A Forrester Total Economic Impact™
Study Commissioned By CA
May 2017

The Total Economic Impact™ Of CA BlazeMeter

Cost Savings And Business Benefits Enabled By BlazeMeter's Performance And Load Testing Capabilities

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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.

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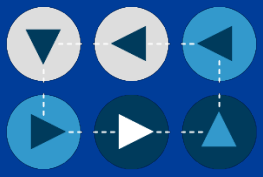
Benefits And Costs

Developer efficiency:
$1.8 million

Improved performance:
$1.4 million



Reduced cost to operate:
$624,000

Executive Summary

Today's consumers get frustrated quickly when their mobile apps or web apps are slow. The patience bar of users is getting closer to a few seconds or even less. Nonresponsive applications cause bad customer experience, and bad customer experience means lower revenue, making high availability and sustained performance more important than ever. Organizations need to put the right tools in their developers' hands to make this level of performance a reality.

CA BlazeMeter is a testing solution that helps its customers democratize performance testing among developers. CA commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying BlazeMeter. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of BlazeMeter on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed five customers with several years of experience using BlazeMeter.

Prior to using BlazeMeter, customers struggled to conduct performance and load testing. Performance testing was often centralized, making it slow and expensive. Thus, testing rates were low and application performance suffered. As organizations attempted to move toward Agile and continuous delivery models, they needed solutions that would put testing in the hands of developers, shifting it left, while allowing them to test at scale. BlazeMeter delivered the functionality developers needed, while relying on open source for easy integration, providing the long-term assurance of continuity.

Key Findings

Quantified benefits. The following risk-adjusted quantified benefits are representative of those experienced by the companies interviewed:

- **Improvement in developer efficiency by 10%.** When testing happened weeks after developers completed each version and performance issues were identified, it took developers time to reacquaint themselves with the code and identify the correct solution. When performance testing shifted left and was built into the development process, developers identified issues immediately. In turn, they spent less time implementing a fix and more quality was built in.
- **Improvement in application performance by a factor of 10.** By increasing testing frequency and adding automation, more issues were caught before they hit production, ultimately improving performance.
- **Reduction in operating costs by $300,000 per year.** Prior testing systems were expensive to run, whether they were systems operated by a central team on-premises or cloud solutions built and managed in-house. Adopting BlazeMeter allowed organizations to eliminate these high-cost options, savings hundreds of thousands of dollars each year.

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

ROI
207%

NPV
$2.6 million

Benefits PV
$3.8 million

Costs PV
$1.2 million

› **Transparency into the results of performance testing.** BlazeMeter provided real-time reporting that showed the results of the performance and load testing. Anyone in the organization with account access could log in and see how different releases were faring. The transparency gave the business confidence in the developers' efforts and highlighted the importance of performance testing to all business partners.

› **Faster release cycles.** Incorporating performance testing sooner in the development life cycle sped up the entire process, enabling organizations to release updates and new software faster than they could previously. Faster release cycles delivered business value sooner than previous solutions allowed, setting up the businesses to move faster into new markets and accelerate growth.

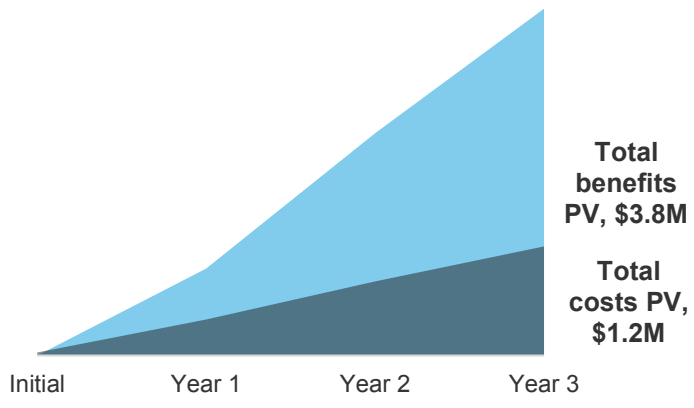
Costs. The interviewed organizations experienced the following risk-adjusted costs:

› **Due diligence, deployment, and ongoing management.** Selecting BlazeMeter as the preferred performance testing solution, onboarding developers, setting up automated tests, and running tests on an ongoing basis required several resource hours across the teams.

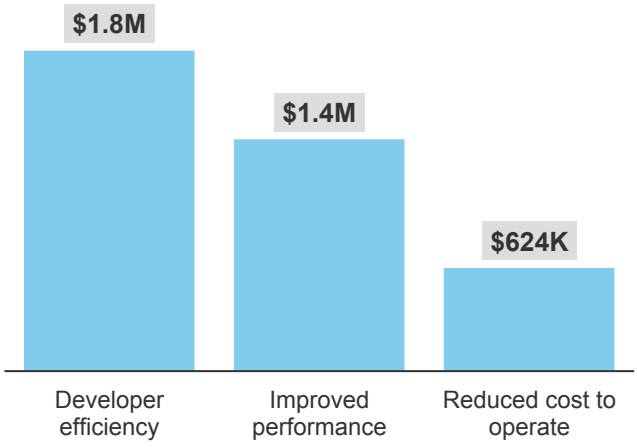
› **Fees to BlazeMeter.** Organizations paid CA for the use of BlazeMeter based on the volume and reach of its performance tests.

Forrester's interviews with five existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of just under $4 million over three years versus costs of $1.2 million, adding up to a net present value (NPV) of $2.6 and an ROI of 207%.

Financial Summary



Benefits (Three-Year)



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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 CA BlazeMeter.

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 CA BlazeMeter can have on an organization:

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

DUE DILIGENCE
Interviewed CA stakeholders and Forrester analysts to gather data relative to BlazeMeter.

CUSTOMER INTERVIEWS
Interviewed five organizations using BlazeMeter 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 CA BlazeMeter'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 CA 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 CA BlazeMeter.

CA 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.

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

The BlazeMeter Customer Journey

BEFORE AND AFTER THE BLAZEMETER ADOPTION

Interviewed Organizations

For this study, Forrester conducted five interviews with CA BlazeMeter customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEE	REVENUE	BLAZEMETER USAGE
Software	Global	Head of product architecture	$120 million	Five to 10 developers testing critical projects
Healthcare	US	Director of application development, provider services	$150 billion	30 developers testing every release
Software	Global	Director of software architecture	$5 billion	Dozens of developers with releases every two weeks
Software	Global	Senior test manager	$200 million	100 developers testing 95% of projects
Athletics	US	Senior manager of software engineering	$10 billion	60 engineers testing 60% of releases

Key Challenges

Prior to adopting BlazeMeter, developers conducted performance and load tests on about 40% of their code. Methods were haphazard — some had a centralized team that leveraged on-premises solutions, while others built their own solutions with instances across a variety of hosted cloud locations. They were slow and expensive. To shorten the life cycle, individual developers and teams experimented with and adopted open source solutions, but there was no consistency.

- **Cumbersome testing processes held teams back from adopting continuous delivery models.** Waiting for centralized teams to have the bandwidth to test code took weeks, while jeopardizing any Agile+DevOps initiative. To be successful, testing needed more integration in the development process and earlier involvement.
- **Ad hoc testing systems and legacy on-premises systems were expensive to operate.** Building systems and acquiring the necessary instances to run tests at scale became cost prohibitive, especially without a cloud solution.

The organizations had the goal of adopting a single system that would enable the move to a continuous delivery model and have the functionality to:

- Conduct load testing at scale.
- Automate and standardize end-to-end performance testing.
- Localize performance testing in teams for developers to test earlier.
- Share results and provide transparency.

After evaluating multiple vendors, the interviewed organizations chose BlazeMeter, citing its reliance on open source technology and robust security practices, and began deployment.

> "Their [our internal team's] schedule would be backed up for weeks. We couldn't get to a continuous delivery model when we were stalled, waiting for them to support performance testing."
>
> *Director of application development, healthcare*

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Key Results

The BlazeMeter investment delivered:

- **The ability to move to a continuous delivery model.** BlazeMeter put testing in the hands of the developers, allowing them to test performance across the entire development life cycle.
- **Faster delivery cycles.** Embedding performance testing into the delivery workflow allowed teams to launch new code faster.
- **Higher testing rates.** Taking performance testing out of a centralized function and federating it to support creation of a continuous delivery model meant organizations could test more frequently and sooner.
- **Improved performance.** Testing more code meant more bugs were caught before production, reducing customer-facing performance issues.
- **Empowered developers.** Running their own tests, developers increased their sense of ownership over the projects. This, in turn, affected the quality of the end product.

"We are seeing improved quality. We're managing the same issues but being more effective. We are no longer reactive."

Head of product architecture, software

Composite Organization

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

Description of composite. The global, $15 billion business-to-business (B2B) organization delivers services and supports client operations through business-critical applications. Maintaining uptime and ensuring seamless updates is essential for its clients' sustainability as well as its own. It maintains its software with a team of 150 developers.

Key assumptions

Global
B2B
$15 billion in revenue
150 developers

Financial Analysis

QUANTIFIED BENEFIT AND COST DATA AS APPLIED TO THE COMPOSITE

Total Benefits

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Developer efficiency	$432,422	$886,465	$908,626	$2,227,513	$1,808,391
Btr	Improved performance	$344,925	$689,850	$689,850	$1,724,625	$1,401,987
Ctr	Reduced cost to operate	$170,000	$297,500	$297,500	$765,000	$623,929
	Total benefits (risk-adjusted)	**$947,347**	**$1,873,815**	**$1,895,976**	**$4,717,138**	**$3,834,307**

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 almost $4 million.

Developer Efficiency

One of the goals of performance and load testing is to catch issues before they hit production. Organizations found that using BlazeMeter as part of a continuous delivery model meant that more code was tested sooner in the process. In previous performance testing scenarios, where testing was only centralized and conducted days to weeks after the code was written, developers dedicated hours to identifying the right stakeholders and remembering the use case before they could solve the problem. When developers became aware of issues soon after they wrote the code, they eliminated that delay, speeding their time-to-resolution.

- Interviewees spoke about how much easier it was to fix a problem in development versus addressing it as a defect, evoking the adage: “The earlier a problem is caught, the cheaper it is to fix.”
- Interviewees cited varying levels of efficiency gains, ranging from 10% to 20%.

For the composite organization, Forrester assumes that:

- Its developers experienced a 5% efficiency gain in Year 1 as more and more developers begin to adopt BlazeMeter. This gain increased to 10% in years 2 and 3.
- Developers recaptured 50% of time saved.
- The average fully loaded salary for developers was $128,125, increasing at a rate of 2.5% per year.

An organization’s ability to realize an efficiency benefit will vary based on:

- The volume of code it tests now versus the volume it tested prior to leveraging BlazeMeter.
- The amount of time its developers previously spent fixing issues.
- Its developers’ 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 $1,808,391.

Developers were 10% more efficient when they were aware of performance issues sooner in the development cycle and could fix them immediately.

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.

Developer Efficiency					
REF.	**METRIC**	**CALC.**	**YEAR 1**	**YEAR 2**	**YEAR 3**
A1	Number of developers using BlazeMeter		150	150	150
A2	Efficiency gains		5%	10%	10%
A3	Recuperated time		50%	50%	50%
A4	Average fully loaded salary		$128,125	$131,328	$134,611
At	Developer efficiency	A1*A2*A3*A4	$480,469	$984,961	$1,009,585
	Risk adjustment	↓10%			
Atr	**Developer efficiency (risk-adjusted)**		**$432,422**	**$886,465**	**$908,626**

Improved Application Performance

Increasing testing frequency meant more issues were caught before they hit production, ultimately improving application performance.

- The $120 million software company experienced a 10% to 15% improvement in load times once it started testing code with BlazeMeter.
- Prior to using BlazeMeter, the healthcare company saw a significant uptick in call center volume after each new release to report problems or resolve issues. After it began performance testing its releases, its call center volume was reduced.
- The healthcare company measured this performance improvement, citing previous availability of 99.9% and current availability of 99.99%.

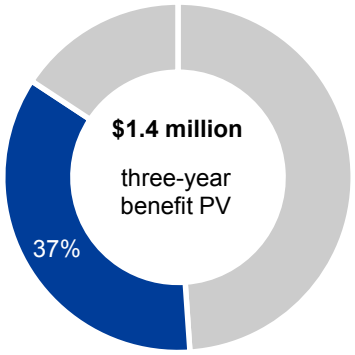
For the composite organization, Forrester assumes that:

- Availability improved from 99.9% to 99.99%.
- The average cost of downtime is $125,000 per hour.

An organization's ability to experience improved performance will vary based on:

- Its availability prior to launching BlazeMeter.
- The volume of code it tested before using BlazeMeter.
- The volume of code it expected to test with BlazeMeter.
- Its average hourly cost of downtime.

To account for these risks, Forrester adjusted this benefit downward by 30%, yielding a three-year risk-adjusted total PV of $1,401,987.



Improved performance:
37% of total benefits

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Improved Performance					
REF.	**METRIC**	**CALC.**	**YEAR 1**	**YEAR 2**	**YEAR 3**
B1	Downtime prior to BlazeMeter (hours)	365*24*(1-99.9%)	8.8	8.8	8.8
B2	Downtime after BlazeMeter (hours)	365*24*(1-99.99%)	0.9	0.9	0.9
B3	Downtime avoided (hours)	B1-B2	7.9	7.9	7.9
B4	Average hourly cost of downtime		$125,000	$125,000	$125,000
B5	Percent realized		50%	100%	100%
Bt	Improved performance	B3*B4*B5	$492,750	$985,500	$985,500
	Risk adjustment	↓30%			
Btr	**Improved performance (risk-adjusted)**		**$344,925**	**$689,850**	**$689,850**

Reduced Cost To Operate

Whether they were on-premises systems operated by a central team, or in-house developments composed of remote-located cloud instances, prior testing systems were expensive to operate. Adopting BlazeMeter allowed organizations to eliminate these high-cost options, saving hundreds of thousands each year.

- The director of application development at a health insurance company said his organization previously spent over a million dollars a year funding performance tests out of a centralized team.
- A director of software architecture at a software company previously spent $100,000 on EC2 instances and engineering time to test code for four to six releases per year.
- Another interviewee, the head of product architecture at a software company, estimated that his organization saved 100 resource hours by using BlazeMeter. Without BlazeMeter, the team would have been strained to dedicate time and resources to build its own in-house system to deliver similar functionality.
- The senior software manager at an athletics company believed his organization, which previously ran performance testing out of a centralized team with an on-premises solution, reduced its costs by a factor of three.

To be conservative, Forrester assumes that the composite organization saved $350,000 per year. Year 1 savings are slightly less, at $200,000, as the organization transitioned between solutions.

A reduction in operating costs will vary based on:

- The previous testing solution in place.
- The increase in testing volume after launching BlazeMeter.

To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year risk-adjusted total PV of approximately $624,000.

Interviewees cited operational cost savings ranging from hundreds of thousands to just over a million dollars per year.

Reduced Cost To Operate					
REF.	**METRIC**	**CALC.**	**YEAR 1**	**YEAR 2**	**YEAR 3**
C1	Reduced cost to operate		$200,000	$350,000	$350,000
	Risk adjustment	↓15%			
Ctr	**Reduced cost to operate (risk-adjusted)**		**$170,000**	**$297,500**	**$297,500**

Transparency

BlazeMeter provided real-time reporting that showed the results of the performance testing. Anyone in the organization with account access could log in and see how different releases were faring. This transparency gave the business confidence in the developers' efforts and highlighted the importance of performance testing to all business partners.

Faster Release Cycles

Incorporating performance testing sooner in the development life cycle sped up the entire process, enabling organizations to release updates and new software faster than it could previously. Faster release cycles delivered improved customer experiences and new services sooner than previous solutions allowed, setting up the business to move faster into new markets and accelerate revenue.

The director of application development at a healthcare company confirmed, "We are able to deliver updates to our providers quicker than we ever had previously."

Interviewees delivered new software to their customers with increased speed and reliability.

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 BlazeMeter and later realize additional uses and business opportunities, including:

- **Expanding the business into new markets sooner.** With shorter release cycles, BlazeMeter customers can launch new products faster, accelerating new customer acquisition and adoption and ultimately resulting in faster revenue growth.

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

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

Total Costs

REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Dtr	Due diligence, deployment, and ongoing management	$33,173	$198,347	$304,959	$312,583	$849,063	$700,369
Etr	Fees to CA	$0	$220,000	$220,000	$220,000	$660,000	$547,107
	Total costs (risk-adjusted)	**$33,173**	**$418,347**	**$524,959**	**$532,583**	**$1,509,063**	**$1,247,477**

Due Diligence, Deployment, And Ongoing Management

Due diligence and onboarding efforts required time from directors and managers on development teams to review options and select the right solution for their organizations. However, due to familiarity with the open source platforms upon which BlazeMeter relies, these efforts were less burdensome than other commercial purchase decisions.

To begin using BlazeMeter regularly, organizations automated tests that developers could incorporate directly into their processes. These tests were suitable for most projects, with only a few requiring customization.

- Interviewees cited varying times for due diligence, ranging from 10 resource days to 120. However, all were in agreement that BlazeMeter's reliance on open source technologies reduced the decision-making time and influenced their final decisions.
- Onboarding for each developer varied based on his or her existing familiarity with the underlying open source technologies. Estimates ranged from little or no time to an hour per developer.
- Time required to automate tests also varied across interviewed organizations. The director of software architecture at a $5 billion software company with hundreds of developers said it took 100 engineering hours to build all the necessary tests. Another interviewee, the senior software manager at an athletics organization with 60 engineers, said his team required anywhere between a day and a week to build each automation.
- Interviewees again saw varying levels of change to their developers' day-to-day operations after the integration of BlazeMeter. Across all interviewees, the sheer volume of testing increased because they went from testing less than 50% of their releases to closer to 90%. Some believed their teams were spending much more time managing tests, while others relied heavily on automation and believed that even though developers were executing on tests, it didn't net any additional effort.

For the composite organization, Forrester assumed that:

- Due diligence required 80 resource hours across four to six weeks.
- Each of the 150 developers dedicated slightly less than 3 hours for onboarding, for a total of 400 hours.

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 $1.2 million.

FTEs
spend an average of a few hundred hours each year building automated and customized tests, and then half an hour per week conducting performance tests.

- The creation of automated tests that would be used by all developers for standard (noncritical) updates, plus the creation of custom tests for critical projects, required 800 engineering hours in the first year and 200 hours in each subsequent year.
- Each of the 150 developers spent an average of 30 minutes each week facilitating tests. With 52 weeks per year, this amounted to approximately 4,000 hours. To accommodate for change management and adoption in Year 1, Forrester assumed only 2,000 hours are expended on ongoing testing efforts.
- The average fully loaded salary for developers was $128,125 in Year 1 and grew at a rate of 2.5% annually.

These costs will vary based on:

- Developers' preexisting familiarity with BlazeMeter and an organization's underlying open source technologies.
- Adoption rates among developers.
- The volume of releases.
- Previous (before) and desired (after) testing rates.
- Average fully loaded salaries.

To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year risk-adjusted total PV of $700,369.

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, Deployment, And Ongoing Management

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
D1	Hours dedicated to due diligence		80			
D2	Hours dedicated to onboarding developers		400			
D3	Hours required to build automated tests and customizations for critical projects			800	200	200
D4	Hours dedicated to running tests			2,000	4,000	4,000
D5	Average fully loaded salary	2.5% annual increase	$125,000	$128,125	$131,328	$134,611
Dt	Due diligence, deployment, and ongoing management	(D1+D2+D3 D4) *D5/2080	$28,846	$172,476	$265,182	$271,811
	Risk adjustment	↑15%				
Dtr	**Due diligence, deployment, and ongoing management (risk-adjusted)**		**$33,173**	**$198,347**	**$304,959**	**$312,583**

Fees To CA

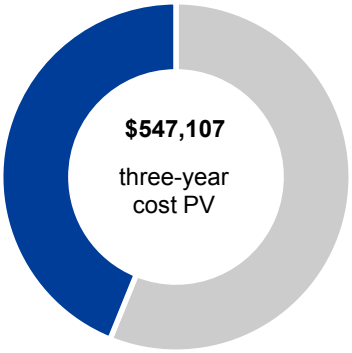
Fees to CA are based on the number of virtual users and testing hours. For this analysis, Forrester assumes the composite organization:

- Releases new code several times a week.
- Conducts global performance tests on more than 80% of those releases.

An organization's testing fees will vary based on:

- The number of virtual users.
- The size, scope, and length of those tests.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of $547,107.



Fees to CA:
44% of total costs

Fees To CA

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	Fees to CA			$200,000	$200,000	$200,000
	Risk adjustment	↑10%				
Etr	**Fees to CA (risk-adjusted)**			**$220,000**	**$220,000**	**$220,000**

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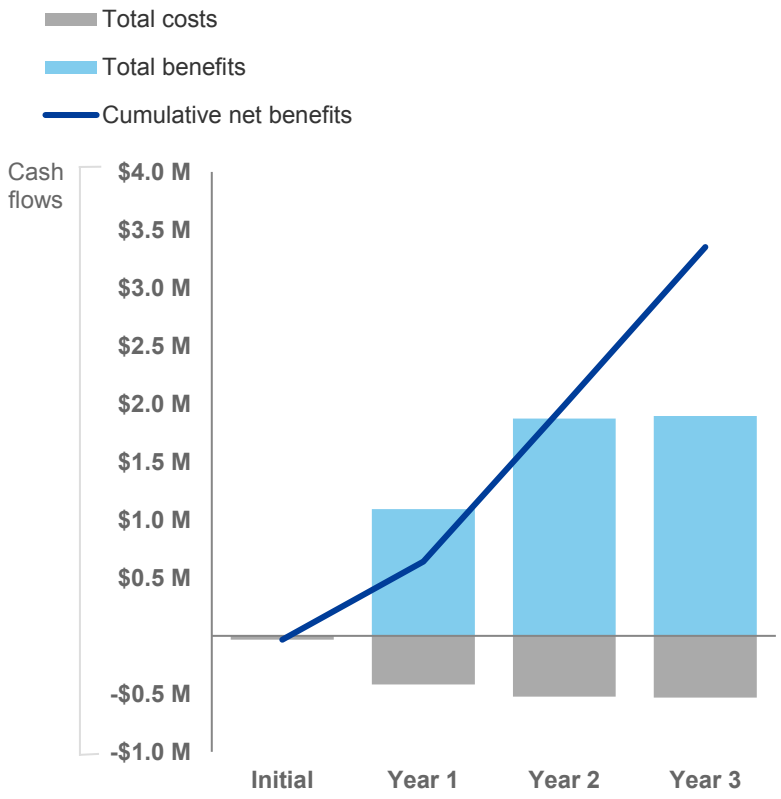
Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



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

These risk-adjusted ROI and NPV 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	($33,173)	($418,347)	($524,959)	($532,583)	($1,509,063)	($1,247,477)
Total benefits	$0	$947,347	$1,873,815	$1,895,976	$4,717,138	$3,834,307
Net benefits	($33,173)	$529,000	$1,348,856	$1,363,393	$3,208,076	$2,586,830
ROI						207%

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CA BlazeMeter: Overview

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

CA BlazeMeter is a next-generation performance testing solution designed to democratize performance testing. With the solution, performance testing isn't limited to a center of excellence. Available via software-as-a-service (SaaS) and on-premises deployment models, CA BlazeMeter is an easy-to-use, free-to-try testing tool. You can run tests for single users as well as massively scalable, open source-based load and performance tests — and do so at any time and from anywhere. Thus, developers can validate performance at every software delivery stage.

The solution offers alignment with open source testing engines like Apache JMeter, Selenium, Gatling, and Locust. Plus, the solution eliminates many of the limitations of these tools, such as reporting, scaling, and worldwide load generation.

Massive-scale load tests were previously only possible with expensive testing environments, but with CA BlazeMeter, you can create and run those tests in the cloud within minutes. Anyone using the solution can run frequent load tests, whether by using existing JMeter scripts or entering a list of URLs. And with proper performance testing, you can address all aspects of application resiliency and redundancy.

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.

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