

A Forrester Total Economic Impact™
Study Commissioned By VMware
August 2019

The Total Economic Impact™ Of VMware Cloud On AWS

Cost Savings And Business Benefits
Enabled By VMware Cloud On AWS

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Executive Summary

VMware Cloud on AWS is an integrated cloud offering jointly developed by AWS and VMware. VMware Cloud on AWS provides customers with a scalable solution to migrate and extend their on-premises vSphere-based environments to the public cloud.

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

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed several customers with at least six months of experience using VMware Cloud on AWS. These customers used VMware Cloud on AWS to migrate their on-premises vSphere workloads to the public cloud. Using VMware Cloud on AWS, customers consolidated their on-premises data centers, extended their data center capacity with cloud resources, and enhanced their disaster recovery capabilities.

Prior to using VMware Cloud on AWS, the customers maintained their own (larger) on-premises vSphere environments. These data center environments required expensive systems maintenance, hardware refresh, and real estate and power/cooling costs. Organizations previously explored moving to the cloud prior to the availability of VMware Cloud on AWS, but they determined that doing so would have required: significant business disruptions; re-architecture of applications to run natively in the public cloud; and the investment in new cloud development and operations skills.

Key Findings

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

- › **Avoided application redesign, totaling savings of \$2.5M.** Organizations utilized VMware's vMotion bidirectional live application migration to seamlessly transition their vSphere workloads to the cloud. Furthermore, these organizations were able to use their existing Software Defined Data Center (SDDC) technologies to facilitate and manage migrations, avoiding the need to redesign applications or adopt new management tooling.
- › **Reduced labor hours for operations, saving \$1.2M.** Eliminating physical servers and networking hardware, along with simplifying operating models, created a reduced demand for operations staff who were dedicated to managing on-premises VMware environments within interviewed organizations.
- › **Reduction in data center operating costs, totaling \$1.4M.** Organizations retired their on-premises deployments, eliminating the power, cooling, and facilities staff expenditures.

Benefits And Costs



Avoided application re-architecture:

\$2,493,038



Reduced labor hours for operations:

\$1,228,505



Reduction in data center operating costs:

\$1,441,131



Software and hardware savings:

\$3,219,008



ROI
102%



Benefits PV
\$8.4 million



NPV
\$4.2 million



Payback
16 months



**\$1,055 savings per
virtual machine in
migration costs**

- › **Software and hardware savings of \$3.2M.** Organizations used their migration to the cloud as an opportunity to consolidate their networking and storage environments, facilitating a reduction in licensing fees. Furthermore, organizations avoided hardware refreshes required to maintain modern data center operations.

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

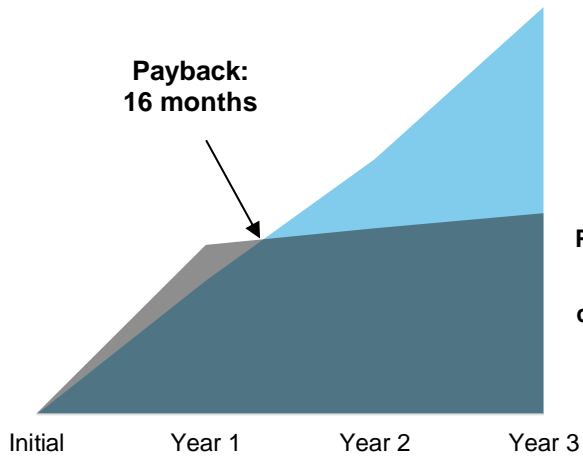
- › **Redeployed legacy servers to accommodate user upgrades.** One organization redeployed legacy servers to provision additional memory for end user email accounts.
- › **Accelerated speed of disaster recovery operations.** Organizations found their new disaster recovery infrastructure to be faster and more reliable than their previous on-premises deployments.
- › **Improved security and reduced likelihood of business disruptions.** Having more secure and responsive cloud-based disaster recovery operations reduced the risk of business disruptions.
- › **Enabled new agile operations.** Being in the cloud enabled organizations to develop new business operations. One interviewed organization in broadcast media planned to use their new capabilities to rapidly deploy remote telecast teams.
- › **Improved employee morale.** Interviewees explained that shifting resources from legacy networking to modern tools was more interesting for employees, noting that the reduction of maintenance time allowed teams the opportunity to explore new innovative projects.
- › **Enabled the termination of expensive commercial leases.** Organizations in high-rent urban locations planned to not renew leases for buildings that were housing data centers, when they reached the end of their contract.

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

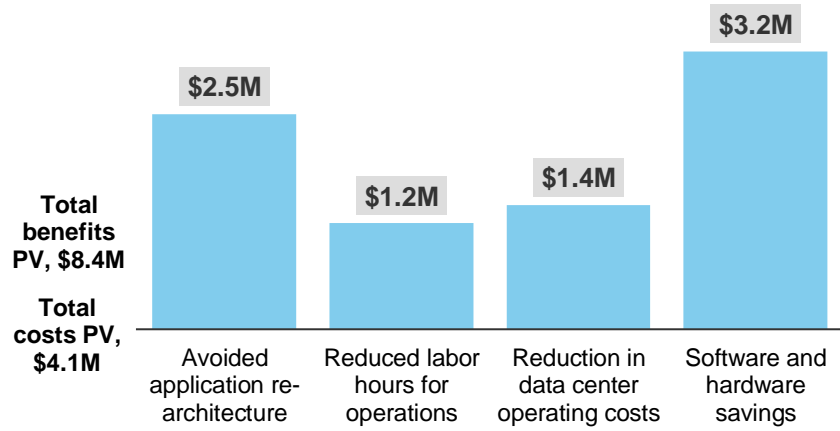
- › **VMware subscription costs.** The fees paid to VMware assume a three-year licensing agreement for eight i3 hosts, with Site Recovery for VMware Cloud on AWS, in one of the AWS US East regions. Over a three-year period, these costs totaled \$3,409,273.
- › **Internal training and deployment costs.** Organizations incurred nominal internal labor hours for initial training and deployment, as well as annual refresher sessions. These costs totaled \$22,814 over a three-year period.
- › **Ongoing VMware management costs.** Organizations incurred internal labor costs for the ongoing management of their vSphere-deployed workloads. Over a three-year period, these costs totaled \$1,128,500.

Forrester's interviews with four existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of \$8,381,682 over three years versus costs of \$4,140,840, adding up to a net present value (NPV) of \$4,240,842 and an ROI of 102%.

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 VMware Cloud on AWS.

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 VMware Cloud on AWS can have on an organization:



DUE DILIGENCE

Interviewed VMware stakeholders and Forrester analysts to gather data relative to VMware Cloud on AWS.



CUSTOMER INTERVIEWS

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

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by VMware 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 VMware Cloud on AWS.

VMware 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.

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

The VMware Cloud On AWS Customer Journey

BEFORE AND AFTER THE VMWARE CLOUD ON AWS INVESTMENT

Interviewed Organizations

For this study, Forrester conducted four interviews with VMware Cloud on AWS customers. Interviewed customers include the following:

INDUSTRY	REGION	REVENUE	SERVERS RETIRED
Higher education	United States	N/A	100
Broadcast media	United States	\$1.2 billion	80
Physical security	United States	\$3.5 billion	80
B2B software	United States	\$250 million	40

Key Challenges

Organizations that decided to invest in VMware Cloud on AWS shared the following key objectives and challenges:

- › **Migrate on-premises data centers to the cloud.** Interviewed organizations searched for a way to recognize the preferable economics of running workloads in the cloud instead of in on-premises data centers. The physical footprints of on-premises data centers left organizations on the hook for significant real estate, power, and cooling costs. Furthermore, scaling the environments required capital investment in hardware — often to accommodate limited peak period usage.
- › **Avoid rearchitecting core applications and business disruptions.** Organizations desired moving to the cloud but recognized that in order to take advantage of cloud-native capabilities they would have to retool or rearchitect their applications. This presented a significant hurdle for organizations, as rearchitecting applications would disrupt business and require recruiting for new developer skill sets.
- › **Improve resiliency and disaster recovery times.** Organizations searched for ways to improve the resiliency of their disaster recovery operations and accelerate recovery times. One organization maintained a disaster recovery center in an area which was designated a coastal flooding zone, creating a mandate to quickly move to a safer area. Migrating to cloud would not only solve this immediate issue but eliminate any future geographic concerns.
- › **Facilitate a more agile business environment.** Interviewed organizations were eager to take advantage of the flexibility and scalability of the cloud. Organizations wanted the ability to easily add capacity as well as accelerate new functionality and business capabilities.

“The difference between VMware and other providers is that they’re willing to talk to us where the other providers are saying, ‘You must adapt your workload and business strategy for us.’ Rather than keeping our business through lock-in, VMware keeps our business by constantly developing bigger and greater services, like VMware Cloud on AWS. We want to choose the best provider based on the needs of the day, and VMware does that by not locking us in.”

Director of cloud platforms, higher education



Solution Requirements

The interviewed organizations searched for a solution that could:

- › Facilitate seamless transition to the cloud with limited business disruption.
- › Utilize existing developer and infrastructure/operations skill sets.
- › Enable reduction in data center footprint.
- › Enable data center extension during peak usage periods without incurring capital expenses.
- › Facilitate development of new business initiatives.

Key Results

The interviews revealed that key results from the VMware on AWS investment include:

- › **Avoided rearchitecting applications for the cloud.** Organizations avoided the need to rearchitect their applications for the cloud, seamlessly lifting and shifting their VMware deployment. In doing so, the organizations saved hundreds of hours in labor for the discovery, planning, and execution phases of migration.
- › **Reduced labor hours needed to manage and maintain virtual machine deployment.** Migrating to the cloud reduced organizations' reliance on physical servers and networking hardware to support their VMware deployments. Furthermore, organizations used the migration as a catalyst to assess and simplify their operations. Combined, these two factors created an environment that was easier to manage and lessened the required labor hours to maintain.
- › **Reduction in data center operating costs.** Interviewed organizations migrated applications to the cloud, allowing them to retire on-premises servers and networking hardware. In doing so, these organizations eliminated their ongoing cost obligations for supplying power, cooling, and maintenance.
- › **Reduction in hardware and software costs.** The virtual hardware that VMware Cloud on AWS supplied organizations with was an upgrade over their existing legacy systems. This upgrade facilitated a higher consolidation ration and allowed organizations to reduce networking software licenses. Furthermore, organizations avoided future hardware refreshes in order to keep their deployments up to date.

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 four 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:

- › A US-based, Fortune 500 company.

“We run a very small staff and so, being able to use the same people for managing workloads both on-premises and in the cloud through the VMware tools that we were already familiar with was one of the biggest driving factors

Senior director of cloud and data center engineering, physical security



“We realized that the on-premises data center we had was kind of useless in a lot of scenarios, and we had to move it off site. The question then was, where were we going to move our existing, classic VMware on-premises infrastructure. We started looking at cloud-based options to get more resiliency, and as we looked deeper at VMware Cloud on AWS we realized we could use the existing skill set we had and get on the cloud even though we had no skills parity with AWS.”

Director of internal IT, B2B software



Key assumptions:

- › 80 servers
- › 40 to 1 ratio of VMs to applications
- › \$2 million annual software budget
- › Three-year contract

- › Prior to investing in VMware Cloud on AWS, the organization maintained an on-premises VMware environment manager by eight engineers. Additionally, the organization spent \$2 million annually on VM licenses and other networking software.
- › Applications within the organization's portfolio are supported by virtual machines at an average ratio of 40 to 1.
- › The composite organization planned to refresh its data center hardware in Year 3 of the business model.
- › The composite organization lacked cloud-native engineering skills at the time of its initial migration.
- › The organization has a three-year contract with VMware for eight i3 hosts, with Site Recovery for VMware Cloud on AWS, in one of the AWS US East regions.

"We got to the cloud in a year without new skill sets, or consultants, and without dragging on the entire organization. Without [VMware Cloud on AWS] I don't know how that could be."

Director of internal IT, B2B software



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	Avoided application re-architecture	\$1,002,488	\$1,002,488	\$1,002,488	\$3,007,463	\$2,493,038
Btr	Reduced operations staffing needs	\$494,000	\$494,000	\$494,000	\$1,482,000	\$1,228,505
Ctr	Reduction in data center operating costs	\$579,500	\$579,500	\$579,500	\$1,738,500	\$1,441,131
Dtr	Software and hardware savings	\$950,000	\$950,000	\$2,090,000	\$3,990,000	\$3,219,008
	Total benefits (risk-adjusted)	\$3,025,988	\$3,025,988	\$4,165,988	\$10,217,963	\$8,381,682

Avoided Application Re-Architecture

Organizations migrated workloads from their on-premises software-defined data centers to the cloud in a seamless manner, avoiding the need to re-architect applications for use with new tools. Maintaining operational consistency with existing vSphere deployments saved organizations hundreds of labor hours in migration work per application.

The composite organization performs a phased migration, moving a selection of workloads each year to prevent significant business interruptions. Organizations saved time during the following migration phases:

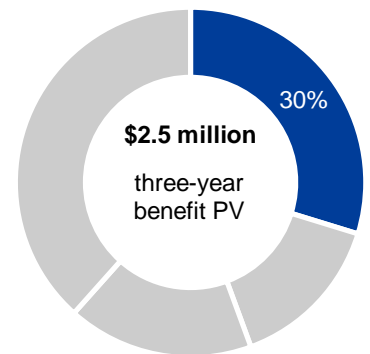
- › **Initial discovery phase:** engaging known stakeholders to do application dependency discovery. This includes network, systems, information security, application support, and application owners.
- › **Adjacent team engagement:** engaging other teams that are discovered to have dependencies.
- › **Migration planning:** discussing time of move, expected impact, and migration methods.
- › **Migration engineering:** setting up DNS, load balancers, firewall rules, and migration scripts.
- › **Migration execution:** all teams and stakeholders on-deck for monitoring efforts and remedial actions such as firewall rules or permissions.

In modeling the benefits of avoided application re-architecting, Forrester makes the following assumptions:

- › 25 applications migrated per year supported by virtual machines at a ratio of 40 to 1.
- › Average annual fully burdened salary of \$130,000.

The savings from avoiding application re-architecture will vary based on size, scope, and complexity of an organization's application portfolio. To account for these risks, Forrester adjusted this benefit downward by 5%.

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 \$8.3 million.



Avoided application re-architecture: 30% of total benefits

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.

yielding a three-year, risk-adjusted total PV of \$2,493,038.

Avoided Application Re-Architecture: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Number of VMs migrated	25 applications* 40 VMs	1,000	1,000	1,000
A2	Hours for initial discovery per VM		0.2	0.2	0.2
A3	Members involved in discovery		10	10	10
A4	Initial discovery, person hours	$A1 * A2 * A3$	2,000	2,000	2,000
A5	Hours engaging adjacent application teams per VM		0.2	0.2	0.2
A6	Members involved in engagement		5	5	5
A7	Adjacent team engagement, person hours	$A1 * A5 * A6$	1,000	1,000	1,000
A8	Hours for migration planning per VM		0.375	0.375	0.375
A9	Members involved in planning		10	10	10
A10	Migration planning, person hours	$A1 * A8 * A9$	3,750	3,750	3,750
A11	Hours for migration engineering per VM		1.5	1.5	1.5
A12	Members involved in migration engineering		4	4	4
A13	Migration engineering, person hours	$A1 * A11 * A12$	6,000	6,000	6,000
A14	Hours for migration execution per VM		0.2	0.2	0.2
A15	Members involved in migration execution		20	20	20
A16	Migration execution, person hours	$A1 * A14 * A15$	4,000	4,000	4,000
A17	Total time spent on VM migration	$A4 + A7 + A10 + A13 + A16$	16,750	16,750	16,750
A18	Average hourly salary	\$130K/2,080	\$63	\$63	\$63
At	Avoided application re-architecture	$A17 * A18$	\$1,055,250	\$1,055,250	\$1,055,250
	Risk adjustment	↓5%			
Atr	Avoided application re-architecture (risk-adjusted)		\$1,002,488	\$1,002,488	\$1,002,488

Reduced Labor Hours For Operations

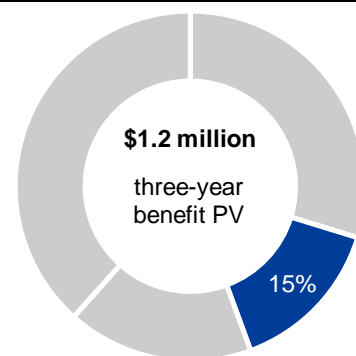
Organizations found that their new, modern data center operations — enabled by VMware Cloud on AWS — required fewer labor hours to administer. Organizations were able to either redeploy assets to other endeavors or reduce them.

For the composite organization, Forrester assumes that:

- › Fully burdened average annual salary of \$130,000.

The reduction in software development expense will vary with:

- › Size, scope, and complexity of operations.
- › Location and prevailing labor market rates.



Reduced labor hours for operations:
15% of total benefits

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of \$1,228,505.

Reduced Labor Hours For Operations: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Team required to maintain data center		8	8	8
B2	Reduction in FTE requirements		50%	50%	50%
B3	Fully burdened salary		\$130,000	\$130,000	\$130,000
Bt	Reduced labor hours for operations	B1*B2*B3	\$520,000	\$520,000	\$520,000
	Risk adjustment	↓5%			
Btr	Reduced labor hours for operations (risk-adjusted)		\$494,000	\$494,000	\$494,000

Reduction In Data Center Operating Costs

Migrating to the cloud enabled organizations to reduce their data center footprints, and in some cases, eliminate them entirely. Retiring physical hardware in data centers, i.e., from servers and supporting networking hardware, eliminated the need to pay for power, cooling, and maintenance staff.

The director of internal IT for a B2B software firm said, “If I look at the support costs (you know, the hidden cost of every piece of hardware) there’s hundreds of thousands of dollars a year in support costs that are going away. Our load balancers, our firewalls, our SAN, our switches, we’re shutting that all down. All footprints are going down 90% and we’re going to see a proportional savings in cooling and power.”

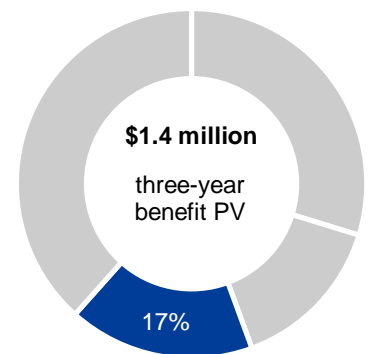
In modeling the reduction in data center operating costs, Forrester makes the following assumptions:

- › The composite organization retires 80 servers.
- › Retired servers are valued at \$15,000. This cumulative value is uplifted 40% to estimate the associated power and cooling support costs.
- › Support staff have an annual fully burdened salary of \$130,000.

Forrester recognizes that experiences will vary by organization. Specific risk considerations include:

- › Size of existing data center footprint.
- › Geographic location and prevailing market rates for wages and electricity.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of \$1,441,131.



Reduction in data center operating costs: **17%** of total benefits

“VMware helps us make better use of existing people resources, avoid technical debt, and provide better flexibility in all regards.”

Director of cloud platforms, higher education



Reduction in Data Center Operating Costs: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Servers retired		80	80	80
C2	Power and cooling	$(C1 * 15,000) * 40\%$	\$480,000	\$480,000	\$480,000
C3	Maintenance and labor		\$130,000	\$130,000	\$130,000
Ct	Reduction in data center operating costs	C2+C3	\$610,000	\$610,000	\$610,000
	Risk adjustment	↓5%			
Ctr	Reduction in data center operating costs (risk-adjusted)		\$579,500	\$579,500	\$579,500

Software And Hardware Savings

Cloud migration to improved infrastructure has enabled organizations to consolidate their server support for applications. In doing so, they were also able to pare down the number of networking software licenses. In addition to discontinuing unnecessary software licenses, organizations avoided future hardware refreshes for end-of-life infrastructure.

The senior director of cloud ad data center engineering for a physical security firm stated: “The big savings have really been around software license counts. In the data center right now I have less than half the number of sockets we were running in the old data center. That’s a huge savings when we’re paying for licenses by each socket.”

The director of internal IT for a B2B software firm said: “We had \$500,000 in hardware refreshes scheduled for last year, and we spent none of it. We also got a performance improvement, so there’s a perceived benefit there. It is pretty high-performing hardware [behind VMware Cloud on AWS] and the hypervisor is fast.”

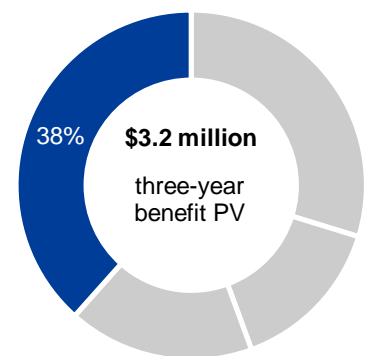
In modeling software and hardware savings, Forrester makes the following assumptions:

- › Annual software license expenditure of \$2,000,000.
- › Server value of \$15,000.
- › Forrester assumes that the hardware refresh cycle falls in Year 3 of the model.

Forrester recognizes that experiences will vary by organization. Specific risk considerations include:

- › Organizational software needs and corresponding spend.
- › Age of current infrastructure and organizational refresh policy.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of \$3,219,008.



Software and hardware savings: **38%** of total benefits



50% reduction in annual software license spend

Software And Hardware Savings: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Annual software expenditures		\$2,000,000	\$2,000,000	\$2,000,000
D2	Percentage reduction in software licenses spend		50%	50%	50%
D3	Annual software savings	D1*D2	\$1,000,000	\$1,000,000	\$1,000,000
D4	Avoided storage hardware refresh	C1*\$15K			\$1,200,000
Dt	Software and hardware savings	D3+D4	\$1,000,000	\$1,000,000	\$2,200,000
	Risk adjustment	↓5%			
Dtr	Software and hardware savings (risk-adjusted)		\$950,000	\$950,000	\$2,090,000

Unquantified Benefits

Interviewees also identified a variety of benefits achieved with VMware Cloud on AWS that could not be quantified for this study. Organizations:

- › **Redeployed legacy servers to accommodate user upgrades.** A director of cloud platforms in higher education stated: “One thing that also worked out well was finding a way to expand certain environments based off the second line resources. We’ve been planning to move email to the cloud, but we’re not quite there yet. However, we did move our mailbox from 2 GBs to 15 GBs without spending any additional money by using the old hardware from our vacated data centers. We achieved improved usability without any extraneous capital expenditures.”
- › **Accelerated speed of disaster recovery operations.** Organizations found their new disaster recovery infrastructure to be faster and more reliable than their previous on-premises deployments.
- › **Improved security.** A director of cloud platforms in higher education stated: “The nice thing about being in a cloud environment — especially a provider with an environment like this — is that there is no negotiation. The environment is secured and updated by default.”
- › **Improved employee morale.** A director of cloud platforms in higher education stated: “We don’t need to burn out the people we have today with really challenging on-call schedules and a lot of calls during the day. We can basically hand over the non-everyday duties to another team to handle.”
- › **Enabled the termination of expensive commercial leases.** Organizations in high-rent urban locations planned to not renew leases for buildings that were housing data centers, when they reached the end of their contract.

“If you take all the support costs, hardware costs, internet costs, and cooling costs that we were paying before, we got georedundant data centers for about what we paid for a single data center before.”

Director of internal IT, B2B software



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 VMware Cloud on AWS and later realize additional uses and business opportunities, including:

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.

- › **Expand cloud capabilities and benefits beyond disaster recovery operations.** A senior director of cloud and data center engineering in physical security stated: “One of the benefits of the model that we have here is that as we improve our infrastructure and the flexibility, our development teams can take advantage of the more modern application development tools and features that are now already inside the security and controls we’ve established in terms of containers.”
- › **Enable new business practices.** A cloud and infrastructure architect in broadcast media stated: “We do remote telecasts for limited time events around the world. I’ve never seen a better use case for transitory data center usage than that. We will have the infrastructure that runs how we want it to be able to run for regular broadcast operations, but it is transitory in nature. Using VMware’s Elastic DRS, we can automatically add nodes to the cluster based on utilization and make them go away. It gives us a true infrastructure cloud for the first time.”

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

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	VMware subscription	\$0	\$3,409,273	\$0	\$0	\$3,409,273	\$3,099,339
Gtr	Internal training and deployment costs	\$19,845	\$1,323	\$1,323	\$1,323	\$23,814	\$23,135
Htr	Ongoing VMware management costs	\$0	\$409,500	\$409,500	\$409,500	\$1,228,500	\$1,018,366
	Total costs (risk-adjusted)	\$19,845	\$3,820,096	\$410,823	\$410,823	\$4,661,587	\$4,140,840

VMware Subscription

The composite organization has a three-year VMware Cloud on AWS contract, paid in full at inception. The organization's deployment consists of eight i3 hosts, with Site Recovery for VMware Cloud on AWS, in one of the AWS East regions.

VMware offers one-year, three-year, and on-demand pricing models as well as volume discounts to meet the varying needs of organizations.

Forrester recognizes that certain factors can impact the annual fees and organization pays for VMware Cloud on AWS. Specific risk considerations include:

- > Contract structure.
- > Number of hosts and region.
- > Applicable discounts.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of \$3,099,339.

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 more than \$4.1 million.



Three-year contract of eight i3 hosts with Site Recovery in an AWS East region

VMware Subscription: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Annual fees paid to VMware			\$3,246,926	\$0	\$0
Ft	VMware subscription	F1	\$0	\$3,246,926	\$0	\$0
	Risk adjustment	↑5%				
Ftr	VMware subscription (risk-adjusted)		\$0	\$3,409,273	\$0	\$0

Internal Training And Deployment Costs

Organizations spent minimal time training their teams for deployment, as they were able to leverage already existing skill sets. Deployment times varied, with organizations taking different approaches — phased and burst — to their rollout. However, all organizations were deployed and in production in well under one year.

The director of internal IT in higher education stated, “This multicloud move is only possible because of VMware HCX. We moved our entire environment to a cloud provider — a population of over 2,700 VMs and 500 TBs of storage — with no downtime.”

The composite organization requires 300 cumulative labor hours across teams to communicate and train for the migration. Furthermore, the organization holds annual refresher courses for new hires and new feature releases.

Implementation risk is the risk that the 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. Specific risk considerations include:

- › Size and scope of operations.
- › Prevailing labor market rates.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of \$23,135.



Less than one year
Total implementation
and deployment time

Internal Training And Deployment Costs: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
G1	Man hours required to train and deploy in VMware Cloud on AWS		300	20	20	20
G2	Average fully burdened hourly rate		\$63	\$63	\$63	\$63
Gt	Internal training and deployment costs	$G1 \times G2$	\$18,900	\$1,260	\$1,260	\$1,260
	Risk adjustment	↑5%				
Gtr	Internal training and deployment costs (risk-adjusted)		\$19,845	\$1,323	\$1,323	\$1,323

Ongoing VMware Cloud On AWS Management Costs

The composite organization employs four FTE resources, which dedicate 75% of their capacity to the ongoing management of their VMware Cloud on AWS deployment. In modeling this cost, Forrester assumes an average fully burdened salary of \$130,000.

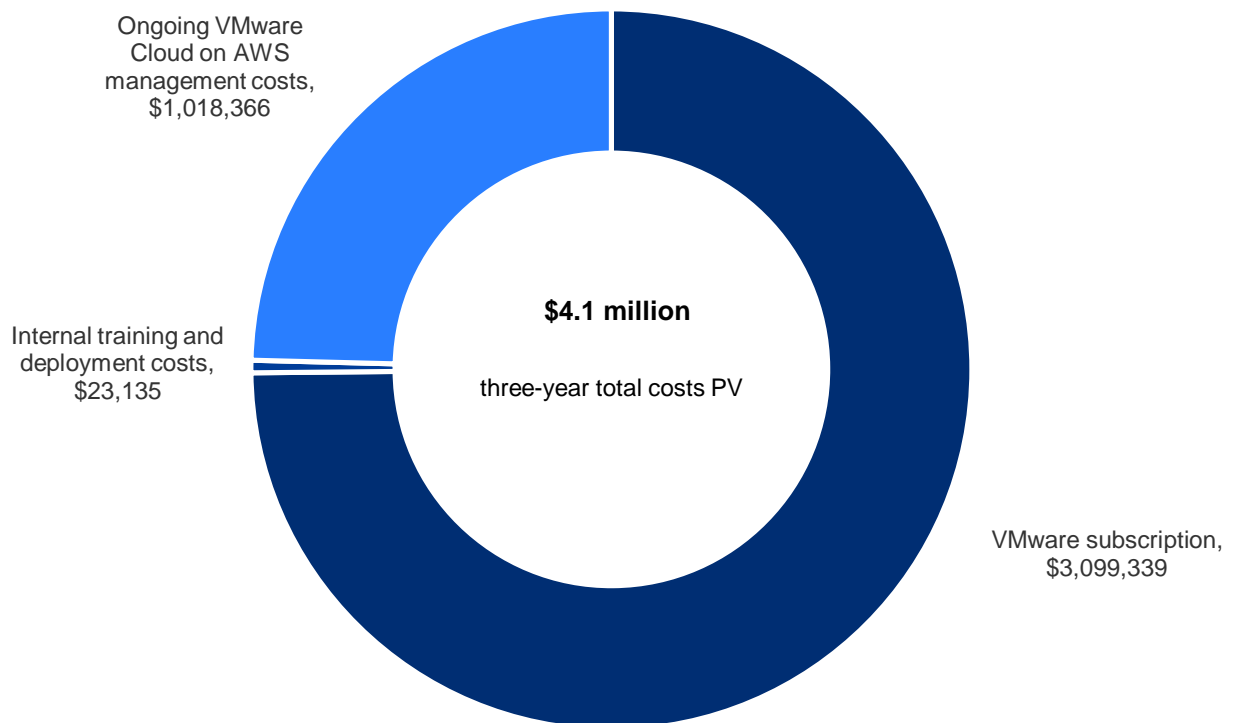
Ongoing VMware management costs will vary based on size and scope of deployment, as well as prevailing labor market rates. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of \$1,018,366.



Four FTEs
spend 75% of their time
on ongoing management
of VMware deployment.

Ongoing VMware Cloud On AWS Management Costs: Calculation Table

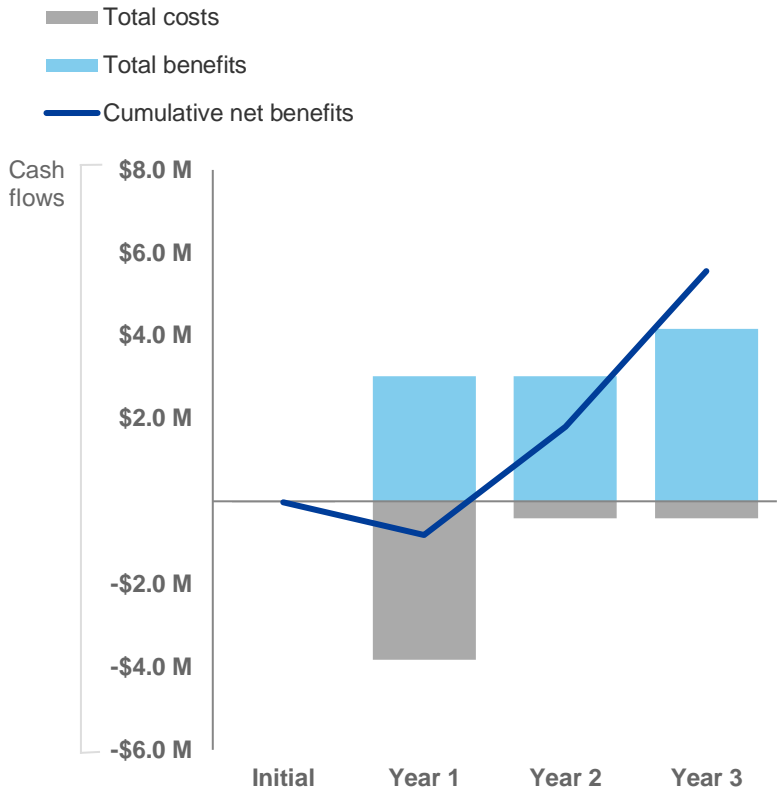
REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
H1	Staff managing VM deployment			4	4	4
H2	Percent of time spent on VMC			75%	75%	75%
H3	Average fully burdened salary			\$130,000	\$130,000	\$130,000
Ht	Ongoing VMware Cloud on AWS management costs	$H1 \times H2 \times H3$		\$390,000	\$390,000	\$390,000
	Risk adjustment	↑5%				
Htr	Ongoing VMware Cloud on AWS management costs (risk-adjusted)		\$0	\$409,500	\$409,500	\$409,500



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.

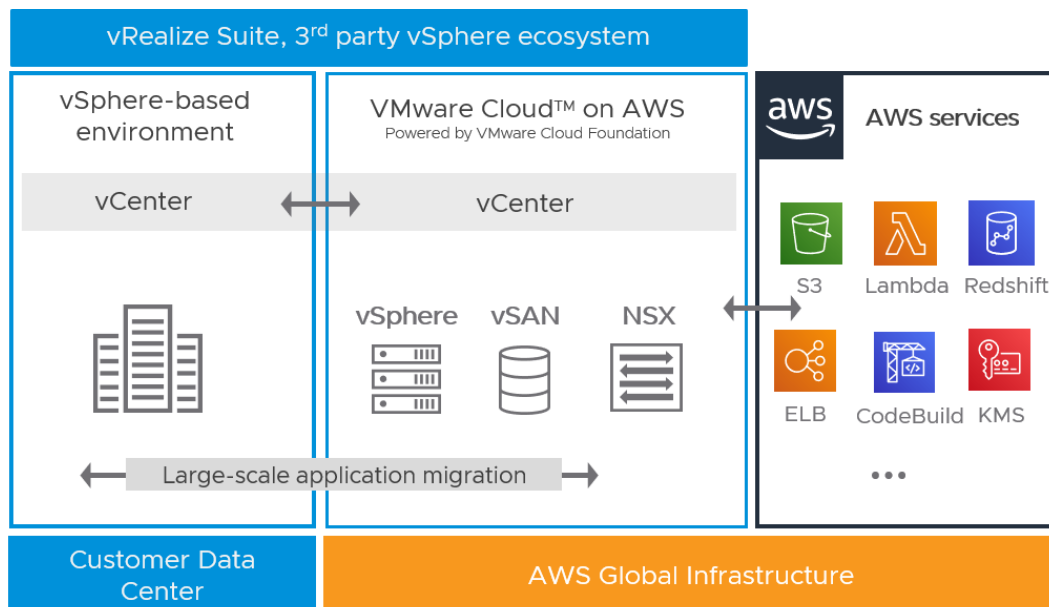
Cash Flow Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	(\$19,845)	(\$3,820,096)	(\$410,823)	(\$410,823)	(\$4,661,587)	(\$4,140,840)
Total benefits	\$0	\$3,025,988	\$3,025,988	\$4,165,988	\$10,217,963	\$8,381,682
Net benefits	(\$19,845)	(\$794,108)	\$2,615,165	\$3,755,165	\$5,556,376	\$4,240,842
ROI						102%
Payback period						16 months

VMware Cloud on AWS: Overview

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

VMware Cloud on AWS brings VMware's enterprise class Software-Defined Data Center software to the AWS Cloud, and enables customers to run production applications across VMware vSphere-based hybrid cloud environments, with optimized access to AWS services. Jointly engineered by VMware and AWS, this on-demand service enables IT teams to seamlessly extend, migrate, and manage their cloud-based resources with familiar VMware tools — without the hassles of learning new skills or utilizing new tools. VMware Cloud on AWS integrates VMware's flagship compute, storage, and network virtualization products (VMware vSphere, VMware vSAN and VMware NSX) along with VMware vCenter management as well as robust disaster protection, and optimizes it to run on dedicated, elastic, Amazon EC2 bare-metal infrastructure that is fully integrated as part of the AWS Cloud. This service is delivered and supported by VMware and its partners. Customers can purchase this service from VMware, AWS, or each company's partner community. With the same architecture and operational experience on-premises and in the cloud, IT teams can now quickly derive instant business value from use of the AWS and VMware hybrid cloud experience.





Cloud Migrations

- Accelerate application-specific and data-centerwide migration to public cloud
- Minimize complex conversions and transition risk
- Run applications on a consistent and enterprise-class cloud service that brings the best of VMware technologies to AWS



Data Center Extension

- Extend your data center with VMware SDDC-consistent agile capacity in AWS
- Access on-demand capacity to expand into new geographies, handle seasonal demand, or perform test and development activities
- Reduce complexity and investment cost with consistent architecture and operations



Disaster Recovery (DR)

- Provide on-demand site protection with native automated orchestration, failover and failback capabilities
- Increase business resiliency and accelerate time-to-protection
- Simplify DR operations and reduce secondary DR site costs



Next-Generation Apps

- Modernize existing enterprise applications and build hybrid applications with AWS cloud capabilities and services
- Seamlessly speed the path to new modernized applications
- Extend the value of existing on-premises enterprise application investments



Virtual Desktops

- Migrate VMware Horizon 7 or Citrix Virtual Apps and Desktops to the cloud to outsource management of the underlying infrastructure
- Extend on-premises VDI deployments for disaster recovery or scale on-demand scenarios



Regional Expansion

- Take advantage of the global AWS footprint for business expansion, M&A integration or divestitures needs
- Quickly deliver familiar and operationally consistent VMware infrastructure in new locations

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.