

FORRESTER®

# The Total Economic Impact™ Of Google Cloud Run

Cost Savings And Business Benefits  
Enabled By Cloud Run

NOVEMBER 2021

# Table Of Contents

Consulting Team: Chris Layton  
Tony Lam

<b>Executive Summary</b> .....	<b>1</b>
<b>The Google Cloud Run Customer Journey</b> .....	<b>6</b>
Key Challenges .....	6
Solution Requirements/Investment Objectives .....	7
Composite Organization .....	7
<b>Analysis Of Benefits</b> .....	<b>8</b>
Faster Deployment Enabling Improved Productivity .....	8
Service Stability Improving Profit .....	9
Ease Of Management .....	11
Avoided Recruiting Costs Enabled By Cloud Run	13
Avoided Costs Of Pre-Provisioned And On-Premises Platforms .....	15
Unquantified Benefits .....	16
Flexibility .....	17
<b>Analysis Of Costs</b> .....	<b>18</b>
Annual Cost Of Cloud Run For Hosted Services .	18
Developer Labor To Integrate Legacy Services To Cloud Run .....	19
<b>Financial Summary</b> .....	<b>21</b>
<b>Appendix A: Total Economic Impact</b> .....	<b>22</b>
<b>Appendix B: Endnotes</b> .....	<b>23</b>



## ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. For more information, visit [forrester.com/consulting](https://forrester.com/consulting).

© Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on the best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies.

## Executive Summary

Google Cloud Run is a fully managed compute platform that automatically scales services based on traffic requirements, and it allows developers to deploy containers using their preferred languages and programming libraries. Interviewees reported that Cloud Run enabled their organizations to reduce usage costs while increasing efficiency for developer, operation, and IT teams. And developers' experiences improved because they were able to start quickly without prior knowledge of Kubernetes or containers.

[Google Cloud Run](#) is a fully managed, serverless compute platform on Google Cloud that automatically scales compute resources based on traffic flow, and its fees are based on a pay-as-you-use model. Hosted services can scale rapidly during times of heavy traffic and drop down to zero when they are not being used. In addition, Cloud Run allows for applications to be fully deployed via containers, and developers can use their preferred languages and programming libraries.

Google commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Cloud Run.<sup>1</sup> The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Cloud Run on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed [four decision-makers](#) with experience using Cloud Run. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single organization.

Interviewees said that prior to using Cloud Run, their organizations used mixtures of on-premises and pre-provisioned cloud deployment platforms. However, these services yielded limited success and left IT groups significantly burdened to monitor service utilization and performance along with infrastructure management overhead. In addition, developers had

### KEY STATISTICS



Return on investment (ROI)

**192%**



Net present value (NPV)

**\$6.79M**

difficulty adopting the technology required to deploy onto these platforms. These limitations led to increased labor costs. In addition, core services were unstable during times of increased traffic as they were not able to scale up fast enough to meet demand.

After investing in Cloud Run, the interviewees' organizations saw increases in developer velocity and service stability and decreases in labor and platform costs.

### KEY FINDINGS

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

- **Deploy services 95% faster than alternative platforms, which saves an average of 180 developer hours per service per year.** Interviewees consistently mentioned that Cloud Run allowed their organizations' teams to deploy updates significantly faster than previously

possible. With on-premises and pre-provisioned platforms, deployment took a matter of weeks. After migrating to Cloud Run, deployment took less than an hour.

**“Cloud Run is one of the easiest services on Google Cloud Platform you can deploy to. It’s just super simple.”**

*Chief technology officer, healthcare SaaS*

- **Improved service stability with 98% fewer critical errors, which reduces failed critical calls by almost 800 per service per year.** Interviewees said another benefit of Cloud Run was that it increased service stability. Some said that prior to using Cloud Run, their organizations had consistent issues with services not being able to scale to meet changing traffic demands, and this caused critical failures and direct loss of revenue and profit. With Cloud Run, services were able to scale quickly, and the number of critical errors due to platform issues essentially dropped to zero.

**“In the time that we have been in production with Cloud Run, we have not had a single issue with applications crashing. Zero. And we used to get these issues all the time before.”**

*Chief technology officer, healthcare SaaS*

- **Improved ease of management with 50% more efficient labor, which leads to reinvested employee time.** Interviewees said on-premises and pre-provisioned cloud platforms required development teams to carefully watch that resource requirements were being met and that utilization rates remained high enough so groups could stay within their budgets. After adopting Cloud Run, development teams saw significant

Interviewees said Cloud Run provided:



**95% faster deployment than legacy platforms**

**98% fewer interruptions to service**

**50% more efficient service management**

reductions in the strain on employees both in terms of workload, but also in terms of cognitive load. Approximately half of the employees who previously monitored services were able to transition to other activities that provided greater benefit to their organizations.

- **Reduced developer recruiting costs of 40%.** Interviewees consistently reported that employee satisfaction increased for developers working with Cloud Run because they were able to use their preferred languages and technologies, but also because they could test and prototype new ideas quickly cost-efficiently. This prompted a culture change in which developers began encouraging their broader networks to join their teams, and this reduced recruiting costs.
- **Avoided costs of pre-provisioned and on-premises platforms.** Interviewees said utilization costs of Cloud Run were lower than those for their legacy solutions, whether those solutions were on-premises or pre-provisioned cloud platforms. With Cloud Run, usage costs for pre-provisioned platforms were 15% to 50% lower, and they were more than 75% lower when compared to on-premises platforms.

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

- **Improvements to deployment speed, which improved customer experience and increased retention.** Interviewees said an additional benefit of the increased speed of service improvement and greater stability of services was increased customer satisfaction as measured by Net Promoter Score<sup>SM</sup> (NPS) and likelihood to repurchase.<sup>2</sup> Interviewees reported general improvements, but their estimates of the effects varied depending on the use case of Cloud Run.
- **Automation, which improved employee morale and engagement.** Employees outside of development, IT, and operations teams also benefited from having faster deployment as new features and application improvements became available significantly more quickly than before. In addition, the increase in stability made employees more effective in their jobs. Research has consistently shown that [“improving employee experience leads to better business results.”](#)<sup>3</sup>
- **Increased team autonomy, which led to product improvements.** Teams that worked with Cloud Run were able to test and build services as needed without bringing in other groups to help. Interviewees noted that this ownership and autonomy resulted in teams caring more about the quality and results of their work.

**“It’s not that the team has worked less with Cloud Run, but rather that [team members] are able to focus on the things they felt mattered to achieve our business objectives.”**

*Senior engineer director, smart home*

- **Improved employee satisfaction and work-life balance.** Interviewees said satisfaction among developers and IT groups increased while

working with Cloud Run and that the work-life balance of those groups improved considerably.

- **Flexibility, which allowed developers to be more productive and increase retention rates.** Developers were able to use their preferred languages and technologies to build applications. This not only led to increased productivity, but it also likely decreased developer attrition.

**“Cloud Run gives you infinite possibility. You can use the library you want, you can use the language you want, and you can have portability.”**

*Google Cloud platform architect, cosmetics*

**Costs.** Risk-adjusted PV costs include:

- **Cloud Run usage costs.** Interviewees reported that costs of Cloud Run were generally lower than they were with on-premises or pre-provisioned platforms, but they said their organizations still paid usage costs that scaled up with resource usage and down to zero when there was no traffic.
- **Change management labor to integrate legacy services during 1.5 months.** Interviewees said their organizations need to make some effort to transition legacy services to Cloud Run, although the level of effort largely depended on how apps had been architected for legacy solutions. Organizations that had services that were already deployed via containers required very little effort during their transitions.

The decision-maker interviews and financial analysis found that a composite organization experiences benefits of \$10.33 million over three years versus costs of \$3.54 million, adding up to a net present value (NPV) of \$6.79 million and an ROI of 192%.



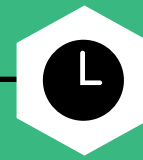
ROI  
**192%**



BENEFITS PV  
**\$10.33M**

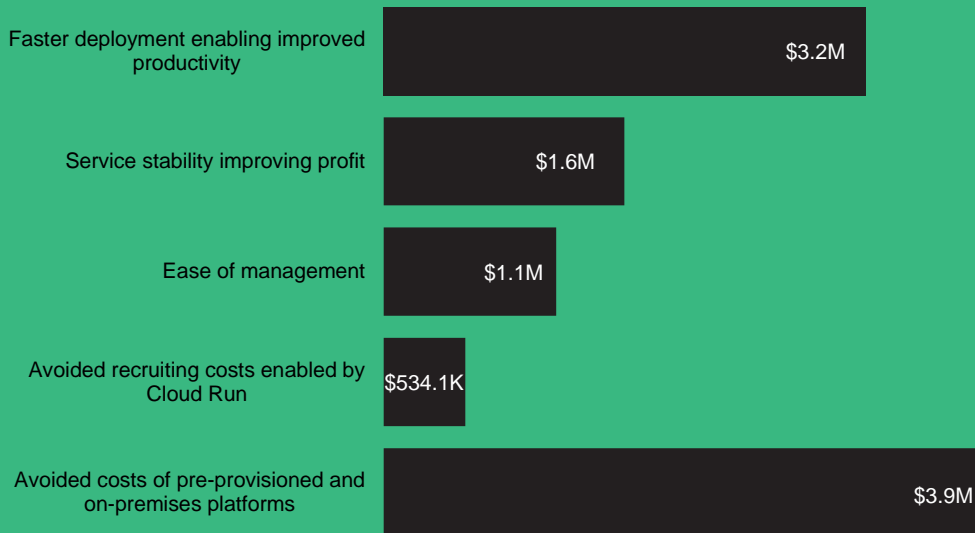


NET PRESENT VALUE  
**\$6.79M**



DEPLOYMENT  
**<1 hour**

### Benefits (Three-Year)



**We wanted serverless with a consumption model without a cluster sitting there. ... Investing in Cloud Run is about the scale factor and zero management.**

– Chief data scientist, home security



## 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 Google Cloud Run.

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 Cloud Run can have on an organization.

### DISCLOSURES

Readers should be aware of the following:

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

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

Google 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.

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



### DUE DILIGENCE

Interviewed Google stakeholders and Forrester analysts to gather data relative to Cloud Run.



### DECISION-MAKER INTERVIEWS

Interviewed four decision-makers at organizations using Cloud Run 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 decision-makers.



### 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.

# The Google Cloud Run Customer Journey

## Drivers leading to the Cloud Run investment

Interviewed Decision-Makers			
Interviewee	Industry	Region	Revenue
Google Cloud platform architect	Cosmetics	Europe	\$30 billion
Chief technology officer	Healthcare SaaS	North America	\$5 million
Senior engineering director	Smart home	North America	\$100 million
Chief data scientist	Home security	North America	\$2 billion

### KEY CHALLENGES

Prior to investing in Cloud Run, the interviewees' organizations had run their services through on-premises servers or pre-provisioned cloud services.

The interviewees said their organizations struggled with common challenges, including:

- **Intense labor requirements for development teams to maintain operation.** The complex nature of on-premises and pre-provisioned cloud platforms meant that developers had to spend significant time and effort during major deployments. This often led to delays with features and improvements, and the organizations were slow to react to changes in user needs.
- **Stability issues with services not being able to scale to meet traffic demands.** Legacy platforms were often unable to meet the needs of rapidly changing traffic patterns, and that led to poor customer experience, employee inefficiency, and significant workloads for IT groups that manually monitored and adjusted resources.
- **Significant management burden on IT groups to monitor services.** IT groups had to balance the needs of their organizations to keep resource costs low while also keeping their services

**“The operational load and the effort to create and maintain services was relatively high before Cloud Run. Application teams would spend a lot of their time running detailed technologies that require a lot of technical knowledge. This took them away from building their applications and services.”**

*Senior engineer director, smart home*

reliable and scalable when needed. This often resulted in tradeoffs between the two, and also to IT groups needing to constantly monitor services and to make frequent and manual adjustments to resource allocation each day.

- **Inefficiency with developers not being able to use their preferred languages.** Legacy platforms were inflexible in how services could be architected, and developers were often inefficient because they had to learn different languages and technologies that worked with the platforms.



## SOLUTION REQUIREMENTS/INVESTMENT OBJECTIVES

The interviewees' organizations searched for a solution that could:

- Enable developers to focus on the core value of their jobs by allowing them to use their preferred languages and technologies.
- Scale quickly and automatically to meet changes in traffic demands.
- Reduce work and cognitive load for operations teams.
- Provide a pay-as-you-use model to offload IT responsibility for maximizing server utilization and to allow developers to quickly prototype and test new ideas.

After a request for proposal (RFP) and business case process evaluating multiple vendors, the interviewees' organizations chose Cloud Run and began deployment:

- Each of the interviewees' organizations chose to use a phased approach to deployment in which an initial group piloted Cloud Run before broader adoption.
- The organizations used Cloud Run for services in which multiple concurrent requests needed to be processed at once and when traffic changed quickly.

## 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 four decision-makers that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

**Description of composite.** The global, multibillion-dollar business-to-consumer organization has a strong brand, and it heavily relies on its applications and microservices for its products.

**Deployment characteristics.** The composite organization transitions 120 of its services to Cloud Run during a three-year period. Previously, it ran half of these services on an on-premises server and half on a pre-provisioned platform. Although the composite organization has hundreds of developers, the services deployed on Cloud Run are managed by 150 developers and 20 infrastructure engineers.

### Key assumptions

- **Billions of dollars in annual revenue**
- **120 services on Cloud Run**
- **150 developers**
- **20 infrastructure engineers**
- **Hybrid legacy environment with on-premises and pre-provisioned platforms**

# 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	Faster deployment enabling improved productivity	\$967,075	\$1,289,434	\$1,611,792	\$3,868,301	\$3,155,770
Btr	Service stability improving profit	\$482,256	\$643,008	\$803,760	\$1,929,024	\$1,573,703
Ctr	Ease of management	\$345,725	\$460,967	\$576,208	\$1,382,900	\$1,128,173
Dtr	Avoided recruiting costs enabled by Cloud Run	\$166,600	\$214,200	\$273,700	\$654,500	\$534,114
Etr	Avoided costs of pre-provisioned and on-premises platforms	\$1,205,755	\$1,607,674	\$2,009,592	\$4,823,021	\$3,934,633
Total benefits (risk-adjusted)		\$3,167,411	\$4,215,282	\$5,275,052	\$12,657,745	\$10,326,393

## FASTER DEPLOYMENT ENABLING IMPROVED PRODUCTIVITY

**Evidence and data.** Interviewees said their organizations were able to deploy services onto Cloud Run significantly faster than legacy solutions. Employees were able to reinvest saved time into higher-value activities.

- Deployment of legacy solutions often took several days or even weeks, but interviewees said teams were able to deploy onto Cloud Run in less than an hour.
- Interviewees said employees were able to reallocate the time saved from faster and easier deployment processes to higher-priority work.

**Modeling and assumptions.** To reflect the interviewees' experiences, Forrester assumes the following about the composite organization:

- The composite deploys 120 of its services onto Cloud Run, and each requires an average of two major updates each year.
- Without Cloud Run, each major update would take an average of 96 combined developer hours to deploy. This time would include that of a team of developers working together for several days to ensure the service could be correctly deployed across complex legacy environments and that testing would be able to scale correctly.
- Cloud Run enables this team to deploy 95% faster because the system integration and testing to scalability is either largely automated or no longer required.

**“Deploying with Cloud Run can easily be done within an hour.”**

*Chief data scientist, home security*

**“It takes a couple of little keystrokes and you’re deploying a new service on Cloud Run. Then it’s just turning more volume and you’re ready to send traffic to it.”**

*Chief data scientist, home security*

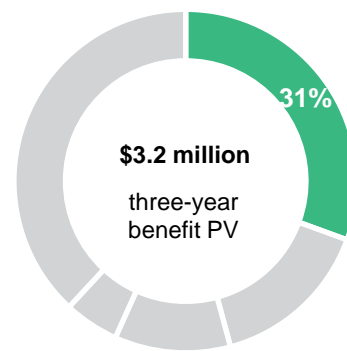
**Risks.** Forrester recognizes that these results may not be representative of all experiences. The impact of this benefit will vary based on:

- The complexity of the organization’s legacy environment prior to using Cloud Run and the amount of labor previously required to deploy major service updates.
- The ability of developers to reinvest saved time into higher-value work.

**“Cloud Run as a service is better because it lets our developers focus on whatever code they are an expert in. They don’t have to worry about the virtual machine. They don’t have to contact the network team. Cloud Run lets them focus on development.”**

*Google Cloud platform architect, cosmetics*

**Results.** To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of over \$3.2 million.



Faster Deployment Enabling Improved Productivity					
Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Number of services running in Cloud Run	Composite	72	96	120
A2	Number of major updates per service annually	Interviews	2	2	2
A3	Number of days to deploy an update prior to Cloud Run	Interviews	15	15	15
A4	Reduction in deployment time enabled by Cloud Run	Interviews	95%	95%	95%
A5	Percent of developer time required during deployment process	Interviews	40%	40%	40%
A6	Number of developers working per deployment	Composite	2	2	2
A7	Saved deployment hours per service per year due to Cloud Run	A2*A3*8 hours*A4*A5*A6	182	182	182
A8	Engineer hourly salary	TEI standard	\$82	\$82	\$82
At	Faster deployment enabling improved productivity	A1*A7*A8	\$1,074,528	\$1,432,704	\$1,790,880
	Risk adjustment	↓10%			
Atr	Faster deployment enabling improved productivity (risk-adjusted)		\$967,075	\$1,289,434	\$1,611,792
<b>Three-year total: \$3,868,301</b>			<b>Three-year present value: \$3,155,770</b>		

### SERVICE STABILITY IMPROVING PROFIT

**Evidence and data.** Interviewees said stabilizing their organizations’ services was a major benefit of deploying onto Cloud Run. Although some of the organizations previously struggled to scale with changes in traffic, Cloud Run automatically managed this for them and avoided interruptions.

- Interviewees consistently mentioned that Cloud Run significantly stabilized their services and that this improved the experience for their users. Interviewed IT leaders said their organizations have not experienced any failures due to Cloud Run.
- Cloud Run enabled teams to easily move traffic to stable versions of services if a new deployment had a programming error. This further improved service stability.
- An interviewee from a healthcare SaaS organization estimated that every time a critical service crashed, it cost their organization \$10 in labor to manually complete the task the service was supposed to perform. The interviewee said their organization likely incurred additional costs in customer retention, but they were unable to quantify them.

**“In case we have a bad deployment, it is super-easy in Cloud Run to move traffic to the previous version and stop people from going to the incorrect deployment.” Chief technology officer, Healthcare SaaS**

*Chief technology officer, healthcare SaaS*

**Modeling and assumptions.** To reflect the interviewees’ experiences, Forrester assumes the following about the composite organization:

- The average annual number of calls completed across all services is almost 80 million. Of all the calls across these services, 2% are critical.

- The failure rate of calls in the composite’s legacy environment was 0.05%. If a critical call failed, it cost the business \$10. If a non-critical call failed, there was no quantifiable impact to the business.
- Cloud Run enables a 98% reduction in call failure due to automatic scaling of resources and the ability to redirect traffic in the case of a bad deployment.

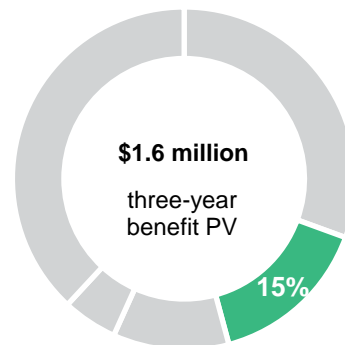
**“We go to Cloud Run whenever we need more compute power — like higher memory or more CPUs — which our previous platform could not provide.”**

*Chief technology officer, healthcare SaaS*

**Risks.** Forrester recognizes that these results may not be representative of all experiences. The impact of this benefit will vary based on:

- The service stability in the organization’s legacy environment and its ability to scale resources quickly when needed.
- The percentage of calls that are critical to the business and the cost of a critical call failing.

**Results.** To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of almost \$1.6 million.



<b>Service Stability Improving Profit</b>					
Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	Number of services running in Cloud Run	Composite	72	96	120
B2	Number of calls per service per day	Interviews	216,000	216,000	216,000
B3	Percent of calls critical to business	Composite	2%	2%	2%
B4	Failure rate of services calls prior to Cloud Run	Interviews	0.05%	0.05%	0.05%
B5	Failure rate of services calls after Cloud Run	Interviews	0%	0%	0%
B6	Number of critical services calls successful due to Cloud Run per service (rounded)	$B2 \times 365 \text{ days} \times B3 \times (B4 - B5)$	788	788	788
B7	Cost avoided per critical call completed by Cloud Run	Interviews	\$10	\$10	\$10
Bt	Service stability improving profit	$B1 \times B6 \times B7$	\$567,360	\$756,480	\$945,600
	Risk adjustment	↓15%			
Btr	Service stability improving profit (risk-adjusted)		\$482,256	\$643,008	\$803,760
<b>Three-year total: \$1,929,024</b>			<b>Three-year present value: \$1,573,703</b>		

**EASE OF MANAGEMENT**

**Evidence and data.** Interviewees noted a reduction in labor required to manage services on Cloud Run. This was largely because Cloud Run automatically scaled resources when needed and ensured service stability, which had previously been very manual and labor-intensive processes.

- A cosmetics enterprise was able to monitor services on Cloud Run with only half the employees it needed with its legacy platform.

- A home security enterprise was nearly able to completely reallocate its service management staff after migrating to Cloud Run.
- Interviewees said that teams monitoring services on Cloud Run were able to refocus their time and energy to improve the user experience at the application level. They also said the cognitive load among employees decreased because the

**“It’s a relief to go to Cloud Run and just dial up our maximum memory and instantly support workloads that we couldn’t support before.”**

*Chief technology officer, healthcare SaaS*

**“We now only need half the people to manage our system as compared to before we had Cloud Run. This is because Cloud Run is easy, auto-managed, and scalable. When you sleep, you don’t have to have someone behind a screen making sure everything is okay. It is not your job anymore.”**

*Google Cloud platform architect, cosmetics*

difficult process of resource scaling was automated.

- An interviewee with a smart home enterprise said Cloud Run’s ability to self-heal and reduce the operational load on teams was a major driver in adoption throughout the organization.

**“We went from needing about 1.7 people to manage our services to 0.1 of a person with Cloud Run.”**

*Chief data scientist, home security*

**Modeling and assumptions.** To reflect the interviewees’ experiences, Forrester assumes the following about the composite organization:

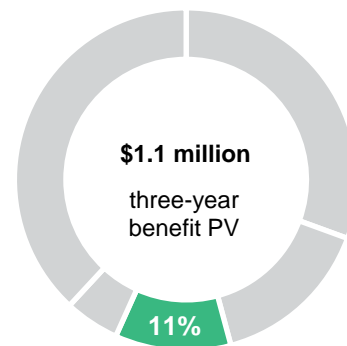
- In its legacy environment, the composite would have needed two infrastructure engineers. Half of their time would be spent on services that are now on Cloud Run.
- With Cloud Run, these services are easier to manage because system-level tasks are automated and issues self-heal. Half of the time

that was previously required to monitor these services is reallocated to higher-value work.

**Risks.** Forrester recognizes that these results may not be representative of all experiences. The impact of this benefit will vary based on:

- The efficiency of infrastructure management in the organization’s legacy environment and the amount of time spent on system-level issues.
- The amount of time saved with Cloud Run that can be reapplied to higher-value work.

**Results.** To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of almost \$1.1 million.



Ease Of Management					
Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Number of FTEs required to monitor cloud platform prior to Cloud Run	Interviews	20	20	20
C2	Percent of FTEs able to reinvest their time in higher priority work	Composite	30%	40%	50%
C3	Percent of reinvested time with value successfully recaptured	Interviews	50%	50%	50%
C4	FTE infrastructure engineer fully burdened salary	TEI standard	\$121,307	\$121,307	\$121,307
Ct	Ease of management	C1*C2*C3*C4	\$363,921	\$485,228	\$606,535
	Risk adjustment	↓5%			
Ctr	Ease of management (risk-adjusted)		\$345,725	\$460,967	\$576,208
<b>Three-year total: \$1,382,900</b>			<b>Three-year present value: \$1,128,173</b>		



## AVOIDED RECRUITING COSTS ENABLED BY CLOUD RUN

**Evidence and data.** Interviewees said their organizations saw significant changes in culture after moving to Cloud Run. Developers were given more freedom and flexibility to use their preferred languages and tools, and they were able to experiment with new ideas much more easily because the cost to prototype on Cloud Run was significantly lower than it was in their legacy environments.

While it's difficult to quantify a shift in culture, it became noticeably easier to recruit developers because employees began inviting members of their personal networks to apply for positions. In addition, hiring managers gained a much larger pool of talent to hire from because developers can build in Cloud Run regardless of their language. With their legacy environments, developers needed specialized skill sets.

- Interviewees said developers enjoyed working in their own languages and being able to easily test ideas so much that they began to refer their organizations to friends.
- Because Cloud Run can deploy services via container with any standard programming language, interviewees said their organizations no longer had to be as selective in the hiring process and they could hire based on programming talent across languages rather than based on familiarity with specific technology or Kubernetes.
- A cosmetics enterprise was able to increase its development team from two to 60 people within two years. An interviewee from the organization said that if it did not have Cloud Run and employees didn't encourage their friends to apply, it would only have been able to grow to 15 or 20 people in that same time.

**“When you hire people, you don’t have to say, ‘I’m looking for a Cloud Run expert.’ [You can say,] ‘If you know Ruby or PHP [programming languages], that’s fine.’ And by doing that, we are opening the possibility to hire a lot of different people and not [just] a specific block of people.”**

*Google Cloud platform architect, cosmetics*

**Modeling and assumptions.** To reflect the interviewees' experiences, Forrester assumes the following about the composite organization:

- The composite does not need to grow its team, but it does need to replace developers.
- The attrition rate of developers is 15% annually.
- The cost of recruiting for one developer position is \$35,000, and that includes effort in recruiting and interviewing applicants.
- Recruitment is 40% more effective with Cloud Run because developers proactively reach out to their networks when a position opens.

**“Because of Cloud Run, we have employees who are talking to their friends about their jobs. [They say:] ‘It’s interesting. It’s new. You can test because you have a pay-as-you-go model. You can make your own sandboxes. You don’t have to ask the boss of your boss if you can make a proof of concept. You can propose new technology.’**

*Google Cloud platform architect, cosmetics*

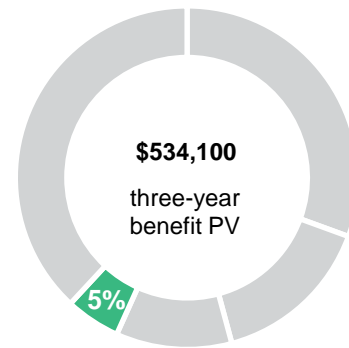
**Risks.** Forrester recognizes that these results may not be representative of all experiences. The impact of this benefit will vary based on:

- The flexibility and freedom developers are given from management after migrating to Cloud Run.
- The speed that the organization’s culture changes because of flexibility provided by Cloud Run.
- The organization’s existing culture prior to using Cloud Run.
- The level that the organization’s developers share open positions with their personal networks.

**Results.** To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of over \$534,100.

**“You can take Cloud Run globally because it’s managed. And because it’s not a specific technology, you don’t need specific people.”**

*Google Cloud platform architect, cosmetics*



### Avoided Recruiting Costs Enabled By Cloud Run

Ref.	Metric	Source	Year 1	Year 2	Year 3
D1	Number of developers using Cloud Run	Composite	90	120	150
D2	Developer churn rate	Composite	15%	15%	15%
D3	Additional developer hires	D1*D2	14	18	23
D4	Recruiting cost to hire new developer prior to Cloud Run	Composite	\$35,000	\$35,000	\$35,000
D5	Reduction in cost to hire a developer enabled by Cloud Run	Interviews	40%	40%	40%
Dt	Avoided recruiting costs enabled by Cloud Run	D3*D4*D5	\$196,000	\$252,000	\$322,000
	Risk adjustment	↓15%			
Dtr	Avoided recruiting costs enabled by Cloud Run (risk-adjusted)		\$166,600	\$214,200	\$273,700
<b>Three-year total: \$654,500</b>			<b>Three-year present value: \$534,114</b>		

### AVOIDED COSTS OF PRE-PROVISIONED AND ON-PREMISES PLATFORMS

**Evidence and data.** Interviewees said their organizations saved on usage costs with Cloud Run as compared to their legacy on-premises or pre-provisioned cloud platforms.

- Interviewees said running services on Cloud Run saved their organizations 15% to 50% on usage while their pre-provisioned cloud platforms were always on. The amount they were able to save depended on the services being hosted.

Cloud Run’s ability to scale automatically was a major driver of cost reduction, so services with more unpredictable traffic patterns tended to lead to greater cost savings with Cloud Run.

- A cosmetics enterprise saw its usage costs drop to less than a tenth of its previous budget when moving from its on-premises environment to Cloud Run.
- A healthcare SaaS enterprise used Cloud Run to completely avoid paying significant capital expenditures associated with on-premises deployment.

**“Before [using] Cloud Run, we were spending between \$2 million and \$3 million per year to run our applications [on-premises]. After a year with Cloud Run, that’s been reduced to about \$100,000. The difference is crazy because Cloud Run has zero cost when no one is using it. ... We are spending less money than ever.”**

*Google Cloud platform architect, Cosmetics*

**Modeling and assumptions.** To reflect the interviewees’ experiences, Forrester assumes the following about the composite organization:

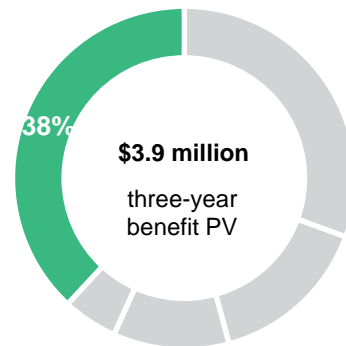
- Half of the 16 services the composite migrates to Cloud Run were previously hosted on a pre-provisioned cloud platform, and the other half were hosted on on-premises platforms.
- The composite avoids paying an average of \$1,250 per month for each service moved from a pre-provisioned cloud platform.
- The composite avoids paying an average of \$1,688 per month for each service moved from an on-premises platform.

**“For medium-sized services, Cloud Run is about half the cost of pre-provisioned platforms. That’s mostly just due to not paying for underutilized resources.”**

*Senior engineer director, smart home*

**Risks.** Forrester recognizes that these results may not be representative of all experiences. The impact of this benefit will vary based on the degree to which the organization’s teams were previously able to maximize utilization rates of pre-provisioned cloud platforms.

**Results.** To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of more than \$3.9 million.



Avoided Costs Of Pre-Provisioned And On-Premises Platforms					
Ref.	Metric	Source	Year 1	Year 2	Year 3
E1	Number of services moving from pre-provisioned platform to Cloud Run	Composite	36	48	60
E2	Average monthly cost per service on pre-provisioned platform	Interviews	\$1,250	\$1,250	\$1,250
E3	Number of services moving from on-premises platform to Cloud Run	Composite	36	48	60
E4	Average monthly cost per service on on-premises platform	Interviews	\$1,688	\$1,688	\$1,688
Et	Avoided costs of pre-provisioned and on-premises platforms	(E1*E2*12 months)+ (E3*E4*12 months)	\$1,269,216	\$1,692,288	\$2,115,360
	Risk adjustment	↓5%			
Etr	Avoided costs of pre-provisioned and on-premises platforms (risk-adjusted)		\$1,205,755	\$1,607,674	\$2,009,592
<b>Three-year total: \$4,823,021</b>			<b>Three-year present value: \$3,934,633</b>		

**UNQUANTIFIED BENEFITS**

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

- **Improvements to deployment speed, which improved customer experience and increased retention.** Interviewees said being able to deploy more quickly on Cloud Run allowed their organizations to provide new features and respond to customer needs. Although an interviewee from the organization was not able to

quantify this impact in terms of business value, they said the company’s NPS improved in part due to the speed at which features became available.

- **Automation, which improved employee morale and engagement.** While some of the value of automation has been quantified, interviewees also mentioned their employee morale and engagement improved significantly because the more labor-intensive parts of their

“Cloud Run could probably improve your customer retention rate because customers like the features [you’re] able to deploy and [that you’re] able to get updates faster. ... We were able to deploy a critical feature update through Cloud Run very quickly and, as a result of that update, customer satisfaction ratings went up by around 20%.”

Chief data scientist, home security

“[With our legacy solution,] employees worked evenings, weekends, and nights. Letting people have healthier nonwork lives and [get] better sleep is just the right thing to do for people, and it makes for more humane work. So, not all the benefits of Cloud Run are measured in hours. But it is something that definitely showed up in team morale and engagement.”

Chief data scientist, home security

jobs were handled by Cloud Run. It is likely that this could result in the business realizing additional value elsewhere, such as improved employee productivity or reduced attrition.

- **Increased team autonomy, which led to product improvements.** Allowing development teams to have more ownership of their product resulted in them feeling more empowered and focusing more on quality. The change in culture could result in improved product performance and innovation.
- **Flexibility that allowed developers to be more productive and increase their retention rates.** Interviewees said their organizations saw positive shifts in culture because developers were able to work with the tools they preferred to use with Cloud Run. They also believe the retention of these developers increased because developers became more engaged, and also because developers could move to other teams that use Cloud Run because the languages and libraries work across environments.

**“The capability we got from Cloud Run spilled over into other places. For example, our mobile team needed something, and rather than going to a server team to build it, [the team was] able to build it and run it on Cloud Run. Because the operational load is so low, [the team was] confident that it would run well.”**

*Senior engineer director, smart home*

**“It is better to work on a technology like Cloud Run [so] you are not locked into a specific cloud platform. You can easily transition to another cloud platform if needed.”**

*Google Cloud platform architect, cosmetics*

## FLEXIBILITY

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

- **Cloud Run’s flexibility and pay-as-you-use model allows teams to develop their own services.** Teams can become more autonomous when they are able to test and deploy the services they need directly rather than relying on other teams to do it on another platform. This could provide flexibility in how improvements and new features are made available to individual teams and products.
- **Organizations can easily move their services to other platforms if needed.** Containerized applications on Cloud Run can easily run on other platforms. That means that if an organization decides to move to another cloud service, it can do so without significant labor. Although interviewees did not express interest in migrating away from Google Cloud, they said their organizations value the flexibility of not being locked in to one particular cloud platform.

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
Ftr	Annual cost of Cloud Run for hosted services	\$0	\$838,598	\$1,118,131	\$1,397,664	\$3,354,394	\$2,736,523
Gtr	Developer labor to integrate legacy services to Cloud Run	\$523,611	\$0	\$174,537	\$174,537	\$872,685	\$798,989
	Total costs (risk-adjusted)	\$523,611	\$838,598	\$1,292,668	\$1,572,201	\$4,227,079	\$3,535,512

## ANNUAL COST OF CLOUD RUN FOR HOSTED SERVICES

**Evidence and data.** Cloud Run costs are based on usage of the services deployed on it. Interviewees said this cost was lower than it was for legacy on-premises solutions or pre-provisioned cloud platforms and that these usage costs replaced the [costs of those solutions](#).

- While the usage costs of Cloud Run varied among the interviewees' organizations depending on computational requirements and traffic, the average was usually less than \$1,000 per service per month when looking at all services on Cloud Run.
- Interviewees said rare errors made by developers occasionally led to services using more resources than required. This would result in a temporary spike in usage that would scale up Cloud Run costs until traffic was redirected to a previous deployment of that service.

The organizations would set warnings and limits within Cloud Run to alert teams and to prevent usage costs from increasing when they should not have been.

**Modeling and assumptions.** To reflect the interviewees' experiences, Forrester assumes the following about the composite organization:



Interviewees said usage costs for Cloud Run were:

**15% to 50% lower than the costs for pre-provisioned cloud platforms**

**More than 75% lower than the cost of on-premises platforms**

- The composite transitions its 16 service to Cloud Run during the course of three years.
- The average monthly usage costs for 150 developers are \$844 per service per month.
- Usage costs of services on Cloud Run are 33% lower than the usage costs of those services on the composite's pre-provisioned cloud platforms, and they are 50% lower than its on-premises platforms.
- The composite uses Cloud Run's built-in alert and limit system to prevent errors with deployment from driving additional usage costs.

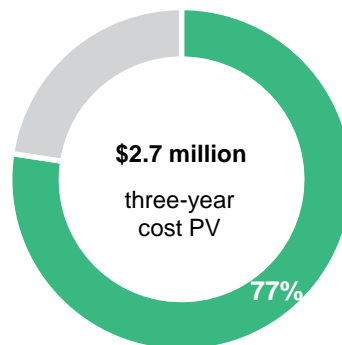


**Risks.** Forrester recognizes that these results may not be representative of all experiences. The impact of this benefit will vary based on:

- The amount of traffic the organization sends to services on Cloud Run and the resources required to process calls.
- The protocols the organization has in place to prevent programming errors from scaling services beyond the level required. Because Cloud Run scales automatically, usage can be higher if a poorly designed service uses more resources than required.

**Results.** To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-

year, risk-adjusted total PV (discounted at 10%) of over \$2.7 million.



Annual Cost Of Cloud Run For Hosted Services						
Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
F1	Number of services hosted on Cloud Run	Composite		72	96	120
F2	Average monthly cost per service hosted on Cloud Run	Interviews		\$844	\$844	\$844
Ft	Annual cost of Cloud Run for hosted services	F1*F2*12 months	\$0	\$729,216	\$972,288	\$1,215,360
	Risk adjustment	↑15%				
Ftr	Number of major updates per services annually		\$0	\$838,598	\$1,118,131	\$1,397,664
<b>Three-year total: \$3,354,394</b>			<b>Three-year present value: \$2,736,523</b>			

**DEVELOPER LABOR TO INTEGRATE LEGACY SERVICES TO CLOUD RUN**

**Evidence and data.** Interviewees said that although it was easy to deploy services that were already deployed via container onto Cloud Run, it was more difficult to transition some services that were custom-built for legacy platforms.

- Interviewees said some services took additional labor to move away from their organizations’ legacy platforms because the services were specifically built for those platforms and could not easily be transitioned.

- Some interviewees said that in addition to the time required for technical transitions, their organizations also required a shift in culture because teams moved to a different platform than they were used to using.

**Modeling and assumptions.** To reflect the interviewees’ experiences, Forrester assumes the following about the composite organization:

- Half of the services the composite moves to Cloud Run are easily transitioned via containers. This makes the labor of deploying onto Cloud

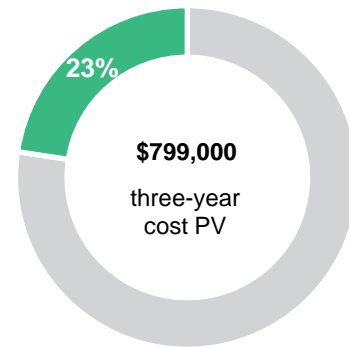
Run negligible because it can take place during regularly scheduled updates.

- The remaining half of the services deployed onto Cloud Run were built specifically for the composite’s legacy environment, and it takes an average of 170 developer hours to successfully transition.
- The composite requires two developers spending 25% of their time during one and a half months to migrate each service.

**Risks.** Forrester recognizes that these results may not be representative of all experiences. The impact of this benefit will vary based on:

- How easily the organization’s services can be transitioned with containers. Variations in the effort required could lead to higher or lower costs than estimated for the composite organization.
- Whether or not teams are hesitant to transition to a new platform. Depending on the culture, the time and resources required to transition could vary.

**Results.** To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of \$799,000.



**“The technical part of migrating to Cloud Run took about two months.”**

*Google Cloud platform architect, cosmetics*

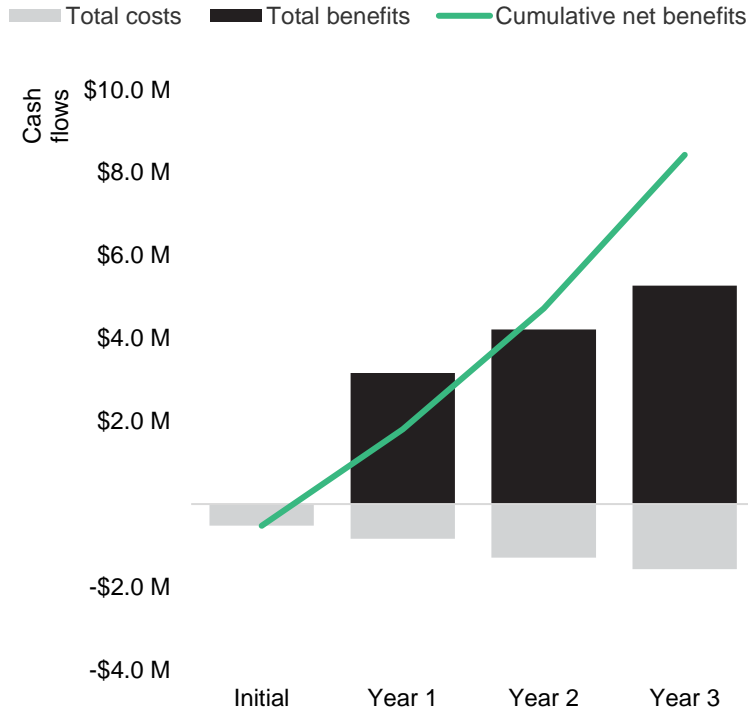
**Developer Labor To Integrate Legacy Services To Cloud Run**

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	Number of developers needed to transition legacy services to Cloud Run	Composite	90		30	30
G2	Number of months to integrate services onto Cloud Run	Interviews	1.5	1.5	1.5	1.5
G3	Hours per developer spent per month integrating legacy services	Interviews	43	43	43	43
G4	Total hours spent integrating services to Cloud Run	G1*G2*G3	5,805	0	1,935	1,935
G5	Developer fully burdened hourly wage	TEI standard	\$82	\$82	\$82	\$82
Gt	Developer labor to integrate legacy services to Cloud Run	G4*G5	\$476,010	\$0	\$158,670	\$158,670
	Risk adjustment	↑10%				
Gtr	Developer labor to integrate legacy services to Cloud Run (risk-adjusted)		\$523,611	\$0	\$174,537	\$174,537
<b>Three-year total: \$872,685</b>			<b>Three-year present value: \$798,989</b>			

# 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 Analysis (Risk-Adjusted Estimates)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	(\$523,611)	(\$838,598)	(\$1,292,668)	(\$1,572,201)	(\$4,227,079)	(\$3,535,512)
Total benefits	\$0	\$3,167,411	\$4,215,282	\$5,275,052	\$12,657,745	\$10,326,393
Net benefits	(\$523,611)	\$2,328,813	\$2,922,614	\$3,702,851	\$8,430,667	\$6,790,881
ROI						192%
Payback						<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

---

<sup>1</sup> 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.

<sup>2</sup> Net Promoter, NPS, and the NPS-related emoticons are registered U.S. trademarks, and Net Promoter Score and Net Promoter System are service marks, of Bain & Company, Inc., Satmetrix Systems, Inc. and Fred Reichheld.

<sup>3</sup> Source: "If You're Not Prioritizing Employee Experience Improvement, You're Doing It Wrong," Forrester Research, Inc., October 18, 2018.

FORRESTER®