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## Business Value Highlights

**560%**

Five-year ROI

**\$1.54M**

Average five-year discounted business benefits per application

**64.3%**

Lower TCO

**68.1%**

More efficient IT staff operations

**\$76,800**

Additional revenue per year per application

**118.4%**

More applications delivered

**81.7%**

Less downtime

# Quantifying the Business Value of Amazon Web Services

## EXECUTIVE SUMMARY

Businesses are being challenged to meet new customer expectations influenced by consumer centric applications powered by cloud services. It is important to understand the value of cloud services for enterprises while embarking on the digital transformation journey. This paper measures the benefits that Amazon Web Services (AWS) provides to organizations which can be used to guide cloud adoption decisions.

IDC interviewed ten organizations from a cross section of industries using Amazon Web Services (AWS) to measure how AWS impacts their business operations and IT environments. These organizations are capturing substantial business value by making their operations more efficient and cost-effective, and by better serving their customers with accelerated solution delivery. On average, IDC calculates that these Amazon customers will capture five-year business benefits worth over \$1.5 million per application they are running in the AWS environment, and earn a return on their investment in AWS of 560%. They will achieve this value because AWS:

- » Supports expanding application environments at a much lower cost than an on-premise or hosted environment
- » Requires less time to manage, administer and update
- » Provides agility, scalability, and improved performance to better address business opportunities and enhance user productivity
- » Reduces risk and minimizes the frequency of application downtime

On the whole, interviews with AWS customers demonstrated that they are not only leveraging Amazon cloud services to build and support applications more efficiently and cost effectively, but that running these applications in the AWS environment is enabling them to better serve their customers and drive their business transformation initiatives.

## Situation Overview

### Introduction

Using lessons learned from e-commerce where fluctuating demand for computing resources is common, Amazon kicked off the Amazon Web Services (AWS) initiative in 2006. Service-oriented architecture experience that pre-dated the AWS launch gave Amazon an advantage in building an offering that fit very well with end-user needs. Delivery of any Information Technology (IT) capability as-a-service helped users match specific components to their solution needs allowing a very flexible and agile approach to solution development. Using customer feedback, AWS services have expanded from the initial portfolio that delivered base infrastructure services to higher end services that deliver highly available infrastructure in an abstracted and automated fashion. The overall value gained is based on a much simpler way of consuming information technology services via cloud delivered services.

### Business Challenges Today

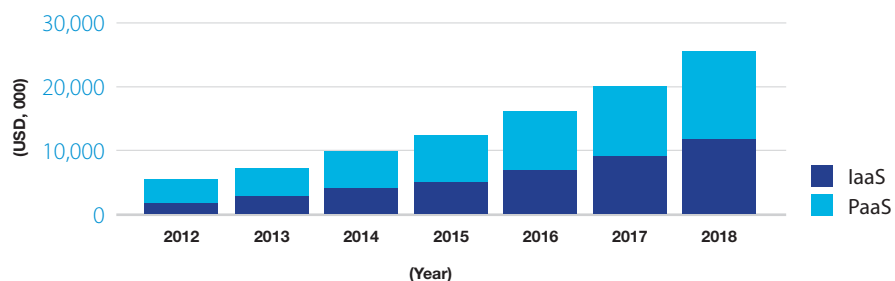
Business processes are quickly made obsolete by technology that evolves with continuous improvement. As a result, businesses that fail to take advantage of technological innovation often struggle to maintain their competitive advantage since technology innovation and competitiveness are increasingly tightly linked. By taking advantage of cloud services, organizations can increase agility, while decreasing their cost and risk. In order to surpass competition, today's CEO has to handle the complex task of digitally transforming the entire organization at a much faster pace than any time before. With the advent of cloud computing, automation through information technology is at the forefront in helping corporations make this transition successful.

### Key Cloud Computing Trends

Figure 1 provides a graphical view of the worldwide public IT cloud services market segmented by primary market. Vendor revenues associated with IaaS and PaaS is projected to grow by about 22% through 2018. This growth illustrates cloud adoption and speaks to the immense value that organizations place on developing and deploying applications on public infrastructure.

**FIGURE 1**

### Worldwide Public IT Cloud Services Market



Source: IDC, 2015

## Amazon Web Services

Amazon's focus on driving costs out of the company's large-scale ecommerce operations led Amazon to move their IT toward service orientation and exposing all resources as scalable and consumable services. This services movement also ensured that the development culture at Amazon would be aligned with modern development techniques and result in a platform that was flexible, agile, and extensible. Internal business requirements necessitated that Amazon build out an application infrastructure that would support massive scale and reliability in the following areas:

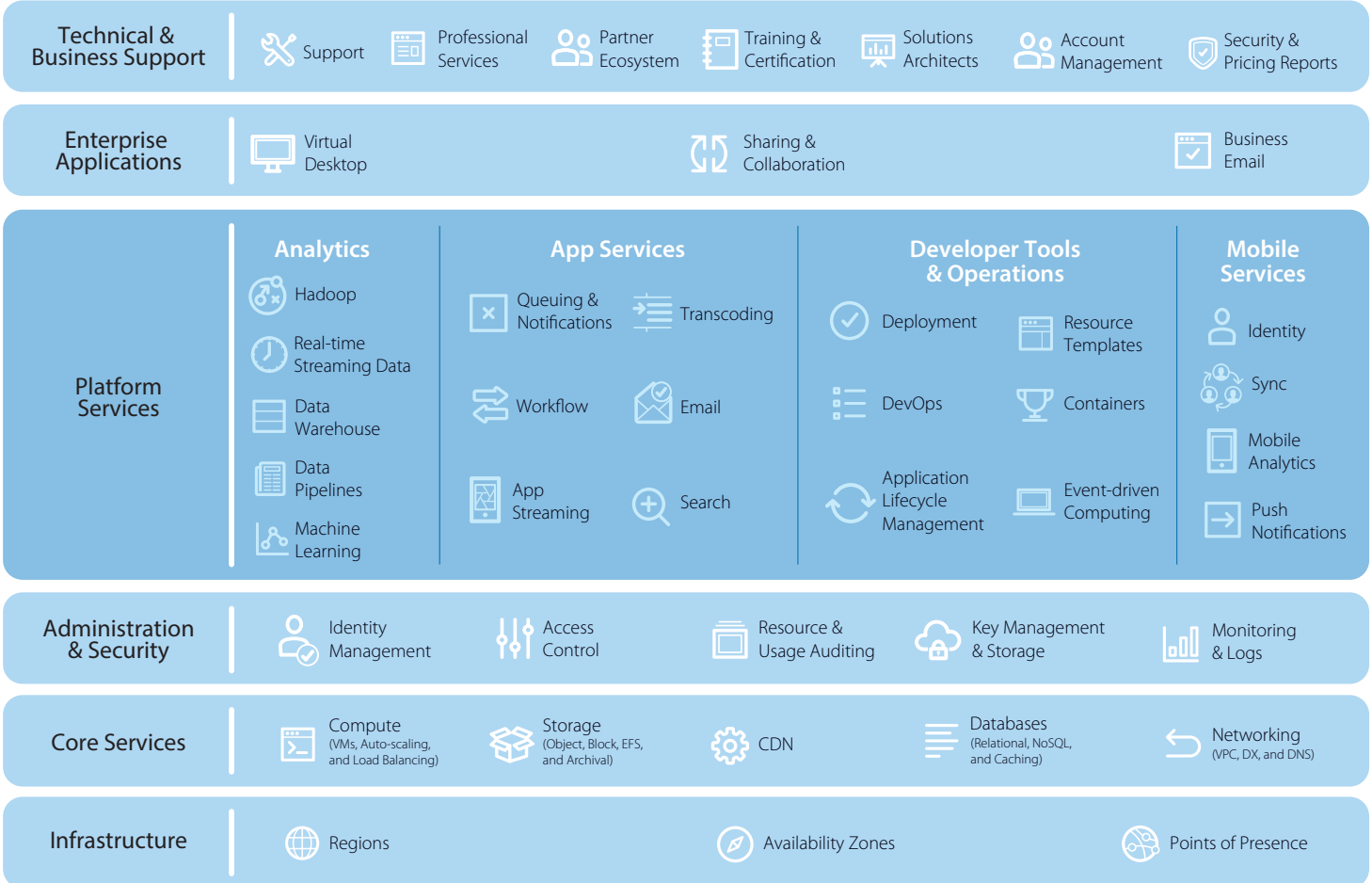
- » Infrastructure: Compute, Storage and Content Delivery, Networking
- » Data: Databases, Analytics
- » Development: Application Services, Deployment and Management, Mobile Services
- » Management: Administration and Security
- » Application Software: Enterprise Applications and AWS Marketplace Software

Competing IT objectives involving scalability and cost steered Amazon down the path of service orientation. The services created during this IT transformation process ultimately laid the foundation for AWS. Figure 2 identifies the key services provided by AWS today.

Amazon launched AWS in 2006 with infrastructure services like Elastic Compute Cloud and Simple Storage Service. It has continued to innovate and now offers many higher end services like Lambda and Aurora (currently in preview) to reduce overall IT complexity. Services like Machine Learning are the foundation for developing smarter applications making predictions from patterns detected by analyzing data. Batch and real time predictions help enterprises make accurate decisions resulting in improved profitability. Enterprises are adopting AWS to experience greater profitability, improve use of valuable IT resources, provide operational agility, and to provide faster time to market for products and services.

FIGURE 2

## Amazon Web Services



Source: Amazon, 2015

## The Business Value Of AWS

### Study Demographics

IDC interviewed ten organizations from a cross-section of industries about their use of Amazon Web Services. These AWS customers are using it as their cloud computing solution for business-critical workloads and applications, with respondents rating the applications they are running in the AWS environment as very critical (4.7 out of 5 on average, with 5 being most critical). The majority of these organizations run customer- or constituent-facing applications with AWS. These organizations reported using AWS for steady-state workloads as well as variable-state workloads<sup>1</sup>.

The study reflects a range of experiences with AWS, but with a common usage theme of leveraging AWS to scale their IT infrastructure to meet the demands of their businesses.

<sup>1</sup>Steady-state workloads are more stable and the resources they demand can be evaluated consistently, whereas variable-state workloads change with more frequency and are more challenging to evaluate consistently. The flexibility of AWS by workload means that it can provide value and support business workloads with different characteristics and resource demands.

By size, interviewed organizations ranged from several hundred to 20,000 employees, with an average of 4,099 employees. These AWS customers have moved substantial parts of their operations and businesses to AWS; on average, they are running 41 business applications in the AWS environment and relying on 1,366 virtual servers with Amazon EC2. Table 1 provides a demographic overview of the interviewed organizations.

TABLE 1

Demographics of Interviewed Organizations	
	Average
Number of employees	4,099
Number of IT staff	266
Number of internal IT users	3,649
Number of customers / external users	360,711
Number of applications with AWS	41
Number of IT staff supporting AWS environment	6
Criticality of AWS applications (1-5, 5=most critical)	4.7
Number of AWS virtual servers	1,366
Industries	Government, Media/Publishing, Professional Services, Cloud Services, Retail, Software, Financial Services

Source: IDC, 2015

"We moved to the cloud and chose a provider based on security, use of internal resources, and driving innovation. We chose Amazon because we believed they were the best of breed, and we believe they still are."

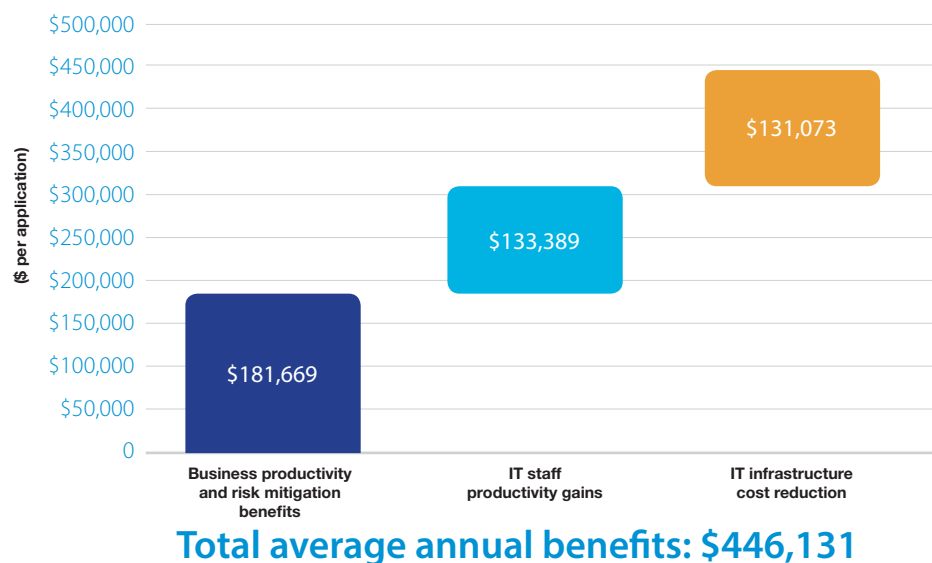
## Financial Benefits Analysis

Surveyed organizations are using AWS because they concluded it offered them the best combination of business agility, ease of application development, cost, security, stability, and efficiencies in use and management. One AWS customer explained: *"We moved to the cloud and chose a provider based on security, use of internal resources, and driving innovation. We chose Amazon because we believed they were the best of breed, and we believe they still are."*

These advantages with AWS are translating to substantial business value for these organizations. Based on interviews with IT managers at these organizations, IDC was able to calculate the impact of AWS on their costs, operations, and businesses. IDC projects that these organizations will achieve business benefits worth an annual average of \$446,131 per application being run in the AWS environment over five years, or \$18.2 million per organization. These benefits fall into four categories:

- » **Business productivity benefits.** AWS customers are driving their businesses and making their employees more productive with AWS thanks to the agility, scalability, and improved performance it provides for their business applications. IDC projects that these organizations will realize increased revenue and productivity benefits worth an average of \$173,003 per application per year over five years, or \$7.04 million per organization.
- » **Risk mitigation – user productivity benefits.** AWS customers benefit from the stability, reliability, and security of applications running in the AWS environment, which reduces downtime and increases confidence in IT’s ability to support operations and business. IDC projects that these organizations will realize savings worth an average of \$8,665 per application per year over five years, or \$0.35 million per organization.
- » **IT staff productivity benefits.** AWS customers are managing and maintaining applications 68.1% more efficiently in their AWS environments by reducing the time needed for day-to-day support. Developing applications in the AWS environment is also simpler and faster thanks to pre-built modules and faster availability of compute resources, enabling deployment of an average of 118.4% more applications per year and requiring 36.7% less time per application. IDC puts the value of these efficiencies at an annual average of \$133,389 per application over five years, or \$5.43 million per organization.
- » **IT infrastructure cost reductions.** AWS customers spend much less to use AWS than they would to support the same workloads with their own datacenter resources. IDC calculates that these organizations will achieve savings on datacenter-related capital and operating expenditures worth \$131,073 per application per year over five years, or \$5.33 million per organization.

**FIGURE 3**  
Average Annual Benefits per Application



Source: IDC, 2015

“We weren’t capable of responding to an unexpected change before we began using AWS. Before, if we needed new capacity, that would be multiple meetings and procurement efforts taking one week compare with one hour now.”

“We get more features out with AWS, which makes our employees up to 80% more productive. . . To do what we’re doing with AWS using internal resources, we’d have to hire a lot more people.”

## Business Productivity Benefits

AWS customers interviewed for this study have leveraged AWS to improve their operations and business outcomes. They credited AWS with providing them the agility, scalability, reliability, and confidence needed to create and address business opportunities, and better serve their customers. In addition, improved performance of important workloads and applications – including cloud, analytics, and mobile workloads - means that their employees have become more productive. Improved performance results in higher employee productivity, more satisfied customers, and higher revenue.

AWS has dramatically impacted these organizations’ ability to scale IT resources to support their businesses. On average, these organizations reported being able to deploy new equipment such as server resources 97.1% faster with AWS, and are able to respond to unexpected IT changes in 97.6% less time. One Amazon customer explained: *“We weren’t capable of responding to an unexpected change before we began using AWS. Before, if we needed new capacity, that would be multiple meetings and procurement efforts taking one week compare with one hour now.”*

AWS customers also attributed employee productivity gains to their use of AWS. Average productivity gain among users whose productivity has been impacted by an application running in the AWS environment was 23.1%, which equals an average net productivity increase of 2.5% across all IT users. Improved performance and faster deployment of applications with AWS mean that users are more effective at their jobs, pushing up productivity levels. One Amazon customer explained: *“We get more features out with AWS, which makes our employees up to 80% more productive. . . To do what we’re doing with AWS using internal resources, we’d have to hire a lot more people.”*

AWS customers also reported that they are capturing more revenue. Five surveyed organizations attributed revenue gains ranging from \$100,000 to \$10 million per year to their use of AWS. According to these organizations, AWS enables them to address more business opportunities, create new business, or better serve their existing customers. Examples include:

- » An organization using AWS for customer-facing operations said: *“We have happier customers now with AWS who are more willing to stay engaged with us. We’ve reduced our churn rate by about 5 percentage points, which is millions of dollars per year.”*
- » An organization using AWS to support its retail operations explained: *“We faced network bottlenecks with our hosting provider. We put our ecommerce sites on AWS because there’s better connectivity and integration into the mobile community.”*
- » An organization using AWS to support its external-facing applications noted: *“We’ve gotten at least two grants, in support of an application that we’ve been able to develop with AWS. We wouldn’t have gotten those grants without being able to deploy it – almost \$2 million in grants.”*

TABLE 2

Business Productivity KPIs	Per organization Per application	
	Reduced time to deploy new equipment	97.1%
Reduced time to respond to unexpected changes	97.6%	
Value of net increased productivity	\$6.57 million	\$161,479
Additional revenue per year	\$3.13 million	\$76,829
Assumed operating margin	15%	15%
Operating margin gain per year	\$469,000	\$11,524

Source: IDC, 2015

“Without AWS, we’d have had to double the IT staff to do what we’re doing. But even doing that, the IT group would still be a bottleneck for the company and we’d be missing a lot of revenue.”

### IT Staff Productivity Benefits

AWS customers reported that their IT staffs have become more productive with AWS. Time savings and efficiencies in the AWS environment are prevalent in two areas: (1) administering and managing workloads and applications; and (2) developing and deploying applications.

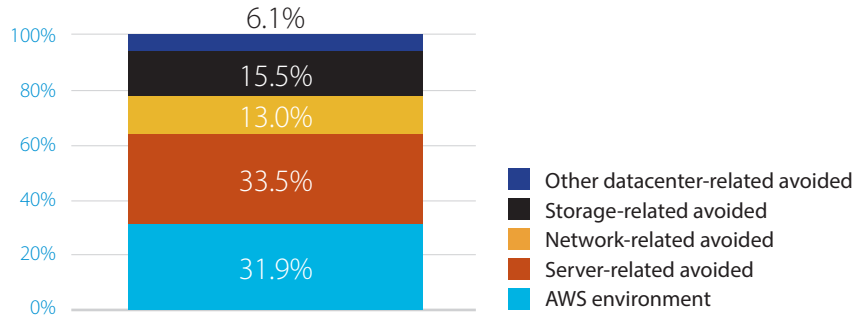
### Managing AWS Environment

Surveyed organizations are managing applications in their AWS environments an average of 68.1% more efficiently compared with maintaining the same environment on-premise or in a hosted environment. They are achieving this even as they expand their workload environments with AWS, which provides them with the opportunity to redeploy staff resources to activities focused on enabling their businesses. Without AWS, more IT staff time would be required to “keep the lights on”, whereas these AWS customers can devote saved IT staff time to work on new projects, innovate, and enable their businesses. One Amazon customer explained: “Without AWS, we’d have had to double the IT staff to do what we’re doing. But even doing that, the IT group would still be a bottleneck for the company and we’d be missing a lot of revenue.” Another customer credited its use of Amazon S3 storage services with helping it avoid staff time it would otherwise need for storage provisioning and certification.



FIGURE 4

### IT Staff Productivity Benefits



Source: IDC, 2015

### Application Development

AWS users are also making their application development efforts much more efficient, which is resulting in application development teams delivering an average of 118.4% more applications (new applications, application releases, application upgrades) while releasing these applications in 36.7% less time. These organizations reported needing less time to deliver applications to users and customers, and releasing more new applications, features, and upgrades. They cited a number of ways that AWS enables their application development efforts, including much faster provisioning of resources for testing and development, having pre-built modules at their disposal, and ease of troubleshooting.

For interviewed organizations, more efficient application development operations are a substantial operational value. Drivers of efficiencies include:

- » **Flexibility, ease of deployment, modules drive fast turn-around.** *“AWS provides pre-built modules that help us, and we’re now able to create a dedicated environment to develop something in that’s a very accurate representation of our production environment, just smaller. And then we get rid of it when we’re done with it.”*
- » **Time savings.** *“Our application development team loves the Amazon environment. . . When it comes to procurement and standing up these instances, they’re 100% more efficient.”*
- » **Faster, more frequent releases.** *“We went from changing our applications two times a week to ten times a day. That’s the biggest benefit for our business and our customers.”*

TABLE 3

Application Development KPIs	Without AWS	With AWS	Difference	Benefit
Average time to deploy new application (weeks)	13.4	8.5	4.9	36.7%
# of business applications deployed per year	22.2	48.5	26.3	118.4%
Equivalent size of application development team	146.8	114.1	32.7	22.3%

Source: IDC, 2015

“We were paying two times as much per month before AWS and now we’re also getting a lot more.”

## IT Infrastructure Cost Reductions

AWS users have leveraged it as a cost effective means of supporting expanding workload and application environments. Across the board, these customers told IDC that they would have spent substantially more – 63.4% more on average - on an annualized basis to use on-premise datacenter resources or hosting services to deliver the workloads and applications running in their AWS environments. One Amazon customer explained: *“We looked at doing this internally and it would have cost a lot more than AWS, not even close – double or 1.5 times as much as AWS.”* Further, AWS is enabling these organizations to limit their capex spending and adopt more opex-focused IT models. This helps organizations avoid costly upfront capital investments and overprovisioning, and enables them to better tie IT spending to ongoing business demand for IT services.

Savings were particularly evident for:

- » **Servers (hardware and related software).** AWS has enabled Amazon customers to not only retire servers (372 on average), but to avoid costs for scaling their datacenter environments to support business growth. One Amazon customer reported: *“We’re in the process of retiring maybe 300-500 servers. . . There are also the ones we’re avoiding because all our growth is going to be on AWS.”*
- » **Hosting and other services.** Organizations reported that they have saved significantly with AWS on hosting costs for growing environments. According to an Amazon customer: *“We were paying two times as much per month before AWS and now we’re also getting a lot more.”*

Several customers credited AWS with offering additional ways to optimize their spending:

- » **Spot instances with AWS.** Five Amazon customers reported using or having used spot instances with AWS, which have saved them up to hundreds of thousands of dollars per year while enabling them to provision in near real time for their actual use of AWS.
- » **Amazon Trusted Advisor.** Several Amazon customers credited Trusted Advisor with helping them realize savings by implementing best practices for provisioning resources.

## Risk Mitigation – User Productivity Benefits

Organizations using AWS also praised its reliability, stability, and security. They reported experiencing fewer unplanned outages of applications running in the AWS environment, minimizing the loss of productive time during downtime. In addition, these organizations said that AWS helps them greatly reduce the risk associated with more impactful scenarios and ensures the continued availability of applications and data integrity. For example, an Amazon

customer located near a flood plain believes that it is avoiding substantial risk by moving workloads and data to the cloud. Another customer credited AWS security groups, or virtual firewalls, with helping them limit problems by providing a “security-by-default configuration to harden virtual instances to the most common sense, best practice.” Risk mitigation results are summarized in Table 4.

**TABLE 4**

Risk Mitigation - KPIs				
	Without AWS	With AWS	Difference	Benefit
Unplanned downtime instances per year	10.6	2.1	8.5	79.8%
Time to resolve downtime (hours)	2.4	2.2	0.2	9.1%
Productive hours lost per year per user due to unplanned downtime	3.0	0.5	2.5	81.7%

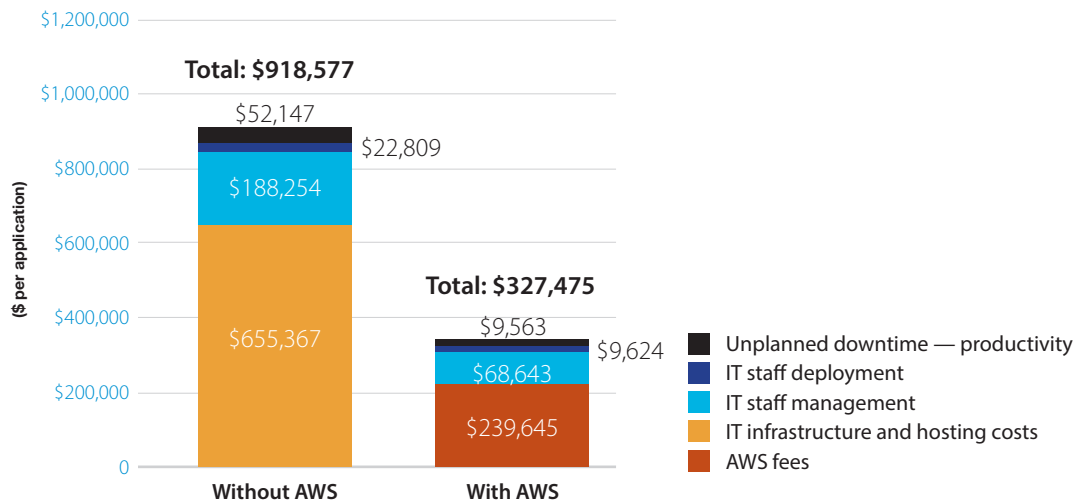
Source: IDC, 2015

### Total Cost Comparison

Surveyed Amazon customers will reduce their TCO per application by an average of 63.9% over a five-year life cycle by moving from on-premises, mixed on-premise and hosted, and hosted solutions to AWS cloud services. On average, these organizations will reduce datacenter hosting and infrastructure costs by 64.3%, IT staff costs for their AWS environments by 63.5%, IT staff time costs for deployment by 57.8%, and the cost of unplanned downtime on productivity by 81.7%.

**FIGURE 5**

### Five-year TCO of AWS per Application



Source: IDC, 2015

## ROI Analysis

IDC uses a discounted cash flow methodology to calculate the ROI and payback period. ROI is the ratio of the net present value (NPV) and discounted investment. Payback period is the point at which cumulative benefits equal the initial investment.

Table 5 provides IDC's five-year ROI analysis for surveyed organizations' deployment of AWS to replace on-premise datacenter environments or use of hosting services. IDC's analysis projects that, on average, these Amazon customers will achieve average discounted benefits per application of \$1.54 million over five years (\$62.61 million per organization), compared with an investment of \$233,225 per application (\$9.49 million per organization). This results in an average ROI of 560% and a payback period of 5.5 months.

**TABLE 5**

5-Year ROI Analysis		
	Average per Organization	Average per Application
Benefit (discounted)	\$62.61 Million	\$1,538,340
Investment (discounted)	\$9.49 Million	\$233,225
Net Present Value (NPV)	\$53.12 Million	\$1,305,115
Return on Investment (ROI)	560%	560%
Payback (months)	5.5	5.5
Discount Rate	12%	12%

Source: IDC, 2015

## Challenges And Opportunities

IDC's CloudView Survey of December 2014 show the top three cloud inhibitors to adoption as security, reliability and ability to support critical apps. Customers interviewed for this white paper showed that none of these inhibitors applied to them and mostly viewed AWS as a technology that helped them overcome challenges faced with on-premise IT implementations. Amazon's challenge is to position their services to enterprise customers as a cost effective way to deliver solutions while keeping pace with the rate of innovation in businesses today.

The overall cloud market is growing at 27% and there is a significant opportunity for AWS to capture the existing market currently valued at \$58B. There is a shortage of skills within large organizations as well as a cultural barrier to use public cloud resources due to the inhibitors reflected in the survey. As IT is undergoing the biggest shift in history strongly impacting

how solutions are built, IT managers need guidance in adopting technology in their journey to become digital enterprises. Amazon needs to grow their sales teams and reach out to customers to individually address enterprise business strategy with the most appropriate solutions.

## Summary & Conclusion

Organizations that adopt cloud are able to be more competitive, increase customer satisfaction, innovate faster, and achieve greater productivity with resources that focus on core business enablement.

Cost savings benefits of cloud computing have been well documented and understood by businesses with a number of proven use cases documenting results. Over the past few years, enterprises implementing business agility initiatives significantly differentiate themselves from competitors. It is important for readers to understand the potential value beyond dollars and cents from the technology. Beyond cost savings, the following benefits observed in the survey are important while justifying cloud computing in an organization:

1. Better out of the box security
2. Upgrades to solutions are more frequent
3. Opportunity to open up new revenue streams
4. Lower downtime resulting in better user satisfaction
5. Improved decision making ability from faster analytics
6. Improved performance
7. Reduced costs
8. Faster innovation and time to market
9. Lower risk of getting locked into one vendor

Furthermore, mobile device growth and the rapid increase of sensors are changing current business environments and providing opportunities to fully digitizing enterprises. To handle huge volumes of information, analytics is important to automate decision making. In this dynamic environment, businesses are challenged to adapt at a very rapid pace. Business agility enabled by cloud computing technology offers the unique ability to address this disruptive shift.

## Appendix

IDC utilized its standard ROI methodology for this project. This methodology is based on gathering data from current users of Amazon Web Services as the foundation for the model. Based on these interviews, IDC performs a three-step process to calculate the ROI and payback period:

- » Measure the savings from reduced IT costs (staff, hardware, software, maintenance, and IT support), increased user productivity, and improved revenue over the term of the deployment.
- » Ascertain the investment made in deploying the solution and the associated training and support costs.
- » Project the costs and savings over a five-year period and calculate the ROI and payback for the deployed solution.

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.
- » Downtime values are a product of the number of hours of downtime multiplied by the number of users affected.
- » The impact of unplanned downtime is quantified in terms of impaired end-user productivity and lost revenue.
- » Lost productivity is a product of downtime multiplied by burdened salary.
- » Lost revenue is a product of downtime multiplied by the average revenue generated per hour.
- » The net present value of the five-year savings 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 every hour of downtime does not equate to a lost hour of productivity or revenue generation, IDC attributes only a fraction of the result to savings. As part of our assessment, we asked each company what fraction of downtime hours to use in calculating productivity savings and the reduction in lost revenue. IDC then taxes the revenue at that rate.

Further, 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 not be exact due to rounding.*

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