A Forrester Total Economic Impact™
Study Commissioned By GitHub
March 2020

The Total Economic Impact™ Of GitHub Enterprise

Improved Developer And DevOps Efficiencies

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ABOUT FORRESTER CONSULTING

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Key Benefits

Percentage of survey respondents who said IT support/management costs went down:
87%

Reduction in onboarding and training time:
40%

Percentage of survey respondents who said GitHub helps them write and deploy better code:
85%

Executive Summary

GitHub provides an enterprise-grade development platform that helps its customers increase development efficiencies and produce better code. It also helps mirror an open source culture inside the organization that contributes to these benefits and increased collaboration. GitHub commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying GitHub Enterprise, subsequently referred to as GitHub. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of GitHub on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed four customers and surveyed 107 additional employees of organizations using GitHub. These customers said that GitHub makes their developers more effective and efficient because GitHub is very easy to use and they are now using a platform and tools they are familiar with. Customers also said that overall code quality improved, as did developers' satisfaction and retention.

Prior to using GitHub, the customers typically used a mix of homegrown and Git-based vendor solutions that could be either on-premises or in the cloud. However, these solutions could no longer support growth and/or development requirements. These limitations led to delays in code delivery and wasteful effort, which meant that organizations could not fully meet business objectives.

Key Findings

Quantified benefits. The following risk-adjusted present value (PV) quantified benefits are representative of those experienced by the interviewed and surveyed companies and applied to a composite organization with 1,800 GitHub users:

- **Developers save 45 minutes per day.** Moving to GitHub makes developers more productive for a variety of reasons. These include activity-specific time savings such as code review, the ability to work remotely, better code reuse and collaboration, configuration of development environments, and less downtime waiting for new development environments. Forrester estimates this saves 45 minutes per day, but survey respondents put the time savings closer to one hour per day. Over three years, the total developer time savings, after applying a 50% productivity capture, is $12.4 million.
- **The 10-person DevOps team is more efficient.** Increased automation and ease of use means that the DevOps team is more efficient and can support more users and projects without adding three additional positions. The total savings over three years is $404,000.
- **Onboarding and training time is reduced by 40%.** Because developers typically already know how to use GitHub, onboarding effort and training around development tools and environments is largely eliminated. This saves 3.6 days per new hire and totals $442,000 over the life of the study.

ROI
639%

Benefits PV
$13.6 million

NPV
$11.8 million

Payback
<3 months after "go live"

› **Previous infrastructure and license costs are eliminated, which offsets 50% of the GitHub costs.** The GitHub solution is much more robust and feature-rich than what was in place before. These costs partially offset GitHub and result in $380,000 in savings over three years.

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

› **The organizations deployed better code, which created a collaborative culture.** Interviewees said that overall code quality increased because of better code review and checks, increased code reuse, and more collaboration between developers around the world. Eighty-five percent of survey respondents said that they experience better code.

› **Code-related security improved.** Security improved in terms of fewer vulnerabilities making it into deployment, identification of insecure dependencies, and better platform security and role-based access control (RBAC). Interviewees also said that compliance improved.

› **Developer satisfaction increased.** Developers became happier because they are using familiar tools that are considered best-in-class. This makes it easier to hire people and increases employee retention.

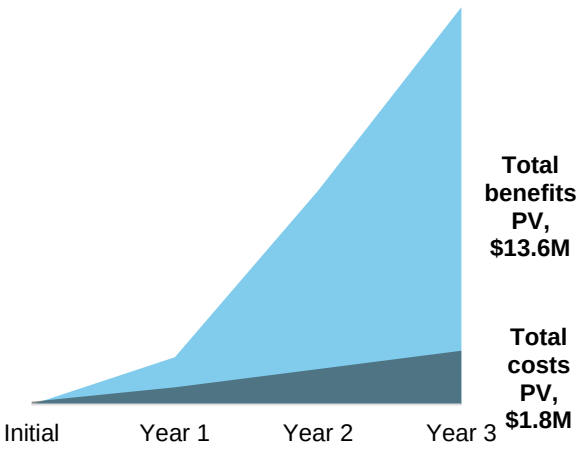
Costs. The interviewed organizations experienced the following risk-adjusted PV costs:

› **Internal costs were $426,000.** These costs included effort to deploy and manage GitHub and internal infrastructure to host GitHub.

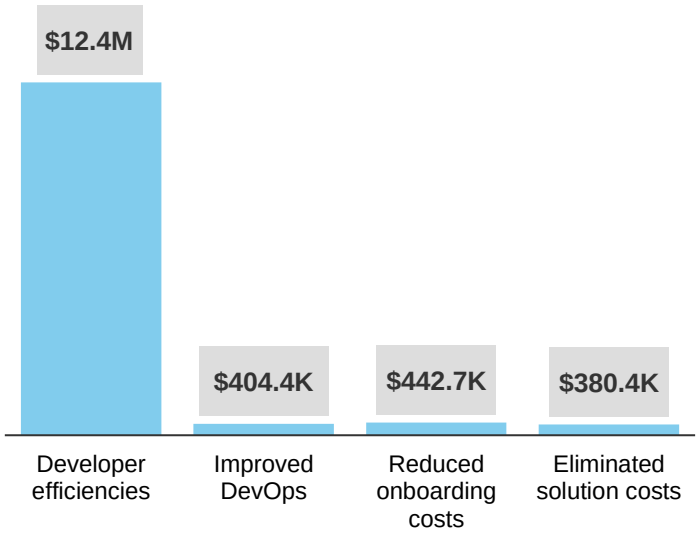
› **GitHub Enterprise costs were $1.4 million.** These costs included user license costs, Premium Support, and professional services.

Forrester's interviews with four existing customers and a survey of 107 other customers and subsequent financial analysis found that a composite organization based on these interviewed organizations would experience benefits of $13.6 million over three years versus costs of $1.8 million, adding up to a net present value (NPV) of $11.8 million and an ROI of 639%.

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 GitHub Enterprise.

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 GitHub Enterprise 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 GitHub stakeholders and Forrester analysts to gather data relative to GitHub Enterprise.

CUSTOMER INTERVIEWS AND SURVEY
Interviewed four organizations and surveyed 107 organizations using GitHub Enterprise to obtain data with respect to costs, benefits, and risks.

COMPOSITE ORGANIZATION
Designed a composite organization based on characteristics of the interviewed and surveyed 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 GitHub Enterprise'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 GitHub Enterprise Customer Journey

BEFORE AND AFTER THE GITHUB INVESTMENT

Interviewed Organizations

For this study, Forrester conducted four interviews with GitHub customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEE	NUMBER OF USERS	PREVIOUS SOLUTION
Retail	HQ in Europe, global presence	Software engineer	1,500	On-premises vendor solution
Fintech	Latin America	Technology manager	1,000	Always on GitHub
Media entertainment	HQ in Europe, global presence	Product manager	3,500	On-premises vendor solution
Software	HQ in Europe, global presence	Senior director of development tools	30,000	On-premises homegrown solution

Key Challenges

The composite organization experienced challenges similar to those of the interviewed and surveyed organizations:

- **There were multiple, country-specific solutions that led to increased costs and complexity.** GitHub can replace multiple solutions across divisions or geographies. These were a mix of other vendor and in-house solutions, which made code sharing very difficult and resulted in redundant efforts and costs.
- **Homegrown solutions no longer supported basic requirements.** Previous solutions couldn't keep up with changing business and technical requirements. That meant developers and DevOps teams spent more time on basic activities than they should have.
- **Developers were unhappy with the previous solutions in place.** Developers expressed frustration with previous solutions, which were difficult to learn and cumbersome to use. Dissatisfaction can result in decreased productivity and increased employee turnover.

> "Prior to GitHub, we used a homegrown solution. Our developers preferred to use something they were familiar with, so organic growth of GitHub was very fast."
>
> *Senior director of development tools, software*

Key Results

The interviews revealed that the GitHub investment enabled digital transformation. Key benefits include:

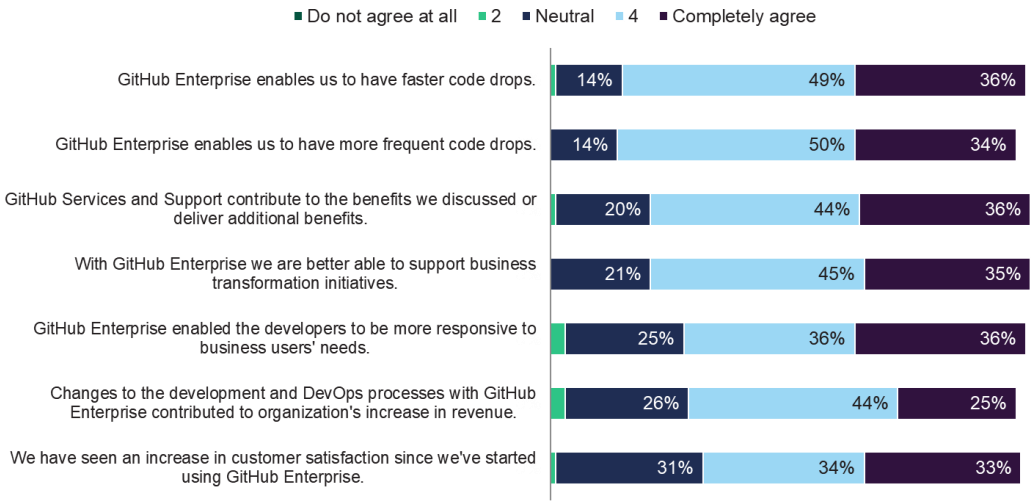
- **Better code and faster software delivery.** Interviewees said that they are now producing better code. Additionally, there are more frequent and faster code deliveries put into production. This helps the businesses achieve objectives and delight both internal and external customers.
- **Reduced cost and effort.** Moving to a single — sometimes cloud-based — solution eliminates redundant costs and effort for both developers and DevOps. The GitHub solutions are also more robust and reliable than those previously in place.

> "Shipping code to production is a big process here. GitHub makes this process more secure and faster. It helps us get really good product to market."
>
> *Technology manager, fintech*

- **Improved security.** Production code has fewer vulnerabilities than in the past. Additionally, the development platform is more secure, and more granular controls protect it from both internal and external threats.

Forrester's survey asked 107 GitHub users to what extent they are realizing a wide range of benefits. For each, a large majority of respondents said that they are realizing the benefit (see chart below).

"On a scale of 1 to 5, how much do you agree with the following statements about the outcomes of using GitHub Enterprise?"



Base: 107 GitHub Enterprise Users

Source: A commissioned study conducted by Forrester Consulting on behalf of GitHub, December 2019

Composite Organization

Based on the interviews and survey, Forrester constructed a TEI framework, a composite organization, and an associated ROI analysis that illustrate the areas financially affected. The composite organization is representative of the four interviewed and 107 surveyed companies 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:

- It's a global company with headquarters in Europe.
- Its previous solutions were a mix of other vendor and homegrown solutions.
- The organization deployed the on-premises version of GitHub Enterprise globally.
- Adoption of GitHub Enterprise started organically and spread as different development teams and locations learned it was available. Eventually, it became the mandated solutions, and all 1,800 developers were using it by Year 3 of the study.

> "We are pushing code out much faster now because the back end is more automated. If someone puts it a code review request, the bots see that code has landed and test it."
>
> *Product manager, media entertainment*

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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	Developer efficiencies	$1,586,132	$6,344,528	$7,613,433	$15,544,092	$12,405,434
Btr	Improved DevOps	$0	$207,000	$310,500	$517,500	$404,358
Ctr	Reduced onboarding costs	$101,412	$202,824	$243,389	$547,626	$442,678
Dtr	Eliminated solution costs	$91,800	$172,800	$205,200	$469,800	$380,434
	Total benefits (risk-adjusted)	$1,779,344	$6,927,152	$8,372,522	$17,079,018	$13,632,904

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite organization expects risk-adjusted total benefits to be a PV of more than $3.6 million.

Developer Efficiencies

Interviewed and surveyed organizations all reported that developers are much more efficient since moving to GitHub. This means developers can complete more work, which results in releasing code faster and having less need to add new developers. There are many contributing factors including faster code checking and review, less rework, greater code reuse, better adherence to best practices, configuration of development environments, and less time waiting for things like new repositories to be provisioned. Interviewees provided the following examples:

- "Development is now more decentralized globally. Previously, a lot of development work had to happen at our headquarters, which caused bottlenecks. For example, one country wanted to launch a mobile app. They were able to reuse code locally. What would have taken a month now takes a few days." (Retail)
- "We save a lot of time from increased automation in GitHub." (Fintech)
- "GitHub really helps us on versioning. People can avoid rework and save time." (Fintech)
- "In the past, getting a new code repository took a week. We have 190,000 repositories and 1,500 new ones added each year. Now it is all self-service, which saves time and makes people very happy." (Software)
- "There is more collaboration within a team and between teams. More code gets reused, and if you can find someone who has already solved your problem, it can speed up development efforts by three times. It's pretty incredible." (Software)
- "We can now have people work together from different cities. We also have more developers working from home. Reduced commuting means they can spend more time coding." (Retail)

For the financial analysis, Forrester makes the following assumptions:

- The number of developers increases from organic growth and GitHub eventually becomes the mandated, global solution.
- On average, developers save 45 minutes are per day. Half of this is realized in Year 1 as developers transition from previous solutions.

"GitHub is well-designed and focused on the developer. It really helps with managing development workflows. This makes a big difference in productivity."

Product manager, media entertainment

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› A 50% productivity capture is applied since not all the time savings result in additional work being completed.

This benefit will vary depending on how productive developers were before and what previous solutions were in place. To account for these risks, Forrester adjusts this benefit downward by 15%, yielding a three-year risk-adjusted total PV of $12.41 million.

Impact risk is the risk that the business or technology needs of the organization may not be met by the investment, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

Developer Efficiencies: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Number of developers		750	1,500	1,800
A2	Hours saved per developer	48 weeks*3.75 hours [50% in Year 1]	90.0	180.0	180.0
A3	Average fully burdened cost (hourly)	$115,000/2,080 hours [rounded]	$55.29	$55.29	$55.29
A4	Total improvement	A1*A2*A3	$3,732,075	$14,928,300	$17,913,960
A5	Productivity capture		50%	50%	50%
At	Developer efficiencies	A4*A5	$1,866,038	$7,464,150	$8,956,980
	Risk adjustment	↓15%			
Atr	Developer efficiencies (risk-adjusted)		$1,586,132	$6,344,528	$7,613,433

Improved DevOps

DevOps teams also see greater efficiencies from features built into GitHub, automation, and providing for less support because developers already know how to use GitHub. Interviewees using the newly released GitHub Actions for continuous integration/continuous development (CI/CD) tools are seeing incremental benefits (not included in the financial analysis). DevOps also improves in terms of the services provided to development teams. The interviewees said:

› “We are expanding through Latin America. GitHub is helping us increase automation and avoid hiring additional people for DevOps. If we had to build out a DevOps team in every country, we would have to double the team, which is not an option. I attribute 30% of the efficiency gains to GitHub.” (Fintech)

› “We’ve always been working on our DevOps processes, and GitHub has helped us take it further. We are using bots for merging code branches and for automatic deployments.” (Media entertainment).

› “We have around 20 people focused on the CI infrastructure and processes. We try to use as much continuous code as possible. GitHub is the place where everyone goes to make changes in the infrastructure and the bots roll everything out. GitHub is also where we collaborate and where developers submit their code. We provide quality feedback via GitHub. We invest a lot of time into code review so that developers understand their problems better.” (Media entertainment)

› “We replaced other code-based solutions with GitHub. In addition to redeploying people who were managing those solutions, we avoided hiring more people which cost $135 thousand per year.” (Software)

“The DevOps team can now support more code review requests. We have streamlined and automated the processes. We also use Dependabot to check dependencies for both opensource and private source code."

Software engineer, retail

“GitHub runs very well, and I am very happy. I can sleep at night. I’m not sure I could with the other solutions we looked at."

Senior manager of development tools, software

For the financial analysis, Forrester assumes that:

- The DevOps team originally included 10 FTEs.
- Moving to GitHub enables the DevOps team to provide better service and support more code and developers without adding additional people. This benefit begins in Year 2 since staffing levels were already set for the start of the study timeframe.

This benefit will vary based on the DevOps team size and spare capacity as well as what tools and automation were already in place. To account for these risks, Forrester adjusts this benefit downward by 10%, yielding a three-year risk-adjusted total PV of $404,358.

Improved DevOps: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Baseline team size		10	10	10
B2	Avoided additional hires		0	2	3
B3	Fully burdened cost		$115,000	$115,000	$115,000
Bt	Improved DevOps	B2[through current year]*B3	$0	$230,000	$345,000
	Risk adjustment	↓10%			
Btr	Improved DevOps (risk-adjusted)		$0	$207,000	$310,500

Reduced Onboarding Costs

New hires almost all know how to use GitHub Enterprise because they have used GitHub in previous jobs or in their personal lives. This reduces the time required to onboard and train new hires. A survey created for this study found that the average onboarding time for a new developer was 9.1 days and was reduced by nearly 40% after moving to GitHub.

- “A few months ago, we moved into a new country and started hiring developers. In the past, we used to have to send them to France for new hire training. We no longer have to do that because they already know how to use GitHub.” (Retail)
- “People know GitHub. We don’ have to train them anymore.” (Media entertainment)
- “We have 30,000 developers and added 2,000 last year. We used to spend one week training them on how to use code depositories, our development processes, and how to connect to the CI/CD. Now we spend virtually no time training them because they know it or learn it at github.com beforehand. This alone pays for the solution.”

For the financial analysis, Forrester makes the following assumptions:

- Ten percent of the developers on GitHub leave the company each year.
- Onboarding used to take 9.1 days and was reduced 39.55%.

This benefit will vary based on employee turnover rates and what solutions were in place before. To account for these risks, Forrester adjusts this benefit downward by 15%, yielding a three-year risk-adjusted total PV of $442,678.

> “We used to spend at least one week training developers on our tools. Now we spend less than three hours."
>
> *Software engineer, retail*

Reduced Onboarding Costs: Calculation Table					
REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Number of new developer hires	A1*10%	75	150	180
C2	Fewer training days	9.1 days*39.55%	3.60	3.60	3.60
C3	Average fully burdened cost (daily)	$115,000/260 days	$442	$442	$442
Ct	Reduced onboarding costs	C1*C2*C3	$119,309	$238,617	$286,340
	Risk adjustment	↓15%			
Ctr	Reduced onboarding costs (risk-adjusted)		$101,412	$202,824	$243,389

Eliminated Solution Costs

Interviewed organizations were able to retire previous vendor and homegrown solutions, which partially or fully offsets the cost of GitHub. If a company is moving to the on-premises or cloud-based version of GitHub, that's another factor. One interviewee said their organization was previously spending €300,000 for on-premises solutions, including servers, licenses, and labor. With GitHub, it is now spending €250,000, although this will increase after adding GitHub for CI/CD. Total costs are expected to be higher, but GitHub will provide a much more robust solution set and quality of service.

Another interviewee looked at several vendor solutions and selected GitHub because of its multitenant capabilities. This enables the organization to host many more projects on GitHub. The interviewee estimated that other solutions would be "at least 10x more expensive because we would have to set up one instance per group, which would require a lot more management."

For the financial analysis, Forrester makes the following assumptions:

- Previous solutions were a mix of homegrown, vendor, and open source solutions. The total cost of ownership (TCO) of these solutions offsets 50% of the new GitHub costs.
- The GitHub solution has more features and provides better quality of service than the previous solutions. This is why companies are willing to pay more for GitHub.

This benefit will vary based on the previous solutions in place and how much of it was open source. To account for these risks, Forrester adjusts this benefit downward by 10%, yielding a three-year risk-adjusted total PV of $380,434.

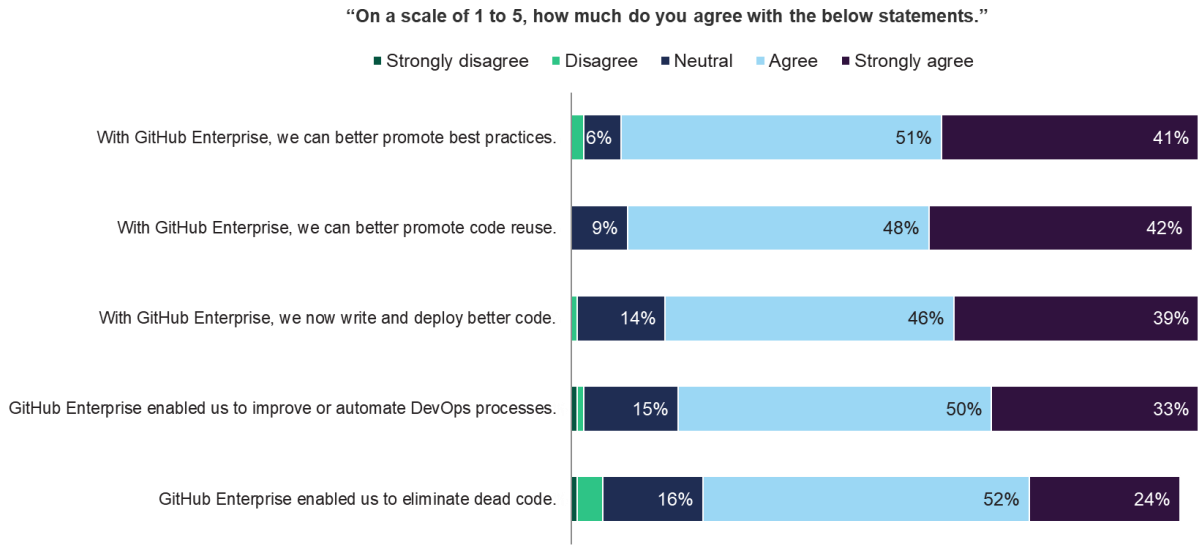
Eliminated Solution Costs: Calculation Table					
REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Replaced solutions	(E5+F2)*50%	$102,000	$192,000	$228,000
Dt	Eliminated solution costs	=D1	$102,000	$192,000	$228,000
	Risk adjustment	↓10%			
Dtr	Eliminated solution costs (risk-adjusted)		$91,800	$172,800	$205,200

Unquantified Benefits

Interviewees shared several benefits that are not included in the financial analysis. Readers are encouraged to take these into consideration when calculating the potential value of GitHub to their organizations.

Better Code Quality And Collaborative Culture

In addition to being more efficient, developers are creating better code and adhering to best practices (see survey results below). Additionally, an open source mindset and culture is brought into the organization to cover all development activities including DevOps. Interviewees provided the following examples:



Base: 107 GitHub Enterprise Users

Source: A commissioned study conducted by Forrester Consulting on behalf of GitHub, December 2019

- "We are doing better code reviews, which results in better quality code." (Retail)
- "We are creating an open source culture inside the company." (Retail)
- "We have better code quality for both our open source and inner source code. We are also getting more reuse." (Media entertainment)
- "We have eliminated dead code. GitHub delivers interesting value with the graph of dependencies." (Media entertainment)
- "I was in charge of a project that was using a library developed by another team. It had a bug, and I wanted to solve it. The other team wouldn't let me. Now the mindset has switched. Everyone is thankful for others' contributions." (Retail)
- "Developers are more and more applying best practices. This includes organic adoption of what a developer sees others doing such as creating a branch for every feature or more frequent and more comprehensive code review." (Retail)

Improved Security

The survey of 107 organizations using GitHub found that a large majority of them feel moving to GitHub has made their codes and organizations more secure (see chart below).

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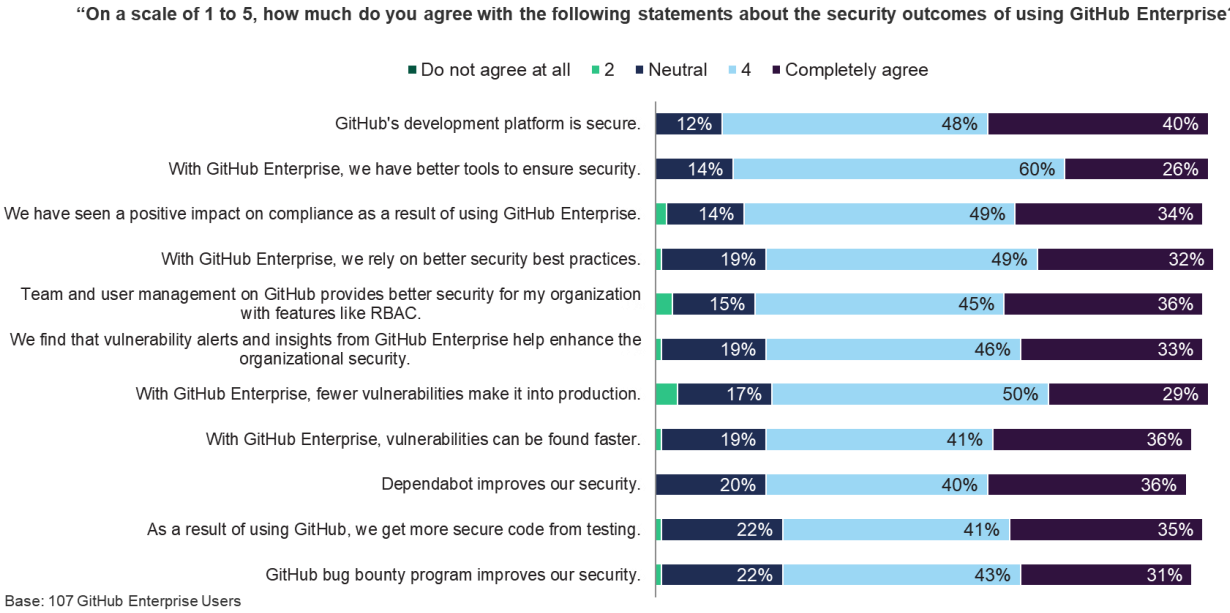

Base: 107 GitHub Enterprise Users

Source: A commissioned study conducted by Forrester Consulting on behalf of GitHub, December 2019

Interviewees shared some example of how security and compliance have improved, including:

- "Dependabot automates security fixes. If I have an identified dependency problem, GitHub is the first tool to warn me." (Retail)
- "GitHub helps us with dependencies and other vulnerabilities. It has an enormous amount of data about dependencies across projects. Our security team is extremely happy, and it saves them a lot of time." (Media entertainment)
- "Our code is much more secure now. In the past, we had some bad surprises." (Retail)
- "The security tools in GitHub are good for managing access. We really trust that it is covering security at all the layers of the cloud." (Fintech)
- "Moving to Enterprise gives us better access audit logs." (Fintech)
- "GitHub helps with compliance in the financial services space. GitHub helps us track changes to show the regulators what we are doing." (Fintech)
- "The workflows in GitHub helped us with GDPR compliance. If we didn't have GitHub, we would have needed to buy or build something else." (Media entertainment)

Increased Developer Satisfaction

Developers are happier because they are using best-in-class tools and something that they already know how to use. This can improve output in terms of the amount and quality of code. It can also help with hiring and retaining developers. Interviewees shared the following examples:

- "The GitHub-specific satisfaction score is 79%. That is much better than our 64% average across all systems." (Software)
- "Having GitHub definitely helps with retention, although it is hard to measure." (Software)
- "I'm totally convinced it helps with retention. Young developers are used to working with modern tools. They don't like it when there is not

CI and best practices. In the past, it was hard to hire developers because they didn't want to use our tools." (Retail)

- "It is difficult to hire good developers. When we say that we are on GitHub, the people being interviewed smile." (Retail)

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 GitHub Enterprise and later realize additional uses and business opportunities. Interviewees shared the following examples:

- Adopting GitHub Actions CI/CD solution
- Actions API for orchestration and workflow
- Moving to the GitHub cloud

None of these future opportunities are included in the financial analysis.

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

Analysis Of Costs

QUANTIFIED COST DATA AS APPLIED TO THE COMPOSITE

Total Costs

REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Dtr	Internal costs	$46,567	$152,900	$152,900	$152,900	$505,267	$426,806
Etr	GitHub Enterprise costs	$52,500	$385,350	$602,700	$689,640	$1,730,190	$1,419,054
	Total costs (risk-adjusted)	$99,067	$538,250	$755,600	$842,540	$2,235,457	$1,845,860

Internal Costs

Internal costs include the effort to implement GitHub and the ongoing management of the platform. If the on-premises version is used, there are also infrastructure costs. All interviewees said that setting up GitHub was very easy. The bulk of the effort revolved around moving projects over from previous solutions.

For the financial analysis, Forrester makes the following assumptions:

- The on-premises version of GitHub is used.
- Setting up GitHub and migrating existing projects from previous solutions took two FTES two months.
- One FTE is responsible for managing GitHub, rolling out new features and updates, providing training, etc.
- Monthly hosted infrastructure costs are $2,500.

Internal costs will vary based on the amount of code being migrated, what the previous solutions are, and whether GitHub will be hosted on-premises or in GitHub's cloud. To account for these risks, Forrester adjusts this cost upward by 10%, yielding a three-year risk-adjusted total PV of $426,806.

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 $1.8 million.

Implementation risk is the risk that a proposed investment may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.

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Internal Costs: Calculation Table						
REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	Number of FTEs		2.0	1.0	1.0	1.0
E2	Number of months		2	12	12	12
E3	Fully burdened cost (monthly)	$115,000/12 months	$9,583	$9,583	$9,583	$9,583
E4	Labor costs	E1*E2*E3	$38,333	$115,000	$115,000	$115,000
E5	Infrastructure	E2*$2,000	$4,000	$24,000	$24,000	$24,000
Et	Internal costs	E4+E5	$42,333	$139,000	$139,000	$139,000
	Risk adjustment	↑10%	□			
Etr	Internal costs (risk-adjusted)		$46,567	$152,900	$152,900	$152,900

GitHub Enterprise Costs

These costs include the monthly per-user licenses, professional services, premium support, and a technical account manager (TAM). Interviewees said that the support they get from GitHub, both regular and premium, is very good and exceeds their expectations.

For the financial analysis, Forrester made the following assumptions:

- The organization added enterprise licenses as GitHub is rolled out to more users.
- The organization used professional services during the implementation, and there is an ongoing contract for a TAM one day per week.
- The organization added a Premium Support contract for higher SLAs and peace of mind.

Beyond the number of licenses, this cost will vary based on the professional services and Premium Support offerings consumed. To account for these risks, Forrester adjusts this cost upward by 5%, yielding a three-year risk-adjusted total PV of $1.42 million.

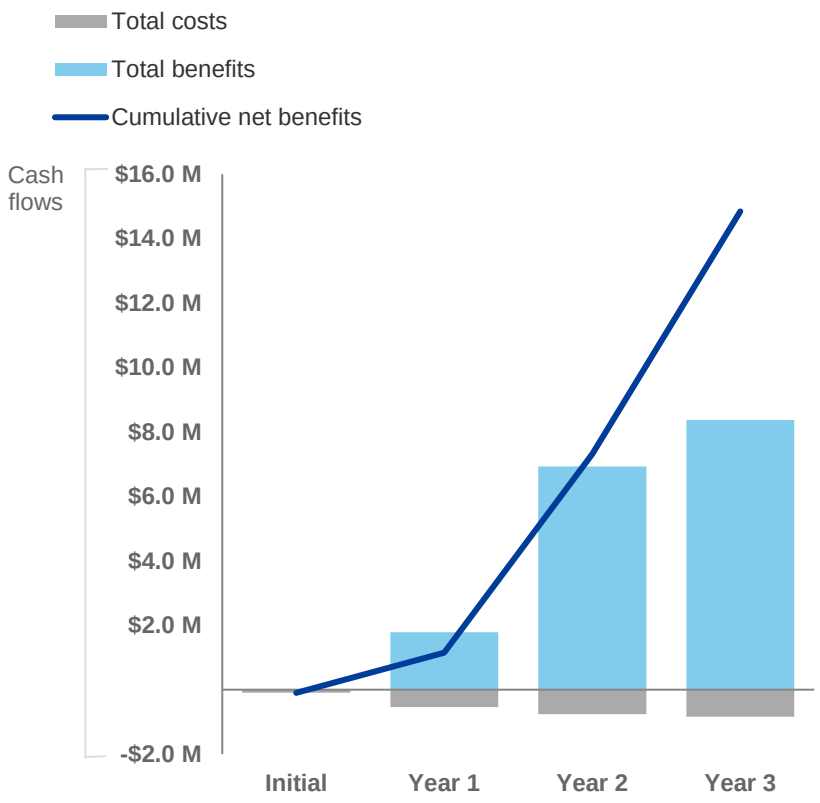
GitHub Enterprise Costs: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Number of users	=A1		750	1,500	1,800
F2	GitHub Enterprise fees	F1*$20*12 months		$180,000	$360,000	$432,000
F3	Professional services		$50,000	$160,000	$160,000	$160,000
F4	Premier support	F2*15%		$27,000	$54,000	$64,800
Ft	GitHub Enterprise costs	F2+F3+F4	$50,000	$367,000	$574,000	$656,800
	Risk adjustment	↑5%	□			
Ftr	GitHub Enterprise costs (risk-adjusted)		$52,500	$385,350	$602,700	$689,640

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	($99,067)	($538,250)	($755,600)	($842,540)	($2,235,457)	($1,845,860)
Total benefits	$0	$1,779,344	$6,927,152	$8,372,522	$17,079,018	$13,632,904
Net benefits	($99,067)	$1,241,094	$6,171,552	$7,529,982	$14,843,562	$11,787,044
ROI						639%
Payback period						< 3 months

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GitHub Enterprise: Overview

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

GitHub Enterprise: Your one-stop for developer innovation

From startups to global companies, GitHub Enterprise helps organizations of every size to code, scale, and work better together.

Get end-to-end security

Millions of teams trust GitHub to keep their codes secure. With leading code security tools, FedRAMP authorization, SOC 2 Type 2 reports, and more, businesses can build securely — and stay focused on customer solutions. From open source project to deployed code, GitHub takes a holistic approach to security, simplifying security and compliance management and reducing time spent resolving vulnerabilities.

Sourcing vulnerability information from industry experts, GitHub reviews every reported security vulnerability to identify and alert affected repositories. GitHub tracks vulnerabilities in packages from supported package managers using data from security researchers, maintainers, and the National Vulnerability Database — including release notes, change log entries, and commit details. To reduce time to remediation, automated security updates automatically open pull requests that update dependencies to the minimum version that resolves the vulnerability. Through the GitHub Dependency Graph, developers have insight into the health of their dependencies and critical information to ensure compliance standards are met. GitHub scans for tokens that have accidentally been exposed in public repositories, then alerts the provider within seconds so they may revoke or notify the owner as appropriate.

GitHub Enterprise helps developers identify, update, and prevent vulnerabilities early in their software development lifecycles, reducing costs and protecting customers and their data.

Boost collaboration

Open source powers innovation — and it all starts on GitHub. Top organizations learn from the communities behind the code they use and adopt an inner source culture to build proprietary software with open source best practices. Using the pull request workflow that developers love, organizations are empowered to implement the practices and development philosophies that allow for rapid iteration and fast deployment cycles. Securely share code across teams or your entire organization, reduce time spent on redundant work, and focus your talent on the work that truly differentiates your business. Keep your developers happy with access to the development platform they love to boost collaboration and attract the best talent to your teams.

Automate your workflows

On GitHub, you control your workflows. GitHub Actions with built-in CI/CD automates your DevOps pipelines using workflows you create — or choose from thousands of workflows created by the community. With GitHub Packages, you can update your package versions and install packages right in your repository. Integrate popular third-party solutions from the world's largest DevOps solution ecosystem and customize workflows based on your own unique requirements and infrastructure. GitHub enables your teams with infinite customizability to automate your entire software development lifecycle.

Deploy your way

You know what's best for your business. We're here to help you build it. Whether in the cloud, on your servers, or hybrid models, GitHub Enterprise supports your organization's deployment strategy with the most scalable platform on the planet.

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.