



The Business Value of Amazon Web Services

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BUSINESS VALUE HIGHLIGHTS



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413%
five-year ROI

10 months
to payback

\$66.3M
higher revenue enabled
per year per organization

50%
lower five-year cost of operations

25%
lower cost of infrastructure

47%
more efficient IT infrastructure
teams

69%
fewer unplanned outages

78%
faster deployment of new
compute/storage resources

2.3x
new features delivered per year

Executive Summary

IDC research shows that leaders across IT and the business increasingly view cloud providers as strategic technology partners in today's digital-first world. They are choosing cloud providers for faster access to technologies spanning compute services, data services, application framework services, and usage multiplier services including governance and security. Yet, increasingly, cloud selection processes are going beyond technology considerations to look more deeply at the business value benefits.

IDC expects that by 2023, 40% of the G2000 will reset cloud selection processes to focus on business outcomes rather than IT requirements. Organizational leaders are increasingly expecting cloud providers to partner with them as they migrate on-premises estates to the cloud and make the transition to cloud-native development and governance, including both cost governance and IT governance. CIOs and CTOs will require cloud providers to help them achieve business case goals directly related to corporate strategy. Business value studies are an important part of that objective.

IDC spoke with 41 organizations around the world about their experiences using various Amazon Web Services (AWS) to run many of their most business-critical applications and services. IDC's research demonstrates how interviewed organizations are using various Amazon Web Services solutions to achieve strong value by optimizing the economics of providing IT resources to their businesses while improving their ability to deliver high-quality, timely, and resilient services and applications to their customers and employees.

IDC grouped the financial benefits that study participants reported achieving through their use of AWS into four broad categories, with total annual benefits calculated to be \$33,600 per AWS EC2 virtual instance (\$26.4 million per organization; see Figure 1):

▶ **IT staff productivity benefits:**

Study participants enable IT teams, which include infrastructure, help desk, security, and development teams, to gain from enhanced functionality, performance, and agility. IDC calculates that study participants will realize staff efficiencies worth an annual average of \$17,100 per AWS EC2 virtual instance (\$13.4 million per organization).

▶ **Business productivity benefits:**

Study participants achieve better business outcomes with AWS. They described winning more business by speeding time to market for new services and solutions and improving customer satisfaction. IDC estimates that they will capture higher net revenue and productivity with a value of \$11,600 per AWS EC2 virtual instance (\$9.1 million per organization).

▶ **Risk mitigation — user productivity benefits:**

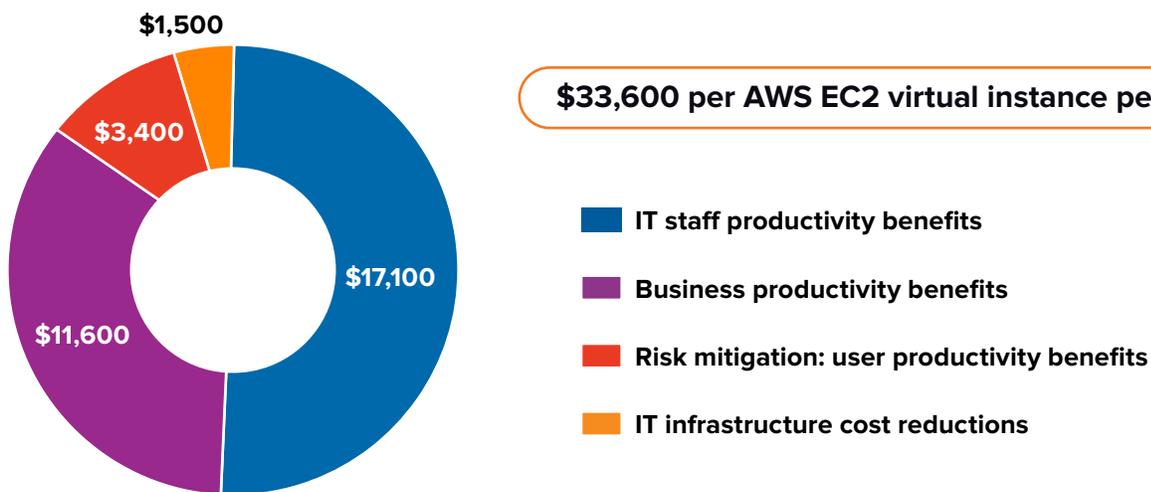
Study participants reduce the impact of operational risk with AWS and reduce direct costs associated with unplanned outages and security issues. IDC calculates that they will see higher productivity and net revenue worth an annual average of \$3,400 per AWS EC2 virtual instance (\$2.6 million per organization).

▶ **IT infrastructure cost reductions:**

Study participants reduce IT resource costs with AWS by moving to opex-focused models with just-in-time provisioning models. IDC projects that they will save an annual average of \$1,500 per AWS EC2 virtual instance (\$1.2 million per organization).

FIGURE 1
Average Annual Benefits per EC2 Virtual Instance

(\$ per EC2 virtual instance)



n = 41; Source: IDC in-depth interviews, February 2022

The Business Value of Amazon Web Services

Study Demographics

IDC conducted research that explored the value and benefits for organizations of using Amazon Web Services. The project included in-depth interviews with 41 organizations around the world, all running enterprise-level workloads on AWS — workloads that previously ran entirely or mostly on on-premises infrastructure environments. Questions asked were both qualitative and quantitative in nature and designed to develop an in-depth, nontheoretical understanding of the impact of AWS on IT costs and processes, IT performance, and business operations. For further detail on IDC's Business Value Study approach, see Appendix A: Methodology and Appendix B: Quantified Benefits of Use of AWS.

Table 1 presents study firmographics for the interviewed AWS customers. Collectively, interviewed organizations shared the profile of a large enterprise with an average of 23,696 employees (median of 8,000) and average annual revenue of \$8.0 billion (median of \$2.9 billion). Study participants represented, a diverse sampling of enterprise-level organizations. Fourteen countries around the globe were represented with a relatively even split among organizations based in North America, EMEA, and APAC. This included 14 study participants based in the United States and four in the United Kingdom, as well as multiple other locations throughout Europe and Asia. The organizations spanned a wide range of industry verticals, including biotechnology, financial services, government, healthcare, insurance, manufacturing, retail, software, telecommunications, travel, and others.

TABLE 1
Demographics of Interviewed Organizations

	Average	Median
Number of employees	23,696	8,000
Number of IT staff	2,359	400
Number of terabytes (total)	883	100
Annual revenue/budget	\$8.0B	\$2.9B
Countries	United States (14), Germany (2), Italy (2), Latvia, Netherlands, United Arab Emirates (2), United Kingdom (4), Australia (2), Hong Kong, India (5), Japan (2), New Zealand, the Philippines (2), and Singapore (2)	
Industries	Biotechnology (2), consumer services, financial services (7), food and beverage, gambling, government, healthcare (2), insurance (2), manufacturing (3), marketing, market research, media (2), medical device manufacturing, pharmaceutical, professional services (2), publishing, retail (2), telecommunications, transportation (3), travel, and utilities (3)	

n = 41; Source: IDC in-depth interviews, February 2022

Choice of Amazon Web Services

Interviewed AWS customers shared their motivations for selecting AWS over both an on-premises environment and other public cloud solutions. The key compelling differentiators distinguishing AWS from competing cloud solutions were reliability and scalability — the ability to scale both up and down with efficiency in response to fluctuating business needs. Customers also pointed out that AWS' flexibility enabled them to adopt and leverage critical new technologies and allows them to accommodate new, sometimes unexpected business opportunities.

Some of the specific benefits that study participants identified as key in helping differentiate AWS from competitors are:

▶ **Scalability allows organization to match capacity to actual demand, IT manager, financial services, United States:**

"We chose AWS for overall infrastructure provisioning capabilities and to be able to scale up and scale down. Previously, our environment was pretty static, and we always had to build for peak capacity because there wasn't enough elasticity."

▶ **Improved ability to deliver applications and capacity, head of IT, transportation, United Kingdom:**

"The biggest challenge we faced was how to distribute our applications globally. We wanted to move to more of a microservices model for publishing applications internally, and we needed to manage capacity flexibility. ... AWS is a much better platform for Linux and microservices workloads."

▶ **Business challenges changed, requiring new IT platform to address, vice president, technology and media, India:**

"Our business has changed, and we've seen a surge into the over-the-top side of content. We were not ready to scale up the technology to that level and face the advancement we needed and the customer challenges we wanted. AWS is the only service provider that has this ecosystem of a complete media supply chain, streaming storage, and archival."

▶ **Focus on scalability and serverless architecture, vice president, hospitality, United States:**

"Scalability was key for us in making the decision to use AWS, and we were moving toward more of a serverless architecture too; in terms of how our services were set up, we definitely wanted an AWS framework to help us out. Serverless is important because it allows better performance of our applications, overall."

Use of Amazon Web Services by Interviewed Organizations

Table 2 details interviewed organizations' use of AWS services and solutions. Analysis of the organizations' usage shows significant use of AWS for compute (EC2), storage (EMR and S3), and database (RDS and Aurora) solutions, alongside important use cases for adopting and leveraging AWS networking services and newer technologies such as serverless (Lambda) and artificial intelligence and machine learning (AI/ML) services.

The scalability that AWS provides, as discussed by a number of interviewed organizations, is reflected in the range of AWS EC2 instances deployed by organizations in the study. The average number of AWS EC2 instances was reported as 785 (median of 263), with a maximum of 1,845 (median of 363). In addition, study participants reported using AWS for 168 databases and more than 28PB of data (28,840TB) in support of 146 applications, with an average of 8,261 users of these applications (all numbers are averages).

More than half of the interviewed organizations' revenue-generating operations are supported by AWS. This statistic conveys the degree of reliance that the interviewed organizations have developed upon AWS (57% of all revenue-generating operations, on average). As these numbers clearly indicate, AWS has become mission-critical to enterprise business operations for these organizations.

TABLE 2
AWS Use by Interviewed Organizations

	Average	Median
Annual spend on AWS	\$4.1M	\$1.7M
Average number of AWS EC2 instances	785	263
Maximum number of AWS EC2 instances	1,845	363
Number of databases	168	40
Number of terabytes	28,840	200
Number of applications	146	28
Number of users of applications	8,261	2,000
Revenue supported	57%	65%

n = 41; Source: IDC in-depth interviews, February 2022

Business Value and Quantified Benefits of Amazon Web Services

Study participants provided numerous examples that tied together the benefits of agility, scalability, and performance with AWS with cost optimization and improved business results, including:

- ▶ **Scalability and costs that align with performance and use, IT manager, medical device manufacturing, United States:**
“With AWS, we have basically improved performance and reliability and enhanced flexibility. For example, initially, during COVID-19, we were able to scale the system and server utilization and pay less. So we have pay for performance with AWS and we can scale up and down.”
- ▶ **Ease and immediacy of scaling, IT manager, media, United Arab Emirates:**
“One of the best things about using AWS is the ability to scale very easily. For example, if we want to scale up our compute power for any reason by 20%, we can do this in 20 minutes.”
- ▶ **Flexibility and ability to drive innovation, cloud platform head, utilities, New Zealand:**
“Computing on demand is the number 1 benefit with AWS, as well as access to a wide variety of services and the ability for us to quickly spin up innovative projects without having to deal with hardware.”

Realizing Better Business Results

Benefits attributed by study participants to their use of AWS, such as improved performance, enhanced agility, and near total scalability, combine to provide an improved customer and end-user experience. As a result, interviewed organizations reported improving their ability to retain existing customers and win new customers. Logically, this translates directly into improved top-line and bottom-line metrics for interviewed AWS customers in the form of higher revenue and, ultimately, profits.

Study participants described numerous ways that AWS provides an enhanced business foundation. Many AWS customers linked their ability to adopt new technologies such as artificial intelligence and machine learning and leverage them across business activities to improved business results. Other features and capabilities included enhanced performance through access to GPU, AWS-enabled expanded functionality of applications and services, and more robust mobile applications with lower latency, among others. All of these combine to improve the experience of customers and users and provide an IT foundation that delivers better results to the business.

Interviewed customers cited myriad ways in which AWS has enabled their businesses. This reflects industry-specific advantages that they have captured as well as differing business pressures. While some organizations have benefited primarily from the ability to bring new services and solutions to the market much faster with AWS, others have established or maintained competitive differentiation through enhanced performance. Other organizations spoke to the ability to create more targeted competitive differentiation with AWS, including the use of analytics or AI/ML automation to respond to and target customer needs. Overall, the message from interviewed AWS customers was consistent: They view the AWS platform as a core component of their ability to run their businesses in a way that can keep up with the pace and requirements of their customers and markets.

Study participants provided numerous examples of how they are achieving business benefits with AWS. The head of IT infrastructure at a financial services organization in Singapore explained: *“Our market is changing quite fast, so we have to be fast to adapt to it, and AWS helps us back into the changing environment. For example, competitors may have some promotion and we don’t want to be left behind, so we want to have a similar promotion. Same with a new function, we want to have new functions to compete, so we need to change and react to our competitors’ new initiatives.”* Likewise, an IT manager at a medical device manufacturer in the United States talked about how AWS has helped it deliver important services to the market faster: *“We launched a COVID-19 testing solution that would normally have taken 18 months, but through use of AWS and the system, we were able to launch in something like 6 months.”*

As shown in **Table 3**, organizations participating in the study linked their use of AWS to substantial business gains in the form of higher revenue. IDC calculates that study participants will realize average annual revenue gains worth \$66.3 million per organization (\$84,400 per AWS EC2 virtual instance). With a 15% operating margin assumption, this equates to net revenue increases of an average of \$9.9 million per organization (\$12,700 per AWS EC2 virtual instance).

TABLE 3
Business Productivity Benefits — Higher Revenue

Revenue Impact	Per Organization	Per EC2 Virtual Instance
Total additional revenue per year	\$66.3M	\$84,400
Assumed operating margin	15%	15%
Total additional net revenue per year*	\$9.9M	\$12,700

n = 41; Source: IDC in-depth interviews, February 2022

* IDC applies a 15% operating margin assumption on total revenue gains. See Appendix A for additional details.

Lower Cost of Operations

As noted, study participants reported considering various factors in selecting AWS but emphasized the importance of reduced operational cost as a key decision criterion. While they gave significant weight to other factors, including AWS’ features, performance, and capabilities, they acknowledged that the cost of providing IT resources remains top of mind. On-premises infrastructure environments in particular were major pain points of cost overruns and ongoing management challenges. Respondents reported often facing a choice between overprovisioning and potentially facing insufficient IT capacity, as well as costs related to day-to-day friction in running their own IT environments.

Participants found that their AWS implementation has yielded dual benefits of lower costs for infrastructure to run equivalent workloads and substantial staff time savings and efficiencies. Overall, IDC calculates that they will save an average of 50% with AWS across these two categories over five years (see **Figure 4**, page 13).

Optimizing Spending on IT Infrastructure Resources

While far from the only consideration, the potential for cost efficiencies with AWS for running equivalent workloads remains a motivating factor in organizations' selection and continued use of AWS. A cost-efficiency analysis should include a comparison with on-premises environments, as this is most frequently the environment from which interviewed organizations are migrating workloads or evaluating as an alternative to AWS. Based on feedback, study participants found that AWS provides a considerably more cost-effective foundation for running their businesses than maintaining an on-premises environment.

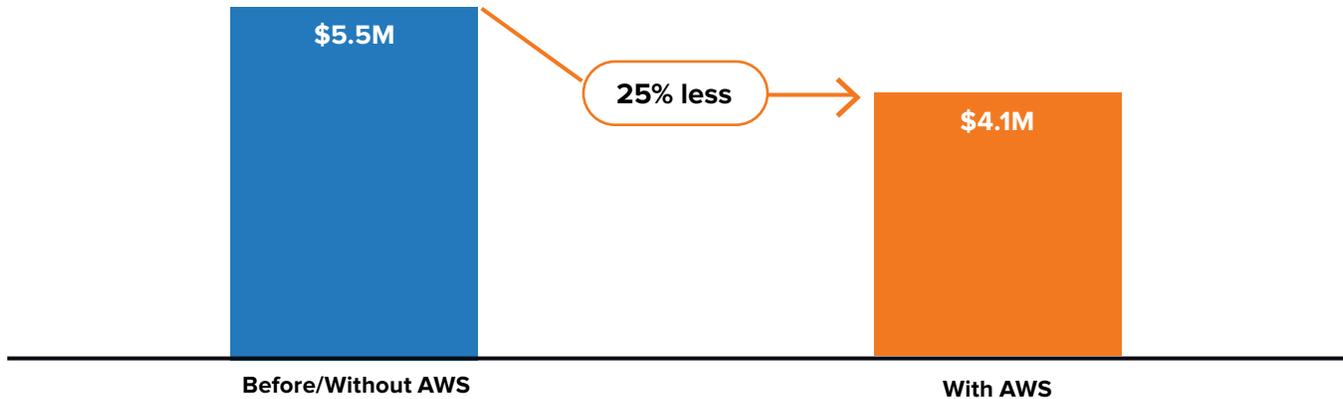
These cost efficiencies relate to several core benefits of AWS. The ability to better match capacity to use stands as a key example of AWS' cost-effectiveness in comparison with on-premises environments. Thus, instead of incurring costs associated with maintaining capacity for occasional peak requirements and thus having low use rates, study participants can adjust capacity as needed and avoid taking on these types of deadweight cost losses.

Organizations participating in the study also reported finding cost efficiencies through harnessing and scaling new technologies such as containerization and microservices with AWS. Further, enhanced visibility into actual business usage enabled by AWS was noted as an additional driver of cost efficiencies, along with savings derived from AWS licensing efficiencies. Study participants provided specific examples of these types of cost-related benefits, including the vice president/CIO at a financial services organization in the United States speaking to cost efficiencies through increased virtualization: *"With our on-premises environment, we would often utilize, literally, 10% or less of our resources, so we had 90% overhead, because we wanted to have the space for peak times. ... Now, with AWS, we essentially have zero overhead, because we expand capacity as needed or on demand, so it's pretty close to zero."* The regional head of a manufacturing company in Singapore spoke to major licensing and infrastructure-related cost savings with AWS: *"We have definitely saved on licensing costs with AWS, as well as facility and power and cooling costs over the last two years. We've saved at least \$2 million in this time."*

Through AWS-enabled cost efficiencies such as those mentioned previously, organizations are realizing significant ongoing savings in provisioning IT resources for equivalent application environments. As shown in **Figure 2** (next page), IDC calculates that organizations will reduce average annualized infrastructure costs of \$5.5 million (before/without AWS) to \$4.1 million (with AWS) — an average annualized expenditure reduction of 25%. These numbers demonstrate that each organization participating in the study will save more than \$1.3 million per year (on average) with AWS.

FIGURE 2 Annualized Infrastructure Costs

(\$ per organization per year)



n = 41; Source: IDC in-depth interviews, February 2022

Empowering IT Teams

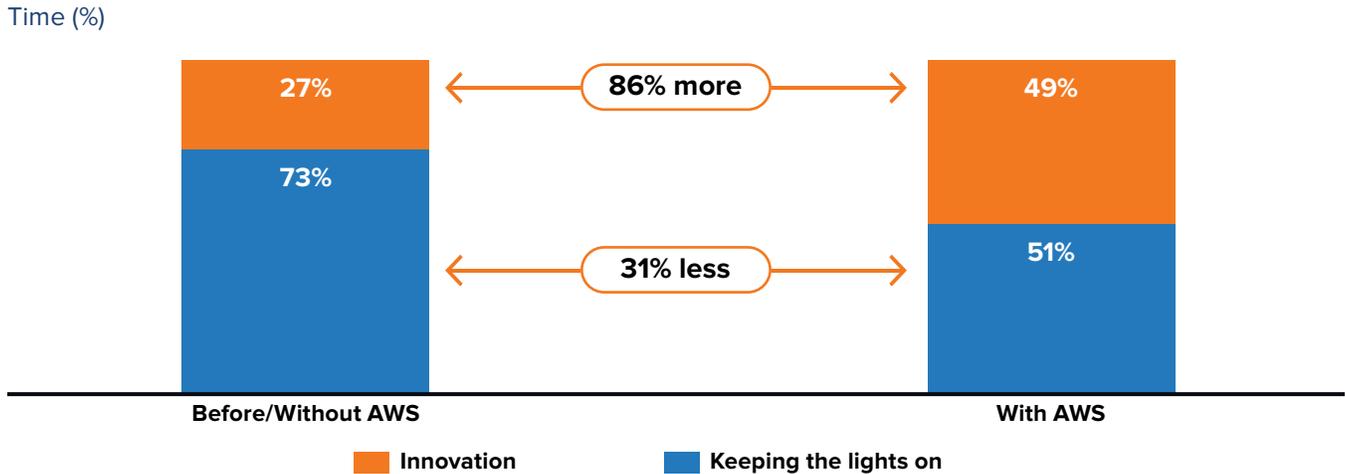
IT teams must contend with increasing organizational expectations in terms of the quality, timeliness, and innovation of IT services. This means that organizations without scalable, high-performing solutions leave resources on the table. IT teams can gain significant efficiencies by reducing or eliminating resources that manage and maintain on-premises hardware and software. This can free IT staff to focus more on meeting needs that previously may have gone neglected.

Organizations participating in the study attributed this exact dynamic to AWS' features and functionality, along with the direct support provided by AWS. They reported achieving quantifiable improvements in IT team efficiencies, noting that they can focus more on value-added processes and less on procedural and maintenance processes, such as what has happened according to a director of IT operations and logistics at a United States–based transportation company:

“With AWS, our IT teams can now focus on areas where we can add value, compared with before, when we were spending all our time just spinning things up and maintaining things.”

Figure 3 (next page) illustrates how study participants have shifted the focus of their core IT infrastructure and administrative teams with AWS, as reflected in the quotes listed previously. Before AWS, these teams spent, on average, almost three quarters of their available time (73%) on routine activities such as maintenance and procedural processes — keeping the lights on. With AWS, those wheel-churning activities now require only about half of staff time and focus (51%), freeing them to spend half of their time on more productive innovation and value-added processes. Thus, AWS has enabled an increase of 86% more time available for innovation and a decrease of 31% in the time required for routine maintenance and procedural activities.

FIGURE 3
Impact on IT Infrastructure and Administrative Team Activities



n = 41; Source: IDC in-depth interviews, February 2022

As shown in **Table 4**, the efficiency increases enabled by AWS for IT infrastructure/administrative teams significantly impact day-to-day demands on these employees’ activities. As a result, IDC’s analysis shows that interviewed organizations require 71 fewer FTEs to run and administer equivalent workloads with AWS, an average efficiency of 47%.

Interviewees also noted derivative benefits of these efficiencies that included streamlined staffing levels, less time spent on incident management, and faster application deployment timelines. The CIO of a media and entertainment company in the United States commented on how automated patching and updates with AWS deliver significant IT team efficiencies: *“With AWS, our infrastructure capacity can grow with the same staff. I estimate that over the last three years, we would have needed about eight more people to work the VM farm without AWS. ... The efficiencies have been in patching and updates. That has been enormous.”*

TABLE 4
Impact on IT Infrastructure and Administration Teams

	Before/ Without AWS	With AWS	Difference	Benefit
Equivalent FTEs required for same workloads	152	81	71	47%
Staff hours per AWS EC2 virtual instance per year	363	194	169	47%
Value of equivalent FTE time required (\$ per organization per year)	\$15.2M	\$8.1M	\$7.1M	47%

n = 41; Source: IDC in-depth interviews, February 2022

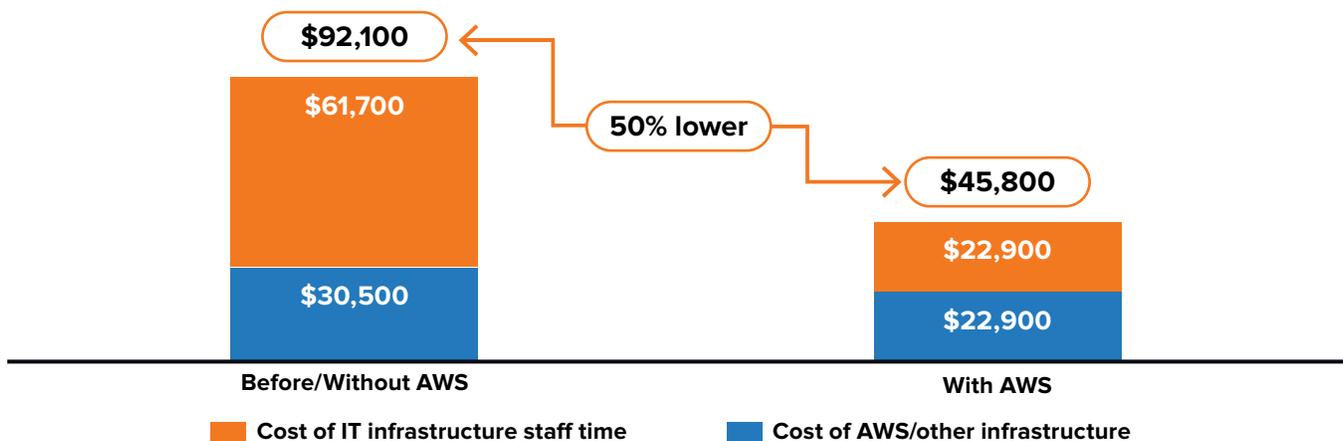
Lowering Cost of Operations

The aforementioned improvements in IT staff costs for keeping the lights on and efficiencies enabled by AWS combine to result in considerable reductions in the cost of operations for study participants. As shown in **Figure 4**, interviewed organizations reported an average five-year cost of operations for workloads per AWS EC2 virtual instance of \$45,800 — down from an average of \$92,100, and a savings of more than \$46,000 per EC2 virtual instance (more than \$36 million per organization over five years). These numbers correlate to a 50% lower cost of operations with AWS, reflecting study participants' ability to optimize costs associated with running core business applications without compromising on agility, performance, or reliability.

FIGURE 4

Five-Year Cost of Operations per AWS EC2 Virtual Instance

(\$ per AWS EC2 virtual instance over five years)



n = 41; Source: IDC in-depth interviews, February 2022

Improving the Capabilities of Development Teams

Importantly, study participants reported that AWS provides them with a significantly more agile, scalable, and flexible infrastructure than on-premises architectures can deliver. They reported much-improved speed in delivering compute and storage resources to development, business, and operational teams, with improvements reflected in statistics related to the delivery of software functionality to business operations.

As shown in **Figure 5**, organizations benefited from their IT teams' enhanced responsiveness in providing compute and storage resources on demand. The average total time required for deploying new compute/storage with AWS plummeted from 38 hours (before AWS) to 10 hours (with AWS), a reduction of 78%. Similarly, study participants gain from reduced staff time necessary to execute these deployments (61% less staff time per deployment). The head of cloud at a telecommunications company in Australia commented on the major impact of AWS on its agility in accessing new compute resources: *"We're 100% more agile with AWS. The development team can have new compute resources within 30 minutes. On premises that would take, from a request going in, anywhere from two to four weeks."*

FIGURE 5 Impact on IT Agility

(Number of hours per deployment)



n = 41; Source: IDC in-depth interviews, February 2022

Enhanced agility and scalability enabled by AWS, as mentioned previously, directly improve the speed and efficiency with which interviewed organizations' development teams provide software product deliveries and upgrades to meet demand from their businesses.

As shown in **Table 5** (next page), before AWS, organizations participating in the study required an average of 21 weeks to develop new applications but have brought that down to just over 10 weeks with AWS, thus reducing development life cycles by half (50%). They have leveraged these efficiencies in part to deliver new applications more frequently, with an average of 86% more new applications delivered per year. Likewise, they reported delivering both significantly more enhancements and upgrades to existing applications (134% more new features) in much less time (44% faster, on average). These types of metrics reflect a much-improved ability of development teams to move at the speed of business operations and thus deliver more value to their organizations. An IT director and CISO at a manufacturing company in the United Kingdom described how AWS has helped it speed time to market for new products: *"Before AWS, we only did OS development. ... With AWS, we have begun to develop and deliver companion applications and subscription services. So it is a new area for us. ... We have accelerated our time to market by two or three times as a result of AWS."*

TABLE 5
Impact on Development KPIs

	Before/ Without AWS	With AWS	Difference	Benefit
New Applications				
Number of new applications per year	19	34	15	81%
Development life cycle (weeks)	21	10	11	50%
New Features				
Number of new features per year	97	227	130	134%
Development life cycle (weeks)	6	3	3	44%

n = 41; Source: IDC in-depth interviews, February 2022

Table 6 provides additional metrics that document the positive impact of AWS on software development processes for study participants. Beyond increased volumes of new applications and features, study participants reported markedly more releases an (an 85% increase), reflecting the increased frequency with which they provide enhanced functionality to customers and employees. They also cited increased release quality, with 27% fewer release errors or defects, and needing one third less staff time (33%) to address errors that do occur. The boost in staff efficiency enabled by AWS is also reflected in the time required to make changes and updates to applications, improving by an average of 37% with AWS.

TABLE 6
Impact on Release KPIs

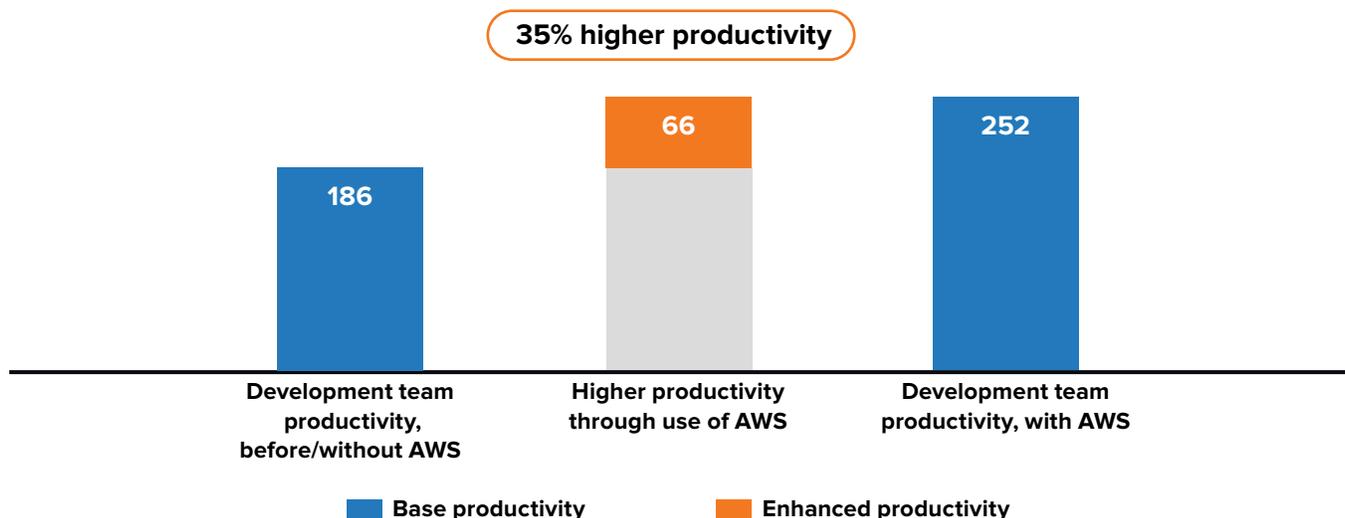
	Before/ Without AWS	With AWS	Difference	Benefit
Number of releases per year	664	1,225	561	85%
Percentage of releases with errors/defects	10%	7%	3%	27%
Staff time to address per error/defect (hours)	23	15	8	33%
Time required to make changes/updates to applications (days)	5	3	2	37%

n = 41; Source: IDC in-depth interviews, February 2022

Improvements in development KPIs achieved with AWS all serve to enhance the value that development teams provide to their organizations, as shown in **Figure 6**. The greater effectiveness and efficiency enabled by working on the AWS platform result in an average 35% increase in development team productivity. This increase in productivity allows study participants to better serve customers and employees with higher-quality software products delivered with tighter timelines. The global director of business intelligence at a healthcare organization in the United States detailed the value of AWS for its development team: *“We’re benefiting from the speed and velocity of AWS and getting our products to market faster. Our ability to do that goes up significantly as we give developers more of a free rein and allow them to control what they can do and how quickly they can initiate a test instance, for example. ... So that means we are getting our IT to respond very rapidly to requests from the business, whereas previously it took us a longer time to turn around those change requests.”*

FIGURE 6 Impact on Development Team Productivity

(Equivalent productivity — FTEs per organization)



n = 41; Source: IDC in-depth interviews, February 2022

Minimizing Operational Risk and Related Costs

Study participants also reported that AWS provides a higher-quality and more reliable IT foundation for their businesses. Greater reliability and uninterrupted access to applications and services offer significant incremental business benefits — especially for enterprises that have incurred outages and performance degradations related to supporting and updating on-premises environments with aging infrastructures, manual processes, and siloed operations. The CIO of a publishing company in Italy commented on the impact of much higher availability with AWS: *“For our on-premises environment, we had some downtime — I am just talking about serious problems not just interruptions — but not a lot. We have had none on AWS. We have much higher availability with AWS compared with our on-premises datacenter, and this was our primary reason for going with AWS.”*

Table 7, focusing on unplanned downtime, quantifies organization-wide benefits that interviewed organizations attribute to their adoption of AWS. Importantly, they experience both fewer and shorter unplanned outages, with 69% fewer outages and 67% faster resolution, combining to decrease the cumulative business impact in terms of lost productivity by an average of 65%. Otherwise stated, each user of IT services at these organizations gains back an average of 4 hours of productive time per year with AWS.

Further, study participants have limited direct business losses by ensuring the availability of services and applications for customers and prospects. An enterprise systems architect at a professional services organization in Japan spoke to the importance of uninterrupted access to its systems and AWS' positive impact: *"One of our fundamental goals of moving to AWS was to reduce downtime, especially on our external websites because, if the website goes down, the customers can't use it. ... Our revenue is about \$1 million a day, so one day out is very expensive and why we have massive amounts of resiliency in that application with AWS."* IDC's analysis shows that study participants now lose an average of 90% less revenue due to unplanned business outages, which saves them an average of \$12.2 million per year per organization in higher revenue.

TABLE 7
Impact on Unplanned Downtime KPIs

	Before/ Without AWS	With AWS	Difference	Benefit
Number of unplanned outages per year	29	9	20	69%
Mean time to repair (hours)	5	2	3	67%
Hours of productive time lost per user per year	6	2	4	65%
Productivity loss per year in FTEs per organization	24	8	16	65%
Value of lost productivity time per organization per year	\$1.7M	\$0.6M	\$1.1M	65%
Value of lost revenue per year per organization	\$13.5M	\$1.4M	\$12.1M	90%

n = 41; Source: IDC in-depth interviews, February 2022

In addition to limiting the negative effects of unplanned outages, study participants also reported establishing more secure IT environments that carry less operational risk with AWS. For example, AWS offers robust security features and functionalities that enable study participants to secure their IT environments not only more efficiently but also more effectively. The CIO at a media and entertainment company in the United States noted: *“We have 95% fewer security events with AWS. It’s a hard question to answer because basically it is not so much breaches, but we had a lot of unwanted access to resources or servers that had largely disappeared with AWS. Permissions has improved greatly.”* Overall, study participants attributed average security team efficiencies of 28% to their use of AWS. In addition, a number of interviewed AWS customers reported that they can now more easily meet regulatory requirements, contributing to compliance team efficiencies and third-party cost savings (see **Table 9** in Appendix B for details of these benefits).

ROI Summary

IDC’s analysis of the financial benefits and costs related to the use of Amazon Web Services is presented in **Table 8**. IDC calculates that, on a per-organization basis, the interviewed organizations will achieve total discounted five-year benefits of \$91.8 million, or \$116,900 per AWS EC2 virtual instance, based on higher net revenue, increased user and staff productivity levels, IT team efficiencies, and IT infrastructure cost savings. These benefits compare with projected total five-year discounted investment costs of \$17.9 million per organization (\$22,800 per AWS EC2 virtual instance). At these levels of benefits and investment costs, IDC calculates that organizations will achieve a five-year ROI of 413% and break even on their investment in 10 months.

TABLE 8
Five-Year ROI Analysis

	Average per Organization	Average per EC2 Virtual Instance
Benefit (discounted)	\$91.8M	\$116,900
Investment (discounted)	\$17.9M	\$22,800
Net present value (NPV)	\$73.9M	\$94,100
Return on investment (ROI)	413%	413%
Payback period	10 months	10 months
Discount rate	12%	12%

n = 14; Source: IDC in-depth interviews, September 2021

Challenges/Opportunities

In pursuing digital innovation and making decisions regarding cloud adoption, IDC sees organizations successfully addressing the following challenges:

- ▶ Speed of provisioning infrastructure and moving from an “IT ticket request” type of process to self-service, thereby empowering development teams to move quickly
- ▶ Ability to (and speed of) scaling the infrastructure up and down with containerization and serverless, thereby reducing overhead costs significantly
- ▶ Team size efficiencies for automated patching and updates, enabling the need for fewer people even as infrastructure capacity grows
- ▶ Minimizing costs and staff time related to unplanned outages and security issues, allowing their time to be more productively engaged
- ▶ Enabling innovation with machine learning and artificial intelligence to create competitive differentiation, deliver cost savings, and increase revenue
- ▶ Empowering developers to deliver new applications and functionality to market rapidly (e.g., within three months instead of six or in days/weeks instead of months)
- ▶ Needing flawless operation and getting attention from executives, not because of outages but for enabling the business

Successfully addressing these challenges represents direct lines of questioning for cloud providers as you align technology and architecture decisions with the overarching digital strategy of your organization.

Conclusion

Cloud adoption continues at a rapid pace, with IDC forecasting a compound annual growth rate of 29% from 2020 to 2025 in the combined IaaS and PaaS markets. Organizations that adopt cloud technologies find that lower-cost, cloud-delivered services combined with agility from open source and cloud-native application development practices lead to competitive advantage because technology innovation and competitiveness are tightly linked. Today’s CEO, CIO, and CTO increasingly see portfolios of cloud-delivered services covering analytics, business applications, blockchain, security/identity/compliance, storage, database, development tools, compute, media services, hybrid architecture, Internet of Things, and machine learning as critical for delivering their own differentiated services to customers.

IDC’s study lays out how interviewed organizations from various geographic locations and industry verticals achieve significant value for their IT operations and businesses through the use of AWS. Study participants consistently reported that AWS provides a more cost-effective, efficient, and agile IT platform than their previous on-premises environments and also offers differentiating benefits compared with other cloud solutions that they considered. IDC’s analysis shows that through their use of AWS, interviewed organizations not only have substantially reduced the cost of running equivalent workloads but also capture strong value through reduced risk, operational efficiencies, and improved business results in the form of higher revenue.

Overall, IDC projects that this sample of worldwide AWS customers will realize more than a 5:1 ratio of benefits to investment costs over five years, which would result in an ROI of 413%, with breakeven on their investment occurring in an average of 10 months.

Appendix A

Methodology

IDC's standard Business Value/ROI methodology was utilized for this project. This methodology is based on gathering data from organizations currently using Amazon Web Services solutions as the foundation for the model.

Based on interviews with organizations using AWS, IDC performed a three-step process to calculate the ROI and payback period:

- 1. Gathered quantitative benefit information during the interviews using a before-and-after assessment of the impact of using Amazon Web Services.** In this study, the benefits included IT infrastructure cost savings, IT staff and development team efficiencies and productivity gains, reduced costs associated with risk, and higher revenue.
- 2. Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of using Amazon Web Services and can include additional costs related to migrations, planning, consulting, and staff or user training.
- 3. Calculated the ROI and payback period.** IDC conducted a depreciated cash flow analysis of the benefits and investments for the organizations' use of Amazon Web Services over a five-year period. ROI is the ratio of the net present value (NPV) and the discounted investment. The payback period is the point at which cumulative benefits equal the initial investment.

IDC bases the payback period and ROI calculations on a number of assumptions, which are summarized as follows:

- ▶ Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and manager productivity savings. For purposes of this analysis, based on the geographic locations of the interviewed organizations, IDC has used assumptions of an average fully loaded salary of \$100,000 per year for IT staff members and an average fully loaded salary of \$70,000 per year for non-IT staff members. IDC assumes that employees work 1,880 hours per year (47 weeks x 40 hours).
- ▶ The net present value of the five-year benefits is calculated by subtracting the amount that would have been realized by investing the original sum in an instrument yielding a 12% return to allow for the missed opportunity cost. This accounts for both the assumed cost of money and the assumed rate of return.
- ▶ Because IT solutions require a deployment period, the full benefits of the solution are not available during deployment. To capture this reality, IDC prorates the benefits on a monthly basis and then subtracts the deployment time from the first-year savings.

Note: All numbers in this document may be inexact due to rounding.

Appendix B

Quantified Benefits of Use of AWS

Table 9 provides details about the financial benefits that IDC calculates interviewed organizations will achieve.

TABLE 9

Annual Quantified Financial Benefits

Category of Value	Average Quantitative Benefit	15% Margin Assumption Applied	Calculated Average Annual Value*
IT infrastructure cost savings	25% lower average cost; saves \$1.4 million per year	No	\$1.2M
IT infrastructure/administrative team efficiencies	47% efficiency; saves 71 FTEs	No	\$6.2M
IT security team efficiencies	28% efficiency; saves 6 FTEs	No	\$508,000
Help desk team efficiencies	27% efficiency; saves 8 FTEs	No	\$707,000
DBA team efficiencies	27% efficiency; saves 3 FTEs	No	\$259,400
Application development team productivity gains	35% higher productivity, worth 66 additional FTEs	No	\$5.8M
Productivity gains — reduced unplanned downtime	4 hours saved per user; 16 FTEs of productivity gained (\$70,000 salary)	No	\$970,800
Revenue gains — reduced unplanned downtime	\$12.2 million in revenue losses avoided per year	Yes	\$1.6M
Compliance team productivity gains and cost savings	39% higher productivity equal to 1 FTEs in higher productivity and \$11,000 cost savings	No	\$0.1M
Revenue gains — business enablement	\$66.3 million in revenue gained per year	Yes	\$8.7M
Higher productivity — analytics teams	30% higher productivity equal to gain of 7 FTEs in productivity	No	\$0.4M
Total annual benefits of use of AWS	NA	NA	\$26.4M

n = 41; Source: IDC in-depth interviews, February 2022

* Data includes 7.5-month deployment period in year 1.

Appendix C

Additional Quotes

Selected additional quotes from interviews with organizations using AWS are:

- ▶ **Ability to cost-effectively scale horizontally cost effectively key to business, financial services, United States:**
“Because of the scalability of AWS, we can scale horizontally to unlimited numbers. What I mean is, if we have 10 times more customers at a peak moment, then we can serve them as efficiently without paying 10 times more — it’s extremely cost efficient compared with our old setup.”
- ▶ **Faster to respond to business opportunities, digital chief architect, utilities, Germany:**
“Addressing our business queues is much faster with AWS, so we’re more able to be the forerunner with new ideas. As a result, our revenue goes up of course — 5% more revenue.”
- ▶ **Much faster development cadence for business-generating services, head of IT, transportation, United Kingdom:**
“Our mean time to releasing a service has been cut dramatically with AWS, going from five to six months to two to three months — half the time and half the aggregation of staff work. That means agility for business as well.”
- ▶ **ML-focused customer recommendations; enable specific service, data scientist, telco, Philippines:**
“We have machine learning through AWS that recommends the next product that the customer should buy or try. We also introduced a ‘loan business’ where the subscriber can actually borrow a small amount to continue using the services for emergency calls or to subscribe to a data promo, and we’ve doubled our revenue there with AWS.”
- ▶ **Leveraging containerization capabilities to optimize costs, vice president, IT applications and connectivity, biotechnology, United States:**
“We also have been leveraging containerization with solutions like EKS or ECS from Amazon, which help reduce the overall footprint of EC2 instances by leveraging containers to give us opportunity for cost savings. ... We can scale appropriately non-production workloads and eliminate them when they’re not used while being able to appropriately scale the production ones through other techniques like containerization.”
- ▶ **Ability to track costs by team/function, global IT director and CISO, manufacturing, United Kingdom:**
“We’re benefiting with AWS from being able to attribute cost and runtimes to specific teams, processes, and functions. This is critical for the company right now because of all the acquisitions we have recently made. We need to be able to track that, which AWS makes simpler.”
- ▶ **Higher functionality for price than public cloud competitor, IT manager, financial services, United States:**
“Most of our applications were on premises before. We looked at [another major cloud vendor], but we felt that we got better bang for our buck with AWS and more functionality that [the competitor] couldn’t offer at that time. For pricing, it was similar, but we just thought AWS was better.”

▶ **Improved performance and reliability core value of AWS, head of technology, retail, United Kingdom:**

“The benefits with AWS are more about the convenience and reliability. We save money not supporting so much on premises, but ... the cost is not as important as what we get for our investment — which is better performance and greater reliability.”

▶ **Much faster to resolve potential problems, data science lead, insurance, Hong Kong:**

“The most obvious change with AWS is the IT time to find the solutions and time to implement it. If something is wrong, it’s a lot quicker to fix it — two to three times faster — and it requires so much less staff to fix problems.”

▶ **Able to adopt agile, microservices approach to development, head of IT, transportation, United Kingdom:**

“AWS helps us achieve a microservices model. It has also allowed us to start leveraging the native technologies in AWS, such as Lambda, for instance, which helps us build more lightweight, streamlined applications. The overall cadence of releases and improvements has improved, which helps the business. We now have a continuous development cycle supporting the business — in terms of fixing bugs, improving functionality, designing applications, and managing releases. A more agile approach to software development.”

▶ **Much faster to deliver modernized applications to business, vice president/CIO, financial services, United States:**

“When we’ve modernized applications with AWS, we’ve been able to do so a lot faster by building them as AWS cloud-native applications than we could on premises. A good example is that we’re typically getting a 1.0 product out on AWS within three months, and this typically would have taken at least six to nine months on premises.”

▶ **Agile development because of ability to only pay for what is used, enterprise system architect, professional services, Japan:**

“AWS has enabled us from a programming perspective because we can spin up extra development environments for one half day and do load balancing or some performance tests. When we’re finished, we take it all down again and we’re charged for just that use. We could never have done that in a physical environment before.”

▶ **Elastic capacity and strong security capabilities, CIO, media and entertainment, United States:**

“We chose AWS to have the elastic capability to grow and shrink resources as needed and to be able to manage that. The other reason is the cost. It is very cost effective for us to use Amazon S3 and Glacier and a lot more reliable. We have access to a lot of tools for managing the environment, especially for security, identification, access control, and security auditing. As a result, if we configure it properly, then we have a very secure environment.”

▶ **Move to self-service access to IT capacity, vice president, IT applications and connectivity, biotechnology, United States:**

“When we had a request for new resources for a project with our on-premises environment, in the best case, we were talking about six weeks but most often around three months. Now, with AWS, that’s self-service.”

▶ **Much more agile IT foundation, senior IT manager, resource management, Italy:**

“We’ve seen a 10x improvement in agility with AWS. It takes so much less time to deliver IT resources, and it is no problem taking them down when they are no longer needed.”

▶ **Automation that delivers infrastructure efficiencies, vice president, IT applications and connectivity, biotechnology, United States:**

“The benefits of AWS come down to staffing and our ability to automate infrastructure. As we’ve grown our infrastructure footprint, we haven’t had to grow resourcing at the pace of the infrastructure growth because we’ve been able to access tooling with AWS necessary to do that in an automated fashion.”

▶ **Orchestration leading to time savings, global IT director and CISO, manufacturing, United Kingdom:**

“We are spending less time on incident management with AWS because we orchestrate patching and updates. Previously, we had to provision for more time to manage vulnerabilities to stay current with new releases.”

▶ **Faster to market due to built-in functionalities, data scientist, telco, Philippines:**

“With AWS, we’re able to quickly deliver a specific deployment of an application or set up the infrastructure, so we’re able to do more. For example, instead of just deploying an application every three months, we can deploy applications in one week because of the automations we implement using some of the cloud components because they already have their built-in scaling or auto-healing.”

▶ **Standardization; reallocation of time for projects, IT portfolio manager, utilities, United Kingdom:**

“Our IT activities are a lot more standardized now with AWS and the tasks are more about optimization. We have been able to put some cloud engineers onto project teams whereas we didn’t have that flexibility before.”

▶ **Application performance and reduced risk for distributed locations, director, IT operations and logistics, transportation, United States:**

“As we grow the business more globally, we already have a significant footprint on the other side of the world, but we can make the applications faster with AWS just by leveraging some replication things we never were able to do before. Resiliency is a huge thing for us, not worrying about failover cluster testing or DR testing.”

▶ **Bending the cost curve for running, storing, and using data, IT director, manufacturing, United States:**

“Over the past few years, our digital transformation has been enormous. We could see that the spend, especially with data warehousing and other areas with gargantuan amounts of data, was moving upward just to keep up with the pace every year. That definitely has become more manageable at this point with AWS.”

▶ **Cost savings by matching actual demand, director, IT operations and logistics, transportation, United States:**

“Some of the aha moments we have had during COVID-19 with AWS is our ability to really ebb and flow the cost, whereas with on premises, once you make that investment, that investment sits there whether it’s getting utilized or not. ... With AWS, we’ve saved anywhere from 10% to 20% total cost compared with an on-premises environment.”

▶ **Achieving same performance/scalability would be much more expensive, director of engineering, financial services, United States:**

“It can appear to be more expensive with AWS, but we wouldn’t be able to get the agility and performance we need with our previous on-premises environment. It was not enough, and it would not scale just the way that we wanted it to. If we were to do this on premises, I think we would need to spend twice as much as we spend on AWS.”

▶ **AWS functionality enables administrator efficiencies, vice president, hospitality, United States:**

“AWS has made our job easier, operationally; we’re more efficient in terms of how we deploy updates, which is reflected in the move from five people down to three people. ... AWS provides really strong reporting, good utilization tracking, and good load balancing, which gives us flexibility in terms of administrative capabilities.”

▶ **Improved performance through GPU access and AI/ML technology use, director of engineering, financial services, United States:**

“With AWS, we have auto updates to the infrastructure and then we can leverage GPUs for machine learning and AI, which is something we couldn’t do previously. Having GPUs helps with the AI and ML processing, so instead of using CPUs or VMs, we can leverage GPU and make our processing faster.”

▶ **Much faster to address release bugs, director, IT operations and logistics, transportation, United States:**

“We deploy releases once a week across different applications. If we do introduce bugs during those releases, our average time to resolve that bug before was 72 hours, [but] now the average time to deploy and change and fix that bug is 4 hours.”

▶ **Simplifying provisioning and consolidating IT environment, global IT director and CISO, manufacturing, United Kingdom:**

“We had recently acquired a few businesses and had to reengineer some of the applications for the new businesses. That led us to make the decision that the best thing to do would be to make them cloud native and move those operations to the cloud to simplify provisioning with AWS. Also, we wanted to consolidate and move away from sprawling datacenters.”

▶ **Scalability to match business growth, head of IT, transportation, United Kingdom:**

“With AWS, we can now scale our operations as we grow our business internationally. We are no longer constrained by infrastructure capabilities, and our operations are standardized on AWS.”

▶ **Staffing efficiencies and improved ability to test and operate leading-edge technologies, global IT director and CISO, manufacturing, United Kingdom:**

“The staffing efficiencies with AWS are beneficial to our support staff and our R&D teams. The overarching one is that it gives our teams a lot of freedom to try new things, much more than we could with traditional infrastructure. A lot of our product is leading edge, with quite complex features. We can test and solve problems easier and more efficiently.”

▶ **Cost-effective use through scalability; move away from running datacenters, head of technology, retail, United Kingdom:**

“We are optimizing our infrastructure spending with AWS, particularly around scaling and provisioning. It has also enabled us to close multiple datacenters, probably sooner than we anticipated.”

▶ **Visibility and AWS support for optimizing use, director, engineering and IT operations, food delivery, Germany:**

“We are constantly growing our AWS usage as the company expands, but there are positives in the relationship such as good discounts depending on the database or EC2. ... As I mentioned earlier, the cost reporting functionality gives valuable insights on our usage and how we can save money and make better use of our resources; whether it be EC2 or the databases, we can save here or we can save there. AWS takes an active role in the relationship.”

▶ **Reinvesting efficiencies to create more value with cloud, director, engineering and IT operations, food delivery, Germany:**

“We spend much less time on capacity management with AWS than we would with an on-premises solution or even a private cloud. We are extremely efficient in monitoring and management running on AWS. ... With the time savings, we are learning more about cloud, diving more deeply into the technology, helping with our growth, [and] improving processes, planning, and project work.”

▶ **Scalability and agility to match speed of business, IT lead, gambling, Latvia:**

“When we run out of storage on premises, we need to clean up or install new storage, and we cannot get this capacity on time. With AWS, it’s two clicks, and we have capacity. Our business is expanding, and it is difficult right now to get hardware and equipment on time when we need it to spin them up and continue our growth. ... We get 10x the scalability or agility, so that is the benefit AWS is giving us.”

▶ **Flexible access to capacity needed for uneven business demand, director, engineering and IT operations, food delivery, Germany:**

“The food delivery business can be demanding. You never know when growth will accelerate or for how long. There are bursts and sustained growth. Having AWS for our infrastructure has enabled us to meet the growth and the demand. During COVID-19, our business has shot up even faster than it had been. Matching that demand, sustaining that growth would be extremely difficult with a traditional infrastructure.”

About the Analysts

**Lara Greden****Research Director, Platform as a Service (PaaS), IDC**

Lara Greden is Research Director for IDC's Platform as a Service (PaaS) practice. Greden's research focuses on platforms for application development on private, public, and hybrid clouds and on edge deployments. She directs research into the competitive markets of cloud platforms and application development and deployment services that are enabling digital transformation, including integration, containers, serverless computing, big data, AI, ML, predictive analytics, IoT, and other emerging technologies.

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Matthew Marden is responsible for carrying out custom business value research engagements and consulting projects for clients in a number of technology areas with a focus on determining the return on investment (ROI) of their use of enterprise technologies. Matthew's research often analyzes how organizations are leveraging investment in digital technology solutions and initiatives to create value through efficiencies and business enablement.

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