

A Forrester Total Economic Impact™  
Study Commissioned By IBM  
September 2019

# The Total Economic Impact™ Of IBM Cloud for VMware Solutions

Cost Savings And Business Benefits  
Enabled By IBM Cloud for VMware  
Solutions

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## ABOUT FORRESTER CONSULTING

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# Executive Summary

## Key Benefits



Data center costs saved:  
**40%**



Operations efficiency:  
**3x**



Developer productivity:  
**40%**

In the past, VMware environments have run on-premises in an organization's data center or in a colocation facility. To grow and maintain these environments, organizations incurred significant capital expenditures, ongoing maintenance costs, and space, power, and cooling costs. Increasingly, organizations are moving to a hybrid cloud model to leverage the economics and flexibility of the cloud while also getting the most out of their current investments. However, many organizations still hesitate to migrate to the cloud out of fear of expensive migrations and new complexity.

With IBM Cloud for VMware Solutions, organizations can automate the migration of new and existing VMware workloads from on-premises to the IBM Cloud, getting the benefits of cloud infrastructure while continuing to leverage the same tools used on-premises. By simplifying the migration to the cloud, IBM Cloud for VMware Solutions enables organizations to scale resources up and down without worrying about overprovisioning or IT staffing, to change capex to opex spending, to access flexible consumption-based pricing, and to benefit from IBM's global presence by moving workloads to reduce latency or enter new markets. Organizations can extend VMware infrastructure to the IBM Cloud to expand capacity, reduce on-premises data center infrastructure, improve disaster recovery, and increase security, all without a significant investment in new skills. On the IBM Cloud, organizations also have access to IBM partners in disaster recovery, backup, security, and compliance solutions.

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

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed several customers with years of experience using IBM Cloud for VMware Solutions.

## Key Findings

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

- › **The interviewed organizations reduced data center costs by an average of 40% by Year 3 by migrating VMware workloads to the IBM Cloud.** This resulted in a total cost saving of over \$1.3 million over three years. The cost savings include disaster recovery cost savings, data center costs savings, improved density, and reduced overprovisioning.
- › **With IBM Cloud for VMware Solutions, operations staff can now more efficiently manage VMware workloads, reducing operations efforts by two-thirds.** Interviewed organizations have streamlined operations tasks including procurement, provisioning, maintenance, and disaster recovery. Additionally, by keeping the same management tools, the organizations now avoid large-scale training or hiring for new skills.



**ROI**  
**153%**



**Benefits PV**  
**\$4.8 million**



**NPV**  
**\$2.9 million**

“Having VMware deployed on IBM Cloud has allowed us to reposition who we are in the marketplace, to offer solutions that are cloud based, that are fully managed and operated, that can be delivered globally, any place in the world. Those are the kinds of things that help differentiate us in the marketplace and improve our go-to-market strategy. It strengthens that so that we’re in a better position as we talk with clients.”

*Managed services program manager, information technology and services company*



- › **Security efforts around investigation and patching also have decreased by two-thirds with the IBM Cloud.** Better visibility and simpler security administration, as well as access to IBM’s security partners, have reduced the amount of time needed for investigation and patching.
- › **The interviewed organizations have improved application availability, avoiding four downtime events per year by Year 3.** Each downtime event lasts a couple of hours, including some downtime that impacts customers. The organizations can now recover faster with less impact to the customer. Including the costs of repair and lost business, each downtime event costs \$50,000 on average, with some organizations in industries like financial services having higher downtime costs.
- › **Developers are 40% more productive with access to Red Hat OpenShift.** Developers can now use Red Hat OpenShift to modernize legacy applications and innovate on new services. These developers achieve a faster time-to-market, higher-quality releases, more frequent releases, and fewer defects.

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

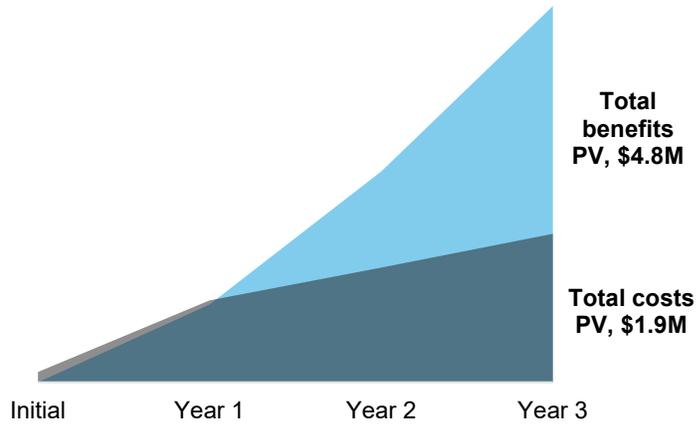
- › **Interviewed organizations achieve improvements in performance and reduced latency.** Interviewed organizations have access to several configuration options that allow them to optimize the performance of workloads. Organizations also reduce latency by leveraging IBM’s global data centers to move workloads closer to users.
- › **Interviewees associate improved customer satisfaction with the IBM Cloud investment.** Interviewees mentioned several metrics that show improvements to customer satisfaction due to IBM Cloud for VMware solutions, including the number of customer complaints, the willingness of customers to serve as references, and improvements to the conversion rate.

**Costs.** The interviewed organizations experienced the following risk-adjusted PV costs:

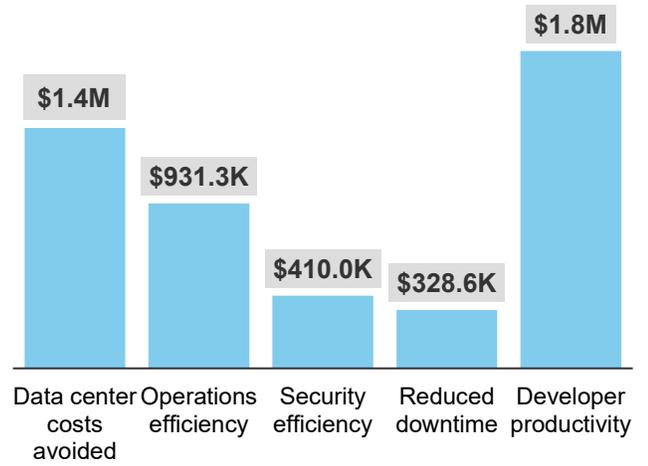
- › **IBM Cloud for VMware Solutions costs.** Organizations pay flexible per-CPU-based pricing. This analysis assumes a vCenter Server deployment with Red Hat OpenShift.
- › **Internal implementation and migration efforts.** A team of internal staff worked on initial planning, testing, and piloting of the solution over three months, on average, and then proceeded with migrating workloads over the course of nine months.
- › **Time spent on training.** Operations, security, and developer staff spend minimal upfront and ongoing time on training.

Forrester’s interviews with five existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experiences benefits of \$4.8 million over three years versus costs of \$1.9 million, adding up to a net present value (NPV) of \$2.9 million and an ROI of 153%.

## Financial Summary



## Benefits (Three-Year)



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

## TEI Framework And Methodology

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing IBM Cloud for VMware Solutions.

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 IBM Cloud for VMware Solutions can have on an organization:



### **DUE DILIGENCE**

Interviewed IBM stakeholders and Forrester analysts to gather data relative to IBM Cloud for VMware Solutions.



### **CUSTOMER INTERVIEWS**

Interviewed five organizations using IBM Cloud for VMware Solutions to obtain data with respect to costs, benefits, and risks.



### **COMPOSITE ORGANIZATION**

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



### **FINANCIAL MODEL FRAMEWORK**

Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.



### **CASE STUDY**

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

## DISCLOSURES

Readers should be aware of the following:

This study is commissioned by IBM 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 report to determine the appropriateness of an investment in IBM Cloud for VMware Solutions.

IBM 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.

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

# The IBM Cloud for VMware Solutions Customer Journey

## BEFORE AND AFTER THE IBM CLOUD FOR VMWARE SOLUTIONS INVESTMENT

### Interviewed Organizations

For this study, Forrester conducted five interviews with IBM Cloud for VMware Solutions customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEE	YEARS OF USE
Financial services	Headquartered in the United Kingdom	Head of IT and security	3.5 years
Financial services	Headquartered in Canada	Chief technology officer	2 years
Financial services	Headquartered in the European Union	Chief technology officer	1.5 years
Information technology and services	Headquartered in the United States	Managed services program manager	6 years
Data analytics	Headquartered in the United Kingdom	IT operations cloud computing engineer	5 years

### Key Challenges

Prior to investing in IBM Cloud for VMware Solutions, the interviewed organizations struggled with the following challenges:

- › **Running VMware workloads on-premises resulted in significant capex, maintenance, and overhead costs.** Most interviewed organizations were either using VMware on-premises or in a colocation facility. Managing infrastructure was not a key strength for these organizations, which resulted in inefficiencies and overprovisioning. One CTO explained: “We do have some infrastructure people, network security people, but primarily our strength is in development. We want to make sure that we’re leveraging our people in the right way. Moving away from the hardware layer was something that we were really keen on doing, just because we don’t understand the hardware as much as we understand the application side of development. The other factor was that because our skill sets were not aligned to the infrastructure side, it became a lot of overhead for us dealing with procuring new hardware, understanding the various support models that come with hardware, the life-cycle management, and all that stuff. The overhead of managing a hardware infrastructure was something we wanted to get out of.”
- › **Cloud-first initiatives pressured organizations to migrate workloads to a cloud solution.** Several interviewed organizations were reaching an inflection point where they were out of capacity in their own data centers but didn’t want to continue with significant capital expenditures and overhead. However, the organizations struggled with huge legacy applications that they would have to move and worried about breaking those applications during migration. Therefore, the choice of cloud platform was crucial to accelerating

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*Chief technology officer, financial services company*



cloud adoption, as one interviewee described: “Key of the factors was the globalization of the company. We have customers everywhere: in North America, Central America, South America, and Europe. And we expect in the future to grow. So, it was very important to work with the cloud vendor with the biggest global reach. That’s why we decided to go with IBM.”

- › **Interviewed organizations needed to improve performance and customer satisfaction.** The interviewed organizations focused on a variety of factors that affect customer satisfaction and their own competitiveness in the market, including reliability, innovation, and speed-to-market. The organizations sought a solution that could improve their capabilities in these areas. Said one interviewee: “Basically, the decision to look for another solution was based on performance. We wanted to increase client satisfaction by improving our services on the market, having in mind that the business is a very sensitive one. Our clients really need a reliable service, and we really want to have happy clients.” Another interviewee commented: “The next dimension was the cost. We need to stay on top of the hardware. We can’t have it failing. From that perspective, we were constantly pouring capital into purchasing these products and building out redundancy.” Another interviewee discussed speed-to-market, saying: “Today, if we need a new server or a new machine, it’s going to be three, five clicks on the website. Before we moved to IBM, we had to buy the physical server, go to the physical building, start the server, start all the software, and after that, come back to the office and finally we would have a new machine running on our production service.”

## Key Results

The interviews revealed that key results from the IBM Cloud for VMware Solutions investment include:

- › **Migrating VMware workloads to the IBM cloud reduces data center spend.** With IBM Cloud for VMware Solutions, interviewed organizations have consolidated legacy infrastructure onto an automated and centrally managed software-defined data center. This has reduced spend on hardware, software, space, and power. With current and compliant hardware provisioned automatically, the organizations no longer overprovision, and custom configurations allow organizations to achieve better density. One interviewee said, “Everything that we need is available in the IBM infrastructure, and we’re utilizing most of it.” Another interviewee mentioned: “It’s got validity to scale up, to grow. This is something that we definitely like. In the last three years, I’ve been doing the upgrades of memory and upgrades of storage once every nine to 10 months.”
- › **Through full access to the native VMware software stack, organizations manage workloads in the cloud as they would on-premises, creating operations efficiency.** The IBM Cloud provides full access to the VMware stack to allow organizations to manage resources as they would on-premises, and all tools that organizations run on-premises can run on the IBM Cloud, so no new skills are needed. Instead, organizations can focus on automating and streamlining operations tasks. Said one interviewee, “Overall, people are more focused not on fighting day-to-day issues, but more focused on implementing important projects and automating and bringing new innovations into the company.”

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- › **The organizations use the IBM Cloud to expand capacity quickly without additional hardware or software spend.** Interviewed organizations can manage resource constraints by bursting workloads to the IBM Cloud, enabling organizations to reduce or eliminate overprovisioning. The IBM Cloud's global footprint also provides access to new markets without having to build out new data centers.
- › **IBM Cloud for VMware Solutions provides access to the IBM partner ecosystem, allowing organizations to streamline backup, restore processes, and reduce risk with secure cloud-based backup and recovery.** Interviewees can protect their organizations in the event of a catastrophe through fast replication of VMware environments, high-speed recovery of applications, automated backup, lower recovery point and time objectives, and monitoring and alerting to issues that impact application performance. This results in reduced downtime and reduced negative impact to customers and the brand. Said one interviewee: "A key feature is the stability. The stable infrastructure, which is very important nowadays to have, and to know that we have the option of stability, scalability, and redundancy."
- › **With IBM Cloud for VMware Solutions and Red Hat OpenShift, developers have access to innovative tools and services to help them iterate faster.** The IBM Cloud supports rapid application development and testing, improving developer productivity and time-to-market for new releases. One interviewee stated: "We can see from our experience moving from physical infrastructure to cloud infrastructure that it does work. And if you extend it over the next five years, I can only see this trend moving further off of infrastructure. Today, we no longer have to worry about any of the physical infrastructure; we just worry about from bare metal up, which means the host, the VM, the OSS, and we see a benefit already. The trend is continuing to move to the next level, which is leveraging containers. Doing away with managing the VMs and managing those aspects and really containerizing our application and as such, removing ourselves even from that layer of the infrastructure world and moving into the DevOps world."

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*Chief technology officer, financial services company*



## Composite Organization

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

**Description of composite.** The composite organization is a large global enterprise with sophisticated operations. The organization is in a regulated industry with stringent security requirements, and the organization has many legacy applications. The organization wants to be able to customize its solutions and retain control, including the ability to adjust security policies. The organization has been using VMware on-premises in its data centers but is coming up against capacity constraints and wants to be able to operate its VMware workloads elsewhere. Motivating factors for this move include the desire to modernize infrastructure and applications, top-down cloud-first initiatives, and pressure to reduce spending.



### Key assumptions

VMware vCenter Server  
on IBM Cloud

2 clusters

10 servers

700 VMs

**Deployment characteristics.** Based on the composite organization's criteria, the IBM Cloud provides an attractive platform to migrate these workloads to a new environment running on modern hardware. The composite organization invests in VMware vCenter Server on IBM Cloud, which includes the automated installation of vSphere on bare metal with licensing for VMware vSphere, vSAN, NSX, and HCX. This secure single tenant implementation meets the organization's requirements. The organization begins with planning and proofs of concept. Once the investment is set up, the organization begins to easily lift and shift workloads without rearchitecting environments. The organization manages workloads using the same interface as it did on-premises. By Year 3, the organization has two clusters with 10 servers, hosting 700 VMs. The organization also leverages IBM's partners for disaster recovery (DR) and backup/replication.

# 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	Data center costs avoided	\$444,600	\$554,040	\$658,350	\$1,656,990	\$1,356,694
Btr	Operations efficiency	\$192,375	\$448,875	\$513,000	\$1,154,250	\$931,282
Ctr	Security efficiency	\$64,125	\$192,375	\$256,500	\$513,000	\$409,995
Dtr	Reduced downtime	\$90,000	\$135,000	\$180,000	\$405,000	\$328,625
Etr	Developer productivity	\$303,750	\$729,000	\$1,215,000	\$2,247,750	\$1,791,463
	Total benefits (risk-adjusted)	\$1,094,850	\$2,059,290	\$2,822,850	\$5,976,990	\$4,818,059

### Data Center Costs Avoided

The IBM Cloud for VMware Solutions investment enables organizations to get out of the data center business and focus on driving value where they are strongest. The organizations migrate VMware workloads out of the data center to the IBM Cloud, consolidate on-premises infrastructure, optimize the utilization of servers, and no longer overprovision for busy seasons. The organizations don't have to repurchase or change their tools as part of the investment, and they don't have to build out a separate data center for disaster recovery. Interviewed organizations shared the following benefits associated with data center cost reduction:

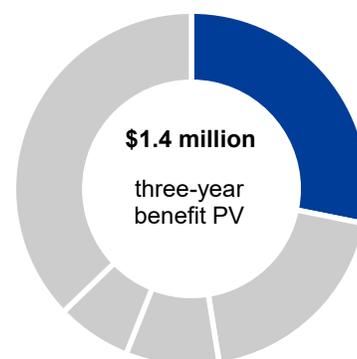
- › “We’re trying to remove parts of the data center presence. So, we’re trying to decommission our old servers and storage because some of those were migrated to the cloud.”
- › “We’re able to host many more VMs within one bare-metal server [with IBM Cloud]. We definitely make use of that increased available resource bandwidth. I would say it has increased maybe 20%.”
- › “I would say somewhere between 15% and 25% total cost savings. That doesn’t include the improvement in the scope of work that we’re able to provide. So, that reduction in costs still reflects being able to do site-to-site recovery and failover between the host and those kinds of things that we were not able to do previously.”
- › “Part of the cost savings came over on the bill, what we were paying before and what we are paying now. So, the bill currently at this stage is around same, but I would say that the environment is probably around 30% bigger than what it was before.”

Forrester assumes that:

- › In Year 1, the composite organization achieves a 30% cost savings for workloads migrated to the cloud. This increases to 40% by Year 3 as the organization migrates more workloads.

The table below shows the total cost avoided. When offset by the IBM solution costs in the costs section, the equation results in the net savings achieved.

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of more than \$4.8 million.



Data center costs avoided: 28% of total benefits

Risks that could impact the ability to achieve this benefit include:

- › Some organizations with smaller investments did not achieve the economics of scale that larger investments provided.
- › Organizations that cannot leverage the public cloud may not achieve cost savings as high as those that can.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year risk-adjusted total PV of over \$1.3 million.

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

### Data Center Costs Avoided: Calculation Table

REF.	METRIC	CALCULATION	YEAR 1	YEAR 2	YEAR 3
At	Data center costs avoided	Interviews	\$468,000	\$583,200	\$693,000
	Risk adjustment	↓5%			
Atr	Data center costs avoided (risk-adjusted)		\$444,600	\$554,040	\$658,350

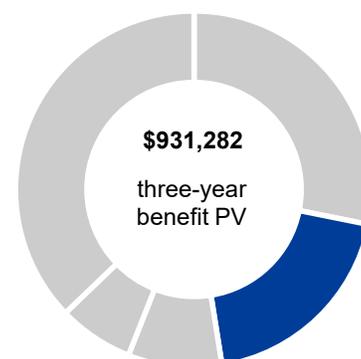
## Operations Efficiency

The interviewed organizations also reduce the number of man hours required to operate a workload, achieving efficiencies in procurement, provisioning, maintenance, support, and disaster recovery. By bringing operations into the cloud, staff can focus on higher-value tasks. With root access control down to the hypervisor layer, the operations team can manage workloads using the same tools as before, requiring no new skills or major training. Interviewed organizations shared the following benefits associated with operations efficiency:

- › “In terms of procurement, we definitely have flexibility there as well. I don’t need to wait one month for the server to arrive. To set it up, I click two buttons, and then I have the server provisioned in a few hours.”
- › “Working in VMware is even faster. My engineers are able to move pretty much at the speed they want to move, and we’ve been able to reduce the provisioning time.”
- › “I think where the saving comes in is in the areas of hardware infrastructure overhead with all of the procurements, actually racking the servers, managing the contracts to those servers, connectivity, physically going to the data center and plugging in a bunch of wires from the switches to the servers, and managing the downtime of those hardware components.”
- › “We had issues every week. Sometimes we had problems with the cable, and other times we had problems with the switches. We always had some issue. With IBM, the only issues that we have are made by ourselves.”
- › “We managed to reduce the actual standby hours by 30% to 40%. The cloud allowed us to not increase further the number of FTEs that are usually needed to support an on-prem environment.”

For the composite organization, Forrester assumes that:

- › In the legacy environment, the organization would have required up to six FTEs by Year 3 to manage the VMware workloads. With the IBM Cloud, two FTEs manage the same number of workloads.



Operations efficiency:  
19% of total benefits

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Head of IT and security, financial services company



- › The average annual fully loaded compensation, including the value of benefits, for operations staff is \$135,000.
- › In Year 1, 50% of benefits are achieved as the organization is actively migrating workloads throughout the year.

Risks that could impact the ability to achieve this benefit include:

- › The level of automation achieved through leveraging IBM and VMware tooling.
- › The use of the IBM Cloud and IBM partners for disaster recovery and backup.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year risk-adjusted total PV of approximately \$931,000.

### Operations Efficiency: Calculation Table

REF.	METRIC	CALCULATION	YEAR 1	YEAR 2	YEAR 3
B1	Operations FTEs, prior state	Interviews	5.0	5.5	6.0
B2	Operation FTEs, with IBM Cloud for VMware Solutions	Interviews	2.0	2.0	2.0
B3	Average operations fully loaded annual compensation	Assumption	\$135,000	\$135,000	\$135,000
B4	Migration ramp	Assumption	50%	100%	100%
Bt	Operations efficiency	$(B1-B2)*B3*B4$	\$202,500	\$472,500	\$540,000
	Risk adjustment	↓5%			
Btr	Operations efficiency (risk-adjusted)		\$192,375	\$448,875	\$513,000

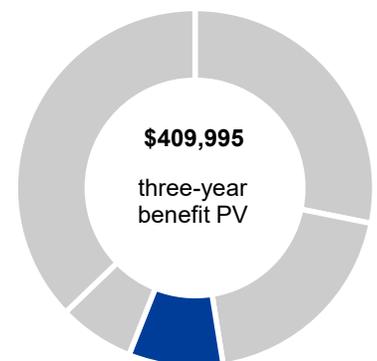
## Security Efficiency

IBM has several security partners that integrate with IBM Cloud for VMware Solutions. Organizations that are already using these tools can continue to do so, while organizations that aren't can begin to benefit from them. Benefits include simpler security administration, better visibility, and reduced operations costs. With root access control, the admins can control security policies, including being able to totally isolate instances from the public internet. Interviewed organizations shared the following benefits associated with security efficiency:

- › “We did optimize the people time needed for investigation.”
- › “Because we are not the owners of the machines, we don't have to spend all of our time searching for new fixes, installing these fixes, patching, and so on.”

For the composite organization, Forrester assumes that:

- › In the legacy environment, the organization would have required up to three FTEs by Year 3 for investigations, updates, and patching. With the IBM Cloud, one FTE completes the same amount of work.
- › The average annual fully loaded compensation, including the value of benefits, for security staff is \$135,000.
- › In Year 1, 50% of benefits are achieved as the organization is actively migrating workloads throughout the year.



Security efficiency: 9% of total benefits

Risks that could impact the ability to achieve this benefit include:

- › The ability to leverage IBM's and IBM partners' security tools to streamline security tasks.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year risk-adjusted total PV of approximately \$410,000.

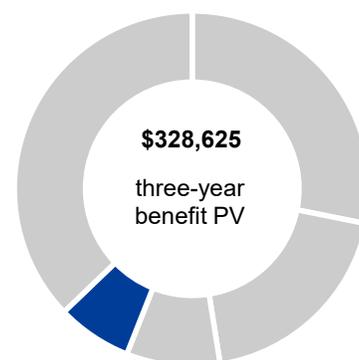
### Security Efficiency: Calculation Table

REF.	METRIC	CALCULATION	YEAR 1	YEAR 2	YEAR 3
C1	Security FTEs, before	Interviews	2.0	2.5	3.0
C2	Security FTEs, with IBM Cloud for VMware Solutions	Interviews	1	1	1
C3	Average security analyst fully loaded annual compensation	Assumption	\$135,000	\$135,000	\$135,000
C4	Migration ramp	Assumption	50%	100%	100%
Ct	Security efficiency	$(C1-C2)*C3*C4$	\$67,500	\$202,500	\$270,000
	Risk adjustment	↓5%			
Ctr	Security efficiency (risk-adjusted)		\$64,125	\$192,375	\$256,500

## Reduced Downtime

With IBM Cloud for VMware Solutions, interviewed organizations also experience improved availability with more reliable and modern hardware. The organizations find it easier to recover than before, and the organizations also notice that the impact to the customer is low without adding significant additional costs to build out redundancy. Interviewed organizations shared the following benefits associated with reduced downtime:

- › “Before, there was no way to simplify or failover if something happened at the data center. With VMware, we’re able to offer those services because we’re able to better manage and lower our operating costs. We then use those lower costs to provide additional benefits to our customers.”
- › “What we can see is we’re improving the availability and the flexibility of the resources, the servers, the networking part in particular, and the storage parts; 99%, 98% of the problems we used to have are resolved. I’d say overall availability was improved by around 80% to 90%.”
- › “Because we purchased and we owned the infrastructure, we wanted to make the most use of it. So, if the warranty is for three years, we’re going to use it for three years. We won’t even consider changing it prior to that. Whereas, if you think about how the cloud works, there’s no contract. I can buy a new server today and I could drop it tomorrow. What you have is you have refreshed hardware once every two years, which means your mean-time-to-failure is reduced, intervals are reduced, and you’re no longer having to deal with potential hardware failures. In the one and a half years with the IBM Cloud infrastructure, we’ve never experienced downtime.”



Reduced downtime: 7% of total benefits

- › “If it were to happen, our ability to recover and keep things operating and keep the clients up is significantly higher and will take a lot less manual involvement than it would have taken previously.”

Forrester assumes that:

- › The composite organization avoids two downtime events in Year 1, increasing to four downtime events avoided in Year 3.
- › The cost per downtime event, including the time and cost of repairs and the cost of lost business, averages \$50,000.

Risks that could impact the ability to achieve this benefit include:

- › Downtime costs are highly variable between organizations and industries. Some industries, like financial services, will have higher costs of downtime that are easier to measure and track, while other industries may not be able to easily correlate downtime with lost business. Some organizations may build out more robust redundancies while others may not be willing to incur as much expense in this area.
- › The frequency of downtime will depend on the ability to manage infrastructure in the prior environment.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of approximately \$329,000.

“If it were to happen, our ability to recover and keep things operating and keep the clients up is significantly higher and will take a lot less manual involvement than it would have taken previously.”

*Managed services program manager, information technology and services company*



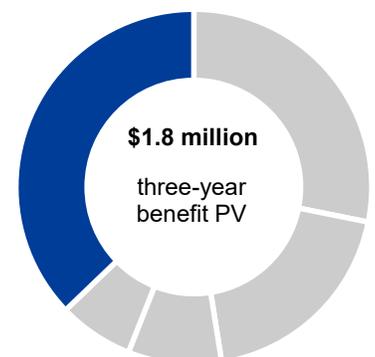
### Reduced Downtime: Calculation Table

REF.	METRIC	CALCULATION	YEAR 1	YEAR 2	YEAR 3
D1	Downtime events avoided per year	Interviews	2	3	4
D2	Cost per downtime event	Interviews	\$50,000	\$50,000	\$50,000
Dt	Reduced downtime	D1*D2	\$100,000	\$150,000	\$200,000
	Risk adjustment	↓10%			
Dtr	Reduced downtime (risk-adjusted)		\$90,000	\$135,000	\$180,000

## Developer Productivity

Organizations use Red Hat OpenShift to innovate freely and extend workloads using containers. Developers spend time on application modernization, moving legacy applications to the cloud to innovate and add more services to make end users happier. Developers may also deploy any net-new workloads to the cloud. Key outcomes include faster time-to-market and increased release frequency. Interviewed organizations shared the following benefits associated with developer productivity:

- › “Developers are seeing a reduced number of activities that they are responsible for, not having to worry about the physical infrastructure, the procurement fees, the licensing or service intervals, or any of those aspects related to hardware. It frees them up to focus on other aspects of support and maintainability of our infrastructure, and so it allows them to put more automation scripts in place where they can automate the deployment of certain VMs into our environment.”



**Developer productivity:  
37% of total benefits**

- › “The developers are getting more into the workflow of setting up and troubleshooting their own environment. In the past, they would request the infrastructure team or IT team to stand up a new environment. It used to take us two to four weeks to get an environment available for our development team. Now, it could be done in a day or in a couple of hours, depending on how big the environment is.”
- › “The improvements that we see are that you can take on more projects at the same time. You could plan more deployments at the same time. You could test those deployments in a more efficient manner.”
- › “We realize the benefits through the level of quality of the deployment. The lower numbers of incidents or defects and the lower number of attempts for a rollback.”
- › “Developers are using this saved time to build out new services and train to improve the old ones.”

For the composite organization, Forrester assumes that:

- › In Year 1, 25 developers use Red Hat OpenShift, increasing to 50 developers by Year 3.
- › Initially, the productivity improvement averages 20% and increases to 40% by Year 3 as developers become more familiar with Red Hat OpenShift.
- › The average annual fully loaded compensation, including the value of benefits, for developers is \$135,000.
- › Fifty percent of time saved is repurposed for additional value-added work.

Risks that could impact the ability to achieve this benefit include:

- › The use of Red Hat OpenShift as part of the investment.
- › The adoption of new tools and more agile processes by developers.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of \$1.8 million.

“Developers are using this saved time to build out new services and train to improve the old ones.”

*Chief technology officer, financial services company*



### Developer Productivity: Calculation Table

REF.	METRIC	CALCULATION	YEAR 1	YEAR 2	YEAR 3
E1	Developers using Red Hat OpenShift	Interviews	25	40	50
E2	Productivity improvement	Interviews	20%	30%	40%
E3	Average developer fully loaded annual compensation	Assumption	\$135,000	\$135,000	\$135,000
E4	Productivity capture	Assumption	50%	50%	50%
Et	Developer productivity	$E1 * E2 * E3 * E4$	\$337,500	\$810,000	\$1,350,000
	Risk adjustment	↓10%			
Etr	Developer productivity (risk-adjusted)		\$303,750	\$729,000	\$1,215,000

### Unquantified Benefits

The interviews revealed additional benefits that interviewees were not able to quantify but that were still important outcomes of the investment:

- › **Interviewed organizations use IBM Cloud for VMware Solutions to optimize the performance of workloads and reduce latency.** With deep access to root configuration and a catalog of configuration options, organizations can customize workloads based on their needs. With IBM's global reach, organizations can also locate instances closer to users, reducing latency. Said one interviewee, "By doing it all from scratch, we're able to optimize and make sure that the customers are getting the best performance."
- › **Interviewed organizations also attribute improvements in customer satisfaction to the IBM Cloud investment.** One interviewee remarked: "We definitely noted that there is a reduced amount of complaints from customers. When the systems are down, whether it's a customer complaint, whether that's coming from a call, a ticket, or chat, or somewhere on the forums, etc., we noted that these were reduced by a lot." Another interviewee noted: "The feedback from clients, their satisfaction, their willingness to serve as references. The closure rate of people that are converting to our solution offering. Those are all things that are driving acceleration in the adoption and in the growth to the VMware infrastructure."

"We definitely noted that there is a reduced amount of complaints from customers. When the systems are down, whether it's a customer complaint, whether that's coming from a call, a ticket, or chat, or somewhere on the forums, etc., we noted that these were reduced by a lot."

*Chief technology officer, financial services company*



## Flexibility

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

- › **Interviewed organizations use cost savings from TCO reduction to invest in additional capabilities.** Interviewed organizations are able to add new or better services, including for backup, replication, and disaster recovery, by using some of the operational and infrastructure cost savings to invest in additional capabilities offered by IBM or IBM partners.

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

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

# Analysis Of Costs

## QUANTIFIED COST DATA AS APPLIED TO THE COMPOSITE

### Total Costs

REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Ftr	IBM solution costs	\$0	\$396,000	\$475,200	\$544,500	\$1,415,700	\$1,161,818
Gtr	Internal implementation and migration costs	\$118,800	\$556,875	\$0	\$0	\$675,675	\$625,050
Htr	Training time	\$13,104	\$54,600	\$32,760	\$32,760	\$133,224	\$114,428
	Total costs (risk-adjusted)	\$131,904	\$1,007,475	\$507,960	\$577,260	\$2,224,599	\$1,901,296

### IBM Solution Costs

For the composite organization, Forrester assumes that:

- › IBM Cloud for VMware Solutions has flexible consumption-based pricing that scales up and down based on physical CPU. Red Hat OpenShift also comes with a monthly subscription cost.
- › A 25% discount is applied to the investment, but actual discounts will vary.
- › Costs grow over time as the composite migrates additional workloads and expands to new workloads.
- › The composite organization does not leverage any of IBM's services offerings. Some organizations, however, may leverage IBM to help design and implement their VMware Solutions investment.

Risks that could impact the magnitude of this cost include:

- › Subscription costs will vary based on configuration, consumption, vendor discounts, volume discounts.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of over \$1.1 million.

The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total costs to be a PV of \$1.9 million.

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

### IBM Solution Costs: Calculation Table

REF.	METRIC	CALCULATION	INITIAL	YEAR 1	YEAR 2	YEAR 3
Ft	IBM solution costs	Assumption	\$0	\$360,000	\$432,000	\$495,000
	Risk adjustment	↑10%				
Ftr	IBM solution costs (risk-adjusted)		\$0	\$396,000	\$475,200	\$544,500

### Internal Implementation And Migration Costs

Typically, the implementation effort begins with a discovery workshop to identify and bucket workloads by complexity and criticality. The implementation of the solution itself is very quick. Once the system is up and running, then organizations need to start moving workloads using

tools like HCX. No refactoring is required. Most organizations prioritize easier workloads to move first and then begin a mass migration. Interviewed organizations shared the following costs associated with implementation and migration:

- › “Initially, we started with the incubation pieces. So, to see what the IBM Cloud is, to start from a few virtual machines and a few servers. Then, we did some testing. And now we’re working on the VMware side by onboarding different technologies that VMware has to offer within the IBM Cloud. Like NSX, like vSAN. And also working on delivering a good disaster recovery project.”
- › “It was quick, the implementation, and the implementation was done in a nice way, and no issues. It was a team of eight. The definition of the needs was done prior to the implementation, of course. And they were clear what to do and the suggestion for solution was done by IBM.”

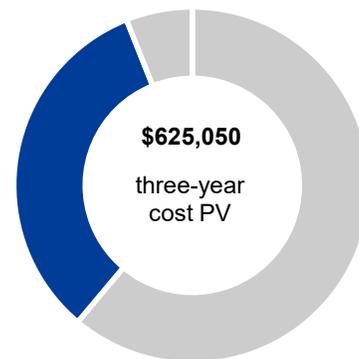
For the composite organization, Forrester assumes that:

- › A team of eight people spends three months and 40% of their time on average on testing, planning, and piloting the solution.
- › During Year 1, a team of 10 people spends half their time on average over nine months migrating workloads to the IBM Cloud.
- › The average annual fully loaded compensation, including the value of benefits, across the internal staff is \$135,000.

Risks that could impact the magnitude of this cost include:

- › Some organizations may leverage IBM professional services to supplement internal staff during the implementation process. Said one interviewee: “We had help from the IBM team. They were very helpful. I must say, the management team, the business team, the presales, and the architectural team were very, very helpful. I don’t think we would have managed to migrate the infrastructure very easily without their help.”
- › Interviewed organizations had highly variable estimates around implementation and migration based on the complexity and size of their environments and the skill sets of internal staff.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of approximately \$625,000.



Internal implementation and migration costs: 33% of total costs

### Internal Implementation And Migration Costs: Calculation Table

REF.	METRIC	CALCULATION	INITIAL	YEAR 1	YEAR 2	YEAR 3
G1	Internal FTEs for implementation and migration	Interviews	0.80	3.75		
G2	Average fully loaded annual compensation	Assumption	\$135,000	\$135,000		
Gt	Internal implementation and migration costs	G1*G2	\$108,000	\$506,250	\$0	\$0
	Risk adjustment	↑10%				
Gtr	Internal implementation and migration costs (risk-adjusted)		\$118,800	\$556,875	\$0	\$0

## Training Time

Interviewed organizations shared the following costs associated with training:

- › “Initially, my approach to training was to try to see whether and where we lack the knowledge to do the migration. And I consider my team as a very senior team. It didn’t require any additional trainings, but with the help and a workshop we organized, we managed to get the level a bit higher. And of course, at the moment, with the new technologies that we’re bringing from VMware, we definitely get people more trained.”
- › “We had to play with the architecture, and of course we took courses, but you have to have hands-on experience to understand and troubleshoot some of the issues that would come up.”
- › “IBM has a lot of information on their own eLearning platform to explain to our technical people how to use it, how to implement it, and so on.”

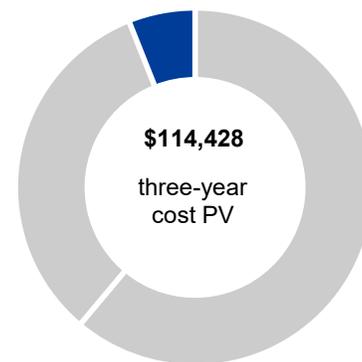
For the composite organization, Forrester assumes that:

- › Initially, the core team of 8 staff requires training, and each spends 24 hours in official and hands-on training.
- › In Year 1, the team of 10 plus the 50 developers using Red Hat OpenShift participate in training for 16 hours, both on the job and in formal training. In Years 2 through 3, everyone participates in 8 hours of on-the-job or formal ongoing training, on average.
- › The average hourly fully loaded compensation, including the value of benefits, across users is \$65, or \$135,000 annually.

Risks that could impact the magnitude of this cost include:

- › The need for training varied across the organizations from no training to formal training.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted total PV of approximately \$114,000.



Training time: 6% of total costs

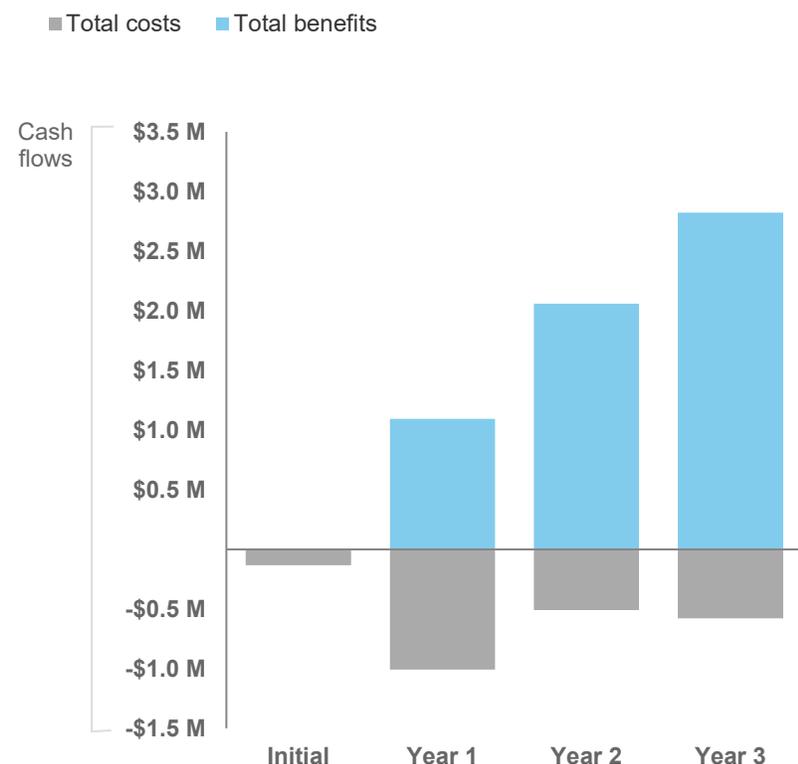
### Training Time: Calculation Table

REF.	METRIC	CALCULATION	INITIAL	YEAR 1	YEAR 2	YEAR 3
H1	FTEs requiring training	Interviews	8	50	60	60
H2	Hours of training per year	Interviews	24	16	8	8
H3	Average fully loaded hourly compensation	Assumption	\$65	\$65	\$65	\$65
Ht	Training time	H1*H2*H3	\$12,480	\$52,000	\$31,200	\$31,200
	Risk adjustment	↑5%				
Htr	Training time (risk-adjusted)		\$13,104	\$54,600	\$32,760	\$32,760

# 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 and NPV for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.



These risk-adjusted ROI and NPV 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	(\$131,904)	(\$1,007,475)	(\$507,960)	(\$577,260)	(\$2,224,599)	(\$1,901,296)
Total benefits	\$0	\$1,094,850	\$2,059,290	\$2,822,850	\$5,976,990	\$4,818,059
Net benefits	(\$131,904)	\$87,375	\$1,551,330	\$2,245,590	\$3,752,391	\$2,916,763
ROI						153%

# IBM Cloud for VMware Solutions: Overview

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

## IBM Cloud for VMware Solutions

*Modernize and migrate your mission-critical VMware workloads with ease on IBM Cloud*

IBM Cloud for VMware Solutions can help organizations improve productivity, efficiency and agility while reducing IT overhead by modernizing mission-critical workloads or migrating them to the cloud.

### Highlights

- › Offers flexible hardware configurations, licensing and storage options
- › Provides access to IBM experts with years of VMware experience
- › Safeguards data with a secure private network backbone
- › Enables global scalability with 60 data centers in 19 countries
- › Automates configuration through VMware vCenter Server
- › Allows full administrator access and control through VMware tools
- › Protects data and workloads within the IBM Cloud secure private network

Across industries, organizations are readily adopting cloud solutions in an effort to improve productivity, increase efficiency, gain agility and reduce IT overhead. But migrating mission-critical workloads to the cloud or modernizing applications using cloud services can be complicated undertakings. How can your organization take advantage of what the cloud has to offer while reducing complexity and minimizing risk?

IBM Cloud™ for VMware Solutions makes it simpler for your organization to capitalize on the tremendous potential of the cloud. Modernize mission-critical VMware workloads or migrate them to the powerful IBM Cloud while continuing to use your on-premises infrastructure as well as your existing tools, technologies and skills.

Take advantage of a hybrid cloud approach by extending or migrating workloads using secure and seamless networking capabilities offered by VMware. Run your workloads on secure, single-tenant IBM Cloud bare metal servers to maintain the utmost control. IBM Cloud provides full access to the native VMware stack to manage resources as you would on premises.

With IBM Cloud for VMware Solutions, you gain:

- › **Flexibility:** Select from multiple hardware configurations, licensing and storage options. Use IBM Cloud data centers in North America, Europe and Asia to scale globally.
- › **Expertise:** Tap into the expertise of thousands of VMware cloud technical experts. Draw from more than 10 years of IBM experience designing, deploying and managing VMware infrastructure.
- › **Security:** Safeguard your data and enterprise workloads with a secure private network backbone while retaining full control of operations—on premises and in the cloud.

### Choose your IBM Cloud and VMware Solution

*VMware vCenter Server on IBM Cloud*

Implement VMware vCenter Server on IBM Cloud to gain on-demand, automated deployment. The solution combines IBM Cloud bare metal servers with a standardized VMware vSphere and vCenter solution to provision and manage your virtual machines. The result is a perfect platform to start small and grow.

*VMware vSphere on IBM Cloud*

Optimize, expand or migrate your workloads onto high-performance, global cloud resources with VMware

vSphere and IBM Cloud bare metal servers. This customizable virtualization service combines the VMware-compatible bare metal servers, hardware components and licenses needed to help you build your own IBM-hosted VMware environment. Manage it all with the same VMware management control panel your team already uses.

### *IBM Cloud Professional Services*

Work with the IBM® Cloud Professional Services team to design, accelerate and implement VMware solutions on bare metal servers. Whether you need help with implementation, workload migration or a fully managed environment, the IBM Cloud Professional Services team can help meet your needs. The IBM Cloud becomes an extension of your existing data centers.

### **Why IBM?**

IBM Cloud for VMware Solutions makes cloud adoption fast and easy, allowing customers to optimize the value of existing on-premises infrastructure while confidently leveraging the same familiar tools, technologies and skills in the cloud.

Customers gain rapid scalability, deployment in more than 60 global data centers and access to industry-leading disaster recovery, backup, security and compliance solutions from an array of ecosystem partners.

### **For more information**

To learn more about IBM Cloud for VMware Solutions, please contact your IBM representative or IBM Business Partner, or visit: [ibm.com/cloud/vmware](https://ibm.com/cloud/vmware)

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All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

# 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.