A Forrester Total Economic Impact™
Study Commissioned By CA Technologies
April 2017

The Total Economic Impact™ Of CA Technologies Application Performance Management (APM)

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ABOUT FORRESTER CONSULTING

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Benefits And Costs

Reduced cost of downtime:
$1,880,060

Improved efficiency of development team:
$5,315,646

Cost to implement and manage:
$1,728,843

Executive Summary

CA Technologies commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) that enterprises may realize by deploying CA Application Performance Management (APM). The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of CA APM on their organizations.

To better understand the benefits, costs, and risks associated with CA APM, Forrester interviewed five individuals with experience using the CA APM platform. The five companies are from financial services, banking, and health insurance sectors. Each company provides services to businesses and consumers through a combination of purchased applications and/or applications developed in-house. Application performance has a direct impact on the quality of the customer experience and depends on the code, the content, and the supporting infrastructure.

Prior to using CA APM, three of the five organizations didn't actively measure or track the performance of customer-facing applications in testing or in production. Costs to the company included service-level penalties, negative revenue and brand impact from customer-perceived poor performance, and inefficiency of detecting/resolving performance problems late in the application life cycle. Too often, online applications were unavailable or performing slowly, causing customers to reach out to the organizations' call centers to handle their business, significantly increasing the cost to the organization.

After implementing CA APM, one executive told Forrester: "APM gives us a very good idea of where the problem is; it gives us details about the commands we are using to connect. APM makes it easier for us to figure out solutions quickly because we can involve the right researchers, quickly figure out where the problem is, [and] get to the root cause." By using CA APM, the organization reduced its outages from 15 per month to six per month, resulting in a decrease in outages of 60%. Even more can be saved by eliminating performance problems in development and test, before customers are affected. Customers also told Forrester that CA APM improved their ability to measure and optimize the performance for Docker containers, which are rapidly increasingly in use.

Key Findings

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

- **Reduced cost of application downtime.** Using CA APM enabled customers to reduce its outages by 50% for customer-facing applications, which avoided almost $1.9 million in costs.
- **Increased productivity of developers.** By reducing the number of errors, CA APM increased the productivity of developers by 15%, resulting in a financial savings over three years that totaled more than $5.3 million.

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ROI
316%

Benefits PV
$7.2 million

NPV
$5.4 million

Payback
3 months

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

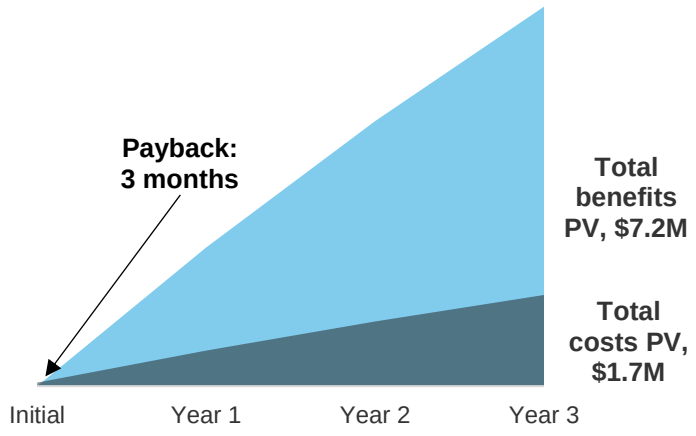
- **Docker container management.** Organizations told Forrester that CA APM was uniquely capable of and effective at providing insights to improve container performance.
- **Brand image improvement due to fewer performance issues.** A reduction in outages and slowdowns improves customer satisfaction, retention, and share of wallet.
- **Increased sense of teamwork and control.** With CA APM, the customers' confidence in their technology improves, along with their perception of the technology team. Development and operations teams enjoy a more collaborative approach, replacing a sense of victimhood with a sense of mastery.

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

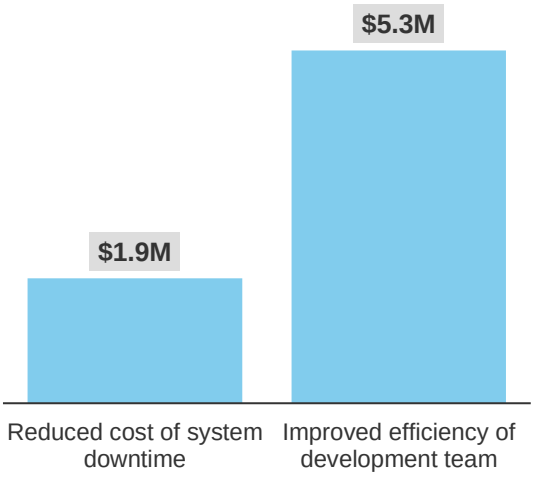
- **Subscription cost of CA APM.** The license fees paid to CA Technologies totaled $913,918.
- **Resources required to implement.** The time required for technical and business employees to set up and configure CA APM totaled $66,780.
- **Resources to manage enterprise application performance.** This includes the cost of two employees for ongoing application monitoring, performance optimization, and app reconfiguration. In addition, the organization paid for 8 hours per month of professional services. The three-year PV cost totaled $748,145.

Forrester's interviews with five existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of almost $7.2 million over three years versus costs of over $1.7 million, adding up to a net present value (NPV) of more than $5.4 million and an ROI of 316%.

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 APM.

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 APM 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 Technologies stakeholders and Forrester analysts to gather data relative to APM.

CUSTOMER INTERVIEWS
Interviewed five organizations using APM 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 APM'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.

The CA APM Customer Journey

BEFORE AND AFTER THE CA APM INVESTMENT

Interviewed Organizations

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

INDUSTRY	COMPANY SIZE	LOCATION	BUSINESS OBJECTIVES
Insurance	5,000 employees	Western US	Improve the quality of service for online applications being accessed by customers.
Insurance	7,000 employees	Eastern US	Diagnose the online experience for millions of buyers who demand instantaneous results.
Financial reporting	4,000 employees	North America	Monitor and improve the online experience for its customers.
Consumer banking	4,000 employees	Southern US	Improve the quality of customer online self-service.
Financial services	60,000 employees	Eastern US	Reduce application failures and improve the performance of Docker containers.

Key Challenges

Each of the interviewed companies delivered significant amounts of its customer experience through online channels. The companies all purchased APM from CA Technologies for monitoring, diagnosing, and resolving performance obstacles in customer-facing applications. Specifically, the companies struggled with the:

- **Quality of customer experience online.** Customer experience with online applications was unpredictable, and it was nearly impossible for the organization to diagnose and resolve performance obstacles.
- **Increase in volume for call centers when applications failed to perform.** Customers who were unable to satisfy their needs using online applications usually reached out to company call centers, which provided quality service but at a much higher cost than online self-service.
- **Inefficient continuous delivery.** Replicating production environments for pre-release testing was time consuming and inefficient, creating drag on development and test resources, slowing the release cycle, and missing performance issues that ultimately affected customer experience.
- **Rapid code changes and demanding business needs for Docker containers.** Frequent code changes to Docker source code combined with increased used of containers in production applications pressured the organizations to deploy tools that could identify and record performance issues even after containers had already been eliminated.

> "It was our intention to ensure that the service that we delivered met our customer expectations. That's what drove the path to searching for an APM solution, and that's what drove us to CA's APM."
>
> *Performance analyst, regional consumer bank*

Key Results

The interviews revealed that key results from the CA APM investment include:

- **Using CA APM reduced the downtime of customer-facing applications.** By using CA APM, customers were able to anticipate, diagnose, and resolve problems that caused downtime or unacceptable performance problems. In addition to reducing application downtime, one interviewed company reduced service-level penalty fees because it was able to prove the cause of problems to a key commercial customer, abating the flow of more than $800,000 that it was paying yearly to a large, global vendor.
- **Applying CA APM in the development process increased developer productivity.** When the development team used CA APM to test new code, the customer was able to accelerate development cycles by 15% in the first year. One company said, "In essence, we're issuing less code or less fixes into production, which allows our developmental organization to focus more on maintaining a competitive advantage in the marketplace of what we deliver in our online solutions."
- **Leveraging CA APM provided insight into performance from mainframes through mobile devices**. Using CA APM allowed the customers to eliminate uncertainty about the cause of problems in complex environments. CA APM reduced the average time-to-resolution and eliminated the finger-pointing between technical teams that previously plagued the diagnosis process.
- **Providing insight into Docker containers and production performance issues.** One director told Forrester, "Right now, we have not found any other tool that can do an equivalent job as CA APM in this new container world."

"APM automates alerts to a 'central pane of glass' so we don't have multiple people working in multiple tools."

APM manager, regional insurance payer

"Right now, we have not found any other tool that can do an equivalent job as CA APM in this new container world."

Senior director, financial services company

Composite Organization

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

- Has 4,000 employees and provides online services to its customers.
- Provides customer service online and on the phone. When customers are unable to use the self-service applications, they contact call centers to address their needs.
- Employs 125 developers for customer-facing applications. The company used CA APM to more rapidly test new code and identify errors sooner in the development process.
- Had two people manage the implementation of CA APM over a period of four months. The organization also hired two permanent employees to manage application performance with CA APM.

Key assumptions

- Has 4,000 employees
- Has 125 developers (for customer-facing apps)
- Staffs call center for customer app support

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	Reduced cost of application downtime	$756,000	$756,000	$756,000	$2,268,000	$1,880,060
Btr	Increased productivity of developers	$2,137,500	$2,137,500	$2,137,500	$6,412,500	$5,315,646
	Total benefits (risk-adjusted)	$2,893,500	$2,893,500	$2,893,500	$8,680,500	$7,195,706

Reduced Cost Of Application Downtime

All the interviewed organizations were financially affected by improving the availability and performance of customer-facing applications. Specifically:

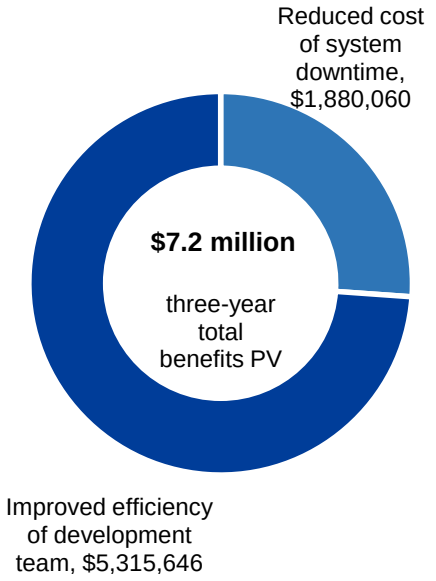
- One organization reduced the penalties that it was paying from failing to meet service levels.
- The other companies measured the impact by the cost of increased calls coming into their call centers when an application was unavailable.
- The organizations reported that, on average, the cost to support a customer with a live operator is eight times the cost of customer self-service online.

With CA APM:

- Organizations reduced the number of outages by 50%.
- The average cost per outage is $10,000.

Although each of the companies experienced a benefit from increasing application performance, the level and nature of the benefit varied. As such, Forrester assigns a 10% risk quotient to this benefit. The risk-adjusted benefit over three years PV totaled more than $1.8 million.

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 nearly $7.2 million.



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Reduced Cost Of Application Downtime: Calculation Table					
REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Cost per outage hour of downtime		$10,000	$10,000	$10,000
A2	Monthly outages before CA APM		14	14	14
A3	Monthly outages after CA APM		7	7	7
At	Reduced cost of application downtime	(A2-A3)*A1*12	$840,000	$840,000	$840,000
	Risk adjustment	↓10%			
Atr	Reduced cost of application downtime (risk-adjusted)		$756,000	$756,000	$756,000

Increased Productivity Of Developers

Interviewed companies told Forrester that by using CA APM in the application development process, developers were more efficient. Reasons for the increased efficiency include:

- Avoiding first-day failures for applications moved into production.
- Compressing the time between development and testing.
- Shifting some of the development team from testing to addressing business issues.

The impact on productivity was a 15% improvement. As shown in Table 2, the savings totaled more than $2.2 million per year.

To compensate for variation between the companies, this benefit was risk-adjusted and reduced by 5%. The risk-adjusted PV benefit from reducing errors in orders totaled more than $5.3 million over three years.

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.

Increased Productivity Of Developers: Calculation Table					
REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Number of developers		125	125	125
B2	Averaged burdened salary		$120,000	$120,000	$120,000
B3	Percent improvement		15%	15%	15%
Bt	Increased productivity of developers	B1*B2*B3	$2,250,000	$2,250,000	$2,250,000
	Risk adjustment	↓5%			
Btr	Increased productivity of developers (risk-adjusted)		$2,137,500	$2,137,500	$2,137,500

Unquantified Benefits

During the interviews, Forrester uncovered benefits that are not quantified in this study:

- **Docker container management.** The increased use of Docker containers combined with the rapid evolution of source code creates unique performance management challenges for operations teams. While the interviewed organizations had not yet measured the productivity or financial impact for Docker, executives were highly confident that CA APM was uniquely capable of and effective at providing insights to improve container performance.
- **Improved brand value.** The organizations improve their brand and corporate image due to fewer performance issues. A reduction in outages and slowdowns improves customer satisfaction, retention, and share of wallet.
- **Increased sense of teamwork and control.** Within and across the customers, business units and executives increase their trust and confidence in the technology team. By using CA APM in both production and development (AKA shift left), the development and operations teams enjoy a more collaborative approach.

Executives were highly confident that CA APM was uniquely capable of and effective at providing insights to improve container performance.

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 CA APM and later realize additional uses and business opportunities, including:

- **Effective decision making.** One director told Forrester: “Before using CA APM, we didn’t have the data to make decisions about performance. Now that we have the data, we are more confident in our decisions.”
- **Emerging technologies.** The director said: “While the current “new” technology is Docker, there is a constant stream of new technologies that we can consider and adopt. CA APM provides a performance foundation that allows us to confidently experiment with new solutions.”

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 so.

Total Costs

REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Ctr	Subscription cost of APM	$0	$367,500	$367,500	$367,500	$1,102,500	$913,918
Dtr	Resources required to implement CA APM	$66,780	$0	$0	$0	$66,780	$66,780
Etr	Resources to manage enterprise application performance	$0	$300,840	$300,840	$300,840	$902,520	$748,145
	Total costs (risk-adjusted)	$66,780	$668,340	$668,340	$668,340	$2,071,800	$1,728,843

Subscription Cost Of CA APM

The cost of CA APM includes bug fixes and updates and is based on the number of CPUs that are hosting the CA APM platform. Most of the interviewed companies began with one CPU and later expanded to as many as 10 CPUs on virtual machines running CA APM.

Pricing for CA APM was generally consistent among the interviewed companies, so Forrester adjusted this cost upward by 5%, resulting in a risk-adjusted cost over three years that totaled $913,918.

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 $1.7 million.

Subscription Cost Of CA APM: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
C1	Subscription cost of CA APM			$350,000	$350,000	$350,000
Ct	Subscription cost of CA APM	= C1		$350,000	$350,000	$350,000
	Risk adjustment	↑5%				
Ctr	Subscription cost of CA APM (risk-adjusted)			$367,500	$367,500	$367,500

Resources Required To Implement CA APM

To implement CA APM, the organization assigned two resources to the project. It required three months of work, which is the equivalent of 0.5 full-time equivalent (FTE) years. In addition, each of the two business units invested 30 hours of time to provide understanding about business operations and requirements. Using a burdened salary of $120,000, the cost of implementation totaled $63,600.

Forrester risk-adjusted this cost up by 5%, resulting in a risk-adjusted total over three years of $66,780.

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.

Resources Required To Implement: Calculation Table						
REF.	**METRIC**	**CALC.**	**INITIAL**	**YEAR 1**	**YEAR 2**	**YEAR 3**
D1	Two FTEs for three months (percent of FTE)		50%			
D2	Two business units at 30 hours each (percent of FTE)		3%			
D3	Average burdened salary		$120,000			
Dt	Resources required to implement	(D1+D2)*D3	$63,600			
	Risk adjustment	↑5%				
Dtr	Resources required to implement (risk-adjusted)		$66,780			

Resources To Manage Enterprise Application Performance

Each of the interviewed companies employs dedicated resources to manage application performance across the enterprise using CA APM, but the number of employees ranges from one to four, giving the organization a degree of variability that is based on the scope and scale of CA APM deployment and how it is being used across the enterprise. Forrester calculated this cost using two staff with a burdened salary of $120,000.

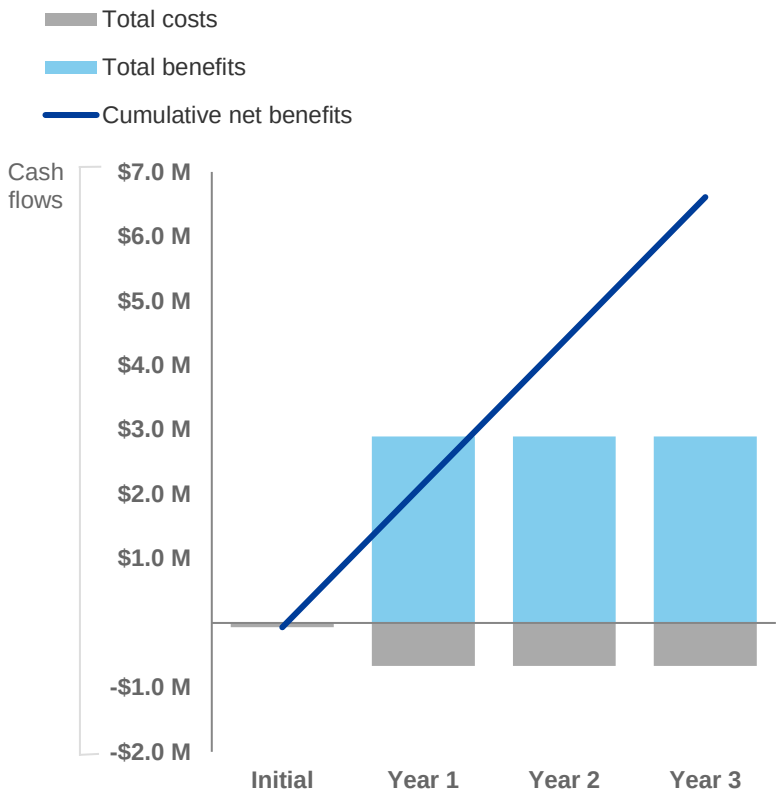
In addition, the organization required professional services from CA Technologies to handle more complicated issues. On average, the company used 8 hours of professional services per month at a rate of $225 per hour. The cost for the resources to manage application performance using CA APM totaled $261,600 per year. Because of the variation in staffing with the interviewed companies, Forrester adjusted this cost upward by 15%, bringing the three-year, risk-adjusted PV total to $748,145.

Resources To Manage Enterprise Application Performance: Calculation Table						
REF.	**METRIC**	**CALC.**	**INITIAL**	**YEAR 1**	**YEAR 2**	**YEAR 3**
E1	Cost of two employees	$120,000 per year		$240,000	$240,000	$240,000
E2	Professional services	8 hours per month at $225/hour		$21,600	$21,600	$21,600
Et	Resources to manage enterprise application performance	E1+E2		$261,600	$261,600	$261,600
	Risk adjustment	↑15%				
Etr	Resources to manage enterprise application performance (risk-adjusted)			$300,840	$300,840	$300,840

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



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

These risk-adjusted ROI, NPV, and payback period values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

Cash Flow Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	($66,780)	($668,340)	($668,340)	($668,340)	($2,071,800)	($1,728,843)
Total benefits	$0	$2,893,500	$2,893,500	$2,893,500	$8,680,500	$7,195,706
Net benefits	($66,780)	$2,225,160	$2,225,160	$2,225,160	$6,608,700	$5,466,864
ROI						316%
Payback period						3 months

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CA Technologies Application Performance Management: Overview

CA Technologies is named a leader by Forrester Research in “The Forrester Wave™: Application Performance Management, Q3 2016.” CA Technologies’ APM solution stands out with its customer experience capabilities and the ability to proactively monitor and provide diagnostic insights into applications across mobile, web, cloud, microservices, containers, and mainframe. The solution manages real-user transactions via JavaScript injection and SDK and deep packet analysis and combines this with user experience and behavioral data to better understand the entire customer's digital experience. Patent-pending analytics provides expertise in the form of guided assisted triage workflows for in-depth, root-cause diagnostics across development and production applications, simplifying and speeding the time it takes to find and fix issues. CA APM scales to your organization’s needs and automatically correlates multiple sources of data to help you sort through the data and act decisively, helping to improve user experience and application performance.

Key features of CA APM include:

- Mobile-to-mainframe APM gives you 20/20 insight into the complexity of your app, from the mobile app into the middleware/infrastructure components to the back-end database or mainframe.
- Smart instrumentation automatically collects deep transaction traces when a problem occurs so users don’t have to recreate the issue.
- Role-relevant application topology views enable better communication between specialists to resolve problems faster.
- Assisted triage provides built-in analytics to recognize patterns and automatically suggest the root cause for faster mean time to repair (MTTR). Automating first-level, root-cause analysis and tying those issues to poor user experience boosts collaboration, productivity, and user satisfaction.
- Differential analysis prioritizes alerts on multiple weighted criteria, reducing noisy alarms and focusing on the most pressing application issues.
- Over 140 out-of-the-box integrations and extensions support infrastructure monitoring, with strong coverage of virtual, cloud, and microservices environments. Modern support includes but is not limited to PHP, Node.JS, Java, .Net, MongoDB, FUSE, Docker containers, Cloud Foundry, and Amazon Web Services, which enables management across a broad range of Tier 1/2/3 apps.

For more information, go to https://www.ca.com/apm.

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.