

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

The Total Economic Impact™ Of VMware vRealize Operations

Cost Savings And Business Benefits
Enabled By vRealize Operations

Table Of Contents

Executive Summary	1
Key Findings	1
TEI Framework And Methodology	3
The vRealize Operations Customer Journey	4
Interviewed Organizations	4
Key Challenges	4
Key Results	4
Composite Organization	5
Analysis Of Benefits	6
Hardware Cost Savings	6
Reduction In Unplanned Downtime	7
Operational Efficiency	8
Storage Cost Savings	9
Software Licensing Cost Savings	10
Unquantified Benefits	11
Flexibility	11
Analysis Of Costs	12
Due Diligence, Implementation, And Ongoing Management	12
Hardware	13
Licensing And Maintenance	13
Financial Summary	15
VMware vRealize Operations: Overview	16
Appendix A: Total Economic Impact	17
Appendix B: Endnotes	18

Project Directors:

Kathleen Byrne
Edgar Casildo

ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. Ranging in scope from a short strategy session to custom projects, Forrester's Consulting services connect you directly with research analysts who apply expert insight to your specific business challenges. For more information, visit forrester.com/consulting.

© 2019, Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to forrester.com.

Executive Summary

As businesses seek to quickly transform to more digitally focused organizations, they look to cloud technologies for support. Forrester Analytics' Global Business Technographics® Infrastructure Survey, 2018, shows that most organizations have either already invested in a private cloud or have made the decision to do so: 59% of organizations say they are implementing or expanding their private cloud deployments, with another 20% planning to implement in the next 12 months.¹ One of the top concerns of these IT professionals, however, is that these private cloud deployments will be difficult to manage. IT operations teams must find solutions for managing their internal cloud infrastructures that deliver optimization and efficiency.

VMware vRealize Operations is a unified management platform that allows its customers to manage the operations of their software-defined data centers efficiently and effectively. vRealize Operations' self-driving functionality delivers continuous, intent-based performance and capacity optimization as well as remediation powered by predictive analytics. VMware commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying vRealize Operations. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the vRealize Operations on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed five customers, each with years of experience using vRealize Operations. Prior to deploying vRealize Operations, these customers struggled with poor performance, inefficiencies in troubleshooting, and wasted capacity. Their vRealize Operations deployments delivered improved visibility, performance and capacity optimization, and faster remediation.

Key Findings

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

- › **A 20% reduction in hardware cost.** vRealize Operations' real-time capacity optimization functionality uses predictive analytics to balance workloads, optimize density, and avoid contention automatically. Interviewees found that this functionality allowed them to right-size virtual machines (VMs), find resources that were spun up but never used, and consolidate VMs on hosts, leading to significant hardware cost savings.
- › **A 93% reduction in unplanned downtime.** Prior to using vRealize Operations, interviewees could not identify issues before they became critical and would, therefore, have to shut down their environments to administer patches. Then, systems would be forced to remain off while the teams ran time-consuming diagnostic tests. vRealize Operations provides continuous performance optimization based on operational and business intent, optimizing resource usage, detecting capacity shortfalls, and proactively resolving issues — helping customers optimize their environment and improve availability.

Key Benefits



Hardware cost savings:
\$4,600,000



Reduction in unplanned
downtime:
\$3,600,000



Operational efficiency:
\$1,350,000



ROI
303%



Benefits PV
\$9.9 million



NPV
\$7.5 million

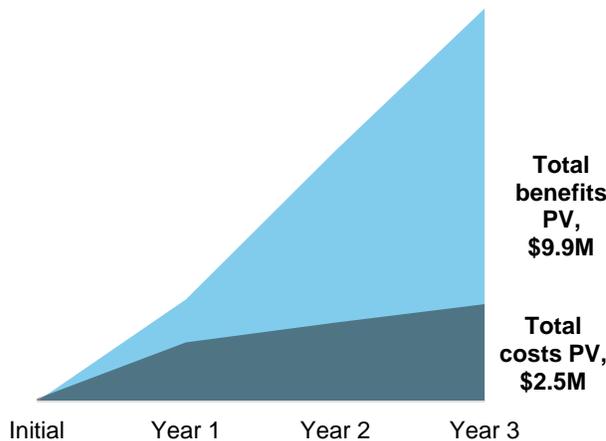
- › **A 30% productivity improvement from intelligent remediation, improved visibility, and faster reporting.** Intelligent Remediation uses advanced analytics to correlate metrics and log data that predict, prevent, and troubleshoot virtual environments. The visibility into the performance, capacity, and configuration of the infrastructure — displayed in a unified dashboard — makes solving issues much faster.
- › **A 50% reduction in database management software licensing costs.** vRealize Operations' continuous performance optimization functionality allowed customers to automate workload balancing based on business intent, such as host-based workload placements. This helped customers consolidate and separate workloads based on software licenses.
- › **A 500-terabyte reduction in storage needs.** In addition to the hardware cost savings that resulted from vRealize Operations' capacity optimization functionality, customers also experienced a reduction in storage needs.

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

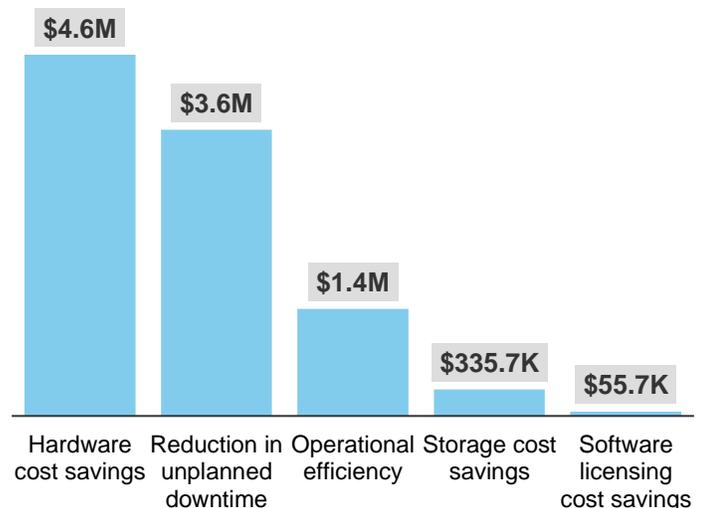
- › **Due diligence, implementation, and ongoing management costs of \$709,000.** While implementation itself was quick, successful deployments required thoughtful collaboration, planning, and customization, as well as strong ongoing management.
- › **Hardware costs totaling \$42,000.** Interviewees needed servers to host their on-premises deployments of vRealize Operations.
- › **Licensing and maintenance fees of \$1.7 million.** Fees to VMware are based on CPU usage and include licensing and maintenance.

Forrester's interviews with five existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of \$9,915,298 over three years versus costs of \$2,457,444, adding up to a net present value (NPV) of \$7,457,854 and an ROI of 303%.

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 vRealize Operations.

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 vRealize Operations can have on an organization:



DUE DILIGENCE

Interviewed VMware stakeholders and Forrester analysts to gather data relative to vRealize Operations.



CUSTOMER INTERVIEWS

Interviewed five organizations using vRealize Operations 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 vRealize Operations' 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 vRealize Operations.

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 vRealize Operations Customer Journey

BEFORE AND AFTER THE VREALIZE OPERATIONS INVESTMENT

Interviewed Organizations

This study is a refresh of a 2016 study. This study leverages data from the interviews conducted in 2016 but relies most heavily on five new interviews with global companies using VMware vRealize Operations. Interviewed customers include the following:

INDUSTRY	HEADQUARTERS	EMPLOYEES	INTERVIEWEE	DATA CENTERS	VIRTUAL MACHINES
Retail	APAC	40,000	IT infrastructure architect	2	1200
Telecommunications	North America	3,000	Infrastructure manager	4	10,000
Financial services	APAC	45,000	Head of cloud infrastructure	2	3,000
Travel	EMEA	100,000	Technical manager	2	4,500
Financial services	APAC	50,000	IT infrastructure architect	2	10,000

Key Challenges

Prior to adopting vRealize Operations, interviewees leveraged a variety of other solutions, from using similar tools to outsourcing manual operations tasks. However, across these alternatives, the interviewees faced many of the same challenges:

- › **Inefficient operations and remediation.** Without visibility into the infrastructure, IT operations staff spent hours trying to identify the root causes of issues and implement solutions. Staff were drowning in troubleshooting and service tickets with no end in sight.
- › **Lack of visibility.** Interviewees, tasked with managing their virtual infrastructure, had little to no visibility into the health of their environments. The technical manager explained that before vRealize Operations, the travel company “had no visibility into our environment in terms of what was allocated where and what was being used.” If there was an issue, the staff were going in blind to solve it.
- › **Wasted resources.** Interviewees frequently spoke of massively oversized VMs running rampant in their environments, sitting there unused and unnoticed. After implementing vRealize Operations, one interviewee said his company found a VM that had been sitting idle — but consuming resources — for over two years. He doesn’t think the organization would have ever found it without vRealize Operations. Another interviewee estimated that 90% of his VMs were over capacity prior to implementing vRealize Operations.

“We needed to get better visibility into our environment to curb spending or avoid capital expenses altogether. That was not possible with our previous toolset.”

Technical manager, travel



Key Results

After implementing vRealize Operations, customers experienced the following outcomes:

- › **Clear visibility.** vRealize Operations provided the infrastructure teams with a comprehensive picture of the physical and virtual environments, including workload distribution, real-time performance, and health metrics. The IT infrastructure architect for the retail firm explained that, before vRealize Operations, the team “had to go to the data center and perform physical health and performance checks. Now we can just open our emails and have complete reports on the data center, health checks, alerts — everything. This has been tremendous for us.” These insights empowered the team to solve incidents more quickly and work more efficiently.
- › **Improved performance and capacity optimization.** vRealize Operations’ self-driving operations capabilities automatically balance workloads and resolve contention. By optimizing existing capacity, the interviewees could reduce the number of hosts required to operate their virtual machines and improve the performance of the existing infrastructure. This improved performance reduced the number of service incidents, driving further efficiencies for the IT operations teams.
- › **Faster remediation.** vRealize Operations uses advanced analytics to correlate metrics and log data that predict, prevent, and troubleshoot issues within virtual environments. Interviewees experienced faster root-cause analysis and fewer tickets.

“Thanks to the data we have in vRealize Operations, we can prevent issues before they happen.”

*IT infrastructure architect,
financial services*



“In my time in IT, I’ve never seen anything this dramatic. The improvements were so big. We suddenly got so much information.”

*Infrastructure manager,
telecommunications*



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 the composite. The global, \$10-billion-dollar business-to-consumer organization employs 25,000 people and manages both digital and brick-and-mortar operations. It’s nearly 85% virtualized, with 10,000 virtual machines in a private cloud environment. Its virtual environment is growing at 5% annually and spread across two data centers. Its team of 20 administrators manages everything in-house; nothing is outsourced. Prior to deploying vRealize Operations, it had an average of 16 VMs per host but improves that to 20 with vRealize Operations.



Key assumptions

25,000 employees

10,000 VMs

20 IT operations admins

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	Hardware cost savings	\$1,054,000	\$2,227,000	\$2,346,000	\$5,627,000	\$4,561,262
Btr	Reduction in unplanned downtime	\$1,419,120	\$1,471,680	\$1,471,680	\$4,362,480	\$3,612,069
Ctr	Operational efficiency	\$216,000	\$667,440	\$802,040	\$1,685,480	\$1,350,552
Dtr	Storage cost savings	\$135,000	\$135,000	\$135,000	\$405,000	\$335,725
Etr	Software licensing cost savings	\$14,400	\$27,000	\$27,000	\$68,400	\$55,690
	Total benefits (risk-adjusted)	\$2,838,520	\$4,528,120	\$4,781,720	\$12,148,360	\$9,915,298

Hardware Cost Savings

vRealize Operations' real-time capacity optimization functionality uses predictive analytics to balance workloads and avoid contention automatically based on intent. Interviewees found that this functionality allowed them to right-size VMs, find resources that were spun up but never used, and consolidate VMs on hosts, leading to significant hardware cost savings. One technical manager said, "With vRealize Operations, we were able to recover enough resources that had been wasted to get through those two years with no capital expenditures."

Interviewees unanimously cited hardware cost savings:

- › The telecommunications company cited a 30% reduction in hardware usage each year.
- › One of the financial institutions saw a 25% reduction in hosts and a 10% to 15% indirect improvement by optimizing idle, overallocated VMs.
- › The retailer consolidated seven clusters down to three and avoided a purchase of 14 servers.
- › The other financial institution consolidated three clusters to two.

Forrester assumes that:

- › Prior to using vRealize Operations, the composite organization required 625 hosts for its 10,000 virtual machines. It needed 5% more hosts every year to support its growing virtual infrastructure.
- › After implementing vRealize Operations, the composite sees a 20% reduction in the number of hosts. It realizes the full 20% by Year 2, experiencing a 10% reduction in Year 1.

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 \$9.9 million.



vRealize Operations delivered a 20% reduction in hardware costs.

- › The fully loaded cost for each server is \$20,000.

The reduction in hardware costs vary with:

- › Starting levels of capacity.
- › Inefficiency across the virtual environment.
- › Fully loaded server costs.
- › Business demands.

To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year risk-adjusted total PV of \$4.6 million.

Hardware Cost Savings: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Number of servers needed prior to vRealize	5% growth rate	625	656	689
A2	Number of servers needed with vRealize	20% reduction (10% in Year 1)	563	525	551
A3	Servers available for repurpose or avoided	A1-A2	62	131	138
A4	Fully loaded cost of a server		\$20,000	\$20,000	\$20,000
At	Hardware cost savings	A3*A4	\$1,240,000	\$2,620,000	\$2,760,000
	Risk adjustment	↓15%			
Atr	Hardware cost savings (risk-adjusted)		\$1,054,000	\$2,227,000	\$2,346,000

Reduction In Unplanned Downtime

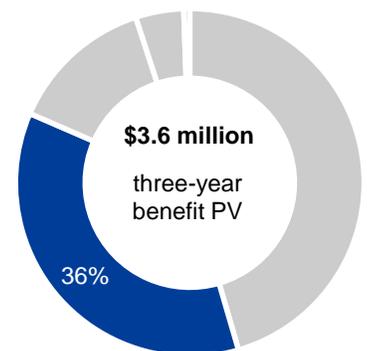
Prior to implementing vRealize Operations, some interviewees struggled to maintain uptime in their production environments. They could not identify issues before they became critical and therefore would shut down their environments to administer patches. Then, systems would be forced to run with fewer resources or remain off while the teams ran time-consuming diagnostic tests.

vRealize Operations provides continuous performance optimization based on operational and business intent, automatically balancing workloads to avoid contention as well as optimize utilization. With this functionality, interviewees experienced optimized resource usage, detected capacity shortfalls, and proactively resolve issues. One interviewee explained, “In the past, we’d have to wait for an application to complain.” Interviewees could now proactivity address reliability issues before they occurred.

- › Prior to vRealize Operations, the retailer had 97.1% availability, which increased to 99.99% after vRealize Operations.
- › Another interviewee noted that his organization could now prevent issues before they snowballed, but he could not share specific performance metrics.

Forrester assumes that:

- › The composite organization starts with 98.5% availability and improves to 99.9%.



Reduction in unplanned downtime:
36% of total benefits

- › Based on lost productivity and revenue opportunities, downtime costs are an average of \$15,000 per hour.

The savings from reduced downtime will vary with:

- › The value of downtime for an organization.
- › The amount of downtime experienced before adopting vRealize Operations.

To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year risk-adjusted total PV of \$3,612,069.

Reduction In Unplanned Downtime: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Uptime prior to adopting vRealize Operations		98.5%	98.5%	98.5%
B2	Uptime after adopting vRealize Operations		99.85%	99.9%	99.9%
B3	Reduction in downtime	B2-B1	1.35%	1.40%	1.40%
B4	Average cost of downtime (per hour)		\$15,000	\$15,000	\$15,000
Bt	Cost savings from a reduction in downtime	$365 * 24 * B3 * B4$	\$1,773,900	\$1,839,600	\$1,839,600
	Risk adjustment	↓20%			
Btr	Cost savings from a reduction in downtime (risk-adjusted)		\$1,419,120	\$1,471,680	\$1,471,680

Operational Efficiency

Prior to deploying vRealize Operations, interviewees struggled to manage their virtual infrastructures efficiently. vRealize Operations delivered improved efficiency through:

- › **Intelligent remediation.** vRealize Operations uses advanced analytics to correlate metrics and log data that predict, prevent, and troubleshoot virtual environments. For example, it can automatically take corrective action to balance workloads, or add resources to undersized VMs, preventing slow performance. When incidents are avoided, operators have fewer problems to respond to, reducing the time dedicated to resolving tickets. One interviewee estimated that his team “reduced tickets by 40% to 45%, with incidents related to servers down a full 80%.”
- › **Visibility into the infrastructure.** The visibility into the performance, capacity, and configuration of the infrastructure — displayed in a unified dashboard — makes solving issues much faster. IT operations managers can see where an alert comes from and what the root cause of the problem is, saving hours of investigation. The visibility also makes onboarding new employees more straightforward because they don’t have to spend as much time learning about the environment: It’s available to them in one clear view.



Intelligent remediation, improved visibility, and faster reporting improve operational efficiency by 30%.

- › **Faster reporting.** Before vRealize Operations, one organization had several people dedicated solely to producing health assessments of application performance. Each report took one or two days, with several reports in flight daily for key applications. Now, with vRealize Operations, these reports are automated and take just 5 minutes each, freeing up these resources for other tasks.

The travel organization's technical manager said that despite growing at over 20% year over year, the company was able to keep the same number of people managing its infrastructure. The manager estimates that without vRealize Operations, the organization would need twice as many people to manage the virtual environment.

Forrester assumes that:

- › Prior to vRealize Operations, the composite organization employed 20 people to manage the virtual environment, with one additional headcount added each year.
- › After vRealize Operations, the composite can reallocate approximately 30% of those people to other activities and reduce the need to hire. To accommodate for ramp time, this results in a reduction of two headcount in Year 1, an additional four in Year 2, and no change for Year 3.
- › The average fully loaded salary for an IT operations manager is \$120,000, growing at 3% per year.

This benefit will vary based on:

- › An organization's size, growth rate, maturity, and efficiency.
- › An organization's adoption and use of vRealize Operations.
- › Average fully loaded salaries.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of \$1,350,552.

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.

Operational Efficiency: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Number of FTEs expected without vRealize Operations		20	21	22
C2	Number of FTEs required with vRealize Operations		18	15	15
C3	Average fully loaded salary	Growing at 3% per year	\$120,000	\$123,600	\$127,308
Ct	Operational efficiency	$(C1-C2)*C3$	\$240,000	\$741,600	\$891,156
	Risk adjustment	↓10%			
Ctr	Operational efficiency (risk-adjusted)		\$216,000	\$667,440	\$802,040

Storage Cost Savings

In addition to the hardware cost savings that resulted from vRealize Operations capacity optimization, customers also experienced a reduction in storage needs.

- › The telecommunications company saved 500 terabytes of VM space.
- › The travel company saved 100 terabytes.
- › The retailer saved 120 terabytes.

Forrester assumes that:

- › The composite organization saves 500 TB of storage when it consolidates its VMs.
- › The fully loaded cost of a terabyte of storage is \$300 per year.

The reduction in storage cost savings will vary with:

- › Starting levels of inefficiency across the virtual environment.
- › The cost of storage used.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of \$335,725.

Storage Cost Savings: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Terabytes saved		500	500	500
D2	Cost per terabyte		\$300	\$300	\$300
Dt	Storage cost savings	D1*D2	\$150,000	\$150,000	\$150,000
	Risk adjustment	↓10%			
Dtr	Storage cost savings (risk-adjusted)		\$135,000	\$135,000	\$135,000

Software Licensing Cost Savings

vRealize Operations' continuous performance optimization functionality allows users to automate workload balancing and host-based placement of workloads based on business intent. These capabilities can help customers consolidate and separate workloads based on software licenses. Done successfully, this reduces the number of licenses that an organization needs. One interviewee took advantage of this feature, reducing his database management licenses by 50%.

Forrester assumes that:

- › Prior to using vRealize Operations, the composite organization required 30 database management licenses.
- › After implementing vRealize Operations, the composite sees a 50% reduction in the number of licenses.
- › Each license costs \$2,000.

The reduction in software development expense will vary with:

- › Starting levels of inefficiency across software licenses.
- › The volume and costs of licenses.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of \$55,690.



Reduction in database management licenses: **50%**

Software Licensing Cost Savings: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
E1	Number of database management licenses needed before vRealize Operations		30	30	30
E2	Number of database management licenses needed after vRealize Operations		22	15	15
E3	Cost per license		\$2,000	\$2,000	\$2,000
Et	Software licensing cost savings	$(E1-E2)*E3$	\$16,000	\$30,000	\$30,000
	Risk adjustment	↓10%			
Etr	Software licensing cost savings (risk-adjusted)		\$14,400	\$27,000	\$27,000

Unquantified Benefits

In addition to the quantified benefits listed above, the interviewed customers discussed a qualitative benefit from using vRealize Operations:

- › The advanced features of vRealize Operations offer users the ability to forecast future capacity based on current usage and growth rates. While none of the organizations were taking advantage of this feature at the time of the interviews, most expected to. When they do, they expect to be better informed during budget season and more empowered to control future spending.

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 vRealize Operations and later realize additional uses and business opportunities.

- › With improved operational efficiency, interviewees expect to leverage their teams' recuperated time to explore new ways to support their business partners. One interviewee said: "We have shifted to a different class of work. We can directly impact the business in a better way."
- › One interviewee planned to extend the capabilities of his vRealize Operations deployment to explore compliance features, which would allow him to ensure his virtualized environment complies with the Payment Card Industry (PCI) and other security policies his organization must follow.
- › Interviewees often cited the natural progression to advancing to vRealize Automation, which would allow them to automate the creation of VMs and drive greater efficiencies.

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



Interviewees anticipate being able to forecast future capacity needs using vRealize Operations.

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	Due diligence, implementation, and ongoing management	\$34,312	\$264,000	\$271,920	\$280,078	\$850,309	\$709,465
Gtr	Hardware	\$42,000	\$0	\$0	\$0	\$42,000	\$42,000
Htr	Licensing and maintenance	\$0	\$1,299,375	\$324,844	\$341,086	\$1,965,305	\$1,705,979
	Total costs (risk-adjusted)	\$76,312	\$1,563,375	\$596,764	\$621,164	\$2,857,614	\$2,457,444

Due Diligence, Implementation, And Ongoing Management

Interviewees began incurring costs when they decided to explore new solutions for managing their virtual infrastructure. Successful deployments leveraged a thoughtful approach that required resource hours over several weeks. Specific due diligence and implementation tasks include:

- › Spending time with VMware to understand how the solution could support management of its virtual infrastructure.
- › Working with VMware on requirements, software setup, network and environment integration, configuration, testing, and customization.

Once the solution was up and running, interviewees dedicated several resources to the task of maintaining the solution. Forrester assumes the composite organization dedicates two IT operations managers to supporting vRealize Operations. Their tasks include:

- › Setting and updating business intent to inform self-driving features.
- › Creating and optimize dashboards.
- › Following up on alerts.
- › Interfacing with VMware for questions, training, etc.
- › Maintaining the hardware and software.

Implementation costs will vary depending on:

- › Labor costs.
- › The size and scope of implementation.
- › The level of customization desired.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of \$709,465.

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 nearly \$2.5 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.

Due Diligence, Implementation, And Ongoing Management: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Hours spent on due diligence		40			
F2	Hours spent on planning and implementation		160			
F3	Professional services		\$20,000			
F4	Resources dedicated to ongoing management			2	2	2
F5	Average fully loaded salary		\$116,400	\$120,000	\$123,600	\$127,308
Ft	Due diligence, implementation, and ongoing management	$((F1+F2)/2,080*F5)+(F4*F5)+F3$	\$31,192	\$240,000	\$247,200	\$254,616
	Risk adjustment	↑10%				
Ftr	Due diligence, implementation, and ongoing management (risk-adjusted)		\$34,312	\$264,000	\$271,920	\$280,078

Hardware

vRealize Operations is deployed on-premises, so interviewees incurred modest hardware costs. The analysis assumes the composite organization requires two servers to host vRealize Operations. The requirements for other organizations will depend on the size and scope of the implementation, so Forrester has risk-adjusted this cost up by 10%, for a total of \$42,000. Maintenance of the hardware is included in ongoing management.

Hardware: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
G1	Number of servers		2			
G2	Cost per server		20,000			
Gt	Hardware	$G1*G2$	\$40,000			
	Risk adjustment	↑5%				
Gtr	Hardware (risk-adjusted)		\$42,000			

Licensing And Maintenance

Fees to VMware for vRealize Operations include perpetual licensing fees and annual maintenance fees.

Forrester assumes the composite organization has 10,000 VMs in Year 1, with an additional 5% in growth each year. Costs total \$1.2 million in Year 1, \$309,000 in Year 2, and \$325,000 in Year 3.

Licensing and maintenance costs will vary based on:

- › CPU usage.
- › Existing licensing contracts with VMware.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted total PV of \$1,705,979.

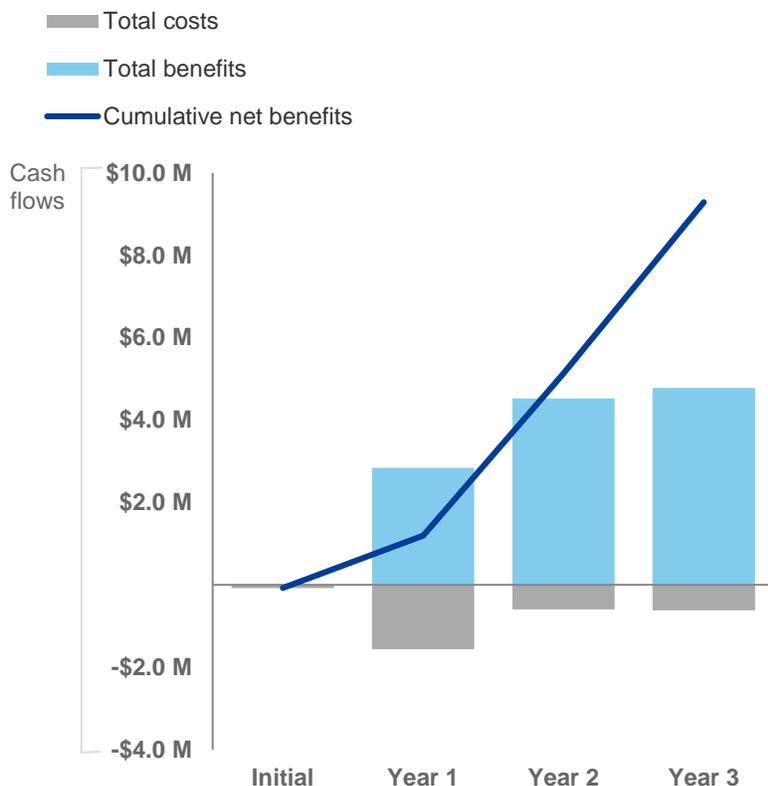
Licensing And Maintenance: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
H1	Licensing and maintenance			\$1,237,500	\$309,375	\$324,844
	Risk adjustment	↑5%				
Htr	Licensing and maintenance (risk-adjusted)			\$1,299,375	\$324,844	\$341,086

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 and NPV 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	(\$76,312)	(\$1,563,375)	(\$596,764)	(\$621,164)	(\$2,857,614)	(\$2,457,444)
Total benefits	\$0	\$2,838,520	\$4,528,120	\$4,781,720	\$12,148,360	\$9,915,298
Net benefits	(\$76,312)	\$1,275,145	\$3,931,356	\$4,160,557	\$9,290,747	\$7,457,854
ROI						303%

VMware vRealize Operations: Overview

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

In order to realize the full benefits of SDDC and cloud infrastructure, companies need to rethink data center operations. They need an operations management platform that can connect, sense and adapt to the environment to provide real time and proactive insights needed to automate performance and capacity management.

VMware vRealize Operations delivers self-driving operations from applications to infrastructure to help organizations optimize, plan and scale their SDDC and multi-cloud deployments. It addresses the business and technical challenges faced by IT teams managing SDDC and multiple cloud environments, automating and simplifying operations management. To this end, vRealize Operations offers the following capabilities:

- › **Continuous performance optimization** - Assure application performance at minimal cost, driven by operational and business intent with real-time predictive analytics driving actions to automatically balance workloads and proactively avoid contention.
- › **Efficient capacity management and planning** - Reduce cost and risk with real-time capacity analytics delivering optimal utilization, cost savings and densification along with proactive planning and procurement.
- › **Intelligent Remediation** - Predict, prevent and troubleshoot faster with actionable insights correlating metrics and logs with unified observability from applications to infrastructure. Centralize IT operations management with native SDDC integrations, federated views and a highly scalable and extensible platform.
- › **Integrated Compliance** - Reduce risk and enforce IT and regulatory standards with integrated compliance and automated drift remediation.

Appendix A: Total Economic Impact

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

Total Economic Impact Approach



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



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



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



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

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



Present value (PV)

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



Net present value (NPV)

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



Return on investment (ROI)

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



Discount rate

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



Payback period

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

Appendix B: Endnotes

ⁱ Source: Forrester Analytics' Global Business Technographics Infrastructure Survey, 2018