

A Forrester Total Economic Impact™
Study Commissioned By Google
November 2019

New Technology Projection: The Total Economic Impact™ Of Anthos

Projected Business Benefits And Cost
Savings Enabled By Anthos For
Application Platform Operators,
Developers, And Security Professionals

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Key Benefits



Reduced non-coding activities for developers:
23% – 38%



Improved productivity for security tasks:
58% – 75%



Accelerated application migrations:
58% – 75%



Increased platform operations efficiency:
40% – 55%

Executive Summary

In the race to deliver the best customer experiences, companies must build and modernize applications faster and more efficiently than ever before. New container-based “cloud-native” tools and services have emerged to serve this need, but enterprises need more than a collection of open source technologies. They need consistent ways to develop, secure, and manage apps at scale across their growing hybrid cloud environments.

Anthos is Google Cloud’s application modernization platform for hybrid cloud environments. It offers a packaged and integrated set of cloud-native tools and services, based on leading open source technologies, that aims to simplify and accelerate app modernization both on-premises and in public clouds.

Google commissioned Forrester Consulting to conduct a New Technology Total Economic Impact™ (TEI) study and examine the potential ROI enterprises may realize by deploying Anthos. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Anthos on their organizations. Forrester interviewed five Anthos customers and one Istio service mesh user to evaluate the benefits, costs, and risks of an investment in Anthos.

Customer Journey

Prior to Anthos, interviewed organizations used fragmented technology to build, deploy, modernize, and manage applications in their on-premises and cloud environments. Without a consistent, managed platform, they misspent time for valuable technical resources and fell short of business demands for improved velocity, customer experience, and sales:

- › Developers wasted labor configuring apps and environments, meeting guidelines, and waiting for customer feedback. They also lacked the tools to effectively migrate existing apps to the cloud.
- › Security professionals struggled to patch vulnerabilities and enforce policies across different environments.
- › Platform operations teams spent excess labor monitoring, patching, updating, automating, and managing both business apps and legacy platforms across their on-premises and cloud environments.

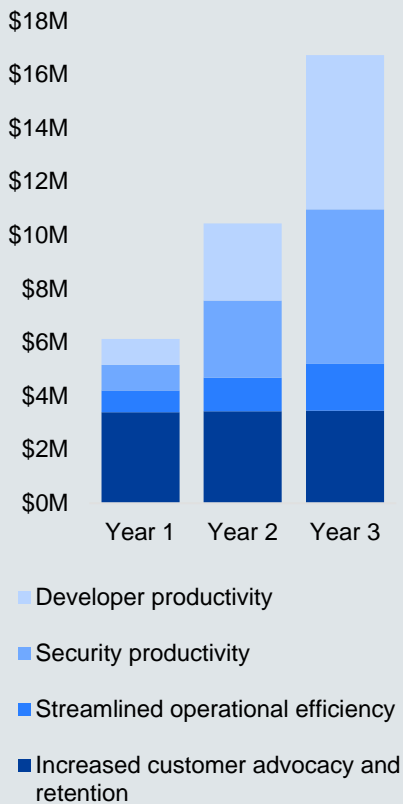
Organizations desired a consistent experience for developers, security professionals, and operations teams to modernize apps faster and with confidence. They turned to Anthos to deliver automation, speed, and scale to their modern application development toolchain — with the experience they enjoy on the public cloud in their own data centers.

Financial Results

Interviewed customers project that their investment in Anthos will accelerate and empower developers, security professionals, and platform and operations engineers alike — enhancing employee and customer experiences, saving bottom-line costs, and increasing top-line revenue.

Forrester developed a composite organization and aggregate financial analysis based on customer interview data to illustrate the potential Total Economic Impact of Anthos for an organization. The composite organization is a large, global enterprise with annual revenues of \$5 billion

Annual Benefits For The Composite Organization Medium Impact Projection



“Anthos is eliminating the complexity of managing our environments. It’s reducing our operational costs, and we’re able to reallocate headcount to higher-value tasks. It allows us to move our application workloads seamlessly between our environments, which ultimately provides value to the customers and gives them confidence in the service availability they’re looking for. It allows our development teams to focus on providing the best set of applications that they can.”

*Director of cloud platform,
security industry*

and 15,000 employees that deploys Anthos with 100 vCPUs in Year 1, 500 vCPUs in Year 2, and 1,000 vCPUs in Year 3. All values are reported in risk-adjusted, three-year present value (PV) unless otherwise indicated.

Quantified benefits. Forrester projects total benefits of \$15.3 million to \$42.8 million over three years for the composite organization, including:

- › **Faster application development, testing, and deployment saves \$5.3 million to \$9.9 million over three years.** Anthos significantly improves development productivity by allowing developers to spend more time coding, testing, and experimenting rather than deployment or configuration activities. The composite organization is projected to reduce time spent on non-coding activities by 23% to 38%, saving annual labor costs equivalent to 45 to 75 FTEs by Year 3.
- › **Consistent, unified security policy creation and governance saves \$5.3 million to \$9.7 million over three years.** Anthos boosts security team productivity by simplifying consistent security policy creation, deployment, and enforcement. The composite organization is projected to improve productivity for security tasks dramatically by 60% to 96%, saving annual labor costs equivalent to 45 to 72 FTEs by Year 3.
- › **Streamlined and automated platform operations boost efficiency by \$1.8 million to \$4.2 million over three years.** Platform engineers can more quickly configure, patch, and update platform components, release software, and migrate applications into Anthos across the hybrid environment. The composite organization is projected to: improve operations productivity by 40% to 55%; accelerate app migration and modernization by 58% to 75%; and nearly eliminate patching and release activities with a 90% to 97.5% reduction, saving annual labor costs equivalent to 11 to 25 FTEs by Year 3.
- › **Accelerated development velocity and improved app dependability enhances customer experience, increasing customer advocacy and retention for a lift in sales profits of \$3 million to \$19 million over three years.** Anthos helps companies ensure application performance, availability, resiliency, and dependability. It also helps teams dedicate more time to development, release more frequently, and shorten time-to-market — providing customers with enhanced performance and capabilities. By enhancing customer experience, Anthos therefore helps increase sales via improved acquisition, retention, and enrichment. The composite organization is projected to reduce application downtime by 20% to 60% and increase retention and acquisition by 0.1% to 0.7%, driving \$1.2 million to \$7.7 million in additional annual profit by Year 3.

Unquantified benefits. Customers expected additional benefits that could not yet be quantified, including:

- › **Enhanced employee experience.** Anthos provides a consistent experience across environments, can help eliminate redundant work, and can improve workload predictability and control. Customers therefore expect Anthos to enhance employee experience, potentially helping them better attract, hire, and retain employees.
- › **Reduced risk of errors.** Consistent app development and automated policy enforcement can help developers code and deploy with greater confidence, reducing the risk of customer-impacting errors and rework.
- › **Efficient scalability.** Anthos enables operators to centrally create and enforce consistent cluster configurations everywhere they run, avoiding future labor to support growing Kubernetes adoption and complexity.



ROI
109% – 484%



Benefits PV
\$15.3 million –
\$42.8 million



NPV
\$8.0 million –
\$35.5 million

- › **Strengthened security.** Anthos can help customers deliver application security by design, instead of piecemeal in different platforms, reducing risk of vulnerabilities and helping address them more quickly.
- › **Consolidated legacy platforms.** Anthos can reduce tools costs and operations labor that would be otherwise needed to manage multiple disparate development environments, tools, and platforms.
- › **Avoided costs for developing a platform of alternative tools.** Sourcing, integrating, and deploying multiple open source tools and services like Kubernetes, Istio, and Knative takes time and resources. Anthos packages and delivers these technologies, ready for use, across the environments with service level agreements (SLAs).
- › **Mitigated risk of vendor lock-in.** Anthos provides application portability across Google Cloud Platform and any VMware-certified on-premises infrastructure without specialized hardware, reducing dependence on specific infrastructure vendors. Since Anthos is built using leading open source components, customers can architect applications in Anthos with a lower barrier to adoption of future tech based on those components.
- › **Reduced infrastructure costs.** In some cases, Anthos can help customers design applications to use underlying hardware and cloud infrastructure more efficiently by optimizing container performance and resource utilization.

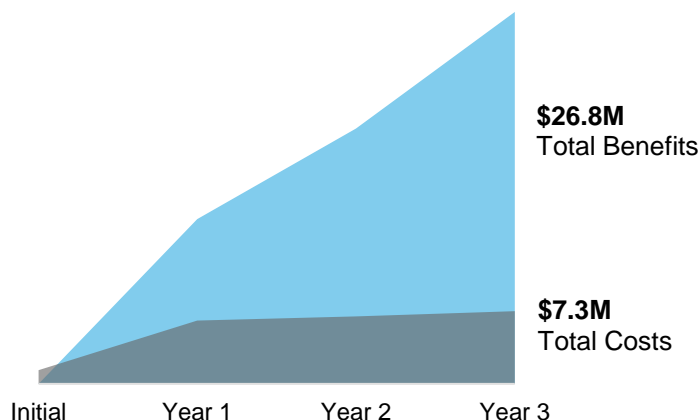
Costs. Forrester projects total costs of \$7.3 million for the composite organization over three years, including:

- › **Implementation and ongoing labor.** Costs include implementation professional services, Anthos training, and ongoing platform support.
- › **Ongoing license and support.** Costs include subscription-based licensing and enterprise support contract costs for Anthos.

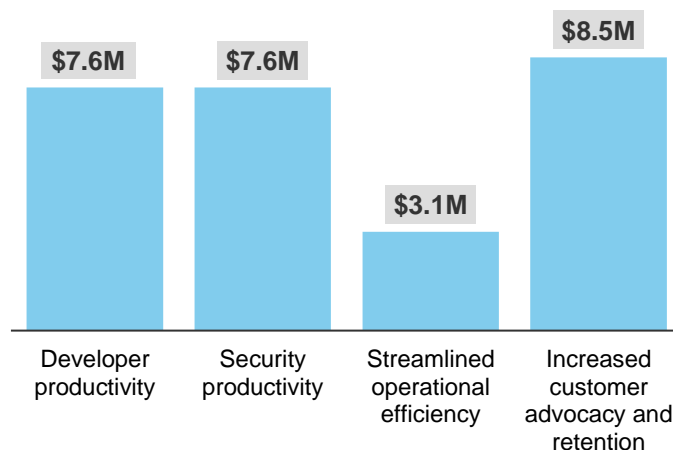
Forrester modeled a range of projected low, middle, and high impact outcomes based on evaluated risk factors. This financial analysis projects that the composite organization accrues the following three-year net present value (NPV) and ROI for each scenario by investing in Anthos:

- › Projected low impact of an \$8.0 million NPV and an 109% ROI.
- › Projected medium impact of a \$19.4 million NPV and a 265% ROI.
- › Projected high impact of a \$35.5 million NPV and a 484% ROI.

Three-Year Financial Summary
Medium Impact Projection



Three-Year Total Benefits
Medium Impact Projection



The Anthos Customer Journey

Moderns Apps Demand Cloud-Native Platforms

Cloud-native tools, architectures, and platforms offer enterprises the most powerful way to accelerate software-driven business transformation today. However, technologies such as microservices, automated DevOps, and cloud-hosted container platforms are advancing too quickly for enterprises to keep up on their own. Companies struggle to effectively and consistently leverage cloud-native technologies because:

- › Piecemeal adoption on-premises and in the cloud leads to inconsistent environments, inefficient operations, and duplicated efforts.
- › Strict business requirements for dependability and security encumber attempts to leverage open source technologies.
- › Platform consolidation efforts can provide consistency, yet shut out other innovations and create unnecessary vendor lock-in.

The most successful app modernization efforts today rely on a key set of cloud-native tools and technologies to accelerate, secure, and simplify development and deployment at scale:

- › **Managed versions of innovative open source technologies** backed by leading vendor contributions, validation, and support. Companies seek open source supported by trusted vendors.
- › **Kubernetes-based enterprise container platforms** that provide consistent development, provisioning, orchestration, and control of container clusters across hybrid cloud environments.
- › **Automated security configuration policy creation and governance** to cost-efficiently integrate security into containers before deployment and protect access to the console and to data, apps, and traffic.
- › **Support for microservices app architectures** to refactor apps into smaller, independent services that enable incremental updates, frequent releases, improved resiliency, and elastic scaling.
- › **A service mesh** that supplies a unified method for connecting, observing, managing, and securing microservices with policies.
- › **Support for serverless programming** to free developers from infrastructure management and efficiently scale resource utilization.

The future of software development is cloud-native, i.e., highly elastic and loosely coupled collections of microservices built and deployed in containers onto highly automated platforms that enable companies to both build and deploy modern applications across a wide range of cloud and on-premises infrastructure platforms.

Interviewed Customers

Forrester interviewed five Anthos customers along with one company that has deployed Istio service mesh. These companies use Anthos for a broad range of application types and sizes. Interviewees included:

INDUSTRY	REGION	INTERVIEWEE	EMPLOYEES	ANNUAL REVENUE
Financial services	Global	Infrastructure lead	50,000	\$14 billion
Financial services	North America	Director of enterprise DevOps	15,000	\$7 billion
Financial services	Global	Head of digital engineering	15,000	\$9 billion
IT services	North America	Partner	Private	Private
Security	Global	Director of cloud platform	15,000	\$3 billion
Retail	North America	IT solutions manager	Over 200,000	Over \$50 billion

Key Challenges Addressed By Anthos

Interviewees stressed the importance of accelerating software-driven innovation to remain competitive and delight customers. However, their pre-Anthos development environments held them back from successful modernization. Before Anthos, interviewed customers reported that:

- › **Legacy technology inhibited business success.** Legacy tools and infrastructure hampered agility, wasted costs, and hurt customer experience. Interviewees knew they needed to modernize, as explained by an IT services partner, “It’s becoming critical for organizations to go to market quicker, to be competitive, reduce cost, and move to cloud.”
- › **Development teams spent too much time on non-coding activities.** Developers wasted labor configuring applications and environments, meeting security and policy guidelines, and waiting for customer feedback due to lengthy release cycles.
- › **Security teams struggled to patch vulnerabilities and enforce policy across different environments.** Organizations lacked a unified, consistent application platform across cloud and on-premises environments. As a result, security pros needed to create policies and secure different application environments manually, adding friction to security and compliance operations. This posed risks, as a security pro explained: “If it takes you three months to patch a zero-day, that opens your business up to a lot of risk you could otherwise mitigate.”
- › **Platform operations teams fought application downtime and faced long hours.** Without a consistent operating environment, platform operations were manual, piecemeal, slow, and prone to errors. Businesses suffered from forced downtime and outages, off-hours reconfigurations, and delayed software releases.
- › **Company culture was stagnated by legacy development platforms and processes.** Employees struggled to collaborate and quickly experiment due to redundant and time-consuming manual processes. By modernizing the technology stack, interviewees aimed to transform their cultures, as stated by a director of enterprise DevOps, “It’s all about a culture of continuous improvement, and Anthos helps enable that because of the speed that it allows us to experiment.”

“It’s becoming critical for organizations to go to market quicker, to be competitive, reduce cost, and move to cloud.”

Partner, IT services industry

“As the environment that we’re operating in becomes more and more complex and we start thinking about hybrid or multicloud approaches to our environments, we really made sure that it was a priority for us to have that one spot to go to with Anthos.”

Director of cloud platform, security industry

Why Customers Chose Anthos

With Anthos, Google Cloud offers a cloud-native application modernization platform, based on supported versions of open source technologies, that runs on Google Cloud Platform and VMware-certified on-premises infrastructure. Anthos includes:

- › Google Kubernetes Engine, a robust enterprise container deployment and orchestration platform.
- › Centralized configuration management to automate and enforce security policies across environments.
- › Anthos Service Mesh, a managed expansion of Istio service mesh for cross-environment observability, security, and control.
- › Google Cloud Console for multi-cluster Kubernetes management across environments.

- › Cloud Run for managed serverless development based on Knative.
- › Migration services to onboard legacy apps into containers.
- › A partner marketplace of third-party tooling and components.

Interviewees turned to Anthos to power application modernization at their organizations because of its:

- › **Comprehensive, integrated tools and services.** Constructing an application platform from open source components and native public cloud services would have been expensive, time-consuming, and difficult to manage — and likely would be limited in capabilities. Instead, Anthos offers an integrated range of tools and services to support both new app development and existing app modernization, with a broad range of new technologies for customers to utilize. An infrastructure lead said: “We’ve used other solutions before, but I wouldn’t consider them the same as Anthos. None of them can give us the same capabilities as what Anthos can give us in relation to the public cloud and our private data centers.”
- › **Consistent development experience across hybrid environments — without additional hardware.** Anthos enables microservices development, serverless application architectures, service mesh, and Kubernetes on-premises and in the public cloud without additional data center hardware. This was important to empower developer innovation and speed for companies unable to go all-in on public cloud, as an infrastructure lead described: “Our organization isn’t ready for a [public] cloud migration just yet, so Anthos on-premises is going to help us because we don’t have to fully move to cloud but we still can run in a cloud fashion in our own on-premises data center, and we can build products in the same way as building in cloud.”
- › **Support for rapid app delivery and experimentation.** Anthos could automate the infrastructure and security tasks currently keeping developers from coding, which can enable developers to experiment, deploy updates, and react to customer demands with speed and agility. A director of DevOps told Forrester, “Now we can spin up wireframes, get feedback on them quickly, and make changes and reprioritize based on feedback that we’re getting from our customers.”
- › **Unified and automated approach to security.** Interviewees looked to Anthos to bake in security by default via automation, reducing manual tasks and hardening environments. An IT services partner explained: “Anthos is going to drive better security. It’s going to drive better policy management, so the security teams can start to build policy and code instead of having to go do manual audits and then going and looking at different things in environments. Everything has been manual up until now; the way you can now do security with Anthos is very different.”
- › **Consistent operations and scaling across hybrid environments.** Anthos includes consistent automation, platform operations, and orchestrated container infrastructure on-premises and in the public cloud. Additionally, by enabling application portability, interviewees aimed to efficiently deliver performance, scalability, and stability. An infrastructure lead stated: “We always focus on stable environments for customers so they can perform their transactions seamlessly. With Anthos’s rolling releases and autoscaling features, those are features that are going to give us that stable environment and experience.”

“It’s all about a culture of continuous improvement, and Anthos helps enable that because of the speed that it allows us to experiment.”

*Director of enterprise DevOps,
financial services industry*

“Anthos is going to drive better security. It’s going to drive better policy management, so the security teams can start to build policy and code instead of having to go do manual audits and then going and looking at different things in environments. Everything has been manual up until now; the way you can now do security with Anthos is very different.”

Partner, IT services industry

- › **Serverless and service mesh capabilities.** Customers desired these leading-edge capabilities to further amplify microservices' benefits of cost savings, labor savings, dependability, and release speed. For example, business velocity was paramount for a director of DevOps: "Cloud Run and Istio are all about enabling velocity. The more bottlenecks, processes, and [manual intervention] we can remove from the value stream, the quicker we can get things through the pipeline."

Composite Organization

Forrester constructed a TEI framework, a composite organization, and an associated ROI analysis to evaluate the projected Total Economic Impact of Anthos. The composite organization is representative of the five interviewed Anthos customer companies and is used to present the aggregate financial analysis. The composite organization:

- › Is a large, global enterprise with annual revenues of \$5 billion and 15,000 employees.
- › Operates a hybrid IT environment spanning Google Cloud Platform and VMware-certified on-premises hardware.
- › Seeks to improve business and agility by modernizing internal and customer-facing applications and processes. Its strategy is to: 1) develop, deploy, and modernize applications using cloud tools, technologies, and platforms; 2) run IT infrastructure across different environments in a consistent manner; 3) ensure workload portability; and 4) ensure consistent, application-centric security across platforms.
- › Deploys Anthos to manage compute, storage, and memory-intensive workloads, with 100 vCPUs in Year 1, 500 vCPUs in Year 2, and 1,000 vCPUs in Year 3.

Risk Treatment For Benefits And Costs Projections

Projection-based financial modeling introduces inherently more risk than analyzing actual, realized impacts. Forrester's New Technology TEI methodology therefore incorporates a risk factor to adjust projections.

For benefit calculations, Forrester incorporates risk via a range of projected outcomes based on customer interview data. In the benefit financial models, low, middle, and high estimates are included for each input variable to create a potential benefit range.

Costs are more consistent and easily estimated, combining interview data with Google-provided list license and support costs. Forrester therefore uses a simplified approach, adjusting cost upward based on risk to ensure a conservative financial analysis. This is described further in the "Analysis Of Costs" section.

"Istio is a major tool that helps us drive an accountable culture. Before, development teams would throw stuff over the fence and leave operations to deal with it. Now, we've empowered teams to put the lens on themselves, understand what their service is doing, and find and fix problems. It helps us put information in the hands of teams that are accountable for services, letting them feel more comfortable testing and releasing more often."

*IT solutions manager,
retail industry*



Key assumptions

- Large enterprise
- \$5 billion annual revenue
- 15,000 employees
- vCPUs

Year 1: 100

Year 2: 500

Year 3: 1,000

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

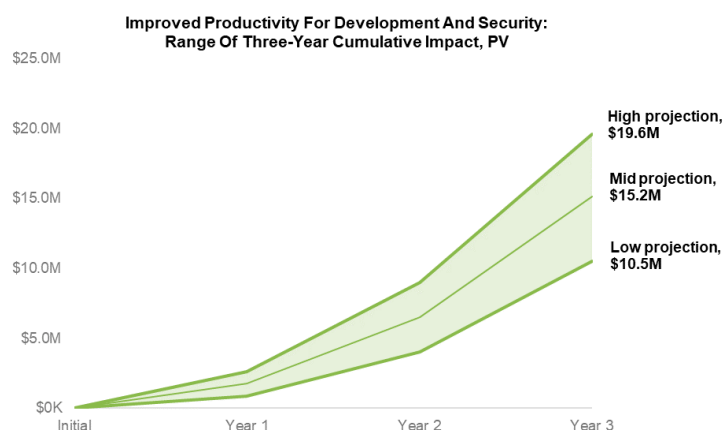
Implementation risk is the risk that a proposed investment may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.

Analysis Of Benefits

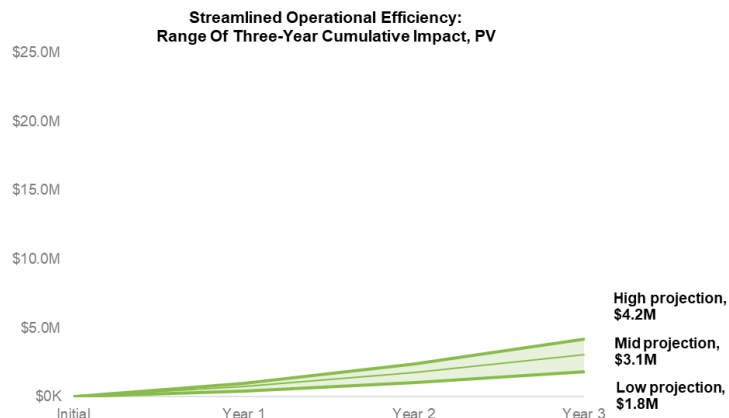
QUANTIFIED BENEFIT DATA AS APPLIED TO THE COMPOSITE

Total Benefits

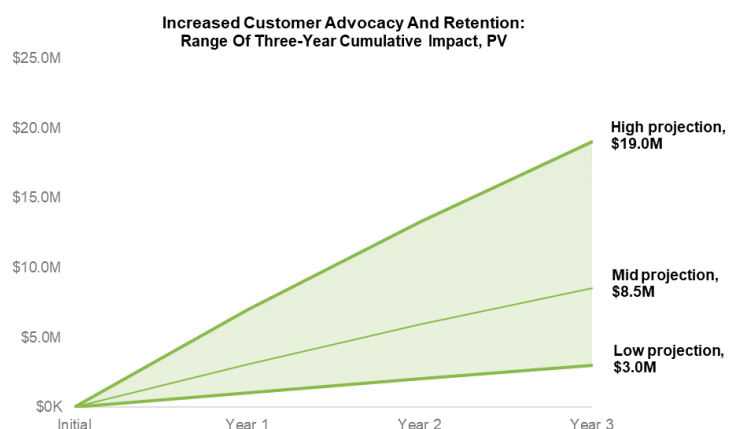
BENEFIT PROJECTION	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
All productivity and sales benefits (Low)	\$2,620,833	\$5,775,079	\$10,885,910	\$19,281,822	\$15,334,113
All productivity and sales benefits (Mid)	\$6,125,943	\$10,441,790	\$16,723,821	\$33,291,554	\$26,763,472
All productivity and sales benefits (High)	\$11,563,854	\$17,050,900	\$24,216,131	\$52,830,885	\$42,798,185



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 have a projected PV range of \$15.3M to \$42.8M.



The graphs to the left show the projection range for each quantified benefit category. Adding these benefits together will result in the total benefits values listed in the table above.



Benefit 1: Improved Productivity For Development And Security

Interviewees projected that Anthos will enhance productivity and employee experience for both developers and security professionals:

- › **Faster application development, testing, and deployment.** With Anthos, developers can focus on what matters, i.e., writing code for the business. A myriad of capabilities such as consistent on-premises and cloud tooling, containerization, microservices, and increasingly serverless and service mesh capabilities, along with many more, can add up to more than the sum of their parts in Anthos. Developers ultimately save time, produce more value, and enjoy an improved experience along the way. An IT services partner shared: “Anthos will eliminate a lot of meetings because everyone is going to be speaking the same language. They will leverage the same platform; they can just use the ‘standard’ approach with much less explanation needed. [Developers] had to spend probably 25% of their time just wrangling environments before, trying to configure or reconfigure environments, or even getting their laptop to work so they can move forward.”
- › **Consistent, unified security policy creation and enforcement.** Anthos can help modernize and automate application security throughout the software supply chain. Standardized security delivered via automation and configuration management can eliminate manual labor, reduce risks of oversights, and ultimately strengthen security posture without holding back application release velocity. A head of digital engineering said: “Centralized control with Anthos is a big benefit. We can set up a configuration once and use it in 300 services. Imagine having to manually check each of 300 services every time there’s a change.” Interviewees also valued that Google has taken over many of their security-related responsibilities within Anthos environments. Further, Google’s service mesh may offer even greater security through monitoring, visibility, and policy configurations.

Forrester modeled the financial impact for the composite organization based on the following estimates:

- › Anthos is utilized by 100 software developers in Year 1, increasing to 200 and 300 in Years 2 and 3, respectively, as the composite continues to onboard more developers to take advantage of the platform.
- › Developers previously spent 65% of their time on non-coding activities. Anthos is projected to cut this waste by 23% to 38%, reducing time spent on non-coding activities to between 50% (low impact) and 40% (high impact).
- › Security engineers and developers previously spent 25% of their time on security policy deployment. Anthos is projected to cut this waste by 60% to 96%, reducing time spent deploying security policy to between 10% (low impact) and 1% (high impact).
- › The average fully burdened annual salary of developers, engineers, and IT service consultants is \$120,000, for calculation simplicity.
- › Eighty percent of time saved by Anthos is recaptured by the organization for additional business value.

Forrester projects that Anthos yields a three-year PV of \$10.5 million to \$19.6 million in development and security productivity. Low, mid, and high estimates are summarized and detailed in the calculation tables shown below.



- Reduced time spent on non-coding activities by **23% to 38%**
- Reduced time spent on security policy deployment by **60% to 96%**

“From a productivity perspective, reducing lead time from two weeks to 24 hours, and adding all that up for the 70 applications that are running in our Anthos environment today and the potential for another two or three dozen next year. Those are significant gains for our application teams as they’re delivering new capabilities.”

*Director of enterprise DevOps,
financial services industry*

“When it comes to security, that’s where Anthos really differentiates itself.”

*Head of digital engineering,
financial services industry*

Benefit 1: Improved Productivity For Development And Security: Summary Table

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
At _{LOW}	Improved productivity for development and security (Low)	\$960,000	\$3,840,000	\$8,640,000	\$13,440,000	\$10,537,641
At _{MID}	Improved productivity for development and security (Mid)	\$1,920,000	\$5,760,000	\$11,520,000	\$19,200,000	\$15,160,932
At _{HIGH}	Improved productivity for development and security (High)	\$2,880,000	\$7,680,000	\$14,112,000	\$24,672,000	\$19,567,844

Benefit 1: Improved Productivity For Development And Security: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
A1	Number of developers/engineers (FTEs)	Composite organization	100	200	300		
A2	Percent time spent on non-coding activities, before Anthos	Composite organization	65%	65%	65%		
A3 _{LOW}	Percent time spent on non-coding activities, with Anthos	Composite organization	60%	55%	50%		
A3 _{MID}			55%	50%	45%		
A3 _{HIGH}			50%	45%	40%		
A4 _{LOW}	Subtotal: Improved productivity from reduced non-coding activities (FTEs)	A1*(A2-A3), rounded	5.0	20.0	45.0		
A4 _{MID}			10.0	30.0	60.0		
A4 _{HIGH}			15.0	40.0	75.0		
A5	Percent time spent on security policy deployment, before Anthos	Composite organization	25%	25%	25%		
A6 _{LOW}	Percent time spent on security policy deployment, with Anthos	Composite organization	20%	15%	10%		
A6 _{MID}			15%	10%	5%		
A6 _{HIGH}			10%	5%	1%		
A7 _{LOW}	Subtotal: Improved productivity from reduced security policy deployment efforts (FTEs)	A1*(A5-A6), rounded	5.0	20.0	45.0		
A7 _{MID}			10.0	30.0	60.0		
A7 _{HIGH}			15.0	40.0	72.0		
A8 _{LOW}	Subtotal: Improved productivity with Anthos (FTEs)	A4+A7	10.0	40.0	90.0		
A8 _{MID}			20.0	60.0	120.0		
A8 _{HIGH}			30.0	80.0	147.0		
A9	Fully burdened developer/engineer annual salary	Composite organization	\$120,000	\$120,000	\$120,000		
A10	Productivity capture	Composite organization	80%	80%	80%		
At _{LOW}	Improved productivity for development and security	A8*A9*A10	\$960,000	\$3,840,000	\$8,640,000	\$13,440,000	\$10,537,641
At _{MID}			\$1,920,000	\$5,760,000	\$11,520,000	\$19,200,000	\$15,160,932
At _{HIGH}			\$2,880,000	\$7,680,000	\$14,112,000	\$24,672,000	\$19,567,844

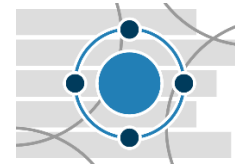
Benefit 2: Streamlined Operational Efficiency

Anthos can help improve the user experience, speed, consistency, and security of application modernization, development, monitoring, and management. By using Anthos, interviewees project notable enhancements to their operations and migration productivity:

- › **Reduced platform management labor.** Cloud application development services are becoming the preferred development environments, but on-premises infrastructure is here to stay. Anthos provides cloud tools across a hybrid environment, allowing admins to focus their efforts on one platform. An IT services partner reported: “The biggest value and benefit of Anthos is the common experience you get across environments. You can start to pick a toolkit, start to build a pipeline and methodology around releasing software, and get management from a day-2 perspective. And you’re not going to have to wrangle two, three, five, or 10 different kinds of stacks of that.”
- › **Faster migrations.** Anthos can help the IT operations team more quickly containerize, lift, and shift applications — improving operational efficiency and responsiveness. For example, Anthos boosted legacy application migrations for a head of digital engineering: “In moving our 20-year old application to the cloud, we are able to migrate app components 30 times a day. Without Anthos, this entire process would take three to five times longer.”
- › **Reduced effort for releases and patching.** Microservices accelerate business innovation by breaking complex applications into modular, independently deployable units — allowing application teams to quickly deliver new functionality with minimal disruption. Anthos can therefore empower frequent, nondisruptive releases and patching by combining the benefits of containerization and microservices with automation, monitoring, orchestration, and continuous integration and continuous delivery (CI/CD). For one infrastructure lead: “Our goal is to deploy releases during the day instead of after business hours or even on the weekends, when there are no transactions happening. Anthos is going to relieve the complexity and operational overhead for all release management activities.”
- › **Easier management of customer environments.** Just as Anthos can streamline management of internal environments, so can it help do the same for companies managing environments on behalf of their customers. A director of cloud platform stated: “Anthos allows us to manage our customers’ environments much easier. Without it, we would have to increase headcount every year as we onboarded more customers. Maintaining and managing that customer environment, doing a follow-the-sun model, upgrades, patches, production issues, etc., it becomes very complex to manage without Anthos.”

Forrester modeled the financial impact for the composite organization based on the following estimates:

- › Platform management activities required 12 FTEs before Anthos. Anthos is projected to reduce task labor by 40% to 55%, reducing the number of FTEs needed for platform management to between 7.2 FTEs (low impact) and 5.4 FTEs (high impact).
- › Three apps are migrated in Year 1, 10 in Year 2, and 20 in Year 3.



- Reduced time spent on platform management by **40% to 55%**
- Reduced time to migrate apps by **58% to 75%**
- Reduced release and patching effort by **90% to 97.5%**

“Anthos gives us that one spot to deploy, manage, visualize and see everything. It reduced that additional overhead we had in managing our environments and can now spend more time on higher value tasks.”

*Infrastructure lead,
financial services industry*

- › Application migration and modernization previously required 12 weeks. Anthos is projected to accelerate the process by 58% to 75%, reducing labor per app migrations by 7 weeks (low impact) to 9 weeks (high impact).
- › Twenty hours were spent each month on release and patching activities before Anthos. Anthos is projected to streamline this effort by 90% to 97.5%, significantly reducing monthly release and patching effort to between 2 hours (low impact) and 0.5 hours (high impact).
- › Given customer onboarding growth expectations over the next three years, the composite organization expected to hire between one FTE (low) and five FTEs (high) per year. Anthos streamlines environment management, preventing the need for these new hires.
- › The average fully burdened annual salary of developers, engineers, and IT service consultants is \$120,000, for calculation simplicity.
- › Eighty percent of time saved by Anthos is recaptured by the organization for additional business value.

“Having one spot to see all your Kubernetes clusters and manage your applications in a single pane of glass is a significant benefit. Anthos eliminates the need to have that additional layer for your data centers or other vendors. The management aspect of it is much simpler. The deployment is much simpler.”

*Infrastructure lead,
financial services industry*

Forrester projects that Anthos yields a three-year PV of \$1.8 million to \$4.2 million in streamlined operational efficiency. Low, mid, and high estimates are summarized and detailed in the calculation tables shown below.

Benefit 2: Streamlined Operational Efficiency: Summary Table

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Bt _{LOW}	Streamlined operational efficiency (Low)	\$489,600	\$729,600	\$1,017,600	\$2,236,800	\$1,812,604
Bt _{MID}	Streamlined operational efficiency (Mid)	\$806,400	\$1,248,000	\$1,747,200	\$3,801,600	\$3,077,193
Bt _{HIGH}	Streamlined operational efficiency (High)	\$1,056,000	\$1,708,800	\$2,419,200	\$5,184,000	\$4,189,812

Benefit 2: Streamlined Operational Efficiency: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
B1	Number of FTEs for platform management, before Anthos	Composite organization	12.0	12.0	12.0		
B2 _{LOW}	Number of FTEs for platform management, with Anthos	Composite organization	8.4	7.8	7.2		
B2 _{MID}			7.2	6.6	6.0		
B2 _{HIGH}			6.6	6.0	5.4		
B3_{LOW}	Subtotal: Improved productivity from reduced platform management effort (FTEs)		3.6	4.2	4.8		
B3_{MID}		B1-B2	4.8	5.4	6.0		
B3_{HIGH}			5.4	6.0	6.6		
B4	Number of app migrations per year	Composite organization	3	10	20		
B5	Number of weeks for app migration, before Anthos	Composite organization	12	12	12		
B6 _{LOW}	Number of weeks for app migration, with Anthos	Composite organization	5	5	5		
B6 _{MID}			4	4	4		
B6 _{HIGH}			3	3	3		

Benefit 2: Streamlined Operational Efficiency: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
B7 _{LOW}	Number of weeks saved per migration	B5-B6	7	7	7		
B7 _{MID}			8	8	8		
B7 _{HIGH}			9	9	9		
B8 _{LOW}	Subtotal: Improved productivity from faster app migrations (FTEs)	B4*B7/52, rounded	0.4	1.3	2.7		
B8 _{MID}			0.5	1.5	3.1		
B8 _{HIGH}			0.5	1.7	3.5		
B9	Monthly release effort, before Anthos (hours)	Composite organization	20	20	20		
B10 _{LOW}	Monthly release effort, with Anthos (hours)	Composite organization	2.0	2.0	2.0		
B10 _{MID}			1.0	1.0	1.0		
B10 _{HIGH}			0.5	0.5	0.5		
B11	Number of working hours per year	Composite organization	2,080	2,080	2,080		
B12 _{LOW}	Subtotal: Improved productivity from reduced effort for releases (FTEs)	(B9-B10)*12/B11, rounded	0.1	0.1	0.1		
B12 _{MID}			0.1	0.1	0.1		
B12 _{HIGH}			0.1	0.1	0.1		
B13 _{LOW}	Avoided FTEs due to more efficient management of client environments in Anthos	+1 FTE/year	1	2	3		
B13 _{MID}		+3 FTEs/year	3	6	9		
B13 _{HIGH}		+5 FTEs/year	5	10	15		
B14 _{LOW}	Subtotal: Improved productivity with Anthos (FTEs)	B3+B8+B12+B13	5.1	7.6	10.6		
B14 _{MID}			8.4	13.0	18.2		
B14 _{HIGH}			11.0	17.8	25.2		
B15	Fully burdened annual salary	Composite organization	\$120,000	\$120,000	\$120,000		
B16	Productivity capture	Composite organization	80%	80%	80%		
Bt _{LOW}	Streamlined operational efficiency	B14*B15*B16	\$489,600	\$729,600	\$1,017,600	\$2,236,800	\$1,812,604
Bt _{MID}			\$806,400	\$1,248,000	\$1,747,200	\$3,801,600	\$3,077,193
Bt _{HIGH}			\$1,056,000	\$1,708,800	\$2,419,200	\$5,184,000	\$4,189,812

Benefit 3: Increased Customer Advocacy And Retention

Not only can Anthos reduce bottom-line costs, it can also enhance customer experience and accelerate business velocity — driving top-line financial sales lift. There are many ways Anthos can enhance the customer-facing application performance and availability:

- › **Ensure application availability and performance.** Containerization, microservices, and serverless all help minimize application footprints and make it possible to prioritize and control resources for specific services instead of as an entire monolith. Application portability helps place those services in whichever on-premises or cloud environment is needed. And meanwhile, automation, orchestration, monitoring, and a service mesh can all help continuously discover which of those services need resources the most, prioritize, quickly provide them with what they need, and help them communicate more efficiently. This



- Increased revenue by **0.1% to 0.7%** via advocacy and retention
- Reduced application downtime events by **20% to 60%**

helps companies prioritize and ensure performance falls within SLAs for internal and customer-facing applications, while reducing the risk of downtime events. Ultimately, Anthos can help enhance scalability, resiliency, performance, availability, and dependability.

Anthos helped a security company quickly identify and remediate issues as its director of cloud platform explained: “Anthos allows us to move an application quickly if we need to. Among other things, this helps with application uptime and availability, which is especially crucial for our customer-facing applications.”

- › **Accelerate business velocity.** Anthos can help teams work with greater agility and reallocate time from unnecessary, time-wasting tasks. Developers can save time when working on containerized microservices backed by automated infrastructure and security policies. Their work can be tested faster with less risk to application dependencies, and then deployed more quickly and frequently through CI/CD pipelines powered by the container platform and related services. This means that the business moves at a greater velocity by releasing features and patches faster and more frequently, accelerating innovation, reducing time-to-market, and ultimately benefiting customers with enhanced performance and capabilities.

Anthos is accelerating time-to-market for a financial services company with faster, more frequent releases, as its director of enterprise DevOps explained: “We used to deploy updates to our core applications on a quarterly basis, right now we’re deploying monthly, and with Anthos we’re expecting to improve to a weekly deployment. That’s a 13x improvement on time-to-market.” It also helped the company’s teams focus on innovation, as its director of enterprise DevOps continued: “We can now spend more time with the application teams, ensuring that they’re doing the right things from an architectural perspective, without having to worry about infrastructure upgrades on a monthly basis. This frees up our engineers to do more value-added and innovation activity.”

- › **Improve customer experience.** Enhanced application availability and performance reduces the likelihood that customers experience frustrating issues or downtime. Increased business velocity means that customers not only benefit from receiving updates sooner, they also benefit from a greater amount of improvements being completed in the same amount of time. Delivering more feature-rich and dependable applications will ultimately delight customers.
- › **Increase sales via advocacy and retention.** Improving customer experience enhances advocacy, retention, and enrichment. They become advocates, helping businesses reach new customers in the marketplace. They are less likely to churn, ensuring ongoing revenue. And they are more likely to increase the frequency or value of their purchases. Ultimately, this translates to increased sales for the business with greater revenue, and therefore, greater profit.

Forrester modeled the financial impact for the composite organization based on the following estimates:

- › Annual revenues of \$5 billion at a profit margin of 20%.
- › Ten application downtime events occur per year before Anthos, each lasting at least 1 hour.
- › Each hour of downtime costs an average of \$570,776 in lost revenue.

“Anthos allows us to move an application quickly if we need to. Among other things, this helps with application uptime and availability, which is especially crucial for our customer-facing applications.”

*Director of cloud platform,
security industry*

“We can now spend more time with the application teams, ensuring that they’re doing the right things [...] without having to worry about infrastructure upgrades on a monthly basis. This frees up our engineers to do more value-added and innovation activity.”

*Director of enterprise DevOps,
financial services industry*

“Istio helps provide a more flexible release schedule. Standardizing our release process helps teams deploy throughout the day instead of waiting for the next monthly or biweekly event.”

*IT solutions manager,
retail industry*

- › Anthos is projected to increase revenue by between 0.1% (low impact) and 0.7% (high impact) via increased retention and acquisition.
- › Anthos is projected to prevent between 20% (low impact) and 60% (high impact) of application downtime events.

Forrester projects that Anthos therefore increases sales profits via increased customer advocacy and retention by a three-year PV of \$3.0 million to \$19.0 million in profit. Low, mid, and high estimates are summarized and detailed in the calculation tables shown below.

Benefit 3: Increased Customer Advocacy And Retention: Summary Table

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Ct _{LOW}	Increased customer advocacy and retention (Low)	\$1,171,233	\$1,205,479	\$1,228,310	\$3,605,022	\$2,983,868
Ct _{MID}	Increased customer advocacy and retention (Mid)	\$3,399,543	\$3,433,790	\$3,456,621	\$10,289,954	\$8,525,347
Ct _{HIGH}	Increased customer advocacy and retention (High)	\$7,627,854	\$7,662,100	\$7,684,931	\$22,974,885	\$19,040,529

Benefit 3: Increased Customer Advocacy And Retention: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
C1	Annual revenue, before Anthos	Composite organization	\$5,000,000,000	\$5,000,000,000	\$5,000,000,000		
C2 _{LOW}	Percent increase in revenue due to net new customers and improved customer retention	Composite organization	0.1%	0.1%	0.1%		
C2 _{MID}			0.3%	0.3%	0.3%		
C2 _{HIGH}			0.7%	0.7%	0.7%		
C3	Profit margin	Composite organization	20%	20%	20%		
C4_{LOW}	Subtotal: Increased profit from increased revenue	C1*C2*C3	\$1,000,000	\$1,000,000	\$1,000,000		
C4_{MID}			\$3,000,000	\$3,000,000	\$3,000,000		
C4_{HIGH}			\$7,000,000	\$7,000,000	\$7,000,000		
C5	Number of customer-facing application downtime events lasting at least an hour, before Anthos	Composite organization	10	10	10		
C6	Revenue loss per hour of downtime	C1/(365*24), rounded	\$570,776	\$570,776	\$570,776		
C7 _{LOW}	Percent reduction in downtime events with Anthos	Composite organization	15%	18%	20%		
C7 _{MID}			35%	38%	40%		
C7 _{HIGH}			55%	58%	60%		
C8_{LOW}	Subtotal: Increased profit from avoided revenue loss	C5*C6*C7*C3, rounded	\$171,233	\$205,479	\$228,310		
C8_{MID}			\$399,543	\$433,790	\$456,621		
C8_{HIGH}			\$627,854	\$662,100	\$684,931		
Ct_{LOW}	Increased customer advocacy and retention	C4+C8	\$1,171,233	\$1,205,479	\$1,228,310	\$3,605,022	\$2,983,868
Ct_{MID}			\$3,399,543	\$3,433,790	\$3,456,621	\$10,289,954	\$8,525,347
Ct_{HIGH}			\$7,627,854	\$7,662,100	\$7,684,931	\$22,974,885	\$19,040,529

Unquantified Benefits

Interviewed customers expect Anthos to provide additional benefits to their organizations. Although these customers lack the necessary usage experience, data, or metrics to quantify the impact, these benefits were important to interviewees. Unquantified benefits can include:

- › **Enhanced employee experience.** Anthos can be used to automate redundant manual tasks and provide a consistent experience across hybrid environments. In place of frustration and monotony, Anthos therefore can empower employees to spend their time on interesting, value-add work. Anthos can also provide greater control and predictability to employee workloads, as an infrastructure lead explained: “Anthos allows us to deploy ‘rolling’ updates, which means we no longer need to wait until after business hours or the weekend to deploy updates to avoid impacting our customers. This is a major win for us because we don’t want our employees to spend their weekends working if we can avoid it.” By helping enhance employee experience, customers are hoping that Anthos can ultimately help them attract, hire, and retain employees — potentially reducing recruitment and replacement costs while protecting human capital.
- › **Reduced risk of errors.** Anthos can help developers write and deploy code with greater confidence. Working on containerized microservices reduces the scope and potential impact of any one update. Meanwhile, enforcement of consistent application development environments combined with automation, CICD, and service mesh help ensure code is correct by default while also helping deploy, route, and manage the applications effectively. This empowers developers to code with less risk of errors, to deploy to small user groups for limited testing, and to control traffic and resources to ensure performance and availability around the clock. The result is fewer customer-impacting issues and less rework. For example, an IT solutions manager found that the Istio service mesh helped them control their releases: “Istio helped us enable canary releases, traffic shifting, and traffic shaping. This is a big benefit as more and more teams try them out.”
- › **Streamlined configuration policy.** As Kubernetes deployments grow, it becomes difficult to ensure consistent access controls, security policies, and other cluster configurations. Anthos Configuration Management provides a centralized repository of declarative configurations that can be continuously applied to ensure security and access controls are enforced on all clusters, whether on-premises or in the cloud. This saves time for operations teams as adoption increases.
- › **Strengthened security.** Avoiding data breaches and meeting regulatory compliance mandates isn’t optional. Anthos can help efficiently and cost-effectively deliver security-by-design across the hybrid environment with policy configuration, automation, and monitoring that hardens the environment and reduces attack surfaces. Anthos also empowers developers to accelerate release velocity, enabling more frequent patching, especially for zero-day threats. Combined, Anthos can help prevent vulnerabilities, shorten the time to close vulnerabilities, and mitigate potential attack impact.
- › **Consolidated legacy platforms.** Disparate vendor and open source solutions can balloon the costs of licensing, hardware, professional services, and internal labor. With Anthos as a consistent platform,

“In our prior environment, when you did the release you needed to stop the production traffic going into that environment to update all the nodes, and then you could start bringing the traffic back. With Anthos, you can effectively do rolling updates.”

*Infrastructure lead,
financial services industry*

“Dealing with security vulnerabilities, quickly, is important. If it takes you three months to patch a zero-day, that opens your business up to a lot of risk you could otherwise mediate. We see breaches just because organizations don’t update their environments in a timely manner. The cost to your brand is huge. So, being able to release a patch in a day, it’s hard to quantify how high that dollar value is.”

Partner, IT services industry

managing the environment and even managing the vendor contract with Google itself becomes more streamlined.

- › **Avoided costs for developing a platform of alternative tools similar to Anthos.** Sourcing, integrating, and deploying multiple open source tools and services like Kubernetes, Istio, and Knative takes time and resources. Anthos packages and delivers these technologies, ready for use, across the hybrid environment. In lieu of Anthos, organizations would eventually have needed to invest in other open source, vendor, or homegrown solutions to manage and modernize their applications and infrastructure.
- › **Mitigated risk of vendor lock-in.** Anthos provides application portability across Google Cloud Platform and any VMware-certified on-premises infrastructure, reducing dependence on specific infrastructure vendors. Further, Anthos is delivered completely via software and therefore does not require purchase and installation of any specialized hardware in the data center. Finally, since Anthos is built using leading open source components, customers can architect applications in Anthos with a lower barrier to adoption of future tech based on those components.
- › **Reduced infrastructure costs.** Modernizing applications and infrastructure with hybrid management, CI/CD, containerization, microservices, and serverless all aim to help organizations use only the resources they need, when they need it. With application portability and greater control over resource provisioning for microservices and containers versus monolithic applications, organizations can reduce wasted space and balance applications across their on-premises and cloud infrastructure. Serverless can take it to the next level by allowing development of applications that can scale to zero when no longer needed. Ultimately, organizations aim to improve their on-premises hardware utilization, avoid future hardware purchases, and ensure they only use and pay for the cloud resources they actually need. However, interviewees cautioned that resource utilization savings may be offset by the resource demands of additional services; for example, the retail company using Istio found that service mesh sidecars required 10% to 20% more resources.

“There are three pillars of benefits [from Istio]: observability, security, and routing. As more teams gain confidence and maturity in Istio, they will come to realize they have a powerful machine and will start to take advantage of the horsepower.”

*IT solutions manager,
retail industry*

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	Implementation and ongoing internal labor costs	\$460,000	\$2,055,096	\$1,972,296	\$1,889,496	\$6,376,888	\$5,377,872
Etr	Ongoing license and support costs	\$0	\$300,000	\$780,000	\$1,380,000	\$2,460,000	\$1,954,170
Total costs (risk-adjusted)		\$460,000	\$2,355,096	\$2,752,296	\$3,269,496	\$8,836,888	\$7,332,042

Cost 1: Implementation And Ongoing Internal Labor

Deploying any new application or infrastructure platform (and associated processes and solutions) will require significant labor for planning, design, deployment, change management, training, and ongoing management. An investment in Anthos is no different; however, interviewees saw it as one of the most streamlined ways to accomplish application modernization and maintain the effort in the long term. Interviewed organizations described the following costs related to implementation and ongoing internal labor:

- › Implementation of professional services.
- › Training for developers and engineers on the Anthos platform.
- › Ongoing platform support.

Forrester modeled the financial investment for the composite organization based on the following estimates:

- › Implementation of professional services for planning, design, deployment, and change management of \$400,000.
- › Developer and engineer training on the Anthos platform of 160 hours per user at 100 new users per year.
- › Ongoing platform support of 7.2 FTEs in Year 1, ramping down to 6.0 FTEs in Year 3 as engineers become more familiar with Anthos.
- › Developer/engineer fully burdened annual salary of \$120,000.

This cost can vary due to uncertainty related to:

- › Legacy architecture (such as current code base, age of monolithic applications, and usage of containers and microservices), existing infrastructure, and desired scope of the Anthos deployment.
- › Additional complexity, knowledge, and labor required to deploy leading edge technologies like service mesh and serverless.
- › Internal expertise and professional services costs.
- › Number of users and their level of expertise and needed training.

To account for these risks, Forrester adjusted this cost upward by 15%, yielding an annual cost ranging from \$2.1 million to \$1.9 million, with a three-year, risk-adjusted total PV of \$5.4 million.

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 have a PV of \$7.3 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.

Cost 1: Implementation And Ongoing Internal Labor: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
D1	Professional services	Composite organization	\$400,000			
D2	Number of developers/engineers needing training	$A1_{\text{CURRENT}} - A1_{\text{PRIOR}}$		100	100	100
D3	Training/change management hours	Composite organization		160	160	160
D4	Fully burdened hourly salary for developers/engineers	A9/2,080, rounded		\$57.69	\$57.69	\$57.69
D5	Ongoing platform support (FTEs, mid-point estimate)	B2 _{MID}		7.2	6.6	6.0
D6	Fully burdened annual salary for developers/engineers	A9		\$120,000	\$120,000	\$120,000
Dt	Implementation and ongoing internal labor costs	$D1 + D2 * D3 * D4 + D5 * D6$	\$400,000	\$1,787,040	\$1,715,040	\$1,643,040
	Risk adjustment	↑15%				
Dtr	Implementation and ongoing internal labor costs (risk-adjusted)		\$460,000	\$2,055,096	\$1,972,296	\$1,889,496

Cost 2: Ongoing License And Support

Organizations that deploy Anthos will incur ongoing subscription-based licensing and support costs. Based on the customer interviews and Google's list pricing, Forrester estimates for the composite organization:

- › One hundred vCPUs in Year 1, ramping up to 500 and 1,000 vCPUs in Years 2 and 3, respectively.
- › A monthly cost of \$10,000 per 100 vCPUs.
- › A monthly enterprise support cost of \$15,000.

This yields an annual cost ranging from \$300,000 to \$1.4 million, with a three-year total PV of \$2 million.

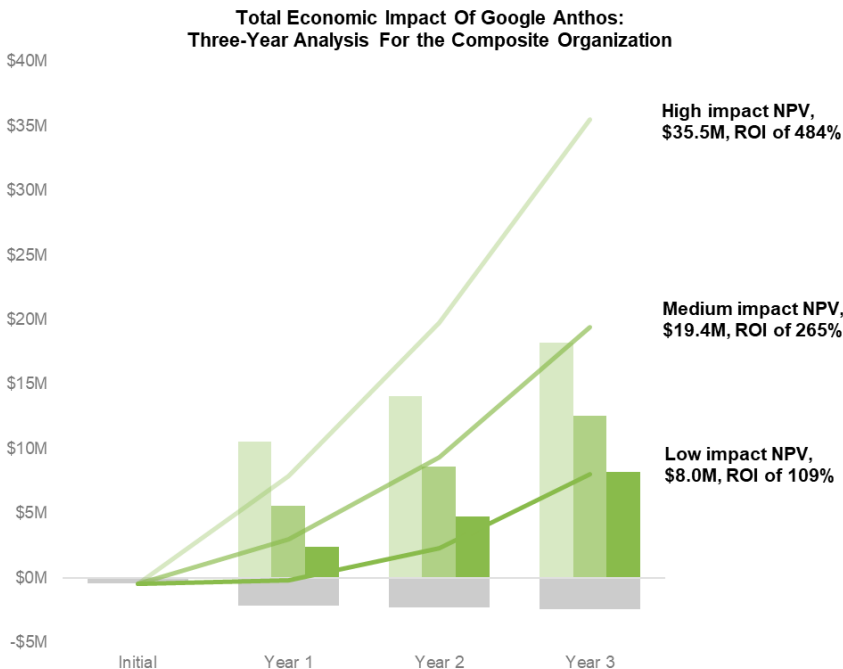
Cost 2: Ongoing License And Support: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	Total number of vCPUs in Anthos	Composite organization		100	500	1,000
E2	Cost per 100 vCPUs, per month	Composite organization		\$10,000	\$10,000	\$10,000
E3	Subtotal: Monthly cost of vCPUs in Anthos	$E1/100 * E2$		\$10,000	\$50,000	\$100,000
E4	Monthly enterprise support	Composite organization		\$15,000	\$15,000	\$15,000
Et	Ongoing license and support costs	$(E3 + E4) * 12$		\$300,000	\$780,000	\$1,380,000
	Risk adjustment	0%				
Etr	Ongoing license and support costs (risk-adjusted)		\$0	\$300,000	\$780,000	\$1,380,000

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)



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



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

Cash Flow Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	(\$460,000)	(\$2,355,096)	(\$2,752,296)	(\$3,269,496)	(\$8,836,888)	(\$7,332,042)
Total benefits (low)	\$0	\$2,620,833	\$5,775,079	\$10,885,910	\$19,281,822	\$15,334,113
Total benefits (mid)	\$0	\$6,125,943	\$10,441,790	\$16,723,821	\$33,291,554	\$26,763,472
Total benefits (high)	\$0	\$11,563,854	\$17,050,900	\$24,216,131	\$52,830,885	\$42,798,185
Net benefits (low)	(\$460,000)	\$265,737	\$3,022,783	\$7,616,414	\$10,444,934	\$8,002,071
Net benefits (mid)	(\$460,000)	\$3,770,847	\$7,689,494	\$13,454,325	\$24,454,666	\$19,431,430
Net benefits (high)	(\$460,000)	\$9,208,758	\$14,298,604	\$20,946,635	\$43,993,997	\$35,466,143
ROI (low)						109%
ROI (mid)						265%
ROI (high)						484%

Google Cloud's Anthos: Overview

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



Anthos

Modern Application Platform For Accelerating Application Innovation

Anthos is Google Cloud's new open platform that lets you run an app anywhere — simply, flexibly, and securely. Embracing open standards, Anthos lets you run your applications unmodified on existing on-premises hardware investments or in the public cloud. Anthos helps you modernize any place, any time, and at your own pace. You can modernize on-premises or by moving to Anthos on the cloud. You can modernize all at once or incrementally. Anthos also enables development and operation teams to deploy and automate consistent policies to manage traditional or cloud native applications both on-premises and in the public cloud. You can easily manage and secure your distributed applications with Anthos. It helps you do this consistently from a cloud-based management plane.

Powered By Open Source

As customers look to the cloud for scalability and access to innovative services, getting locked into a single vendor has become a major concern. But with Anthos you have the freedom to modernize without being locked in. Anthos is built on open standards like Kubernetes, Istio, and Knative and delivers portability and agility for developers and operators.

Reliable And Secured Way To Run Kubernetes Clusters

Anthos will make it easier for your platform operators to manage your container-based microservices by leveraging the efficiencies of managed Kubernetes. You can deploy your application on managed Kubernetes clusters in Anthos — on-premises, in the cloud, or on your existing Kubernetes cluster by easily registering with Anthos. And Google Cloud Console gives you a single pane-of-glass view for managing all your clusters across environments.

Automate Application Security

Anthos empowers your security team by automating application security across diverse environments. Anthos allows you to enforce consistent policies codified in declarative configurations from a single source of truth — a central Git repository. Consistent policy enforcement delivers stronger governance.

Application-level Visibility And Observability

Anthos gives operations and development teams increased application-level visibility for container and VM workloads with Anthos. It offers out-of-the-box telemetry for service management and makes it easy to set and view service level objectives to better manage application performance.

Increase Developer Productivity

Anthos delivers on the promise of a “truly developer-centric user experience.” Your operators and developers can seamlessly collaborate to deploy applications faster and more securely than ever before.

Partner Ecosystem

Anthos also has a strong ecosystem of partners who are working with Google to create innovative solutions built with and on Anthos.

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

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 Google Cloud's Anthos.

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 Anthos can have on an organization:



DUE DILIGENCE

Interviewed Google stakeholders and Forrester analysts to gather data relative to Anthos.



CUSTOMER INTERVIEWS

Interviewed five organizations using Anthos to obtain data with respect to costs, benefits, and risks.



COMPOSITE ORGANIZATION

Designed a composite organization based on characteristics of the interviewed organizations.



FINANCIAL MODEL FRAMEWORK

Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.



CASE STUDY

Employed four fundamental elements of TEI in modeling Anthos's impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by 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 report to determine the appropriateness of an investment in Anthos.

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.

Appendix A: New Technology

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. A range of values are projected for benefits.



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.

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: Supplemental Materials

Forrester has infused findings and recommendations for application modernization from its published research within this Total Economic Impact study to help explain the technologies included in Anthos and the ways in which they may impact customers. For more information, please see the following Forrester reports:

- › “Assess The Pain-Gain Tradeoff Of Multicloud Strategies,” Forrester Research, Inc., March 19, 2019.
- › “Best Practices: Cloud Governance,” Forrester Research, Inc., October 9, 2019.
- › “Cloud Powers The Modern Adaptive Enterprise,” Forrester Research, Inc., October 11, 2019.
- › “Harness Emerging Technologies To Guide Business Strategy,” Forrester Research, Inc., February 5, 2019.
- › “How To Capture The Benefits Of Microservice Design,” Forrester Research, Inc., May 26, 2016.
- › “Hybrid Cloud Security Best Practices,” Forrester Research, Inc., June 20, 2019.
- › “Monitoring Containerized Microservices? Elevate Your Metrics,” Forrester Research, Inc., February 25, 2019.
- › “Put Customers At The Center Of Tech Processes,” Forrester Research, Inc., March 5, 2019.
- › “Serverless Development Best Practices,” Forrester Research, Inc., October 2, 2019.
- › “The Forrester New Wave™: Enterprise Container Platform Software Suites, Q4 2018,” Forrester Research, Inc., October 16, 2018.
- › “The Public Cloud Market Outlook, 2019 To 2022,” Forrester Research, Inc., July 2, 2019.
- › “With Microservices, A Service Mesh Helps Developers Focus On The Business,” Forrester Research, Inc., October 24, 2019.