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New Technology: The Projected Total Economic Impact™ Of Microsoft Azure VMware Solution

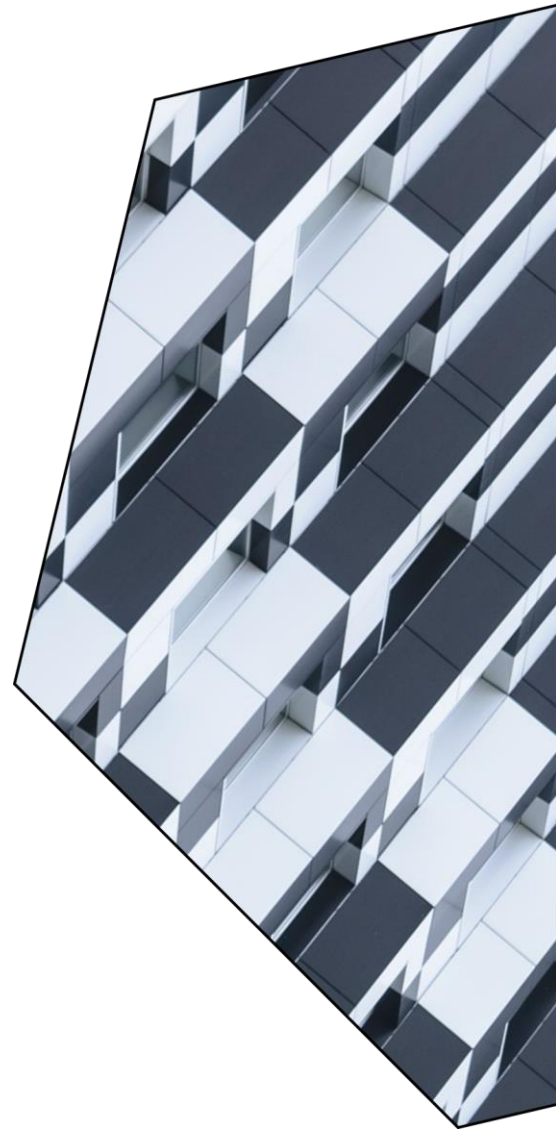Cost Savings And Business Benefits Enabled By Azure VMware Solution

OCTOBER 2021

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Executive Summary

> Azure VMware Solution (AVS) democratizes and accelerates the path to cloud, allowing organizations to maintain their VMware investments and personnel expertise as usual without rearchitecting and disrupting business-critical workloads — all while taking advantage of the immense benefits of the cloud including elasticity, infrastructure cost savings, personnel productivity savings, and increased workload performance and availability.

The benefits of a cloud migration, such as cost savings, productivity benefits, and improvements to application performance, are evident for nearly every organization. To stay competitive, firms must curate cloud ecosystems that link employees, customers, partners, vendors, and devices to serve rising customer expectations and encourage rapid adaptation to changing markets and business conditions.[1] However, the path to cloud is often nuanced and complex. Some organizations face an uphill climb given monolithic applications that require costly and time-consuming rearchitecture, in addition to high availability requirements. In these cases, the quickest and least-disruptive path to these substantial cloud benefits may be best served by lifting and shifting these key workloads to the cloud.

Azure VMware Solution is an Azure service that redeploys and extends organizations' VMware-based enterprise workloads to Microsoft Azure.

Microsoft commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Azure VMware Solution.[2] The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Azure VMware Solution on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed four decision-makers with experience using Azure VMware Solution. For the purposes of this study,

KEY STATISTICS

Projected return on investment (ROI)
125% to 274%

Projected net present value (NPV)
$3.28M to $7.22M

Forrester aggregated the interviewees' experiences and combined the results into a single composite organization.

Prior to using AVS, the interviewees' organizations stood at a crossroads in their respective cloud transformations. End users and customers demanded the high availability and performance that cloud-based applications can offer, while increasing infrastructure requirements and discontinued security support stressed IT budgets and personnel. Despite these challenges, interviewees noted their organizations were not in a position to rearchitect their VMware workloads due to limited time, personnel, required business disruption, and the specific rearchitecting required.

By redeploying their VMware workloads to Azure VMware Solution with no disruption, the interviewees' companies maintained their VMware investments and personnel expertise while benefitting from the elasticity, cost savings, and increased performance of the cloud.

"	**With Azure VMware Solution, we can spin up nodes nearly instantaneously. That's a major advantage because we can be much more flexible than before and pivot quicker to meet the demands of our business.** "

— Director, IT cloud infrastructure, education

KEY FINDINGS

Quantified projected benefits. Risk-adjusted present value (PV) quantified benefits include:

- **Two to five avoided full-time IT system administrator hires.** By redeploying and extending VMware workloads on Microsoft Azure, personnel skills on VMware investments retained their value in the cloud, allowing the organization to avoid hiring additional personnel for their cloud skills or reskilling current personnel.

- **Nearly $400,000 in avoided personnel effort in maintaining on-premises infrastructure.** By redeploying on Microsoft Azure, IT personnel tasked with updating, provisioning, and maintenance tasks for their VMware environment's on-premises infrastructure reclaimed time as workloads were moved out of the organizations' data centers to Microsoft Azure. In some cases, nearly 100% of the time spent on these tasks is eliminated.

- **Nearly $2 million in avoided overprovisioning, refreshes, and decommissioned infrastructure spend.** By redeploying VMware workloads on Azure VMware Solution, the interviewees noted their organizations avoided overprovisioning for peak demand via the scalability of the cloud and Microsoft Azure. As the organizations continued to expand on Azure, avoided hardware refreshes, extended security updates, and ultimately decommissioned infrastructure yielded additional cost savings.

- **Over 75% of application downtime reclaimed.** By redeploying key VMware workloads on Microsoft Azure, business-impacting downtime was nearly nonexistent while application performance was increased as a result of Azure's high-end, up-to-date computing infrastructure.

Unquantified benefits. Benefits that are not quantified for this study include:

- **Access to the Microsoft Azure Services ecosystem.** Each of the interviewees noted optimism and described early benefits resulting from their organizations' access to the Azure Services ecosystem.

- **Improved disaster recovery and business resiliency.** Multiple interviewees described a major improvement to their organizations' resiliency and disaster recovery capability once redeployed in the cloud.

Costs. Risk-adjusted PV costs include:

- **Fees paid to Microsoft of $400,000 per year (on average).** The composite organization pays Microsoft $3,500 per node per month for between eight and 12 AVS nodes over the three-year model.

- **Microsoft Azure VMware Solution implementation partner fees of $1.38 million.** The composite organization pays a Microsoft partner just over $1 million to assist with the redeployment on Microsoft Azure in lieu of an extensive internal effort, mirroring the experience of several interviewees' organizations.

- **Microsoft Azure VMware Solution ongoing management of just over $92,000 per year in IT personnel effort.** For the composite organization, multiple IT system administrators are involved in a limited capacity to manage ongoing redeployments or extensions, Azure Services, among other tasks.

Forrester modeled a range of projected low-, medium-, and high-impact outcomes based on evaluated risk. This financial analysis projects that the composite organization accrues the following three-year net present value (NPV) for each scenario by enabling Microsoft Azure VMware Solution:

- Projected high impact of a $7.22M NPV and projected ROI of 274%.

- Projected medium impact of a $5.41M NPV and projected ROI of 205%.

- Projected low impact of a $3.28M NPV and projected ROI of 125%.

> **"We have a good VMware background and a significant amount of people that are well trained on our VMware platforms. We decided on AVS so we can still leverage those investments and expertise while using all the other functions that Azure had to provide to our developer teams."**
>
> *Director IT, infrastructure architecture, entertainment*

> **"We need to leverage the benefits of cloud, especially the ease of the scalability. On-premises, we're often fighting against capacity concerns. There's no way for us to nimbly scale VMware workloads."**
>
> *Senior director, IT, head of hybrid cloud, healthcare*

PROI
125% to 274%

PROJECTED BENEFITS PV
$5.92M to $9.86M

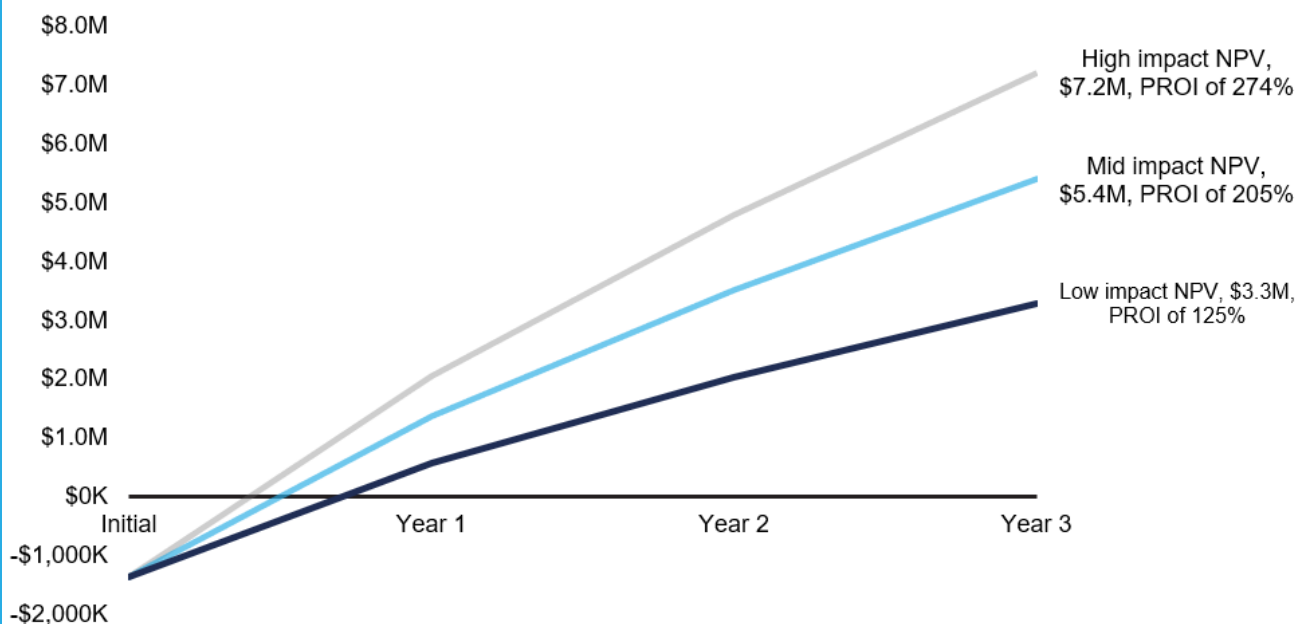**PROJECTED NPV**
$3.28M to $7.22M

TOTAL COSTS
$2.64M

Three-Year Projected Financial Analysis For The Composite Organization

High impact NPV, $7.2M, PROI of 274%

Mid impact NPV, $5.4M, PROI of 205%

Low impact NPV, $3.3M, PROI of 125%

	Initial	Year 1	Year 2	Year 3

$8.0M
$7.0M
$6.0M
$5.0M
$4.0M
$3.0M
$2.0M
$1.0M
$0K
-$1,000K
-$2,000K

NEW TECH TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a New Technology: Projected Total Economic Impact™ (New Tech TEI) framework for those organizations considering an investment in the Microsoft Azure VMware Solution.

The objective of the framework is to identify the potential cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the projected impact that the Azure VMware Solution can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Microsoft and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in the Azure VMware Solution (AVS).

Microsoft 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.

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

DUE DILIGENCE
Interviewed Microsoft stakeholders and Forrester analysts to gather data relative to the Azure VMware Solution.

EARLY-IMPLEMENTATION CUSTOMER INTERVIEWS
Interviewed four decision-makers at organizations using the Azure VMware Solution in a pilot or beta stage to obtain data with respect to projected costs, benefits, and risks.

COMPOSITE ORGANIZATION
Designed a composite organization based on characteristics of the interviewees' organizations.

PROJECTED FINANCIAL MODEL FRAMEWORK
Constructed a projected financial model representative of the interviews using the New Tech TEI methodology and risk-adjusted the financial model based on issues and concerns of the decision-makers.

CASE STUDY
Employed four fundamental elements of New Tech TEI in modeling the investment's potential impact: benefits, costs, flexibility, and risks. Given the increasing sophistication of ROI analyses related to IT investments, Forrester's TEI methodology provides a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

Interviewed Decision-Makers			
Interviewee	**Industry**	**Region**	**Revenue/Endowment**
Director, IT cloud infrastructure	Education	North America	$1.05 billion
Director IT, infrastructure architecture	Entertainment	North America	$6 billion
Senior director, IT, head of hybrid cloud	Healthcare	Europe	$16 billion
Systems engineering manager	Manufacturing	North America	$600 million

KEY CHALLENGES

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

- **The need to get to the cloud as quickly and as frictionless as possible.** Monolithic, business-critical applications and workloads in the interviewees' organizations' VMware environments required modernization in the cloud to support the current and future demands of the business while providing flexibility and elasticity to IT budgets and staff. However, rearchitecting these VMware workloads in the cloud required personnel resources, time, and disruption, which the organizations simply could not spare for these efforts despite their need to get to the cloud.

- **Expanding infrastructure requirements.** As organizations expanded, demands on their VMware workloads expanded as well, forcing these organizations to overprovision and maintain infrastructure for peak demand, resulting in significant costs. Further complicating the organizations' infrastructure deployments were expiring extended security updates (ESUs) for frequently used software, such as Microsoft

Server 2008, requiring action to maintain critical updates.

- **Limited personnel capacity.** At the center of all of the interviewees' organizations' cloud migration efforts were their IT personnel (e.g., systems administrators, solution architects, etc.) responsible for these cloud transformation tasks. However, these cloud transformation activities often involve reskilling or hiring additional personnel at great expense to the organizations.

> **"We wanted to get to the cloud with Azure [VMware Solution] so we could deal with business uncertainty with ease."**
>
> *Director IT, infrastructure architecture, entertainment*

- **High availability and performance requirements for VMware workloads.** The interviewees noted that their organizations' business-critical VMware workloads required the increasingly high availability that only the cloud could offer.

across the globe and an annual revenue of $5 billion. Fifteen IT systems administrators maintain the organization's VMware environments including V-Sphere, NSX-t, and HCX.

Deployment characteristics. The organization looks to Microsoft's Azure VMware Solution to provide an accelerated path to the benefits of the cloud while maintaining its current VMware investments and personnel skills, and minimizing business disruption. The organization leverages AVS to migrate and extend its VMware environment supporting 50 business-critical applications over a three-year period, adding four additional nodes as needed over this period.

> **"We explored Azure [VMware Solution] to bridge our technology into the cloud. We can seamlessly bring our VMware workloads and applications to cloud where we might not have the business case or technology and personnel resources for a native cloud migration."**
>
> *Senior director, IT, head of hybrid cloud healthcare*

INVESTMENT OBJECTIVES

The interviewees' organizations searched for a solution that could:

- Allow the organizations to maintain their VMware investments and personnel skills without rearchitecting their applications for the cloud.

- Take advantage of the flexibility and on-demand capacity of the cloud.

- Allow for a steady migration cadence while maintaining connectivity to both Azure and on-premises VMware workloads.

Key assumptions

- **$5 billion in annual revenue**
- **10,000 employees**
- **15 IT systems admins**
- **12 Azure VMware Solution nodes (Year 3)**

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and a ROI analysis that illustrates the areas financially affected. The composite organization is representative of the four decision-makers that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite organization is a global manufacturing organization based in North America with 10,000 employees

Analysis Of Benefits

Quantified benefit data as applied to the composite

Total Projected Benefits

Benefit	Year 1	Year 2	Year 3	Total	Present Value
Total projected benefits (low)	$2,569,446	$2,271,946	$2,271,946	$7,113,338	$5,920,449
Total projected benefits (mid)	$3,449,922	$3,109,922	$3,109,922	$9,669,766	$8,043,006
Total projected benefits (high)	$4,207,383	$3,824,883	$3,824,883	$11,857,149	$9,859,645

AVOIDED SYSTEM ADMINISTRATOR HIRES

Evidence and data. The interviewees described lean IT teams responsible for the management of their respective organizations' VMware workloads. To rearchitect VMware workloads as part of a greater cloud migration, this expertise on vSphere and other VMware platforms would diminish in value as employees needed to reskill on additional cloud tasks, costing the organization time and additional hires.

By redeploying and extending VMware workloads on Azure, it was business as usual for IT staff, who leveraged the same VMware skills as they would on-premises. This saved the interviewees' organizations in productivity loss or additional administrator hires to bring the necessary skills in house to support a more extensive migration.

- The senior director of IT, head of hybrid cloud for a healthcare organization noted: "As an organization, we don't have to increase our workforce in order to migrate [to the cloud] with Azure VMware Solution. Our existing personnel people can manage it both for on-premises and the cloud."

- By redeploying VMware workloads on Azure, the director, IT cloud infrastructure from an educational organization noted the organization avoided several potential hires if it had rearchitected to the cloud. The interviewee continued: "We were able to take the knowledge that our admins have in the VMware space and use it in the cloud space [on Azure] as well. Our VMware personnel will basically continue to use it the way it has been in the past."

- The systems engineering manager at a manufacturing organization noted that a non-AVS path to cloud would have required additional hires for roughly two years, since not all of its key applications were easily rearchitected without a significant undertaking.
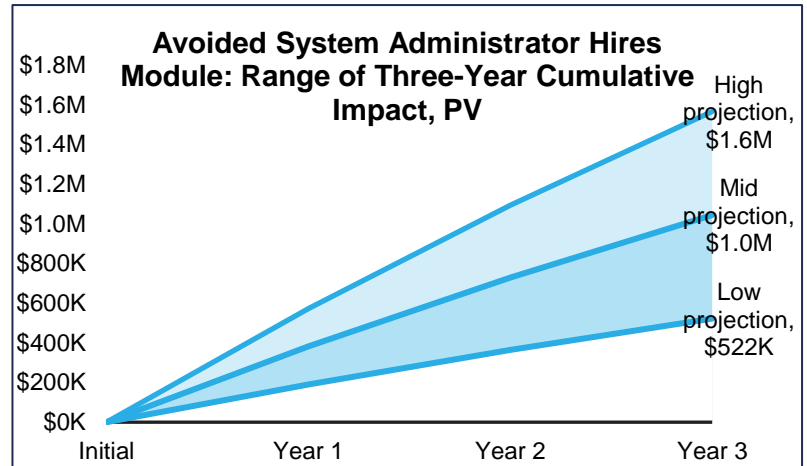
> **"We don't need to assess and rearchitect and migrate each of our VMware workloads and applications. We can gain the savings and performance benefits of rearchitecture with Azure [VMware Solution]."**
>
> *Senior director, IT, head of hybrid cloud healthcare*

Modeling and assumptions. For the composite organization, Forrester makes the following assumptions:

- The organization requires between 10% and 30% more personnel capacity to maintain its VMware environment as 15 IT system administrators learn additional cloud skills to support architecture and a more complex migration.

- This increase in personnel capacity requires between two and five full-time hires for support. The size and complexity of an organization's VMware environment and workloads makes demand higher.

- An average salary of $140,000 across all levels of IT system administrator seniority.

Results. This yields a three-year projected PV (discounted at 10%) ranging from $522,000 (low) to nearly $1.6 million (high).

Avoided System Administrator Hires Module: Range of Three-Year Cumulative Impact, PV

High projection, $1.6M
Mid projection, $1.0M
Low projection, $522K

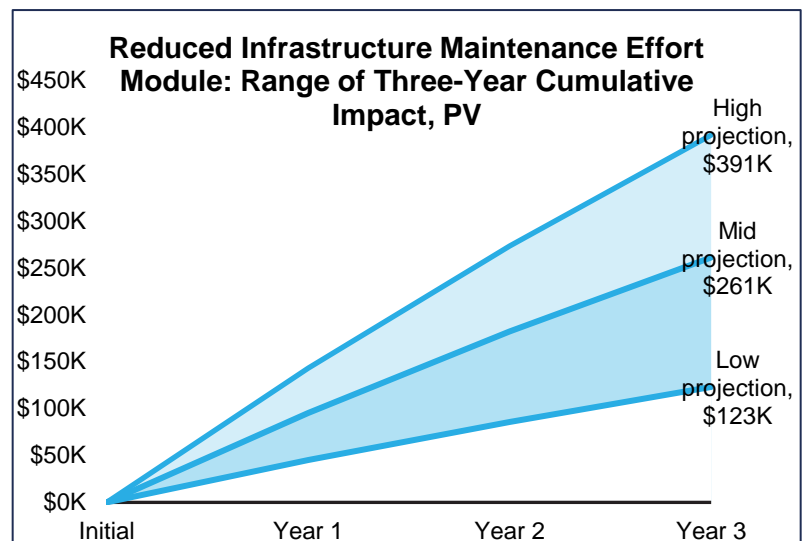| Avoided System Administrator Hires					
Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Total number of system administrators	Composite	15	15	15
A2$_{Low}$			10%	10%	10%
A2$_{Mid}$	Required additional capacity required to reskill VMware admins	Interviews	20%	20%	20%
A2$_{High}$			30%	30%	30%
A3$_{Low}$			2	2	2
A3$_{Mid}$	Required additional system administrator headcount (rounded)	A1*A2	3	3	3
A3$_{High}$			5	5	5
A4	Average system administrator salary	Composite	$140,000	$140,000	$140,000
At$_{Low}$			$210,000	$210,000	$210,000
At$_{Mid}$	Avoided system administrator hires	A3*A4	$420,000	$420,000	$420,000
At$_{High}$			$630,000	$630,000	$630,000
Three-year projected total: $630,000 (low) to $1,890,000 (high)		**Three-year projected present value: $522,239 (low) to $1,566,717 (high)**			

REDUCED INFRASTRUCTURE MAINTENANCE EFFORT

Evidence and data. Among the interviewees' organizations, on-premises infrastructure maintenance and workload provisioning were a significant drain on IT personnel productivity, especially as the organizations' business-side demands grew. By migrating and extending VMware workloads on Azure VMware Solution, organizations realized IT personnel savings for these tasks.

- The systems engineering manager at a manufacturing organization noted that, since redeploying on Azure, the organization's IT personnel virtually eliminated the need to manage physical storage and firmware updates altogether, reclaiming significant amounts of time for key staff.

- Scaling on-premises infrastructure to meet the ever-increasing demands of the needs of the business side proved challenging to the healthcare organization before AVS. Now on Azure, the IT staff spent less time deploying these resources while developers delivered to the business on a faster timeframe. The senior director of IT, head of hybrid at the healthcare organization summarized: "On AVS, our initial experience and expectation moving forward is seamless scaling that will translate not just into IT productivity, but business productivity as well. Developers get their jobs done faster so they can deliver to the business faster, and so on."

- The director of IT cloud infrastructure at the education organization estimated that the organization's IT systems administrators reclaimed an average of 6 hours per week on updates alone, as these are automated on Azure.

Modeling and assumptions. For the composite organization, Forrester makes the following assumptions:

- The composite organization's 15 IT systems administrators reclaim between 20% and 90% of the 5 hours spent each month managing on-premises updates. This is a conservative assumption given the interviews, where some admins previously spent upwards of 20 hours per month. Variances in savings across the interviewees' organizations result from differences in the AVS scope of deployment and nuances in these organizations' VMware environments.

- The composite organization's 15 IT systems administrators reclaim between 30% and 90% of the 20 hours each month spent on hardware and workload provisioning tasks once redeployed on AVS.

- The composite organization's 15 IT systems administrators reclaim between 30% and 90% of the four monthly hours spent on infrastructure maintenance tasks.

- An average hourly rate of $67 across all levels of IT system administrator seniority.

- A 50% productivity capture, as not all hours reclaimed in the above manners are repurposed into value-adding work.

Results. This yields a three-year projected PV (discounted at 10%) ranging from $123,000 (low) to $391,000 (high).

Reduced Infrastructure Maintenance Effort Module: Range of Three-Year Cumulative Impact, PV

High projection, $391K

Mid projection, $261K

Low projection, $123K

Reduced Infrastructure Maintenance Effort

Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Number of VMware/system administrators	Composite	15	15	15
B2	Average hourly system administrator rate	Composite	$67	$67	$67
B3	Average monthly time spent on on-premises updates (hours per admin)	Interviews	5	5	5
B4$_{Low}$			20%	20%	20%
B4$_{Mid}$	Reduction on time spent on updates on Microsoft Azure VMware Solution	Interviews	60%	60%	60%
B4$_{High}$			90%	90%	90%
B5$_{Low}$			$12,060	$12,060	$12,060
B5$_{Mid}$	Subtotal: Reduced personnel effort on system updates	B1*B2*(B3*12)*B4	$36,180	$36,180	$36,180
B5$_{High}$			$54,270	$54,270	$54,270
B6	Average monthly time spent on workload provisioning tasks (hours per admin)	Composite	20	20	20
B7$_{Low}$			30%	30%	30%
B7$_{Mid}$	Reduction on time spent on workload provisioning on Microsoft Azure VMware Solution	Interviews	60%	60%	60%
B7$_{High}$			90%	90%	90%
B8$_{Low}$			$72,360	$72,360	$72,360
B8$_{Mid}$	Subtotal: Reduced personnel effort on workload provisioning	B1*B2*(B6*12)*B8	$144,720	$144,720	$144,720
B8$_{High}$			$217,080	$217,080	$217,080
B9	Average monthly time spent on infrastructure maintenance (hours per admin)	Composite	4	4	4
B10$_{Low}$			30%	30%	30%
B10$_{Mid}$	Reduction on time spent on infrastructure maintenance on Microsoft Azure VMware Solution	Interviews	60%	60%	60%
B10$_{High}$			90%	90%	90%
B11$_{Low}$			$14,472	$14,472	$14,472
B11$_{Mid}$	Subtotal: Reduced personnel effort on infrastructure maintenance	B1*B2*(B9*12)*B10	$28,944	$28,944	$28,944
B11$_{High}$			$43,416	$43,416	$43,416
B12	Productivity recapture		50%	50%	50%
Bt$_{Low}$			$49,446	$49,446	$49,446
Bt$_{Mid}$	Reduced infrastructure maintenance effort	(B5+B8+B11)*B12	$104,922	$104,922	$104,922
Bt$_{High}$			$157,383	$157,383	$157,383
Three-year projected total: $148,338 (low) to $472,149 (high)		Three-year projected present value: $122,965 (low) to $391,388 (high)			

REDUCED TOTAL COST OF OWNERSHIP (DATA CENTER)

Evidence and data. Each of the interviewees cited growing on-premises infrastructure costs for their organizations' VMware environment as one of, if not the greatest, drivers toward the cloud. By redeploying and extending VMware workloads on Azure, organizations reduced their reliance of overprovisioning infrastructure for peak demand and took advantage of the elasticity and on-demand capacity of Azure. These organizations also avoided the cost of hardware, software, ESUs, power, and cooling, as infrastructure refreshes were avoided and servers were decommissioned as VMware workloads were moved into Azure.

- The director, IT cloud infrastructure at the educational organization noted that every request from the end users (faculty) was more heavily scrutinized due to the potential hardware investment(s) the request and associated workloads would require. With the scalability of Azure, this was no longer the case. The interviewee noted: "If we needed a few hundred VMs [virtual machines], we'd have to buy a new host and now we're maintaining that for five years, even if the workload isn't needed for five years. Whereas with AVS, this is a request that may end up being long term, but we don't necessarily need it to be."

- AVS eliminated the need to build the data center for peak capacity for the healthcare organization, which underwent an initial infrastructure consolidation, saving on cost. The senior director of IT, head of hybrid cloud at the healthcare organization noted: "Our [organization's] hardware cost and data center facilities cost are some of our greatest expenses. As we were filling up our data centers with more and more hardware, then of course we need to also create

more data centers. Azure has allowed us to stop this."

> **"Ever since we moved to Azure VMware Solution, we're saving thousands of dollars in hardware acquisitions per month and potentially hundreds of thousands during the year."**
>
> *Director, IT cloud infrastructure, education*

- The director of IT and infrastructure architecture at an entertainment company described a 30% savings on hardware alone related to the ability to run VMware at a higher density (on fewer AVS nodes) than with its own on-premises infrastructure.

Avoided yearly
Infrastructure refreshes: **%**

50% to 100%

Modeling and assumptions. For the composite organization, Forrester makes the following assumptions:

- The composite organization refreshes 40 servers, or 20% of its 200 server on-premises infrastructure deployment, each year.

- In the first year after redeploying VMware workloads on AVS, the composite organization avoids between 50% and 100% of these 40 server refreshes.

- In the subsequent years of the analysis, the composite organization decommissions between 10% and 30% of its remaining infrastructure per

year as VMware workloads are moved into Azure.

- A total cost per server of $25,500, including the cost of hardware, software, extended security updates, and annual power and cooling.

Results. This yields a three-year projected PV (discounted at 10%) ranging from $799,000 (low) to $1.9 million (high).

Reduced Total Cost Of Ownership (Datacenter) Module: Range of Three-Year Cumulative Impact, PV

High projection, $1.9M

Mid projection, $1.4M

Low projection, $799K

Ref.	Metric	Source	Year 1	Year 2	Year 3
Reduced Total Cost Of Ownership (Data Center)					
C1	Cost per server (hardware, annual power, and cooling)	Forrester assumption	$14,875		
C2	Cost per server (software/ESUs)	Forrester assumption	$10,625	$10,625	$10,625
C3	Total cost per server	C1+C2	$25,500		
C4	Total number of on-premises servers (infrastructure)	Composite	200	200	200
C5	Refresh cycle	5 years	20%	20%	20%
C6	Total number of on-premises servers purchased/refreshed annually (to overprovision)	C3*C4	40	40	40
C7$_{Low}$			50%		
C7$_{Mid}$	Percentage of server refreshes/purchases avoidable once migrated to Azure VMware solution	Interviews	75%		
C7$_{High}$			100%		
C8$_{Low}$			$510,000		
C8$_{Mid}$	Subtotal: Avoided infrastructure purchases/refreshes	C3*C6*C7	$765,000		
C8$_{High}$			$1,020,000		
C9$_{Low}$				10%	10%
C9$_{Mid}$	Servers decommissioned annually with migration to Azure VMware Solution	Interviews		20%	20%
C9$_{High}$				30%	30%
C10$_{Low}$				$212,500	$212,500
C10$_{Mid}$	Subtotal: Avoided ESUs from decommissioned infrastructure	C2*C4*C9		$425,000	$425,000
C10$_{High}$				$637,500	$637,500
Ct$_{Low}$			$510,000	$212,500	$212,500
Ct$_{Mid}$	Reduced total cost of ownership (data center)	C8+C10	$765,000	$425,000	$425,000
Ct$_{High}$			$1,020,000	$637,500	$637,500
Three-year projected total: $935,000 (low) to $2,295,000 (high)		**Three-year projected present value: $798,911 (low) to $1,933,095 (high)**			

IMPROVED APPLICATION PERFORMANCE AND AVAILABILITY

Evidence and data. Another driver towards the cloud for the interviewees' organizations was the performance and availability increases possible on the powerful Azure infrastructure. By redeploying and expanding on Azure, the interviewees noted business-benefitting availability increases, while applications and VMware workloads also performed better for end users and customers. In addition, IT delivered to the business faster than ever before since AVS nodes were provisioned in minutes versus

acquiring and provisioning infrastructure to support VMware workloads in the past.

- Before redeploying on Azure VMware Solution, the systems engineering manager noted the manufacturing organization experienced several downtime events per year in its on-premises data center, which caused sever business disruption in the distribution centers. In some cases, this represented hundreds of tens of dollars per hour and hundreds of thousands as some outages lasted several days. On AVS, availability is nearly 100% and this business disruption is eliminated. The systems engineering manager noted, "We now have a stable platform for our VMware workloads."
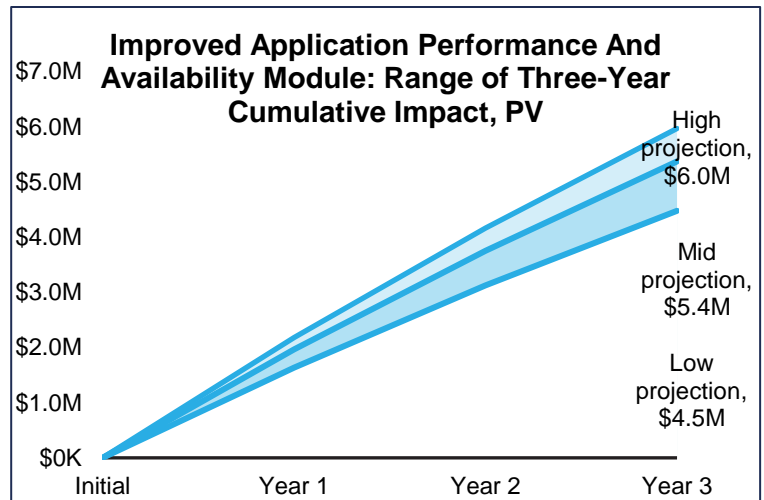
> **"We are able to provision Azure VMware Solution nodes much faster than we can provision new hardware. This increases our speed in delivering to the business."**
>
> *Senior director, IT, head of hybrid cloud, healthcare*

- The director of IT cloud infrastructure at an education organization described a performance increase (both in bandwidth and capabilities) for many of its applications running on VMware after redeploying on AVS.

Modeling and assumptions. For the composite organization, Forrester makes the following assumptions:

- Four twelve-hour outages occur annually, with each hour representing $50,000 in lost revenue or end-user productivity.

- Between 50% and 100% of this downtime is eliminated once redeployed on Azure VMware Solution. Variances may occur among different organizations based on the scope and nuances of their VMware environment on Azure.

> Avoided yearly business disruption:
>
> **75% to 100%**

Results. This yields a three-year projected PV (discounted at 10%) ranging from $4.48 million (low) to $5.97 million (high).

Improved Application Performance And Availability Module: Range of Three-Year Cumulative Impact, PV

High projection, $6.0M

Mid projection, $5.4M

Low projection, $4.5M

Improved Application Performance And Availability					
Ref.	Metric	Source	Year 1	Year 2	Year 3
D1	Annual number of outages resulting in downtime	Assumption	4	4	4
D2	Average outage duration (hours)	Interviews	12	12	12
D3	Average revenue lost per hour	Composite	$50,000	$50,000	$50,000
$D4_{Low}$			75%	75%	75%
$D4_{Mid}$	Downtime reclaimed on Microsoft Azure VMware Solution	Assumption	90%	90%	90%
$D4_{High}$			100%	100%	100%
Dt_{Low}			$1,800,000	$1,800,000	$1,800,000
Dt_{Mid}	Improved application performance and availability	D1*D2*D3*D4	$2,160,000	$2,160,000	$2,160,000
Dt_{High}			$2,400,000	$2,400,000	$2,400,000
Three-year projected total: $5,400,000 (low) to $7,200,000 (high)		Three-year projected present value: $4,476,334 (low) to $5,968,445 (high)			

UNQUANTIFIED BENEFITS

Additional benefits that customers experienced but were not able to quantify include:

- **Access to the Microsoft Azure Services ecosystem.** Each of the interviewees noted optimism and described early benefits resulting from their organizations' access to the Azure Services ecosystem.

  - The director of IT, infrastructure architecture at the entertainment organization noted that the developer staff was able to leverage Azure Kubernetes Service (AKS) now that the organization was deployed within the Azure ecosystem.

  - The director of IT cloud infrastructure at the education organization described a heavy usage of Azure Services that added additional value to VMware workloads. The director noted: "On Azure, we're able to take advantage of different services within the Azure ecosystem. We're using Azure DevOps to create DevOps pipelines for our templates that we have on-premises and in AVS, our VM templates. We keep them up to date weekly and through DevOps pipelines to create and publish them in the vSphere environment. We also have some Azure functions that are set up to different VMs that are running in vSphere. And much of this is automated with Azure Automation. We have Power BI gateways; we have Power Automate gateways there. All in all, we have many services that are running out of AVS that integrate with the Azure services."

- **Improved disaster recovery and business resiliency.** Multiple interviewees described a major improvement to their organizations' resiliency and disaster recovery capability once redeployed in the cloud.

    - The director of IT cloud infrastructure at the education organization, which is based in a hurricane zone, noted an increase in resiliency by moving VMware workloads to the cloud. Before redeploying on Azure, expensive colocation outside of the hurricane zone was a necessity.

FLEXIBILITY

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

- **Organizational flexibility enabled by the cloud.** Each of the interviewees spoke optimistically about the flexibility the cloud offered their organizations, particularly related to scalability. On-demand capacity gave the organizations the ability to spin up AVS nodes without long lead times to take advantage of time-sensitive opportunities, while also providing the flexibility to pivot and scale back on AVS as needed.

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

> **"On Azure [VMware Solution], we have more flexibility to use whichever Azure platform services we want to use and integrate them seamlessly into our VMware environment.**
>
> *Senior director, IT, head of hybrid cloud, healthcare*

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**
Etr	Fees paid to Microsoft	$0	$336,000	$420,000	$504,000	$1,260,000	$1,031,225
Ftr	Microsoft Azure VMware solution implementation: Partner fees	$1,375,000	$0	$0	$0	$1,375,000	$1,375,000
Gtr	Microsoft Azure VMware solution ongoing management	$0	$92,400	$92,400	$92,400	$277,200	$229,785
	Total costs (risk-adjusted)	$1,375,000	$428,400	$512,400	$596,400	$2,912,200	$2,636,010

Costs by Category

- Fees paid to Microsoft
- Microsoft Azure VMware Solution implementation: Partner fees
- Microsoft Azure VMware solution ongoing management
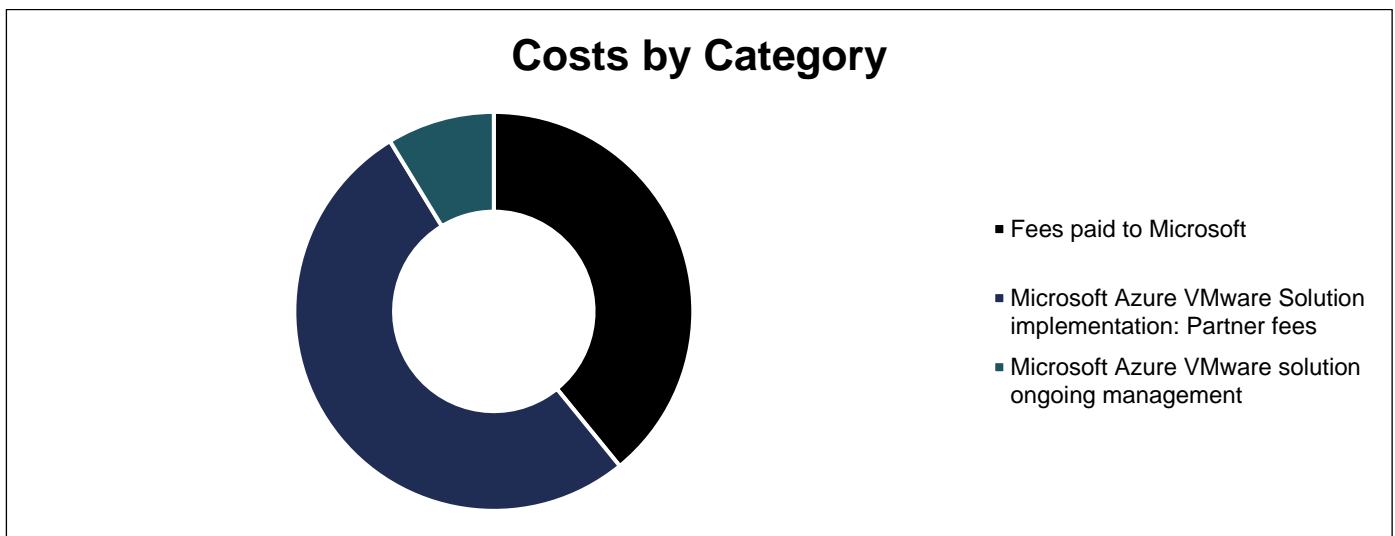
FEES PAID TO MICROSOFT

The interviewees' organizations paid subscription fees to Microsoft for Azure VMware Solution based on the number of AVS nodes required for their VMware workloads each month. The number of nodes varied among the interviewees' companies based on scope and current demand on the VMware environment. The number of nodes ranged from five to beyond 15 per month.

Modeling and assumptions. For the composite organization, Forrester makes the following assumptions:

- A $3,500 average monthly cost per AVS node. This assumption is based on Microsoft list pricing. For pricing specific to your organization, please contact Microsoft.

- Eight AVS nodes in Year 1 of the analysis, expanding by two for each subsequent year of the analysis as the composite organization scales

its VMware environment to meet current growth demands.

Risks. This cost will vary among organizations based on:

- The scope and current demands of an organization's VMware environment as it relates to the required AVS nodes.

Results. Forrester did not adjust this cost despite potential variances among organizations, since pricing is based on Microsoft list price, yielding a three-year, total PV (discounted at 10%) of $1.03 million.

Fees Paid To Microsoft							
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
E1	Average cost per node per month	Assumption		$3,500	$3,500	$3,500
E2	Number of nodes	Composite		8	10	12
Et	Fees paid to Microsoft	(E1*E2)*12 months	$0	$336,000	$420,000	$504,000
	Risk adjustment	0%				
Etr	Fees paid to Microsoft (risk-adjusted)		$0	$336,000	$420,000	$504,000
	Three-year total: $1,260,000			**Three-year present value: $1,031,225**		

MICROSOFT AZURE VMWARE SOLUTION IMPLEMENTATION: PARTNER FEES

Several interviewees noted their organizations leveraged Microsoft's extensive partner network to support initial redeployment efforts on Azure VMware Solution. By working with an implementation partner, the organizations tapped into external expertise while limiting the burdened on an already lean staff of IT administrators.

Modeling and assumptions. For the composite organization, Forrester makes the following assumptions:

- A $1,250,000 one-time initial fee to a third-party implementation partner. This is a conservative estimate based on interviews and the specifics of the composite organization's deployment.

Risks. This cost will vary among organizations based on:

- The scope and complexity of an organization's VMware environment as it relates to redeployment on Azure.

- The depth of support contracted for from the implementation partner.

- The contract specifics with the implementation partner.

Results. To account for these variances, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of $1,375,000.

Microsoft Azure VMware Solution Implementation: Partner Fees						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
F1	Fee for third-party implementation support	Interviews	$1,250,000			
Ft	Microsoft Azure VMware Solution implementation: Partner fees	F1	$1,250,000	$0	$0	$0
	Risk adjustment	↑10%				
Ftr	Microsoft Azure VMware Solution implementation: Partner fees (risk-adjusted)		$1,375,000	$0	$0	$0
	Three-year total: $1,250,000		**Three-year present value: $1,375,000**			

MICROSOFT AZURE VMWARE SOLUTION ONGOING MANAGEMENT

The interviewees described the level of effort for their organizations' IT system administrators involved with management of ongoing redeployments or extensions on Azure VMware Solution. This level of effort was characterized as part-time effort from several IT personnel, which varied among the interviewees' companies based on the scope of their VMware environment, the current demands on their workloads, and usage of Azure Services.

Modeling and assumptions. For the composite organization, Forrester makes the following assumptions:

- Six IT system administrators spend 10% of their total working time on tasks related to their VMware workloads in Azure.

- An average salary of $140,000 across all levels of IT system administrator seniority.

Risks. This cost will vary among organizations based on:

- The scope of deployment of an organization's VMware environment on Azure VMware Solution.

- The current and future demands on VMware workloads as it relates to extension on Azure.

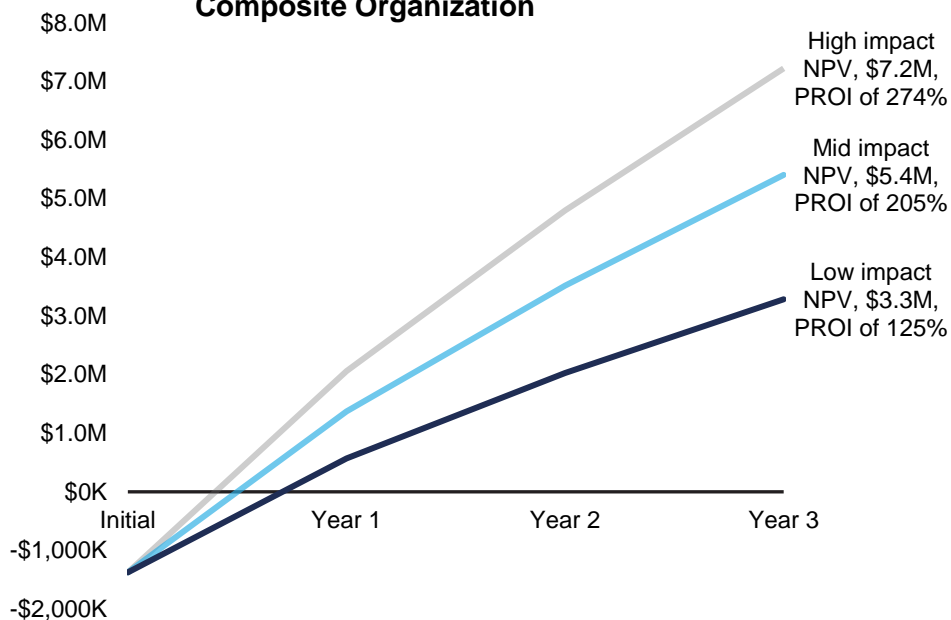- The skill and capacity of an organization's IT system administrators.

Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of $230,000.

Microsoft Azure VMware Solution Ongoing Management							
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	IT admin personnel required for Azure VMware Solution oversight	Composite		6	6	6
G2	Average working time spent on Azure VMware Solution oversight tasks	Assumption		10%	10%	10%
G3	Average annual salary for IT system administrator	Assumption		$140,000	$140,000	$140,000
Gt	Microsoft Azure VMware solution ongoing management	G1*G2*G3	$0	$84,000	$84,000	$84,000
	Risk adjustment	↑10%				
Gtr	Microsoft Azure VMware solution ongoing management (risk-adjusted)		$0	$92,400	$92,400	$92,400
Three-year total: $277,200				Three-year present value: $229,785			

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Three-Year Projected Financial Analysis For The Composite Organization

High impact
NPV, $7.2M,
PROI of 274%

Mid impact
NPV, $5.4M,
PROI of 205%

Low impact
NPV, $3.3M,
PROI of 125%

The financial results calculated in the Benefits and Costs sections can be used to determine the PROI and projected NPV for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

These risk-adjusted PROI and projected 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	($1,375,000)	($428,400)	($512,400)	($596,400)	($2,912,200)	($2,636,010)
Total benefits (low)	$0	$2,569,446	$2,271,946	$2,271,946	$7,113,338	$5,920,449
Total benefits (mid)	$0	$3,449,922	$3,109,922	$3,109,922	$9,669,766	$8,043,006
Total benefits (high)	$0	$4,207,383	$3,824,883	$3,824,883	$11,857,149	$9,859,645
PROI (low)						125%
PROI (mid)						205%
PROI (high)						274%

Appendix A: New Technology: Projected Total Economic Impact

New Technology: Projected Total Economic Impact (New Tech TEI) is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value of their products and services to clients. The New Tech TEI methodology helps companies demonstrate and justify the projected tangible value of IT initiatives to senior management and key business stakeholders.

TOTAL ECONOMIC IMPACT APPROACH

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

Projected Costs consider all expenses necessary to deliver the proposed value of the product. The projected cost category within New Tech TEI captures incremental ongoing costs over the existing environment that are associated with the solution.

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

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

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

PRESENT VALUE (PV)

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

NET PRESENT VALUE (NPV)

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

RETURN ON INVESTMENT (ROI)

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

DISCOUNT RATE

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

PAYBACK PERIOD

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

Appendix B: Supplemental Material

Related Forrester Research
"Cloud Powers The Adaptive Enterprise," Forrester Research, Inc., November 30, 2020.

Appendix C: Endnotes

[1] Source: "Cloud Powers The Adaptive Enterprise," Forrester Research, Inc., November 30, 2020.
[2] Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders

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