of mind.** Running tests with Docker Business and resolving issues quickly allows developers to focus on their work and confidently check on their code without fear of breaking things or being paged. Interviewees said Docker sets the industry standard in streamlining the development process and attracting talent because new developers can quickly become productive and make changes to production on their first day.

Costs. Three-year, risk-adjusted PV costs for the composite organization include:

- **Docker Business subscription and investment in the cloud DevOps ecosystem of tools.** The composite pays for Docker Business subscriptions for close to 3,000 users, and this also covers capabilities for advanced management and monitoring, centralized control and visibility, and corporate-level security features. Training and educational resources are also provided with the Docker Business subscription, which enables the composite organizations to upskill its teams and maximize the value of the technology. The composite organization also implements a series of additional DevOps capabilities and a Kubernetes orchestration platform. The three-year risk-adjusted total PV of this investment for the composite organization is $11.1 million.
- **Docker Business setup, pilot, training rollout, and ongoing standardization and oversight.** The composite organization invests significant time and effort in preparing for the implementation of Docker Business and other DevOps tools. This involves running pilot projects and fine-tuning its DevOps ecosystem for more than a year before launching the platform for general availability. The composite conducts alpha and beta testing with a group of business users to ensure a successful rollout and a smooth transition to the new architecture. Its internal costs also include ongoing investment in creating standards and centrally managed Docker images, as well as developer training in the form of Docker workshops and certifications. The composite's three-year risk-adjusted PV of this investment totals close to $7.8 million.
- **Containerizing legacy applications.** During the period of the analysis, the composite organization dedicates up to 200 developers to the task of breaking down monolithic applications into smaller, containerized ones. Developers spend about 60% of their time on this process, and although time-consuming, it takes an average of approximately one year per application. Over the span of three years, the developers create 72 containerized applications. This investment costs the composite organization nearly $24.6 million in risk-adjusted PV during the three-year period.
- **Cloud solution provider (CSP) hosting fees for new, container-first applications.** The composite's preferred hosting environment for new containerized applications developed with Docker Business is the public cloud. The organization incurs CSP hosting fees for 216 new

applications released into production during the time of this analysis, which amounts to a three-year risk-adjusted PV of just more than $9.6 million.

The representative interviews and financial analysis found that a composite organization experiences benefits of $119.98 million over three years versus costs of $53.1 million, adding up to a net present value (NPV) of $66.9 million and an ROI of 126%.

“The investment pays for itself quite quickly, making it an easy message to convey. We had a clear idea of the savings we could achieve, and we exceeded our expectations. This made it a straightforward message to sell to our investment committee and board.”

— DevOps team lead, general merchandise

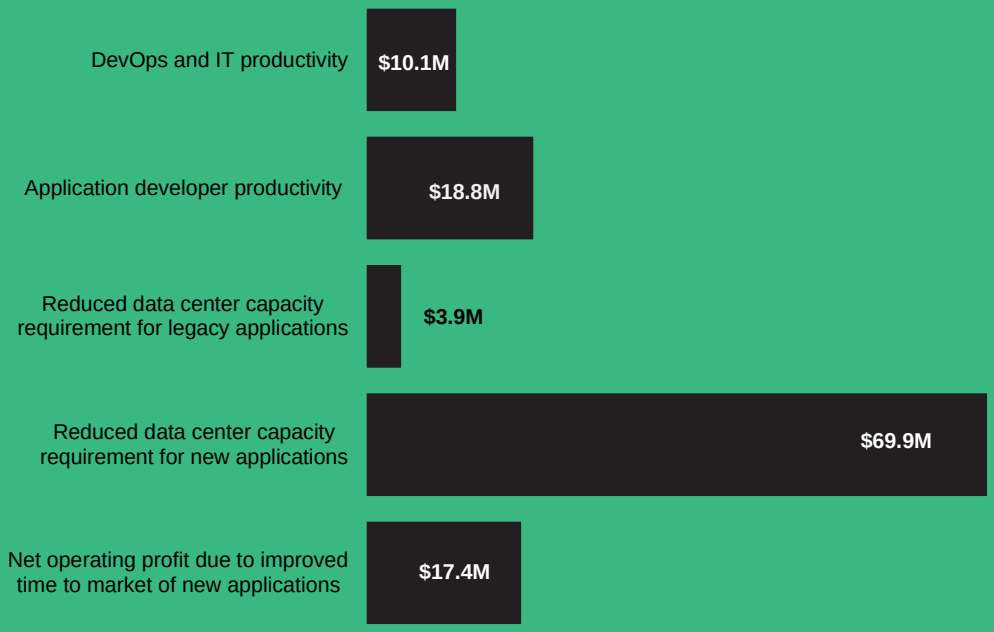
ROI
126%

BENEFITS PV
$119.98M

NPV
$66.9M

PAYBACK
15 months

Benefits (Three-Year)



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 Docker Business.

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 Docker Business can have on an organization.

DUE DILIGENCE

Interviewed Docker stakeholders and Forrester analysts to gather data relative to Docker Business.

INTERVIEWS

Interviewed five representatives at organizations using Docker Business 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 interviewees.

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.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Docker 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 Docker Business.

Docker 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.

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

The Docker Business Customer Journey

Drivers leading to the Docker Business investment

Interviews			
Role	**Industry**	**Headquarters**	**Docker Business Users**
DevOps engineer	IT services	North America	70
Site reliability engineer (SRE)	Technology manufacturing	Europe	4000
DevOps team lead	General merchandise	Asia Pacific	120
Director of technology	Retail	North America	5000
VP of DevOps	Financial services	Europe	800

KEY CHALLENGES

Before investing in Docker Business, interviewees' organizations heavily relied on legacy systems that consisted of large monolithic applications running on thousands of virtual machines in on-premises data centers. Deploying these systems was a hands-on, time-consuming process that required coordination across multiple teams and external partners. Releasing a single feature could take weeks or even months of planning, paperwork, and scheduling. Engineers had limited access to production environments, which caused problems when partners deployed changes without fully understanding the specifications. Interviewees described these processes as inflexible, complicated, delicate, and agonizing.

Their organizations relied on a large number of DevOps personnel or external contractors to manage legacy systems in areas such as operating systems and security. However, making changes to these systems required formal approval and lengthy processes to update standardized architecture documents. The use of manual processes, virtual machines, and external partners resulted in slow and fragmented systems that could not easily adapt to changing business needs. Thus, the organizations sought to modernize their architectures and enable their internal developers to work more efficiently.

> **"The Docker Business suite offered several advantages including improved efficiency and greater autonomy for our development teams who would no longer have to rely on cumbersome manual processes. As we worked to streamline our delivery of solutions and standardize the developer experience, it became evident that Docker Desktop would be crucial in achieving our objectives."**
>
> *DevOps team lead, general merchandise*

The interviewees noted how their organizations struggled with common challenges, including:

- **Complex environments.** Setting up local software development environments was complex and time-consuming.
- **Lack of local code scanning.** The ability to scan code locally before promotion to pipelines was lacking, which hindered the shift of security left.

- **Slow and manual deployment.** Software releases were infrequent and required meticulous planning and coordination, which unnecessarily delayed application deployments.
- **Challenges with updating and scaling.** With monolithic architectures, compatibility issues and complex dependency graphs resulted in slow patching and upgrade processes.
- **Lengthy troubleshooting processes.** Application troubleshooting processes were extensive and involved paperwork and ticketing systems, which limited agility and innovation.
- **Lack of service isolation.** The lack of isolation between services on VMs impacted application performance and availability.
- **Security vulnerabilities with VMs.** Reliance on VMs resulted in security vulnerabilities, necessitating suboptimal solutions like firewalls for mitigation.
- **Need for additional VMs.** Monolithic applications required a high number of VMs and additional servers to handle growing resource demands and workloads.
- **Overprovisioning of VMs.** The inability to easily scale compute capacity and add additional resources led to high infrastructure costs.

"Considering our company's long history and size, we have accumulated a significant number of legacy systems that are monolithic. Our goal is to gradually migrate the monoliths, although not all applications may be suitable for this transition."

VP of DevOps, financial services

"Our goal is to enable squads to shift left and be more efficient. We encourage them to test locally by creating local testing environments, such as database containers, to shorten feedback loops. Our focus now is on guiding squads to be self-sufficient and efficient, rather than building pipelines for them. The templating ecosystem takes care of automating the pipeline creation process."

DevOps team lead, general merchandise

INVESTMENT OBJECTIVES

The interviewees' organizations wanted a solution that would enable them to transition from legacy monolithic applications to containerized environments. The VP of DevOps at a financial services company said: "As product owners, our responsibility is to ensure the ecosystem is in place for developers to thrive and embrace containerization as a transformation opportunity for the business. This will help us move away from legacy ways of working and monoliths, streamlining the business and reducing delivery time."

Investment goals were centered around improving IT efficiency, reducing IT infrastructure footprints, and enhancing the time to market (TTM) of revenue-generating applications. Interviewed decision-makers said their organizations wanted a solution that would:

- **Simplify deployment and management.** The organizations wanted to simplify the deployment and management of applications by being able to package applications and their dependencies into portable and self-contained containers to streamline deployment across different environments and application management.

- **Enable DevOps.** Interviewees' organizations wanted the ability to align with DevOps practices to implement continuous integration and continuous deployment (CI/CD) pipelines to automate the build, test, and deployment processes and allow for faster and more efficient software delivery.
- **Provide isolation and security.** The organizations sought competence to provide a lightweight and isolated runtime environment for applications and ensure they are encapsulated and separated from each other to reduce the risk of security vulnerabilities and conflicts between different components.
- **Be flexible and portable.** Interviewees said their organizations needed to achieve greater flexibility and portability of applications by running containers on any host environment that supports multicloud or hybrid cloud strategies to avoid vendor lock-in and enable workload mobility.
- **Provide efficiency and scalability.** The organizations wanted to achieve better resource utilization by running multiple containers on a single host to improve efficiency in hardware usage and make scalability easier to handle increased workloads.
- **Reduce infrastructure footprints.** Interviewees said their organizations needed the ability to consolidate data center infrastructure by running multiple containers on a single host or across a cluster of hosts to reduce their overall hardware footprints. This could lead to cost savings in hardware procurement, maintenance, and power consumption.
- **Improve time to market.** The organizations wanted to facilitate faster application delivery and deployment cycles by containerizing applications to streamline the development, testing, and deployment processes and provide consistency across different environments to reduce time to market.

> **"Many of our applications are hosted in a private cloud environment using our own on-premises servers. We also have an in-house hosted Kubernetes management system that serves as our platform-as-a-service solution for hosting containers."**
>
> *VP of DevOps, financial services*

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 five interviewees, and it is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite organization is a global technology manufacturing firm with $25 billion in annual revenue. Its internal application development team creates and maintains hundreds of internal and external applications. The organization hosts many of its business-critical applications on-premises while also partnering with cloud service providers as part of its cloud-first strategy.

The composite has a traditional infrastructure that consists of monolithic applications running on thousands of VMs and physical servers in on-premises data centers. Managing this complex setup with its established IT processes is slow and challenging.

Deployment characteristics. A small team creates a proof-of-concept deployment to highlight the advantages of Docker, and this sparks a gradual move towards containerization. The composite spends a year establishing a containerization ecosystem, protocols, and best practices, which results in an increase in Docker adoption throughout the development organization and the creation of a Kubernetes platform to support the containers.

By using the containerization approach, the composite's development teams break monolithic systems into independently deployable microservices. Coupled with process automation, this reduces deployment times from months to days or even hours in certain cases. With this newfound autonomy, developers release their work faster and without worrying about causing issues for others.

Key Assumptions

- **Global technology manufacturing firm**
- **$25B annual revenue**
- **Increases its number of Docker Business users from 600 in Year 1 to 2,600 in Year 3**
- **Containerizes 42 monolithic applications in 3 years**
- **Creates 504 new containerized applications in 3 years**

Best Practices For Transitioning From Monolithic Applications To Microservices

Based on their experiences, the interviewees offered advice and best practices organizations can use to transition to microservices.

- The shift must often be gradual because monolithic systems represent significant legacy investments. Containerizing and decomposing them takes time — often years.
- Starting the journey by adopting Docker Business for new applications and taking a containerized-first approach allows developer teams to get familiar with containers and microservices for greenfield projects.
- For existing monolithic applications, interviewees advise using an initial "lift and shift" approach that means putting VM images into containers without optimization. This can provide operational consistency across new and old applications.
- Over time, as teams grow more comfortable with Docker Business, they can start decomposing monoliths into microservices where possible. However, some monoliths may be too complex or regulated to move completely.
- Larger organizations may leverage orchestrators like Kubernetes to help run and manage containers and microservices while standardized templates accelerate developer onboarding.
- Central security scanning of base-container images helps secure both monoliths and microservices so developers can focus on coding rather than infrastructure.
- Automation and process changes are pivotal in enabling developer autonomy and faster release cycles. Culturally, it requires teams to take ownership of full deployment lifecycles.

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	DevOps and IT productivity	$784,534	$3,285,872	$8,864,213	$12,934,619	$10,088,624
Btr	Application developer productivity	$3,371,550	$6,743,100	$13,486,200	$23,600,850	$18,770,237
Ctr	Reduced data center capacity requirement for legacy applications	$0	$1,260,000	$3,780,000	$5,040,000	$3,881,292
Dtr	Reduced data center capacity requirement for new applications	$0	$22,680,000	$68,040,000	$90,720,000	$69,863,261
Etr	Net operating profit due to improved time to market of new applications	$0	$7,458,750	$14,917,501	$22,376,251	$17,371,995
	Total benefits (risk-adjusted)	$4,156,084	$41,427,722	$109,087,913	$154,671,719	$119,975,409

DEVOPS AND IT PRODUCTIVITY

Evidence and data. Interviewees highlighted how Docker Business profoundly changed their organizations' DevOps processes by automating and simplifying tasks, resulting in resource reallocation or headcount reduction. With containers, the organizations could complete deployments that once took days in a matter of hours, and they could make upgrades that used to demand extensive weekend work from multiple engineers within just a couple of hours. Lower-level support staff was able to handle most issues with containers because they abstract away complex infrastructure details and enable focus on core service support.

Docker empowered IT operations personnel and DevOps engineers by providing automation, standardization, efficiency, and enhanced capabilities in areas such as container builds, environment consistency, infrastructure utilization, deployment speed, reliability, security, monitoring, resource utilization, and scaling.

Interviewees noted the efficiency gains and improvements in DevOps processes enabled by Docker. They highlighted the following capabilities and benefits:

- **Automated container builds.** Dockerfiles and CI/CD pipelines automated application builds, which reduced manual effort and ensured reproducibility.
- **Faster deployment.** Containers simplified and accelerated deployment to Kubernetes clusters, enabling faster application delivery.
- **Environment consistency.** Containers provided standardized environments across development, testing, and staging, which eliminated environment-related issues and reduced time spent troubleshooting.
- **Improved reliability.** Interviewees said Docker's auto-restart policies and distributed architectures increased uptime and made applications more resilient.

- **Enhanced security.** Interviewees said Docker offers features like central base image scanning and RBAC policies to bolster application security.
- **Easier monitoring.** Interviewees said Docker integrates with their organizations' logging and APM tools, which provides visibility into container health and performance.
- **Flexible scaling.** Interviewees said container orchestrators like Kubernetes simplify autoscaling, which enables efficient application scaling based on demand.

These efficiencies contributed to streamlined processes, improved productivity, and enhanced application delivery for the interviewees' organizations.

Interviewees shared several use cases specific to their industries:

- **Technology manufacturing:** The SRE at a technology manufacturing organization said: "In the past, deploying a general feature release involved extensive paperwork, coordination with external partners, and multiple steps such as package selection, planning changes, and scheduling deployments across numerous VMs and services. It required a team of at least four or five people including an engineer, a pre-production code deployer, a production code deployer, and a project manager. However, with Docker [Business], the deployment process is significantly streamlined. Now, only two people are needed for deployment instead of five thanks to automated management."
- **IT services:** The DevOps engineer at an IT services organization explained: "Docker [Business] has greatly reduced deployment time. Whether deploying locally or on servers, it now takes minutes or even seconds. Automated testing inside containers makes the process easier. Previously, deploying virtual machines and applications was time-consuming, taking days for customer deployments. Now, it only takes a few hours. We can easily troubleshoot and replace containers if something goes wrong. Security is also easier to manage with containers. We spend much less time on deployment thanks to Docker [Business]."

  The interviewee added: "Minor maintenance tasks such as upgrades, backups, and firmware updates used to demand weekends of work from multiple engineers, causing downtime for internal and customer-facing services. Physical servers were cumbersome, requiring VM migration between clusters for upgrades. However, containers have significantly reduced these time commitments. Container replacements now

"Docker [Business] enables quick fixes and restoration times in minutes rather than hours or days. Gone are the months-long approval processes and delays caused by outdated technologies."

Director of technology, retail

"Testing solutions on pre-production took a minimum of three days to a week, and every deployment required a formal deployment request to be sent to a mailbox for scheduling. With Docker [Business], deploying to production is much faster and takes a fraction of the time."

SRE, technology manufacturing

enable upgrading in hours instead of days. Quick reproduction of issues simplifies debugging, and orchestrators like Kubernetes automate deployment and management further."

- **Retail:** The director of technology at a retail organization noted: "Releasing software used to require meticulous planning and coordination. However, with Docker [Business], we adopted a mentality of continuous deployment. Code is checked, tests are run, and once it hits the main branch, it is released without delay. This change was challenging at first, but now it's ingrained in our DNA. Docker [Business] allows for rapid fixes and restoration in minutes, minimizing downtime. If an issue arises, we can quickly roll back and restore the system to its previous state. This mindset has transformed our approach to releases, making them less of a big deal and more focused on delivering value to users. Also, Docker [Business] has significantly reduced the need to have a full-time DevOps person support each development team, as a fraction of one person's time can support a large number of individuals.

  The interviewee added: "By fully utilizing the machines and being able to autoscale, we can handle peak usage without the need for time-consuming processes like reimagining VMs and deploying them behind load balancers."

- **General merchandise:** The DevOps team lead at a general merchandise organization explained: "The time savings from creating standardized templates and rolling them out across the ecosystem are significant. We have estimated that implementing this approach saves about 21,000 hours of effort per year for updating existing templates, primarily driven by security alignment. Overall, the annualized hours saved through our Docker-based approach is equivalent to the workload of 35 people."

> **"The use of Docker [Business] for web servers and its simple installation process has greatly contributed to efficiency in managing applications. It has made it easier for our DevOps teams, developers, and support teams to work together and support the infrastructure."**
>
> *DevOps engineer, IT services*

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

- The number of developers who use Docker Business grows from 650 in Year 1 to 2,600 in Year 3. These numbers include both developers assigned to containerizing monolithic applications and development team members tasked with creating new applications from scratch using Docker Business.
- In the composite's legacy environment, its DevOps engineer-to-developer ratio was 1:20. With Docker Business, this ratio improves significantly to 1:60.
- This frees up 22 DevOps resources in Year 1, 43 in Year 2, and 87 in Year 3. It takes two years for the composite to fully realize this improvement because the skills of DevOps engineers and the availability of reusable Docker images grow over time.
- Forrester attributes 65% of this benefit to Docker Business while recognizing that other technologies within the organization's new cloud development ecosystems also contribute to the improved ratio.
- The fully burdened average annual cost of a DevOps engineer is $165,000.

Risks. Factors that can influence the impact of this benefit include:

- The size of the development team and the previous ratio of DevOps engineers to developers.
- The speed at which developers and the IT department adopt Docker Business capabilities and the availability of templates and Docker images for development teams to use.
- How successful the implementation of a cloud ecosystem including Docker Business is.
- The prevailing annual costs of DevOps resources.

Results. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $10.1 million.

DevOps And IT Productivity

Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Developers	Composite	650	1,300	2,600
A2	DevOps FTEs who support developers before using Docker Business at a 1:20 ratio	A1/20	33	65	130
A3	DevOps FTEs who support developers with Docker Business at a 1:60 ratio	A1/60	11	22	43
A4	DevOps FTEs freed up for other tasks	A2-A3	22	43	87
A5	Realization factor	Assumption	35%	75%	100%
A6	Attribution to Docker Business	Interviews	65%	65%	65%
A7	Fully burdened annual cost of a DevOps engineer	Composite	$165,000	$165,000	$165,000
At	DevOps and IT productivity	A4*A5*A6*A7	$825,825	$3,458,813	$9,330,750
	Risk adjustment	↓5%			
Atr	DevOps and IT productivity (risk-adjusted)		$784,534	$3,285,872	$8,864,213
	Three-year total: $12,934,619			**Three-year present value: $10,088,624**	

APPLICATION DEVELOPER PRODUCTIVITY

Evidence and data. Interviewees said application development teams are the biggest user group of Docker Business at their organizations, and these teams varied in size from fewer than 100 to more than 5,000 developers. The interviewees explained that Docker Business enabled developers by providing a lightweight, portable, and uniform environment for creating and running applications. Using Docker Business, developers could bundle their applications and dependencies into containers, which ensured they could function consistently across various environments. This eliminated instances of developers saying, “It works on my machine,” and it streamlined the development process.

Developers were able to effortlessly share and collaborate on application stacks with Docker Business, which led to quicker iteration and deployment. The organizations also seamlessly integrated Docker Business with their CI/CD pipelines, which enabled automated testing, deployment, and version control. As a result, Docker

“Docker Desktop has allowed developers to make changes to containers on their own devices and test them before rolling them through the pipeline. Previously, changes had to be made within an IDE and then tested in the pipeline, which was inefficient. Docker [Business] eliminates the need for a pipeline and greatly enhances the turnaround time, making it the most efficient way of working.”

Director of technology, retail

Business improved developer productivity, accelerated application development, and facilitated more agile and efficient development workflows.

The decision-makers Forrester interviewed stated their organizations’ application developers experienced enhancements in the following ways:

- **Faster setup.** Developers gained the ability to start new projects in minutes with standardized templates instead of needing to wait days or weeks for traditional IT provisioning.
- **Improved development productivity.** Interviewees said Docker Business provides consistent local environments that enable faster coding, testing, and release cycles.
- **Developer autonomy.** Developers gained the ability to build and release applications independently without coordinating with IT workers or others.
- **Polyglot development.** While legacy architectures are restricted to certain languages, Docker Business gave developers the ability to reuse existing libraries, frameworks, or components written in different languages. This saved development time and effort by allowing the developers to leverage the strengths of a particular language or ecosystem.
- **Version consistency.** Containerized dependencies eliminated “works on my machine” issues caused by inconsistencies between developers’ laptops and VMs.
- **Faster testing.** Developers could perform unit and integration testing earlier on local containers.
- **Lower bug rates.** Container consistency led to fewer bugs from environment conflicts.
- **Faster recovery.** Interviewees said rolling back or rebuilding containers is faster than traditional redeployment.

Interviewees shared use cases specific to their industries:

- **General merchandise:** The DevOps team lead at a general merchandise organization explained: “Developers can start coding within 60 seconds using a standardized Docker template. The Docker container also includes integrated test functionality, enabling local testing and a shift left in development. Additionally, our top priority is to make sure that developers are well-informed about security. Using our templated system in Docker [Business] has many benefits, including the ability to quickly update templates to address any security vulnerabilities. These updates can then be made available to squads for a swift and efficient upgrading process. We leverage Docker [Business] as a key component in this process."
- **Financial services:** The VP of DevOps at a financial services organization said: “Docker Desktop has allowed developers to make changes to containers on their own devices and test them before rolling them through the pipeline. Previously, changes had to be made within an IDE (integrated development environment) and then tested in the pipeline,

which was inefficient. Docker [Business] eliminates the need for a pipeline and greatly enhances the turnaround time, making it the most efficient way of working. Some teams even develop within a container, committing their code exclusively within a development container."

- **Retail:** The director of technology at a retail organization noted: "Having a smaller dependency chain and more autonomy for each team enables quicker decision-making and implementation of the appropriate tools for the task at hand. The use of Docker [Business] has prompted a reevaluation of architecture. By utilizing Docker [Business], we have broken down complex systems into microservices, which simplifies the logic and offers developers the ability to make changes without disrupting other functionalities. This has decreased complexity and improved the quality of our applications."

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

- The number of developers who use Docker Business grows from 650 in Year 1 to 1,300 in Year 2 and to 2,600 in Year 3. This number includes both developers assigned to containerizing monolithic applications and development team members tasked with creating new applications from scratch using Docker Business.
- Overall productivity across the development team increases by 6%. This represents the net efficiency that can be directly attributed to Docker Business.
- The fully burdened average annual salary of a developer is $140,000.
- Developers apply 65% of their gained efficiencies to productive tasks.

"Thanks to Docker [Business] and standardized templates, we've saved a lot of time and successfully completed major projects as scheduled. Development teams are much more autonomous in experimenting and testing locally, and we no longer face delays in development as the bottleneck has shifted to the process of making business decisions."

DevOps team lead, general merchandise

Risks. Factors that can influence the impact of this benefit include:

- The extent to which the organization adopts Docker Business and integrates it into its development processes and infrastructure.
- The proficiency of the organization's developers and IT teams in utilizing the capabilities of Docker Business, including their ability to create and manage containers, optimize performance, and troubleshoot issues.
- The availability and quality of Docker templates, images, and tools that support the organization's development and deployment processes.
- The ability of the organization's infrastructure to support the scaling of Docker containers and the associated resources required for efficient development.
- The prevailing annual cost of developer resources.

Results. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $18.8 million

Application Developer Productivity					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
B1	Application developers	Composite	650	1,300	2,600
B2	Percent increase in application developer productivity due to Docker Business	Composite	6%	6%	6%
B3	Fully burdened annual salary of an application developer	TEI standard	$140,000	$140,000	$140,000
B4	Percentage of time recaptured	Assumption	65%	65%	65%
Bt	Application developer productivity	A1*A2*A3*A4	$3,549,000	$7,098,000	$14,196,000
	Risk adjustment	↓5%			
Btr	Application developer productivity (risk-adjusted)		$3,371,550	$6,743,100	$13,486,200
	Three-year total: $23,600,850			**Three-year present value: $18,770,237**	

REDUCED DATA CENTER CAPACITY REQUIREMENT FOR LEGACY APPLICATIONS

Evidence and data. Interviewees' organizations employed varying strategies for containerizing legacy applications; some set out to containerize most of their in-house-built applications over time, while larger organizations identified subsets of their monolithic applications that warranted the effort of containerization.

The director of technology at a retail company explained their organization's strategy for legacy applications: "Initially, we took a lift-and-shift approach where we put existing applications into Docker containers without optimizing them. This allowed us to have a consistent infrastructure for DevOps, and [it] simplified monitoring. Over time, we started breaking down the monolith and creating smaller, more efficient Docker services. This allowed us to adopt scrum and agile methodologies, resulting in faster release cycles and continuous deployment."

Most of the interviewees' organizations continued to host the newly dockerized applications on VMs because they wanted to ensure optimal performance for applications with varying resource requirements and to provide a bridge between containerized applications and legacy systems in hybrid environments. At the same time, interviewees reported that their organizations' newly containerized applications achieved more efficient resource utilization compared to their monolithic applications and that they typically required fewer VMs. This meant fewer servers could handle the workloads.

"The return on investment was achieved in less than a year, and we continue to benefit from ongoing [hardware cost] savings without needing to reinvest the same amount every year."

DevOps team lead, general merchandise

Containerization also allowed the organizations to reduce the number of VMs required to host the same number of applications. The improved application density resulted in reduced infrastructure costs, simplified management, and improved resource utilization in data centers. The SRE at a technology

"Deploying services using Kubernetes and Docker [Business] can reduce the number of VMs required for load balancing and high availability, resulting in cost savings. For example, deploying five services with load balancing and high availability using VMs would require 15 VMs. But with Kubernetes, it might only require four VMs."

SRE, technology manufacturing

manufacturing firm provided an example of improved application density: "There was always a concern about isolating services from different areas or projects on a single VM to avoid negative impacts. However, with Docker [Business], services can be hosted alongside each other on a single VM in an isolated environment, making it easier to deploy and orchestrate them."

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

- The number of developers who use Docker Business to containerize monolithic applications grows from 50 in Year 1 to 100 in Year 2 to 200 in Year 3.
- Each developer has the capacity to create an average of 12 microservices or containers per year.
- Based on this capacity, the developers create a total of 4,200 containers over three years, which equates to a total of 42 formerly monolithic and newly containerized applications. Each application comprises an average of 100 containers.
- The composite has an average of 10 containers per VM and three VMs per server. This is only one-third of the VM and server requirements of the organization's previous monolithic applications.
- As a result, the composite organization hosts new containerized applications on just one-third of the number of physical servers that were previously required.
- The average cost per server hosted in the corporate data center is $35,000.
- The composite realizes the resulting cost savings with a 12-month delay, which is the average time it takes to containerize monolithic applications.

Risks. Factors that can influence the impact of this benefit include:

- The number of monolithic applications the organization containerizes and the speed at which this work is completed.
- The average VM density in the organization's data center.
- The organization's average cost of hosting server infrastructure in its on-premises data center.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $3.9 million.

Reduced Data Center Capacity Requirement For Legacy Applications					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
C1	Developers who containerize legacy applications	Composite	50	100	200
C2	Docker Business containers created per developer	Composite	12	12	12
C3	Docker Business containers created	C1*C2	600	1,200	2,400
C4	Legacy applications containerized at an average of 100 containers per app	C3/100	6	12	24
C5	VMs required for containerized applications at an average of 10 containers per VM	Composite	60	180	420
C6	Servers required to host newly containerized applications at an average of 3 VMs per server	C5/3	20	60	140
C7	Virtual machines required to host previous monolithic applications	C5*3	180	540	1,260
C8	Servers required to host previous monolithic applications at 3 VMs per server	C7/3	60	180	420
C9	Servers potentially eliminated after containerization of legacy applications	C8-C6	40	120	280
C10	Average cost per server hosted on-premises	Composite	$35,000	$35,000	$35,000
C11	Potential cost savings from reduced server capacity requirement	C9*C10	$1,400,000	$4,200,000	$9,800,000
Ct	Reduced data center capacity requirement for legacy applications	Composite	$0	$1,400,000	$4,200,000
	Risk adjustment	↓10%			
Ctr	Reduced data center capacity requirement for legacy applications (risk-adjusted)		$0	$1,260,000	$3,780,000
	Three-year total: $5,040,000			**Three-year present value: $3,881,292**	

REDUCED DATA CENTER CAPACITY REQUIREMENT FOR NEW APPLICATIONS

Evidence and data. Interviewees revealed that their organizations opted for a container-first approach using Docker Business for new applications. They created these containerized applications to be cloud-native and utilized flexible and cost-effective cloud infrastructure instead of traditional on-premises data centers. By using public cloud environments to host their new containerized workloads, some of the organizations saved considerably on infrastructure costs. Implementing a container-first strategy allowed them to build modern and portable applications that could be deployed across various cloud providers.

The DevOps team lead at a general merchandise firm explained: “Creating and managing virtual machines comes with significant costs, including hardware, installation, monitoring, and management. If we had continued down that path, the investment would have been tenfold. Instead, by leveraging cloud services, we were able to start small with minimal investment and gradually grow over time. The investment in cloud infrastructure was significantly less compared to the equivalent investment in hardware and virtual machines. Today,

"Maintaining physical servers is expensive and requires additional resources like engineers and backup systems. Now, a cluster is just thousands of containers, and it gives us peace of mind knowing everything is running smoothly in the cloud. This shift to containers and cloud services is part of our cost-saving initiative."

VP of DevOps, financial services

running our containers costs us approximately $100,000 per year. If we had continued with the traditional infrastructure, it would have easily cost us $1 million per year."

The DevOps engineer at the IT services firm stated that using Docker Business resulted in lower costs due to a reduced need for infrastructure, hardware, and specialized personnel compared to maintaining VM and bare metal environments. They said: "Cost-saving is a significant advantage as we eliminate bare metal or virtual machines and transition to container-based applications that are easier to support and run smoothly in the cloud."

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

- The number of developers who use Docker Business to create new applications grows from 600 in Year 1 to 1,200 in Year 2 to 2,400 in Year 3.
- Each developer has the capacity to create an average of 12 microservices or containers per year.
- Based on this capacity, the developers create a total of 50,400 containers over three years, which equates to a total of 504 new containerized applications. Each application comprises an average of 100 containers.
- Each VM has an average of 10 containers.
- Previously, the composite organization would have required three times the number of VMs — thus three times the number of servers — to host the same number of new applications in its data center.
- In its corporate data center, it costs the composite an average of $35,000 to host a server. However, by hosting all new applications in the public cloud, the organization eliminates this cost entirely. The cost of hosting new applications with a CSP is included in this cost for the composite.
- The composite realizes these cost savings with a 12-month delay, which is the average time it takes to create a new application.

Risks. Factors that can influence the impact of this benefit include:

- The number of new applications the organization builds and the speed at which this work is completed.
- The average VM density in the organization's data center.

"We embraced containers and cloud services and decided to host all new applications in the cloud. The transition from bare metal and virtual machines to containers and cloud services has made managing everything much easier."

DevOps engineer, IT services

- The average cost of hosting server infrastructure in the organization's on-premises data center.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $69.9 million.

Reduced Data Center Capacity Requirement For New Applications

Ref.	Metric	Source	Year 1	Year 2	Year 3
D1	Developers who create new containerized applications	Composite	600	1,200	2,400
D2	Docker Business containers created per developer	Composite	12	12	12
D3	Docker Business containers created annually	D1*D2	7,200	14,400	28,800
D4	New containerized applications at an average of 100 containers per app	D3/100	72	144	288
D5	VMs required for containerized applications at an average of 10 containers per VM	Year 1: D3/10 Year 2: D3/10+D5 Y1 Year 3: D3/10+D5 Y2	720	2,160	5,040
D6	VMs required using legacy application development approach	D5*3	2,160	6,480	15,120
D7	Servers required to host applications created with legacy development approach at an average of 3 VMs per server	D6/3	720	2,160	5,040
D8	Average cost per server hosted on-premises	Composite	$35,000	$35,000	$35,000
D9	Potential cost savings from reduced server capacity requirement	D7*D8	$25,200,000	$75,600,000	$176,400,000
Dt	Reduced data center capacity requirement for new applications	Composite	$0	$25,200,000	$75,600,000
	Risk adjustment	↓10%			
Dtr	Reduced data center capacity requirement for new applications (risk-adjusted)		$0	$22,680,000	$68,040,000
	Three-year total: $90,720,000			**Three-year present value: $69,863,261**	

NET OPERATING PROFIT DUE TO IMPROVED TIME TO MARKET OF NEW APPLICATIONS

Evidence and data. Interviewed decision-makers said Docker Business accelerated application deployment and release cycles and that using a containerized approach simplified deployment by minimizing dependencies and ensuring consistency across various environments. They said Docker Business made it easier to package and distribute applications, which led to faster delivery of features. Each interviewee reported that this agility in application deployment translated to faster time to market for new applications, new features, and enhancements, which enabled their organizations to innovate faster and stay competitive.

- **Retail:** The director of technology at a retail organization noted: "In my area, we had a problem with low velocity and struggled to make changes quickly. The breaking point was when a simple request to add a column to a web page was estimated to take six weeks. We realized the complexity of the existing system was hindering our progress. We decided to rebuild the core functionality from scratch, starting with Docker

[Business]. In just six weeks, we were able to rebuild the entire platform whereas, before, it would have taken six weeks just to add one column to a table in the legacy system. This demonstrates the massive efficiency gains, velocity, and quality improvement achieved through Docker [Business]."

The interviewee added: "My team works with both legacy systems and new technologies. We focus on improving visibility into inbound shipments, which used to take six to eight months to change in the legacy system. With the dockerized system, we can make the same change in four to six weeks. This shift from months to weeks has been a driving factor for my team. By embracing Docker [Business] and adopting an agile approach, we have been able to serve more customers faster. It's not just about following scrum processes, but truly delivering business value in a quick and efficient manner."

- **Technology Manufacturing:** The SRE at a technology manufacturing organization explained: **"**As a manufacturer, we understand the importance of our external-facing application, which is what our customers interact with. As digital services became integral to our core product, we shifted our focus towards becoming a software company that builds software and services for our customers. To deploy any application that can expose a port, we started using Docker containers. This has not only helped DevOps operate and run application workloads smoothly, but [it] has also made it easier for developers to create applications faster and more efficiently than before. Consequently, our time to market for digital services has improved significantly."

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

"One major impact of moving to Docker [Business] was that we have seen a faster time to market. Having a smaller dependency chain and more autonomy for each team enables quicker decision-making and implementation of the appropriate tools for the task at hand."

Director of technology, retail

- The annual revenue of the composite organization is $25 billion.
- Ten percent of the new applications the composite develops are customer-facing and directly contribute to the organization's annual revenue.
- As a result of more efficient application development processes, the organization launches new applications three months faster than it could before, resulting in an additional three months of revenue capture per application.
- The composite realizes the resulting revenue uplift with a 12-month delay, which is the average time it takes to create a new application.
- Forrester attributes 65% of this benefit to Docker Business while recognizing that other technologies within the organization's new cloud development ecosystems also contribute to this faster time to market of new applications.
- The organization's operating profit margin is 6%.

Risks. Factors that can influence the impact of this benefit include:

- The organization's annual revenue.
- The number of new revenue-generating applications the organization releases per year.

- The speed at which new features and applications impact the organization's bottom line.

Results. To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $17.4 million.

"These time savings have allowed us to do more and achieve business results faster. In some cases, developers have been able to create a solution in just two weeks, which was previously unheard of in the business."

DevOps team lead, general merchandise

Net Operating Profit Due To Improved Time To Market Of New Applications

Ref.	Metric	Source	Year 1	Year 2	Year 3
E1	Revenue	Composite	$25,000,000,000	$25,000,000,000	$25,000,000,000
E2	New revenue-generating applications released	Composite	0	7.2	14.4
E3	Time gained bringing new revenue-generating applications to market (months)	Interviews	3	3	3
E4	Average monthly revenue contribution per new application	E1*0.005/12 months	$10,416,667	$10,416,667	$10,416,667
E5	Revenue overage from faster time to market	E2*E3*E4	$0	$225,000,007	$450,000,014
E6	Attribution to Docker Business	Assumption	65%	65%	65%
E7	Operating profit margin	TEI standard	6%	6%	6%
Et	Net operating profit due to improved time to market of new applications	E5*E6*E7	$0	$8,775,000	$17,550,001
	Risk adjustment	↓15%			
Etr	Net operating profit due to improved time to market of new applications (risk-adjusted)		$0	$7,458,750	$14,917,501
	Three-year total: $22,376,251			**Three-year present value: $17,371,995**	

UNQUANTIFIED BENEFITS

Interviewees mentioned the following additional benefits that their organizations experienced but were not able to quantify:

- **Reduced downtime due to reliable service delivery.** The DevOps engineer at the IT services firm explained how using container techniques available through Docker Business allowed their organization to meet customer expectations. They said: “Customers increasingly expect fast, reliable service without downtime. Containers make it possible to deliver that through automated deployments, easy rollbacks, and high-availability configuration.”
- **Simplified audits due to enhanced security posture.** The director of technology at the retail company shared: “While working towards SOC 2 (System and Organizational Controls) Type 2 compliance, we educated the auditors on the temporary nature of containerized machines and the benefits it offered. Docker provides processes that could be included in our SOC 2 Type 2 compliance, which gave the auditors confidence in our security. The temporary nature of containers makes it difficult for potential attacks to have a significant impact. Docker [Business] provided us with the confidence we needed and helped us achieve SOC 2 Type 2 compliance.”

  The same interviewee added: “Docker [Business] facilitates security analysis and aggressive management of vulnerabilities at both the [operating system] and software levels. Docker [Business] allows developers to focus on delivering business value while security measures are taken care of centrally."
- **Attracting developer talent and improving developers’ peace of mind.** Teams using Docker Business can work confidently and with peace of mind. With tests being run and issues quickly resolved, developers can check in their code without worrying about breaking things or being paged.

  The director of technology at the retail company pointed out: “Teams no longer wait for releases or worry about breaking things. They can confidently check in their code knowing that tests have been run and any issues can be quickly resolved. This allows them to focus on their work without the fear of being paged or spending their weekends fixing problems.”

  Interviewees said their teams are enthusiastic about Docker Business and stated that developers see Docker as an industry standard that allows them to work in a different way and keep their skills current and transferable. They said this streamlined developer experience not only contributed to staff retention, but that it also attracts talent from other companies. Interviewees said Docker Business is so easy to use and brings so much efficiency to their

“Users are very enthusiastic and see Docker as an industry standard. It excites people and allows them to work in a different way, keeping their skills current and transferable.”

VP of DevOps, financial services

“Our efforts in creating a streamlined developer experience have contributed to staff retention and have even attracted talent from other companies.”

DevOps team lead, general merchandise

organizations' development processes that new developers can be productive immediately. The director of technology at the retail company said, "One of the main benefits of using Docker [Business] is that a new developer can join the team and be able to push a trivial change into production by lunchtime on their first day."

FLEXIBILITY

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

- **Unlocking the value of Docker Desktop plug-ins and extensions**. Interviewees discussed exploring new capabilities and extensions to Docker Desktop including Docker Scout, which helps organizations shift security left by enabling developers to manage container vulnerabilities on their own devices. While container scanning typically takes place during procurement and promotion in the pipeline, two of the decision-makers mentioned exploring Docker Scout as an additional tool to provide this capability.

  The DevOps engineer at the IT services firm talked about the value of additional plug-ins and extensions: "Docker [Business] has many useful plug-ins that can be found in Docker Desktop … [including] Portainer for managing containerization in a graphical interface. This is helpful for Level 1 support and avoids the need to access the command line interface SSH (Secure Shell). Docker extensions are a hot topic for my company as they extend the capabilities of Docker Desktop, with thousands of options from different providers. It's crazy how much value these extensions bring as they enhance servers and provide a variety of additional services."

- **Opportunities accessible through the partnership with Docker.** Interviewees mentioned various benefits their companies experienced after upgrading to Docker Business.

"I am collaborating with Docker to implement Docker Scout, a tool that compares differences between two images. It's available to my team through Docker's early-access program and addresses a gap in the container security process. This feature is still in beta, but [it] has proven to be very useful."

VP of DevOps, financial services

Some of the advantages that they highlighted include:

- **Enhanced support and maintenance.** The Docker Business subscription comes with access to a dedicated support team with enhanced services, including 24/5 service, fast response times, priority support, and desktop support for versions up to six months older than the latest versions.
- **Advanced security features.** Interviewees said security of containerized applications was a major concern for their organizations and that Docker Business offers additional security features to enterprise customers. This includes image analysis, vulnerability assessment, and access controls.
- **Enterprise-grade management and monitoring.** A Docker Business subscription offers advanced management and monitoring tools that provide centralized control and visibility into container environments. This allows companies to manage and monitor their applications at scale, and it includes features such as resource management

and advanced logging and monitoring capabilities.

- **Integration with existing infrastructure and tools.** Companies can seamlessly integrate Docker Business with their existing infrastructures and tools, including enhanced compatibility, integrations with popular CI/CD tools and support for enterprise-grade infrastructure components. This allows companies to leverage the investment in their DevOps ecosystems to ensure a smooth transition to Docker Business.
- **Training and education.** Docker Business customers can leverage training programs, workshops, and certifications tailored to specific roles and needs. Interviewees said these resources helped their companies upskill their teams, improve their Docker Business adoption, and maximize the value derived from the technology.
- **Long-term partnership.** Interviewees said they view their organization's partnership with Docker as a long-term relationship that is reliable and strategic. The organizations leveraged the paid version's features, support, and future enhancements, and interviewees said they value the continuous innovation, roadmap, and industry leadership provided by Docker.

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

Benefits Of Docker Business Containerization On Improving Infrastructure Efficiency

Interviewees said their organizations saw the following benefits of using Docker Business:

A reduction of hardware resources due to efficiency gains by packing more applications into the same infrastructure. Interviewees said using Docker's containerization technology allows for packing of multiple applications into the same infrastructure, which led to higher application density. In turn, this reduced the need for additional hardware resources and optimized the overall usage of infrastructure.

Improved infrastructure utilization by right-sizing resource allocation. Interviewees said containers provide the flexibility to allocate resources precisely according to the requirements of each application. They explained that by right-sizing resource allocation, containers help maximize the utilization of infrastructure and ensure that resources are efficiently utilized without unnecessary waste.

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	Docker Business fees and cost of containerization ecosystem	$0	$2,296,909	$4,083,394	$7,521,185	$13,901,488	$11,113,582
Gtr	Internal costs	$1,039,500	$1,303,470	$2,433,690	$4,694,130	$9,470,790	$7,762,556
Htr	Legacy application containerization costs	$0	$4,410,000	$8,820,000	$17,640,000	$30,870,000	$24,551,540
Itr	CSP fees to host new container-first applications	$0	$0	$3,129,840	$9,389,520	$12,519,360	$9,641,130
	Total costs (risk-adjusted)	$1,039,500	$8,010,379	$18,466,924	$39,244,835	$66,761,638	$53,068,808

DOCKER BUSINESS FEES AND COST OF CONTAINERIZATION ECOSYSTEM

Evidence and data. During the interviews, some interviewees stated that their organization made significant investments in their building technology ecosystems to support their container and cloud development strategies. These expenses included the cost of a Docker Business subscription, which is licensed per user per month, as well as other tools and technologies that are essential to the cloud DevOps ecosystem. The Docker Business subscription fees typically accounted for less than 10% of these total costs.

The DevOps team lead at the general merchandise firm explained: “In our DevOps ecosystem, we have 12 technology components for things like CI/CD, our containerization orchestration platform, and tools for configuration management, monitoring, and logging. We have invested significantly in this ecosystem over the past few years. This investment has focused on creating a platform that integrates all 12 systems, ensuring smooth operation and automation."

Other interviewees’ organizations leveraged the advanced management and monitoring tools included with the Docker Business subscription. These tools enabled centralized control and visibility into the organizations’ container environments, which made it easier for them to manage and monitor their applications at a scale. The features of the Docker Business subscription include container orchestration, resource management, and advanced logging and monitoring capabilities.

Interviewees also said the Docker Business subscription provided corporate-level security features such as image scanning, vulnerability assessment, access controls, compatibility enhancements, integrations with popular CI/CD tools, and support for enterprise-grade infrastructure components for all organizations.

They also said their Docker Business subscriptions included access to training and educational materials, training programs, workshops, and certifications tailored to specific roles and needs. These resources helped the organizations upskill their teams, improve Docker adoption, and maximize the value derived from the technology.

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

- The composite has 661 Docker Business users in Year 1, and this doubles each year. This number includes all developers and DevOps engineers.
- The composite's Docker Business subscription starts at $243 per user per year in Year 1, but it decreases to $199 per user per year in Year 3 due to a volume discount for enterprise users. Subscription fees include coverage for standard support and customer care.
- As more of the composite's teams adopt containerized development, its investment in its DevOps ecosystem also increases. The cost of its Docker Business licenses amounts to approximately 8% of the total ecosystem cost. The composite's cost for the DevOps toolset is calculated 12 times the cost of its Docker Business subscription.

Risks. Factors that may influence the impact of these costs include:

"We have had constant contact with our Docker account manager and appreciate their care for our success."

DevOps team lead, general merchandise

- The size of the development and DevOps teams adopting Docker Business.
- The DevOps technology landscape the organization builds, including the requirement to implement a Kubernetes orchestration platform.

Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $11.1 million.

Docker Business Fees And Cost Of Containerization Ecosystem

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
F1	Docker users	Composite		661	1,322	2,643
F2	Docker Business subscription cost per user	Composite		$243	$216	$199
F3	Total cost of Docker Business subscriptions	F1*F2		$160,623	$285,552	$525,957
F4	Investment in the DevOps/cloud containerization ecosystem	Interviews		$1,927,476	$3,426,624	$6,311,484
Ft	Docker Business fees and cost of containerization ecosystem	F3+F4	$0	$2,088,099	$3,712,176	$6,837,441
	Risk adjustment	↑10%				
Ftr	Docker Business fees and cost of containerization ecosystem (risk-adjusted)		$0	$2,296,909	$4,083,394	$7,521,185
	Three-year total: $13,901,488			**Three-year present value: $11,113,582**		

INTERNAL COSTS

Evidence and data. A common thread among interviewees was that their organizations invested considerable time preparing for full-scale implementations of Docker Business and other DevOps tools. They typically ran multiple pilot projects and fine-tuned their DevOps ecosystems for more than a year before launching it for general availability. This allowed for careful planning and ensured that the new approach to building applications met the unique needs of the organizations.

Several of the organizations undertook alpha and beta testing with groups of business users to prepare for their full-scale implementations. The VP of DevOps at the financial services organization said: "After determining the engineering strategy, we implemented Docker [Business] in a preproduction environment, followed by alpha and beta testing with a group of business users. These users were instrumental in preparing for the general availability launch later in the year."

Interviewees also emphasized the importance of implementing organizational, technical, and cultural changes to successfully modernize their enterprise architectures. They said they expected to encounter operational obstacles during the shift from monolithic systems to microservices and made efforts to overcome them.

"To facilitate adoption, we have a dedicated DevOps team that creates Docker images, supports the environment, and makes it easy for developers to use Docker [Business] successfully. This team plays an important role in the adoption curve and helps developers become comfortable with Docker [Business]."

VP of DevOps, financial services

"As part of our process, my team is required to update all libraries once a quarter. This task is relatively quick and doesn't disrupt our workflow much, thanks to Docker [Business]."

DevOps team lead, general merchandise

Interviewees said that in the year prior to their Docker Business rollouts, pilot teams usually concentrated on initiatives that tackled the following challenges:

- **Technical debt and legacy constraints.** The organizations' monoliths represented large sunk investments over decades. Unraveling the entanglements to decompose them was key in preparing for the larger-scale adoptions.
- **Skill gaps.** Developers trained for monoliths initially lacked experience with containers and modern architectures, and reskilling at scale required preparation and thoughtful planning. Interviewees said the new architecture required gradual adjustment of developer, ops engineer, security, and SRE skills.
- **Cultural inertia.** Teams were set in their ways and resistant to change. The new model required a mind shift to more ownership from developers.
- **Regulation and compliance.** The organizations could not easily move heavily regulated systems to the cloud or containers, and they required thorough planning of security controls.
- **Legacy integrations.** Tight coupling and dependencies between systems made breaking them down risky. Refactoring interfaces was

complex and required pilot teams to build standards and templates centrally.

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

- The composite organization invests the full-time equivalent (FTE) of six DevOps engineer's time in setting up and testing Docker Business to gain hands-on expertise with the environment, run alpha and beta tests with small groups of business users, and create standards and Docker images for the development team in preparation for the launch.
- The ongoing upkeep of the Docker Business environment and the effort of creating and maintaining Docker images requires one DevOps engineer FTE.
- Developers invest an average of 2 hours per month in formal Docker Business training, which includes self-paced training workshops and certifications.

Risks. Factors that may influence the impact of these costs include:

> **"Learning Docker [Business] itself is not hard, and Docker provides comprehensive documentation and a supportive community. Compared to other technologies, Docker [Business] is much simpler to configure and use."**
>
> *DevOps engineer, IT services*

- The effort required to set up, test, and pilot the a Docker Business environment and cloud development practice.
- The complexity of the application landscape and the resources required to implement corporate standards and centrally managed Docker images.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $7.8 million.

Internal Costs

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	Initial pilot, setup, and training costs	Composite	$990,000			
G2	Ongoing effort by DevOps engineers to set up, standardize, and customize Docker Business	Composite		$165,000	$165,000	$165,000
G3	Developers trained	Composite		650	1,300	2,600
G4	Average time spent on training related to Docker Business (hours)	Composite		24	24	24
G5	Blended fully burdened hourly cost of a Docker Business user	TEI standard		$69	$69	$69
Gt	Internal costs	G1+G2+(G3*G4*G5)	$990,000	$1,241,400	$2,317,800	$4,470,600
	Risk adjustment	↑5%				
Gtr	Internal costs (risk-adjusted)		$1,039,500	$1,303,470	$2,433,690	$4,694,130
	Three-year total: $9,470,790			**Three-year present value: $7,762,556**		

LEGACY APPLICATION CONTAINERIZATION COSTS

Evidence and data. Several interviewees said breaking up monolithic applications and containerizing them was a top priority for their organization. However, the DevOps engineer at the IT services firm pointed out the challenges involved in determining which legacy applications are worth containerizing: "Given our company's extensive history and size, we have accumulated a significant number of legacy systems that are monolithic and unsuitable for containerization. Converting these legacy systems into microservices would require a significant amount of time."

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

- The number of developers assigned to containerize monolithic applications grows from 50 in Year 1 to 200 in Year 3.
- The annual fully burdened cost of a developer is $140,000.
- Developers are responsible for supporting monolithic applications while they are still in production. The same developers also work on breaking up these monolithic applications and creating containers to host the code. On average, developers spend approximately 60% of their time containerizing monolithic applications.

> **"The goal is to gradually migrate the monoliths, although not all applications may be suitable for this transition. It will depend on the architecture and nature of the application."**
>
> *DevOps engineer, IT services*

Risks. Factors that may influence the impact of these costs include:

- The number of monolithic applications the organization decides to containerize.
- The size of the assigned development teams.
- The speed at which the work will be completed.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $24.6 million.

Legacy Application Containerization Costs

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
H1	Developers who containerize legacy applications	C1	0	50	100	200
H2	Fully burdened annual cost of an application developer	TEI standard	$0	$140,000	$140,000	$140,000
H3	Percentage of work reallocated to refactoring legacy applications	Composite	0%	60%	60%	60%
Ht	Legacy application containerization costs	H1*H2*H3	$0	$4,200,000	$8,400,000	$16,800,000
	Risk adjustment	↑5%				
Htr	Legacy application containerization costs (risk-adjusted)		$0	$4,410,000	$8,820,000	$17,640,000
	Three-year total: $30,870,000			**Three-year present value: $24,551,540**		

CSP FEES TO HOST NEW CONTAINER-FIRST APPLICATIONS

Evidence and data. While some interviewees' organizations maintained private cloud environments for certain applications, the prevailing hosting environment for new applications developed with Docker was implementation with a cloud service provider (CSP).

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

- The number of new applications created with Docker Business increases from 72 in Year 1 to 288 in Year 3
- The composite hosts these applications in the public cloud, and its annual CSP costs are $41,400 per application.
- The composite incurs CSP hosting fees with a delay of 12 months because it typically takes it one year to release a newly developed business application into production.

Risks. Factors that may influence the impact of these costs include:

> **"By leveraging the cloud and using fully managed Kubernetes services, we were able to start small with minimal investment and gradually grow over time. The investment in cloud infrastructure was significantly less compared to the equivalent investment in virtual machines."**
>
> *DevOps team lead, general merchandise*

- The number of new containerized applications to be hosted with CSPs.
- The size of the organization's applications.
- The organization's resource and high-availability requirements.
- The CSP service the organization chooses and the prevailing costs of cloud hosting services.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $9.6 million.

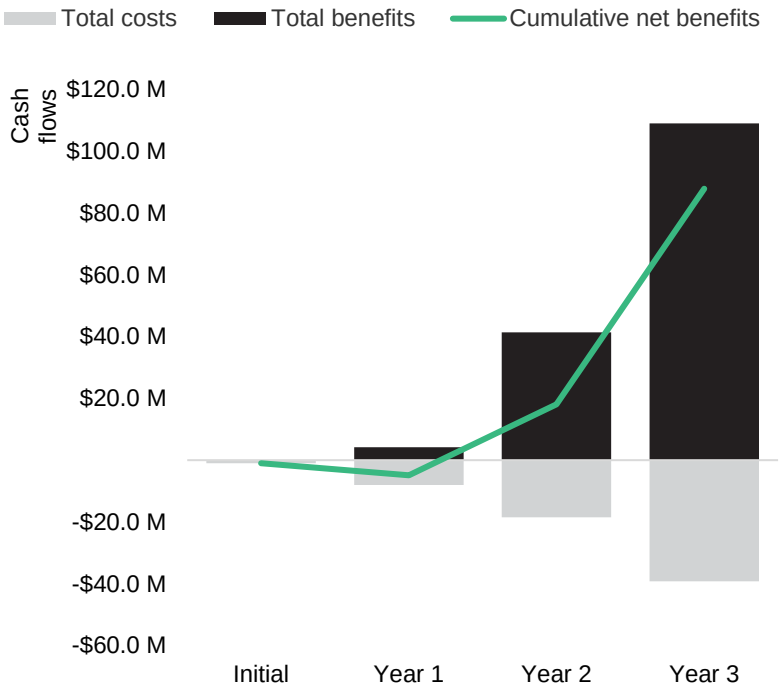
CSP Fees To Host New Container-First Applications

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
I1	New containerized applications created	D4		72	144	288
I2	Average CSP hosting cost per application	Composite		$41,400	$41,400	$41,400
I3	Potential annual CSP hosting costs	I1*I2		$2,980,800	$5,961,600	$11,923,200
It	CSP fees to host new container-first applications	Composite		$0	$2,980,800	$8,942,400
	Risk adjustment	↑5%				
Itr	CSP fees to host new container-first applications (risk-adjusted)		$0	$0	$3,129,840	$9,389,520
	Three-year total: $12,519,360			**Three-year present value: $9,641,130**		

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	($1,039,500)	($8,010,379)	($18,466,924)	($39,244,835)	($66,761,638)	($53,068,808)
Total benefits	$0	$4,156,084	$41,427,722	$109,087,913	$154,671,719	$119,975,409
Net benefits	($1,039,500)	($3,854,295)	$22,960,799	$69,843,078	$87,910,082	$66,906,601
ROI						126%
Payback						15 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 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.

Appendix B: Supplemental Material

Related Forrester Research

"The Future Of Cloud," Forrester Research, Inc., July 17, 2023.

"Kubernetes: Your Innovation Platform," Forrester Research, Inc., March 7, 2023.

"Getting Started With Kubernetes," Forrester Research, Inc., January 24, 2023.

"Navigate The Cloud-Native Ecosystem In 2022," Forrester Research, Inc., October 25, 2022.

"Top 10 Facts Every Cloud Leader Needs To Know About Kubernetes And Containers," Forrester Research, Inc., October 25, 2021.

Appendix C: Endnotes

[1] 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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