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The Total Economic Impact™ Of Sauce Labs
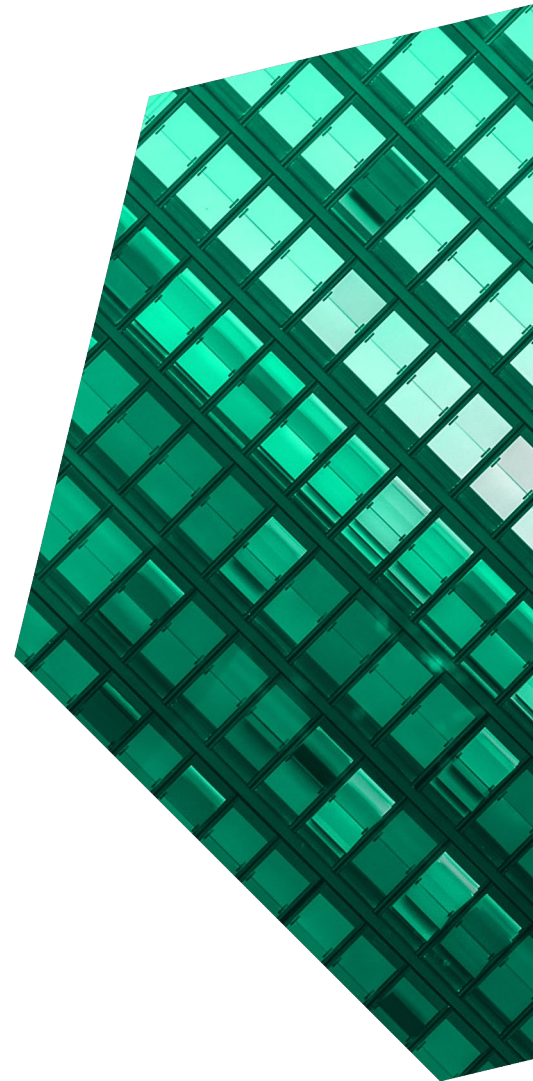
Cost Savings And Business Benefits
Enabled By Sauce Mobile From Sauce Labs

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Table Of Contents

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Executive Summary

Organizations often struggle to implement and scale modern testing practices (e.g., continuous automation testing) on mobile. Organizations might consider buying rather than building: A mobile testing platform saves internal resources required to maintain an in-house solution and increases developer and QA productivity. Organizations with business-critical mobile apps realize even greater benefits from improved software quality and release velocity.

Sauce Labs is a unified platform for continuous, live, and automated testing across the software development lifecycle. The platform includes solutions for cross-browser testing, mobile application testing, low-code testing, error monitoring and reporting, application programming interface (API) testing, visual testing, performance data, and test analytics. Sauce Labs can enable engineering and product teams to release high-quality software faster and more confidently. Sauce Labs' product for mobile testing, Sauce Mobile, has features for remote testing on real devices as well as on emulators and simulators, beta distribution, and error monitoring and reporting.

Sauce Labs commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Sauce Labs.[1] The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Sauce Labs on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed five representatives with experience using Sauce Labs. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single composite organization. The composite organization has $5 billion in revenue and a delivery team of 800 developers and 200 quality assurance (QA) engineers and testers. The composite organization's

KEY STATISTICS

Return on investment (ROI)
217%

Net present value (NPV)
$6.85M

web and mobile apps are crucial to its business: Any issues have an immediate financial impact.

Prior to using Sauce Labs, the interviewees maintained mobile testing infrastructure (i.e., devices) in-house and struggled with unreliable testing platforms. The interviewees' old solutions were expensive and did not support the scale, speed, and quality that the software delivery teams wanted to achieve.

After investing in Sauce Labs, the interviewees' teams migrated their existing testing processes and procedures to Sauce Mobile. The teams automated tests and increased testing frequency and coverage. Better testing led to better software, and the interviewees reported that the quality improvements plus feature enhancements had material financial benefits.

Reduction in software
issues with Sauce Labs

95%

KEY FINDINGS

Quantified benefits. Three-year, risk-adjusted present value (PV) quantified benefits for the composite organization include:

- **Savings on testing infrastructure and operations totaling $1.3 million.** Before Sauce Labs, the composite organization managed mobile devices for testing in-house — a considerable expense and significant headache. By investing in Sauce Labs, the composite organization not only avoids these costs, but it also benefits from testing capabilities far beyond those of its legacy solutions.

- **Productivity gains for the software delivery team — i.e., developers plus QA and testers — worth $4.1 million.** Automation reduces the time to perform tests by 90%. But test automation does more than save the QA team time — it also enables them to increase testing frequency and expand testing coverage. Due to these improvements, the delivery team detects issues earlier in the development process, when the issues are easier to fix. The developers also save time when fixing issues because Sauce Labs provides rich test assets and diagnostics (e.g., screenshots and logs).

- **New business attributed to improved testing worth $1.1 million.** Better testing helps to improve the delivery team's velocity: They release incrementally more features from their backlog than before. Product enhancements attract new customers, and expanding device

coverage unlocks new markets (e.g., markets in which devices that the delivery team previously did not support are prevalent). Because a variety of factors affect business growth, the composite organization attributes only a small percentage of this benefit to features that would have remained unreleased without the testing improvements made possible by Sauce Labs.

- **Software quality improvements worth $3.5 million.** After investing in Sauce Labs, the delivery team catches up to 95% more issues during QA and testing than before. This means that fewer issues escape to production, where the issues can be encountered by customers and hurt the business. By using Sauce Labs to improve testing, the delivery team releases software without these critical issues and so avoids financial losses.

Unquantified benefits. Benefits that provide value for the composite organization but are not quantified in this study include:

- **Improved collaboration.** With Sauce Labs, the QA and development teams work together to identify issues earlier in the development cycle and move products toward release more quickly. This is a cultural shift; before Sauce Labs, the teams often blamed each other when releases failed.

- **Increased innovation.** Delivery teams used the time savings unlocked by testing automation to engage in creative endeavors that had previously been out of scope due to capacity constraints.

- **Breadth of the Sauce Labs platform.** In addition to mobile testing, Sauce Labs offers a full suite of products for testing many types of software throughout the development lifecycle. Organizations may realize additional benefits by taking advantage of these offerings.

Costs. Three-year, risk-adjusted PV costs for the composite organization include:

- **Sauce Labs subscription fees total $323,000.** The composite organization's enterprise relationship with Sauce Labs includes ample capacity for mobile testing on public (i.e., shared) devices, private devices, and emulators and simulators. The composite organization also benefits from Sauce Labs' enterprise security and support. Although the composite organization primarily leverages Sauce Mobile, it further benefits from the flexibility to leverage Sauce Labs' other testing tools.

- **Deployment effort worth $164,000.** The composite organization creates a small team of QA engineers and testers to deploy and implement Sauce Labs. This team completes deployment in two weeks.

- **Ongoing effort invested in testing improvements total $2.7 million.** For the composite organization to reap the business benefits from better testing, the implementation team must spend time improving testing procedures on Sauce Labs: e.g., automating tests, writing new tests, and more. The implementation team members spend about three months per year on this work; it is the composite organization's largest cost.

The representative interviews and financial analysis found that a composite organization experiences benefits of $10.02 million over three years versus costs of $3.16 million, adding up to a net present value (NPV) of $6.85 million and an ROI of 217%.

ROI
217%

BENEFITS PV
$10.02M

NPV
$6.85M

PAYBACK
<6 months
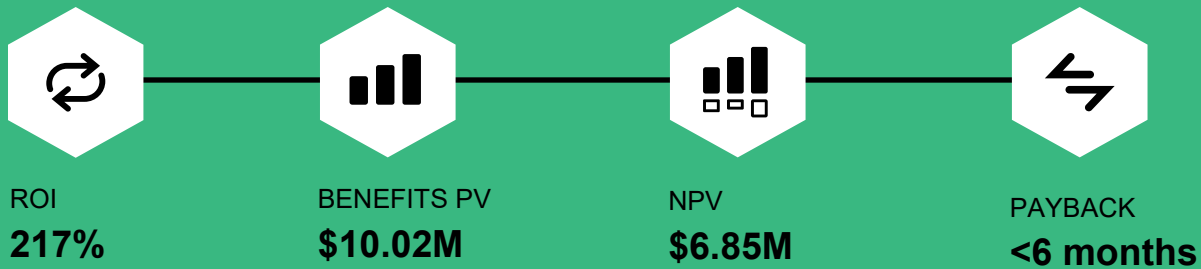
Financial Summary (Three-Year)

Reduced business exposure to app issues, $3.5M

New business attributed to improved testing, $1.1M

Delivery team productivity, $4.1M

Savings on testing infrastructure and operations, $1.3M

Savings on testing infrastructure and operations alone are **2.6x** associated costs.

Ongoing effort invested in testing improvements, $2.7M

Deployment effort, $164K

Sauce Labs subscription fees, $323K

Benefits   Costs

"[Sauce Labs] gives you confidence in the definition of 'done' — so that the teams that are in high-pressure situations can deliver software quicker, faster, and more iteratively."

— Director of enterprise QA, financial services

TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in Sauce Labs.

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 Sauce Labs can have on an organization.

DUE DILIGENCE
Interviewed Sauce Labs stakeholders and Forrester analysts to gather data relative to Sauce Labs.

INTERVIEWS
Interviewed five representatives at organizations using Sauce Labs to obtain data with respect to costs, benefits, and risks.

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

CASE STUDY
Employed four fundamental elements of TEI in modeling the investment 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.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Sauce Labs 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 Sauce Labs.

Sauce Labs 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.

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

■ Drivers leading to the Sauce Labs investment

Interviews					
Role	**Industry**	**Region**	**Employees**	**Delivery Team**	**Sauce Mobile Device Cloud**
Director of enterprise quality assurance	Financial services	Headquartered in North America with global operations	44,000	20,000 to 25,000 IT personnel and 1,500 to 2,000 QA/testers	70 devices
Senior test architect	Gaming	Headquartered in Europe with global operations	600	100 to 200 developers and 35 QA/testers	36 devices
VP of IT quality assurance	Financial services	Headquartered in North America with regional operations	10,000	300 developers and 100 QA/testers	10 devices
Manager of software test engineering	Technology	Headquartered in North America with global operations	15,000	1,000 developers	20 devices
Domain expert in mobile development	Financial services	Headquartered in Europe with regional operations	18,000	50 developers and 2 QA/testers	47 devices

KEY CHALLENGES

Before adopting Sauce Labs, most of the organizations tested their apps on mobile devices that they had purchased and maintained in-house. Most testing processes were manual, which meant that testing was slow and frequently a bottleneck.

The interviewees reported several common challenges, including:

- **Managing devices in-house was expensive, inefficient, and impractical.** According to the interviewees, purchasing and maintaining devices in-house had multiple downsides:

    - **Devices and parts were expensive.** For example, the senior test architect in the gaming industry said, "We had pretty much the latest devices at that time. … 20 to 30 devices multiplied by £500 to £1000 — it was quite a bit [of money]."

    - **Managing and servicing the devices was time-consuming.** Some interviewees described their old setups as "headaches," while other interviewees

reported hiring personnel simply to oversee in-house devices.

- **The systems and platforms were unreliable.** Some interviewees described bottlenecks such as multiple testers wanting to use the same device. Other organizations had invested in software to allow testers to remotely connect to devices. However, the interviewees described these platforms as "laggy" and "flaky." The platforms also lacked capabilities — such as automation and delivery pipeline integration — that support scale and modern development practices.

- **There were often coverage gaps.** That is, there were frequently combinations of devices and operating systems on which the organizations could not test because the devices were not in-house.

The interviewees described their organizations before Sauce Labs as follows:

- The domain expert in mobile development said: "We had a cabinet with a lot of devices. [Testers] connected to [software], and [the software] was connected to devices in the cabinet. But the maintenance was dramatic. [And] performance was slow, so [the setup] was really not working. That's why we started looking for something else."

  They elaborated: "We had to [maintain] the phones, and that was problematic for us because if you keep the phone connected, then every now and then — after a year or so — the battery blows up. So we had to maintain [the devices] ourselves. That was cumbersome."

- The senior test architect said: "There was a lot of manual intervention. And then you've got stuff like version updates, devices, and the [software]. Just a lot going on. At the time, I did that in addition to my role. So it was hitting up a lot of my time and the team's time as well."

  They added: "The obvious issue we used to have was that we had a limited amount of devices for five or six product teams. If we're all trying to deploy stuff at the same time, then we'd have to wait for another team to finish up using their devices. There was a lot of hassle with teams impacting each other."

- The manager of software test engineering said: "Prior to [Sauce Labs], we had to make our own [testing lab] and [were] responsible for keeping various things up-to-date and making sure that we had the right amount of machines and that sort of thing."

  In addition, the same manager described their organization's old testing software as follows: "It was very slow, and the portal — I think it was written in Flash, so it wasn't up to modern standards. It was very slow for teams to use, and the phones were constantly breaking."

  They continued: "The slowness was constant. It was like, 'Oh, we're having a good day,' or, 'We're having a bad day.' Just latency. It was terrible to the point that it was becoming [a] usability issue. You can imagine how hard it is to remotely control a device when you click, and then 2 seconds later, [something happens]. It just drives people nuts. So we needed more of a real-time experience."

Given these challenges, maintaining devices in-house was not sustainable.

- **Low testing maturity.** In addition to the high costs of their old testing solutions, the interviewees described their old testing platforms' capabilities as limiting. That is, the organizations wanted to test more frequently and perform different types of tests, but their old systems did not scale. Their old platforms lacked capabilities for automation and integration into delivery pipelines.

  The interviewees reported that the limits of their old platforms often had business impacts. For example, the manager of software test engineering reported that testing became a bottleneck as the organization's business grew, and several interviewees said that coverage gaps had been significant enough to negatively impact their businesses.

SOLUTION REQUIREMENTS

The interviewees' organizations searched for a solution with the following characteristics:

- **Quality and reliability.** First and foremost, the interviewees sought to resolve the problems that they had been experiencing with their prior systems and platforms.

- **Security.** For some interviewees, Sauce Labs' security capabilities were crucial. Whether for specific regulatory reasons or simply for general security reasons, these organizations took advantage of Sauce Labs' private device cloud offering.

  The VP of IT quality assurance in the financial services industry said: "The most important [criteria] for me were being able to [choose] the devices that I want and being able to have that private cloud. That way, we don't have to share [devices] with any other company. … My company's security is pretty tough. … Believe it or not, Sauce Labs was one of the only vendors able to provide [those capabilities]." Because of the nature of this organization's business — financial services — the enhanced security provided by a private device cloud with Sauce Labs was key.

- **Superior customer support.** The interviewees praised Sauce Labs' customer service and described their relationship with Sauce Labs as a partnership. Several interviewees said that Sauce Labs' support set the vendor apart when they were searching for a solution.

  - The senior test architect said: "Their support has been a big positive. … They made the whole [deployment] process very streamlined."

  - The director of enterprise quality assurance said: "The private and public [devices] flexibility is good; the service and support and the features [are also good]. We have discussions [with Sauce Labs] on a weekly basis. They are good about presenting their roadmap so that

> **"The platform as a whole was really easy to use. It was really stable. Their team and their customer service we way above the other teams we'd worked with, and it still is today. We have a really good relationship with them, and they had developers on their side working with us to get us set up and running, which was really nice."**
>
> *Senior test architect, gaming*

we can understand what's next and what would help us in the future."

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an ROI analysis that illustrates the areas financially affected. The composite organization is representative of the five interviewees, and it 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 has global operations, $5 billion in revenue, and 10,000 employees. Its mobile app delivery team includes 800 developers and 200 testers and QA engineers. The organization's web and mobile apps are key to its business, and any issues in these apps can have a severe business impact. While the software delivery team uses agile development practices, the team is having trouble scaling its mobile testing to achieve quality at speed. The organization's legacy practices and platforms for mobile testing do not support DevOps practices such

as automation, integration, and reporting. Mobile testing is thus excluded from the software delivery team's pipelines and is often a bottleneck.

Deployment characteristics. The composite organization tasks a subset of the QA team with responsibility for deploying and implementing Sauce Labs. This team contains 30 QA engineers, or approximately 15% of the team. This team spends two weeks deploying Sauce Labs; afterward, the team spends up to three months per year shifting the organization's testing to Sauce Labs as well as using Sauce Labs to improve the organization's testing procedures. During the first year, the composite organization uses Sauce Labs for 30% of testing; during the second year, the organization uses Sauce Labs for 60% of testing; and during the third year, the organization uses Sauce Labs for 90% of testing. (A small percentage of testing — 10% — cannot be conducted in Sauce Labs and remains manual.) Testing shifted to Sauce Labs is modernized: e.g., automated, integrated into software delivery pipelines, tracked with analytics, etc.

Key Assumptions

- **$5 billion in revenue**
- **Delivery team includes 800 developers and 200 QA engineers/testers**
- **Mobile apps are essential to business**
- **Investments in testing improvements over three years**

Analysis Of Benefits

Quantified benefit data as applied to the composite

Total Benefits						
Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Savings on testing infrastructure and operations	$515,698	$513,418	$512,278	$1,541,394	$1,278,011
Btr	Delivery team productivity	$859,248	$1,718,496	$2,577,744	$5,155,488	$4,138,076
Ctr	New business attributed to improved testing	$200,000	$500,000	$700,000	$1,400,000	$1,120,962
Dtr	Reduced business exposure to app issues	$625,000	$1,250,000	$2,500,000	$4,375,000	$3,479,527
	Total benefits (risk-adjusted)	$2,199,946	$3,981,914	$6,290,022	$12,471,882	$10,016,576

SAVINGS ON TESTING INFRASTRUCTURE AND OPERATIONS

Evidence and data. The interviewees reported that replacing their prior solutions — both in-house devices and other testing platforms — reduced costs in three ways:

- The organizations no longer had to purchase devices and parts.

- The organizations no longer had to manage and service devices in-house.

  - Several interviewees said that before Sauce Labs, they had done this work themselves, and it had taken up most of their time.

  - Two interviewees reported hiring or dedicating at least one full-time employee primarily to administer the in-house devices.

- The organizations also retired other testing software and consolidated on Sauce Labs.

The manager of software test engineering explained: "[Our] prior solution was a device wall. [Now], we don't have to worry about making sure the devices

Analysis Of Testing Infrastructure And Operations Changes

Benefits | Costs
$1.3M | **$487K**

Even without investing in testing improvements, the composite organization experiences benefits of $1.3 million versus costs of $487,000 over three years solely by shifting its testing infrastructure and operations to Sauce Labs. The benefit of infrastructure and operations savings alone is 2.6x the applicable costs.

are healthy. [Our old solution also] didn't scale very well."

They continued: "The Sauce Labs model works a lot better for us because you are basically renting [devices] from Sauce Labs. You can just say, 'I want these devices,' [and] they procure them for you, and you can swap them out. ... That works out really well for us. … It's just nice to have Sauce Labs [manage] that."

They added: "It's very easy for our teams to just upload the app, control it, and then drive their tests through [Sauce Labs]. … We're getting [more of a real-time experience] now with Sauce Labs."

Modeling and assumptions. Forrester assumes:

- Before Sauce Labs, the composite organization has 50 mobile devices in-house that it uses for testing purposes.

- Every year, the composite organization retires 20% of its in-house mobile devices and replaces them with new devices.

- On average, the total cost for a new mobile device plus associated parts for repairs is $800.

- The composite organization liquidates half of its in-house mobile devices per year. At liquidation, devices are worth 25% of their original value.

- The composite organization assigns responsibility for managing the in-house mobile devices to two employees on the QA team. This work includes servicing the devices, distributing the devices among developers, etc. Administering the in-house mobile devices takes up 85% of the employees' time. The employees earn a fully burdened hourly rate of $65.

- After investing in Sauce Labs, the composite organization retires other testing software that it had been using and consolidates on Sauce Labs. The composite organization retires two testing suites that each had annual licensing fees of $150,000.

Risks. Organizations may realize benefits different from those of the composite organization due to variability in the following factors:

- Number of in-house devices before Sauce Labs.

- Annual replacement rate for in-house devices.

- Cost per in-house device.

- Number of legacy testing software suites and cost per software suite.

Results. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $1.3 million.

$1.3 million
three-year
benefit PV

13%
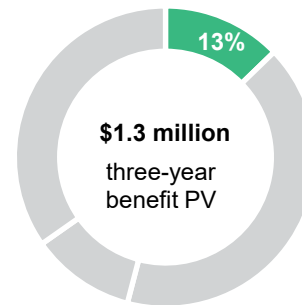
Savings on infrastructure and operations: 13% of total benefits

> **"We don't have to worry about making sure the devices are healthy or [scaling]. Having Sauce [Labs] manage [devices] saves time for my team on the administration. It's been much more hands-off. … It's just nice. It just works."**
>
> *Manager of software test engineering, technology*

Savings On Testing Infrastructure And Operations

Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	In-house mobile devices	Composite	50	50	50
A2	Percentage of in-house devices replaced annually	Interviews	20%	20%	20%
A3	Average cost per device (i.e., list price, parts, etc.)	Composite	$800	$800	$800
A4	Subtotal: Avoided device procurement costs	A1*A2*A3	$8,000	$8,000	$8,000
A5	Percentage of in-house mobile devices liquidated	Composite	50%	50%	50%
A6	In-house mobile devices liquidated	Year 1: A1*A5 Years 2 and 3: $A6_{PY}$*A5	25	13	7
A7	Percentage of device value retained at liquidation	Composite	25%	25%	25%
A8	Average device value at liquidation	A3*A7	$200	$200	$200
A9	Subtotal: Liquidated devices	A6*A8	$5,000	$2,600	$1,400
A10	QA/developers responsible for administering devices in-house	Composite	2	2	2
A11	Percentage of time spent administering devices in-house before Sauce Labs	Interviews	85%	85%	85%
A12	In-house device administration time saved after Sauce Labs (hours)	Interviews: A10*A11*2,080	3,536	3,536	3,536
A13	Average QA hourly rate (fully burdened)	Composite	$65	$65	$65
A14	Subtotal: Avoided device administration costs	A12*A13	$216,320	$216,320	$216,320
A15	Legacy testing software suites retired	Composite	2	2	2
A16	Average licensing fees per legacy testing software suite	Composite	$150,000	$150,000	$150,000
A17	Subtotal: Avoided licensing costs due to testing software consolidation	A15*A16	$300,000	$300,000	$300,000
At	Savings on testing infrastructure and operations	A4+A9+A14+A17	$542,840	$540,440	$539,240
	Risk adjustment	↓5%			
Atr	Savings on testing infrastructure and operations (risk-adjusted)		$515,698	$513,418	$512,278
	Three-year total: $1,514,394		**Three-year present value: $1,278,011**		

DELIVERY TEAM PRODUCTIVITY

Evidence and data. The interviewees reported that their software delivery teams — i.e., QA personnel and developers — saved time with Sauce Labs. The interviewees also said that collaboration between the two teams improved as the organizations increased their mobile testing capabilities.

With Sauce Labs, the QA engineers and testers automated their existing tests and then implemented new tests that they had been unable to perform before. The teams both tested more frequently and implemented new types of tests. The interviewees gave the following examples of time savings during testing:

- The senior test architect in the gaming industry said that before Sauce Labs, the delivery team had spent 2 hours per day testing. Now, with Sauce Labs, the delivery team executes those same daily tests in about 10 minutes.

- Similarly, the senior test architect said that before Sauce Labs, each new product feature had required 2 to 3 hours of manual testing. Now, with Sauce Labs, the delivery team performs the same tests in about 30 minutes.

- The VP of IT quality assurance said that the delivery team's smoke test for its mobile app used to take 6 hours to complete. After automating the test with Sauce Labs, the time requirement dropped to 2 hours, and the delivery team now runs the smoke test daily.

"When things come into our test environment, there's nothing that's being thrown over. … The defects are getting found earlier on. … And we are finding a lot more."

VP of IT quality assurance, financial services

- Similarly, the VP of IT quality assurance reported that before Sauce Labs, manually completing its full regression test used to take 20 hours. Now, after Sauce Labs, the full regression test takes only 7 hours, and the delivery teams run the test multiple times per sprint.

- The domain expert in mobile development in the financial services industry said that before Sauce Labs, the delivery team's full testing regimen had taken more than two weeks to perform. Now, with Sauce Labs, the entire testing regimen takes only 2.5 hours per operating system. The delivery team is testing more, too. After Sauce Labs, the team increased its number of flow tests from 60 to 260 and now performs 13,000 unit tests and 13,000 screen tests per operating system .

Developers saved time as well. With Sauce Labs, the delivery teams tested more frequently. This shortened the feedback loop: Issues were discovered sooner in the software development lifecycle — closer to when the developers were working with the code — and so were easier to fix. In addition, the interviewees said that the rich test assets (e.g., screenshots, recordings, etc.) and mobile app diagnostics (e.g., error and crash reports, device vitals, network captures, etc.) that Sauce Labs provided helped developers diagnose and fix issues

QA time savings with automation:

90%

faster. Before Sauce Labs, bug reports usually lacked these details, and the information was often time-consuming for QA to provide. With Sauce Labs, though, the developers had ready access to all the information they needed to debug and resolve issues.

- The VP of IT quality assurance explained: "There were a lot of times [before Sauce Labs] when there were still defects in the [user acceptance test (UAT)] environment. Now, we're finding them earlier, inside the test environment. … We're running a lot more tests, [and the] tests have been automated, so the team runs them on a daily basis and catches defects in the test environment."

- The senior test architect said: "We [now] run tests as part of our release pipelines. And we're able to rely on [the tests in Sauce Labs], so they're in everybody's pipelines. In the past, we couldn't rely on [testing]; if [a release] failed, [we didn't know why]. … That's the biggest change that has happened. We have [Sauce Labs] running on staging, running on production, and running for our nightly builds."

They continued: "We have a lot more logs available to us. We have screenshots and recordings, all of which we wouldn't have had in the past. We may have had some basic logs, but not to the level that Sauce Labs provides us. So it's definitely a lot easier to find out where an issue has occurred."

Developer time savings fixing issues:

90%

The senior test architect concluded: "The feedback from developers and product teams was that [our old solution] was never working and gave unreliable results. [With Sauce Labs], that's no longer a problem. We can rely on the platform we're using. It doesn't go down, it's constantly up and running, and we're constantly running tests."

"Since we can parallelize the tests, they run very fast. We're covering hundreds of tests in under about 20 minutes. [I have heard from QA] nothing but good things about the mobile capabilities, especially compared to what we were using previously, so the [QA] teams are liking it."

Manager of software test engineering, technology industry

Modeling and assumptions. To calculate the value of the delivery team's time savings during QA and testing, Forrester assumes:

- The composite organization has 200 developers responsible for QA and testing.

- Before Sauce Labs, these developers spend 25% of their time running tests. (They spend the rest their time on other activities related to QA — e.g., coordination, documentation, automation, etc. However, Sauce Labs has the greatest impact on the execution tests, so the other activities QA personnel perform are not part of this benefit calculation.)

- The composite organization migrates its testing to Sauce Labs over time. (This requires work that Forrester accounts for in Cost G: Ongoing Effort Invested In Testing Improvements.) In Year 1, 30% of testing leverages Sauce Labs; in Year 2, 60%; and in Year 3, 90%. (A minority of tests are better performed locally instead of on cloud infrastructure.)

- Testing in Sauce Labs leverages automation and takes 90% less time to execute compared to when the testing is manual.

- QA team members earn a fully burdened hourly rate of $65.

Issues caught during QA/testing:

Before
50%

After
95%

To calculate the value of the delivery team's time savings when fixing issues, Forrester assumes:

- The composite organization has 800 developers who focus on feature delivery (rather than QA).

- On average, these developers check in code with issues 20% of the time. Most of the time, the developers commit code that is issue-free. However, all developers — no matter how diligent — sometimes write code with issues that are only caught later, during QA and testing.

- Before Sauce Labs, the QA team catches 50% of committed issues before release. While QA and testing are not ineffective, the QA team is still limited by manual processes and the capabilities of its prior solutions.

- Using Sauce Labs, the QA team automates and increases testing. Shifting testing to Sauce Labs

results in a proportionate increase in issues caught during QA and testing (i.e., instead of escaping to production).

- Developers utilizing Sauce Labs may even run tests prior to committing code and thus catch and fix issues immediately. This reduces the number of issues that the QA team is responsible for catching and brings software closer to being release-ready earlier in the development cycle.

- Fixing an issue *after* QA and testing (e.g., on production) takes a developer one business week (40 hours) on average. In contrast, fixing an issue caught during QA takes 4 hours on average. Issues that escape QA are harder to diagnose because they lack the rich test data that QA provides. In addition, these issues are more time-consuming to fix because the developers must refamiliarize themselves with the relevant code (i.e., "context-switch"). By catching issues during QA and testing, the delivery team provides rapid feedback to developers. The rich test assets from Sauce Labs also make it easier to diagnose issues.

"We have a lot more logs available to us. We have screenshots and recordings, all of which we wouldn't have had in the past. We may have had some basic logs but not to the level that Sauce Labs provide us. It's definitely a lot easier to find out where an issue has occurred."

Senior test architect, gaming

- Developers earn a fully burdened hourly rate of $98. (Their salary is 150% higher than that of the QA team members to reflect their skill level.)

- Issues that escape to production may also impact the business — e.g., reduce app ratings, increase user churn, etc. Such costs are evaluated under Benefit D: Reduced Business Exposure To App Issues. The calculations for Benefit B reflect only the value to the composite organization of increased developer and QA productivity.

Finally, when calculating the business value of the delivery team's productivity, Forrester assumes a productivity recapture rate of 50%. No knowledge workers are productive 100% of the time. Some of the time that the delivery team saves may be devoted relatively unproductive activities (e.g., office small talk, coffee breaks, etc.). To be conservative, Forrester assumes that the delivery team members use half the time they save productively (e.g., coding, etc.).

Risks. Organizations may realize benefits different from those of the composite organization due to variability in the following factors:

- Size of the delivery team.

- QA time spent on testing before Sauce Labs.

- Development time required to remediate issues caught during QA versus after.

- Number of issues caught during QA before Sauce Labs versus after.

- Percentage of testing shifted from legacy solutions to Sauce Labs.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $4.1 million.

$4.1 million
three-year
benefit PV

41%
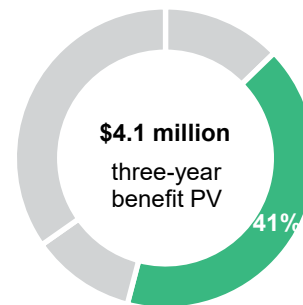
Delivery team productivity: 41% of total benefits

Delivery Team Productivity					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
B1	Subtotal: Time savings during QA/testing	BAt	$1,825,200	$3,650,400	$5,475,600
B2	Subtotal: Time savings remediating issues during development	BBt	$84,240	$168,480	$252,720
B3	Productivity recapture rate	TEI standard	50%	50%	50%
Bt	Delivery team productivity	(B1+B2)*B3	$954,720	$1,909,440	$2,864,160
	Risk adjustment	↓10%			
Btr	Delivery team productivity (risk-adjusted)		$859,248	$1,718,496	$2,577,744
	Three-year total: $5,155,488		Three-year present value: $4,138,076		

Subtotal: Time Savings During QA/Testing

Ref.	Metric	Source	Year 1	Year 2	Year 3
BA1	Developers responsible for QA/testing	Composite	200	200	200
BA2	Percentage of time spent testing before Sauce Labs	Interviews	25%	25%	25%
BA3	Time spent testing before Sauce Labs (hours)	BA1*2,080*BA2	104,000	104,000	104,400
BA4	Percentage of testing shifted to Sauce Labs	Interviews	30%	60%	90%
BA5	Percentage of time saved with Sauce Labs	Interviews	90%	90%	90%
BA6	Total testing time saved with Sauce Labs (hours)	BA3*BA4*BA5	28,080	56,160	84,240
BA7	Average QA hourly rate (fully burdened)	A8	$65	$65	$65
BAt	Subtotal: Time savings during QA/testing	BA6*BA7	$1,825,200	$3,650,400	$5,475,600

Subtotal: Time Savings Remediating Issues During Development

Ref.	Metric	Source	Year 1	Year 2	Year 3
BB1	Developers not responsible for QA/testing	Composite	800	800	800
BB2	Probability that an average developer commits code with an issue	Interviews	20%	20%	20%
BB3	Code issues committed per year	BB1*BB2	160	160	160
BB4	Percentage of issues caught in QA/testing before Sauce Labs	Composite	50%	50%	50%
BB5	Issues caught in QA/testing before Sauce Labs	BB3*BB4	80	80	80
BB6	Increase in issues caught in QA/testing after Sauce Labs	Interviews	30%	60%	90%
BB7	Percentage of issues caught in QA/testing after Sauce Labs	BB4*(100%+BB6)	65%	80%	95%
BB8	Issues caught in QA/testing after Sauce Labs	BB3*BB7	104	128	152
BB9	Subtotal: Incremental issues caught in QA/testing after Sauce Labs	BB8-BB5	24	48	72
BB10	Average time to remediate an issue caught after QA/testing (hours)	Interviews	40	40	40
BB11	Average developer hourly rate (fully burdened)	Composite: A8*150%	$98	$98	$98
BB12	Cost to remediate an issue caught after QA/testing	BB10*BB11	$3,900	$3,900	$3,900
BB13	Average time to remediate an issue caught before/during QA/testing (hours)	Interviews	4	4	4
BB14	Cost to remediate an issue before/during QA/testing	BB13*BB11	$390	$390	$390
BB15	Subtotal: Savings from remediating an issue before/during QA/testing instead of after	BB12-BB14	$3,510	$3,510	$3,510
BBt	Subtotal: Time savings remediating issues during development	BB9*BB15	$84,240	$168,480	$252,720

NEW BUSINESS ATTRIBUTED TO IMPROVED TESTING

Evidence and data. The interviewees said that after improving testing with Sauce Labs, their delivery teams' velocities increased. That is, the delivery teams released product enhancements — e.g., new features and quality improvements — faster and more confidently than before.

Three of the interviewees linked the product enhancements enabled by improved testing to new business opportunities for their organizations. For example, the VP of IT quality assurance said that customer ratings of their organization's app had been trending upward, which helped attract new customers. Similarly, the senior test architect described how using Sauce Labs enabled the delivery team to increase its device coverage, which in turn supported the business's expansion into new markets. This is particularly important when expanding into international markets where buying devices locally for testing becomes a challenge. With Sauce Labs, organizations are able to achieve more comprehensive device coverage across the globe.

- The VP of IT quality assurance said: "We're continuing to build the type of features and functionality that our customers [want]. It's all about improving the technology so it's easier for our customers; it's about enhancing our applications. … By having [testing] automation, we were able to get [development] moving quickly. … If we went with another solution, [I don't think] we [would] have been able to move as quickly. … I keep [asking] myself, if we didn't have Sauce Labs, would we have been as successful? I really don't think so. ... If we didn't go this route [and if] we went another route, would we have been as successful? I don't think so. I truly don't think so."

  They elaborated: "For example, in India, there's very heavy usage of [specific mobile devices], and there's a wide range of devices. So now,

we're able to do a lot more in terms of coverage in that region that we weren't able to do before. [Before Sauce Labs,] we definitely would have had gaps."

> **"We have definitely improved in terms of how much we're delivering. It's meant that, from a QA perspective, we can pick up a lot of backlog items we had for coverage. We were able to add stuff into our pipelines to cover different markets — [including] India, Sweden, and Mexico. … In the past, we may not have run tests on them at all."**
>
> *Senior test architect, gaming*

Modeling and assumptions. Forrester assumes:

- The composite organization has 1 million customers using its apps annually.

- As the composite organization implements Sauce Labs, it sees the number of app customers grow. The total number of app customers increases by 2% to 3% per year.

- The composite organization's customer base grows for many reasons. The organization believes that only 25% of new customers are attributable to product enhancements — e.g., new features in the app, quality improvements, and expanded device coverage.

- Similarly, the delivery team's velocity is the result of countless factors. The composite organization assumes that only 10% of product enhancements

are made possible because of the testing improvements with Sauce Labs.

- The average revenue per app customer per year is $2,500.

- The composite organization's operating margin is 10%.

Risks. Organizations may realize benefits different from those of the composite organization due to variability in the following factors:

- Number of app customers before Sauce Labs (i.e., how integral the app is to the overall business).

- Average revenue per app customer, which may vary across industries.

- Annual growth rate in number of customers.

- Attribution of customer growth to product enhancements.

- Attribution of product enhancements and increased velocity to testing improvements enabled by Sauce Labs.

- Operating margin (this may vary by industry).

Results. To account for these risks, Forrester adjusted this benefit downward by 20% — a very high level of risk adjustment — yielding a three-year, risk-adjusted total PV of $1.1 million.

$1.1 million

three-year
benefit PV

11%
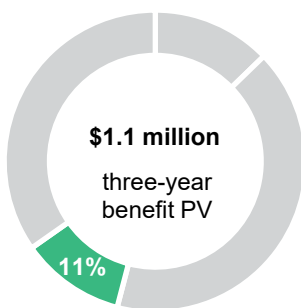
New business attributed to improved testing: 11% of total benefits

"[Overall] velocity has definitely improved. … [Testing is] no longer a bottleneck as it may have been in the past when we had [to] wait for QA [and] testing. That is not an issue anymore."

Senior test architect, gaming

New Business Attributed To Improved Testing

Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	App customers before Sauce Labs	Composite	2,000,000	2,000,000	2,000,000
C2	Cumulative increase in app customers after Sauce Labs	Composite	2%	5%	7%
C3	Cumulative new app customers after Sauce Labs	C1*C2	40,000	100,000	140,000
C4	Percentage of new app customers attributed to app improvements (e.g., expanded coverage, improved quality, and new features)	Composite	25%	25%	25%
C5	Percentage of app improvements attributed to improved testing with Sauce Labs	Interviews	10%	10%	10%
C6	New app customers attributed to improved testing with Sauce Labs	C3*C4*C5	1,000	2,500	3,500
C7	Average revenue per app customer	Composite	$2,500	$2,500	$2,500
C8	Revenue from new app customers attributed to improved testing with Sauce Labs	C6*C7	$2,500,000	$6,250,000	$8,750,000
C9	Operating margin	Composite	10%	10%	10%
Ct	New business attributed to improved testing	C8*C9	$250,000	$625,000	$875,000
	Risk adjustment	↓20%			
Ctr	New business attributed to improved testing (risk-adjusted)		$200,000	$500,000	$700,000
Three-year total: $1,400,000			**Three-year present value: $1,120,962**		

REDUCED BUSINESS EXPOSURE TO APP ISSUES

Evidence and data. The interviewees said that improved testing with Sauce Labs increased the quality of their apps. According to the interviewees, their delivery teams caught more issues during development and QA than before. That meant that fewer issues escaped to production, where they could impact customers.

The interviewees described three ways in which they used Sauce Labs to improve app quality:

- **Automation.** The delivery teams integrated automated testing on Sauce Labs into their release pipelines. The interviewees said that Sauce Labs provided automation capabilities and a level of reliability that their prior solutions had lacked.

- **"Shifting left."** The interviewees said that after automating testing with Sauce Labs, their delivery teams tested more frequently and earlier in the software development lifecycle. The teams caught issues more issues on the staging and test environments.

- **Coverage.** The interviewees said that Sauce Labs expanded the ranges of devices they tested on. This enabled the delivery teams to fix device-specific issues that would have gone undetected before.

App issues impacting business per year:

Before	After
4	**0**

The interviewees reported the following experiences:

- The VP of IT quality assurance said that the delivery team was catching twice as many defects during QA than before Sauce Labs.

- The senior test architect said: "We definitely don't have as many production issues as we've had in the past, and I think the general stability of our products has improved. Before, a lot of blame would have come on to QA: 'How did we miss this?' and 'How did we not catch that?' That's died down quite significantly since we've been using Sauce Labs."

- The manager of software test engineering reported the Sauce Labs had enabled the delivery team to catch a "handful" of issues that would have otherwise escaped into production.

Modeling and assumptions. Forrester assumes:

- The delivery team at the composite organization commits and catches code issues at the rates described in Benefit B.

- Five percent of the issues not caught during QA and testing — and which therefore escape to production — are severe enough to impact the business.

  - Before Sauce Labs, 80 issues escape to production. Four of these issues are severe enough to hurt the business.

  - After Sauce Labs, far fewer issues escape. The number of code issues that have a business impact drops to zero by

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Percentage reduction in app issues impacting the business:

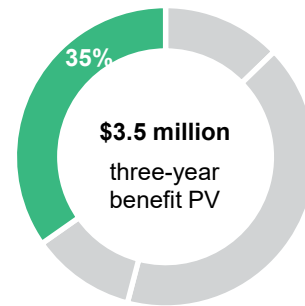| Year 3	Year 2	Year 3
25%	**50%**	**100%**

Year 3 as the organization shifts almost all its testing to Sauce Labs.

- Severe issues in production impact 5% of app customers. (Not all app customers may encounter an issue.)

- When customers encounter an app issue, the average revenue they would contribute drops by 50%. E.g., the customers may spend 50% less in the app. App issues do not cause customers to abandon the composite organization entirely, but they do significantly hurt its business.

- By catching more issues during QA and testing, the composite organization improves app quality and avoids losses.

 "We are catching a lot more [issues] in QA, [which is] great. … When [code] comes into our test environment, there's nothing that's being 'thrown over.' … The defects are getting found earlier on, and we are finding a lot more."

VP of IT quality assurance, financial services

Risks. Organizations may realize benefits different from those of the composite organization due to variability in the following factors:

- Percentage of code issues with business impacts.

- Percentage of customers affected by code issues in production.

- Effect of code issues in production (e.g., for some organizations, code issues may lead to total rather than partial revenue lost per customer).

Results. To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year, risk-adjusted total PV of $3.5 million.

$3.5 million
three-year
benefit PV

35%

Reduced business exposure to app issues: 35% of total benefits

Reduced Business Exposure To App Issues

Ref.	Metric	Source	Year 1	Year 2	Year 3
D1	Code issues committed per year	BB3	160	160	160
D2	Issues caught in QA/testing before Sauce Labs	BB5	80	80	80
D3	Issues caught in QA/testing after Sauce Labs	BB8	104	128	152
D4	Risk of an app issue not caught in QA/testing impacting business	Composite	5%	5%	5%
D5	App issues impacting business before Sauce Labs	(D1-D2)*D4	4	4	4
D6	App issues impacting business after Sauce Labs	(D1-D3)*D4	3	2	0
D7	Percentage of app customers impacted by an issue not caught in QA/testing	Composite	5%	5%	5%
D8	App customers impacted by issues before Sauce Labs	C1*(D5/D1)*D7	2,500	2,500	2,500
D9	App customers impacted by issues after Sauce Labs	C1*(D6/D1)*D7	1,875	1,250	0
D10	Average revenue per app customer	C7	$2,500	$2,500	$2,500
D11	Average revenue per app customer lost when impacted by an issue	Composite	50%	50%	50%
D12	Business impact of app issues before Sauce Labs	D8*D10*D11	$3,125,000	$3,125,000	$3,125,000
D13	Business impact of app issues after Sauce Labs	D9*D10*D11	$2,343,750	$1,562,500	$0
Dt	Reduced business exposure to app issues	D12-D13	$781,250	$1,562,500	$3,125,000
	Risk adjustment	↓20%			
Dtr	Reduced business exposure to app issues (risk-adjusted)		$625,000	$1,250,000	$2,500,000
	Three-year total: $4,375,000		**Three-year present value: $3,479,527**		

UNQUANTIFIED BENEFITS

Interviewees mentioned the following additional benefits that their organizations experienced but were not able to quantify:

- **Improved collaboration across teams.** Automating testing with Sauce Labs enabled QA and developer teams to work together more efficiently to identify issues earlier in the development cycle and move products toward release more quickly. Before Sauce Labs, catching issues later in the testing lifecycle meant more frustration across teams and spending additional time trying to determine who was responsible for the issue rather than immediately working toward remediation. After investing in Sauce Labs, teams were able to collaborate more productively — working together to release better, less error-prone products.

   The domain expert in mobile development said: "Sometimes we had issues discovered relatively late, and we had developer teams and testing teams blaming each other, [saying], 'It's your test that doesn't work. It's your app that doesn't work.' But nobody was looking at the issue. ... That's not the case anymore."

- **Increased innovation.** Having greater testing automation capabilities allowed organizations to venture beyond their basic testing needs and engage in new projects that would have otherwise been low priority. Once companies addressed their initial testing needs, they were able to free up their queues to engage in other creative endeavors to enhance existing products and even develop new ones.

   The manager of software test engineering explained: "We don't have to worry about capacity for our on-premises testing. … It's a lot easier [to say], 'We have this capacity, let's use it.' It allows us to be more creative and jump on some projects that before would [have taken] a

little bit more of a lead time. ... Having that capacity at the ready has been very powerful."

FLEXIBILITY

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

- **Additional products in the Sauce Labs suite.** The comprehensive nature of Sauce Labs' offerings enabled organizations to leverage the platform as a full suite for all their testing needs. In addition to mobile app testing capabilities, Sauce Labs also offers a variety of solutions — including API testing, visual testing, error monitoring and reporting, low-code testing, cross-browser testing, integrations with common third-party tools, and insights powered by artificial intelligence (AI) — that enable organizations to build a robust, end-to-end testing ecosystem. This wide range of products can allow more segments of a business to unlock the value of testing automation and create efficiencies across an entire organization. Sauce Labs' extensive offerings also allow for greater inclusions of nontechnical users in the testing process, expanding organizational capacity and agility.

   The senior test architect explained: "We will most likely scale up slightly on the mobile side. [Also], we may look into the desktop offering they have as well. Those would be the two main areas for now. … As a business, we want everybody to move toward using Sauce Labs, if they're not already."

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

Analysis Of Costs

Quantified cost data as applied to the composite

Total Costs

Ref.	Cost	Initial	Year 1	Year 2	Year 3	Total	Present Value
Etr	Sauce Labs subscription fees	$0	$129,938	$129,938	$129,938	$389,813	$323,135
Ftr	Deployment effort	$163,800	$0	$0	$0	$163,800	$163,800
Gtr	Ongoing effort invested in testing improvements	$0	$1,076,400	$1,076,400	$1,076,400	$3,229,200	$2,676,847
	Total costs (risk-adjusted)	$163,800	$1,206,338	$1,206,338	$1,206,338	$3,782,813	$3,163,782

SAUCE LABS SUBSCRIPTION FEES

Evidence and data. The subscription fees the interviewees' organizations paid Sauce Labs were based on usage — e.g., number of devices and whether those devices were public (securely shared and used by multiple customers) or private (dedicated to one customer only). The interviewees suggested that Sauce Labs' subscription fees were fair for the industry.

However, the interviewees all said that the support they received from Sauce Labs was far superior to that from other vendors.

- The manager of software test engineering said: "If there is a question or an issue, [Sauce Labs'] support is very attainable or reachable. We can just send them an email, and they get back to us right away."

- The VP of IT quality insurance said: "I'm very happy with how Sauce Labs assigns a person to be our rep [to address] any questions or issues we have. … They have been really great about connecting with me to tell me about new features. … [They have been] very good [about] helping us."

The interviewees also appreciated how Sauce Labs enabled them to change their testing devices. That made it easy to keep up with evolutions in the device landscape. Most interviewees reported changing up to 20% of the devices they had selected in Sauce Labs annually. The rate at which an organization can change devices may depend on its specific agreement with Sauce Labs.

The VP of IT quality assurance said that their delivery team had trouble deciding which devices to test on. They noted, "We had a conflict … so being able swap out devices was a big a deal for me."

"From a customer service perspective, [Sauce Labs has] been wonderful."

VP of IT quality assurance, financial services

**Modeling and assumptions.** Forrester assumes:

- The composite organization pays subscription fees to Sauce Labs typical for an organization of its size and usage requirements.

- The composite organization has an enterprise agreement with Sauce Labs. This includes premium support as well as private devices.

Risks. Organizations may incur costs different from those of the composite organization due to variability in the following factors:

- Usage requirements (i.e., testing volume).

- Feature requirements (e.g., private devices, etc.).

Pricing may vary. Readers should contact Sauce Labs for costs specific to their environments and needs.

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $323,000.
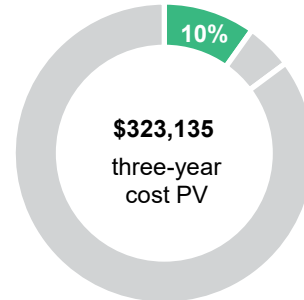
Sauce Labs subscription fees: 10% of total costs

| Sauce Labs Subscription Fees						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
E1	Sauce Labs subscription fees	Composite	$0	$123,750	$123,750	$123,750
Et	Sauce Labs subscription fees	E1	$0	$123750	$123,750	$123,750
	Risk adjustment	↑5%				
Etr	Sauce Labs subscription fees (risk-adjusted)		$0	$129,938	$129,938	$129,938
	Three-year total: $389,813			**Three-year present value: $323,135**		

DEPLOYMENT EFFORT

Evidence and data. Although the interviewees had spent time deploying Sauce Labs, they said that this effort was minimal. The interviewees noted only minor technical tasks such as setting up user permissions. They also reported that Sauce Labs required almost no administration effort (beyond regular calls with the Sauce Labs team) and that their developers needed no additional training to use the platform itself. At many of the interviewees' organizations, Sauce Labs was deployed and overseen by a central team responsible for quality assurance, testing, and developer tools.

Modeling and assumptions. Forrester assumes:

- At the composite organization, Sauce Labs is deployed and implemented by a team of developers and QA engineers drawn from the larger QA staff. This team includes 15% of the organization's QA staff (30 people).

- This team deploys Sauce Labs in two business weeks.

Risks. Organizations may incur costs different from those of the composite organization due to the unique characteristics of their environments (e.g., greater security requirements).

Results. To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of $171,600.
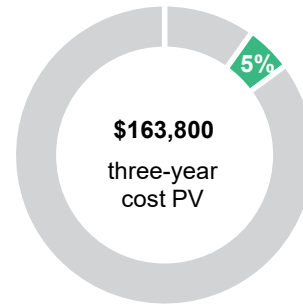
Deployment effort: 5% of total costs

Deployment Effort						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
F1	QA/developers on deployment and implementation team	BA1*15%	30	30	30	30
F2	Deployment time (weeks)	Interviews	2	0	0	0
F3	Deployment time (hours)	F2*40	80	0	0	0
F4	Average QA hourly rate (fully burdened)	A8	$65	$65	$65	$65
Ft	Deployment effort	F1*F3*F4	$156,000	$0	$0	$0
	Risk adjustment	↑5%				
Ftr	Deployment effort (risk-adjusted)		$163,800	$0	$0	$0
	Three-year total: $163,800			**Three-year present value: $163,800**		

ONGOING EFFORT INVESTED IN TESTING IMPROVEMENTS

Evidence and data. The interviewees said that they realized maximum benefits with Sauce Labs by investing effort into improving testing. The interviewees' QA teams were able to automate tests that had previously been manual, wrote new tests, and so on. Two interviewees reported that their teams dedicated one to two months per year to this work.

Modeling and assumptions. Forrester assumes:

- At the composite organization, the work to improve testing with Sauce Labs is performed by the same team of QA engineers who deployed Sauce Labs.

- This team spends three months (12 weeks) per year automating manual tests, writing new tests, and otherwise improving the delivery team's testing procedures. This includes work to migrate tests from the composite organization's prior solution to Sauce Labs.

Risks. Organizations may incur costs different from those of the composite organization due to variability in the following factors:

- Testing maturity before Sauce Labs (organizations with lower or higher testing process maturity may respectively require more or less effort to realize business benefits).

- Timing of effort invested in testing improvements (the composite organization invests evenly over three years; organizations could choose to invest more earlier on and so would realize greater benefits sooner).

Results. To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year, risk-adjusted total PV of $2.7 million.
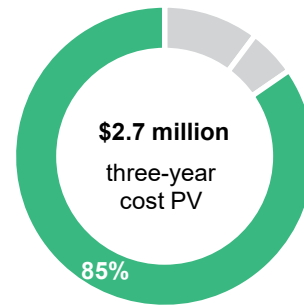

Ongoing effort invest in testing improvements: 85% of total costs

Ongoing Effort Invested In Testing Improvements						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	QA/developers on deployment and implementation team	F1	30	30	30	30
G2	Time invested in improving testing with Sauce Labs (weeks)	Interviews	0	12	12	12
G3	Time invested in improving testing with Sauce Labs (hours)	G2*40	0	480	480	480
G4	Average QA hourly rate (fully burdened)	A8	$65	$65	$65	$65
Gt	Ongoing effort invested in testing improvements	G1*G3*G4	$0	$936,000	$936,000	$936,000
	Risk adjustment	↑15%				
Gtr	Ongoing effort invested in testing improvements (risk-adjusted)		$0	$1,076,400	$1,076,400	$1,076,400
	Three-year total: $3,229,200			**Three-year present value: $2,676,847**		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)

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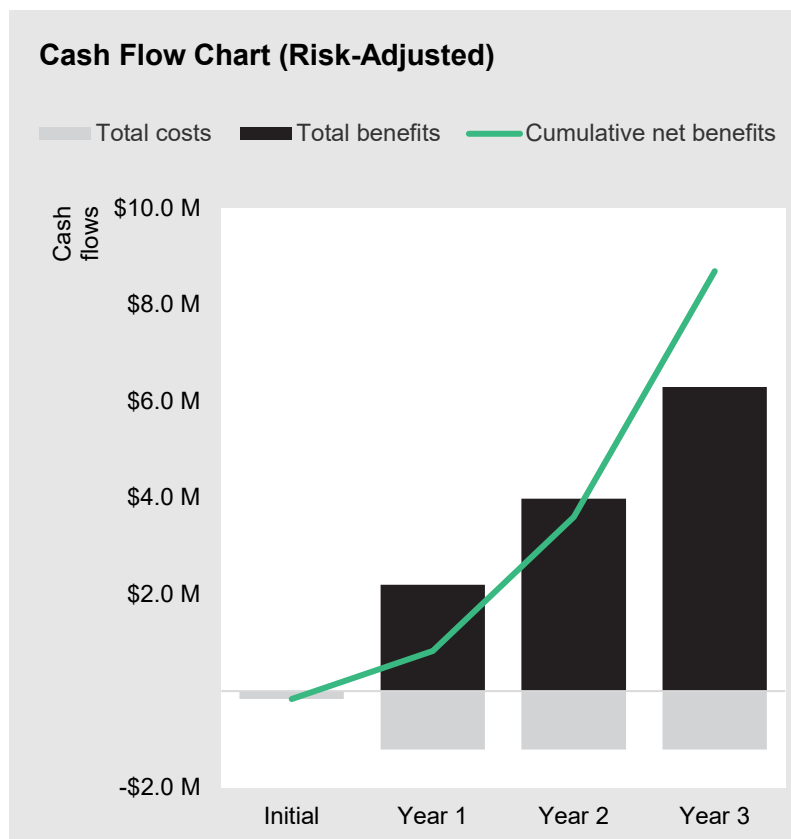
The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

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 Analysis (Risk-Adjusted Estimates)						
	Initial	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Total costs	($163,800)	($1,206,338)	($1,206,338)	($1,206,338)	($3,782,813)	($3,163,782)
Total benefits	$0	$2,199,946	$3,981,914	$6,290,022	$12,471,882	$10,016,576
Net benefits	($163,800)	$993,609	$2,775,577	$5,083,685	$8,689,070	$6,852,794
ROI						217%
Payback period						<6 months

Appendix A: Total Economic Impact

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

TOTAL ECONOMIC IMPACT APPROACH

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

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

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

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

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

PRESENT VALUE (PV)

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

NET PRESENT VALUE (NPV)

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

RETURN ON INVESTMENT (ROI)

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

DISCOUNT RATE

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

PAYBACK PERIOD

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

Appendix B: Endnotes

[1] 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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