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Business Value Highlights

469%
average five-year ROI

$758,845
average annual benefits per 100TB per year

$319,300
higher revenue per 100TB per year

71%
more productive analytics teams

60%
more efficient management of data warehousing operations

72%
less unplanned downtime

52%
lower average cost than legacy or alternative data

Business Value of Amazon Redshift

EXECUTIVE SUMMARY

IDC's research has shown the movement of most IT workloads to the cloud in the coming years. Yet, with all the talk about enterprises moving to the cloud, some of them still wonder if such a move is really cost effective and what business benefits may result. While the answers to such questions vary from workload to workload, one area attracting particular attention is that of the data warehouse.

Many enterprises have substantial investments in data warehousing, with an ongoing cost to managing that resource in terms of software licensing, maintenance fees, operational costs, and hardware. Can it make sense to move to a cloud-based alternative? What are the costs and benefits? How soon can such a move pay itself off?

With these questions in mind, IDC conducted a study on behalf of Amazon Web Services (AWS) to determine what sorts of experiences its customers were having with Amazon Redshift, AWS' data warehousing service, and quantify their benefits.

IDC interviewed eight organizations using Amazon Redshift to explore its impact on their data warehousing, IT, and business operations. According to these organizations, Redshift has not only proven to be a cost-effective data warehousing platform for them but also enabled them to create more value with analytics and data through its ease of use, performance, and scalability. IDC projects that these organizations will realize average annual benefits worth $758,845 per 100TB per year over five years, which would result in an average return on investment (ROI) of 469%, with financial benefits tied to:

» Capturing more revenue by including more of the data organizations are collecting to improve the depth of analysis and insights

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» Increasing productivity of employees who rely on the timely and robust delivery of data to do their jobs

» Requiring less IT staff time for day-to-day support and maintenance of the organizations' data warehousing environments

» Experiencing fewer user- and business-impacting outages

» Reducing data warehousing–related costs by moving to a variable spend model and scaling with ease to meet business demand while also benefiting from enhanced data compression capabilities

Situation Overview

For a few years now, IDC has been tracking and reporting on the phenomenon of "digital transformation" in which a new class of information technology has been blended into operations based in the cloud and on various highly scalable technologies for collecting and analyzing that data. This new class of information technology includes mobile devices, sensors, and other elements of the "Internet of Things" ("IoT"), along with machine-generated data, such as log files and streaming data. The various operational components of this phenomenon, taken together, form what IDC calls the "3rd Platform." Digital transformation involves leveraging all this data to make the enterprise operate more intelligently, more nimbly, and more efficiently than ever before and carry out business functions never before contemplated on an agile basis.

One aspect of this data explosion has been the need to incorporate some of it in the analytic operations of data warehouses. This has placed great pressure on data warehouses to provide tremendous scalability, with greater levels of query performance against more data than ever before. IT managers provision database systems and storage at levels necessary for the "high water mark" of how large the data warehouse might become. Because the high water mark is hit only occasionally, the result is low average utilization rates and high operational costs.

Moving to the cloud avoids such overprovisioning by enabling the data warehouse manager to dynamically allocate resources as needed, paying only for what is used. Ideally, such a data warehouse platform should be designed for the cloud, enabling it to take advantage of the virtualized resources and scalability of that environment. At the same time, the data warehouse platform should operate on a multitenant basis to deliver optimal value in relation to the resources used.

Amazon Redshift

One such data warehousing solution is Amazon Redshift. This service uses columnar storage, massively parallel processing (MPP) architecture, and a variety of other technologies to minimize I/O and maximize data throughput to deliver high performance for $1,000 per terabyte per year. IDC has reported that Amazon Redshift grew by an impressive 360.2% from 2014 to 2015, setting the pace for the cloud-based data warehousing market (see *Worldwide Relational Database Management Systems Software Market Shares, 2015: The Year of Transition to the Cloud* (IDC #US41484516, June 2016). Clearly, Amazon Redshift has gained wide adoption.

The first reason for this wide adoption has been Amazon Redshift's simple and pay-as-you-go pricing model. A second reason has been the ease with which data from applications running on AWS and on-premises can be loaded into Redshift. AWS offers data transfer services that cover the entire range of data types — AWS Direct Connect provides a private direct connection from on-premises datacenters to AWS, Amazon Kinesis Firehose loads streaming data, and AWS Snowball moves massive data into AWS. The third reason is the ease of setup and administration and short time to value that the service offers. Redshift automates infrastructure provisioning and administrative tasks such as backups, replication, and patching. The last reason is that the service also allows customers to use business intelligence (BI) and analytics tools they are already using because it supports standard JDBC/ODBC drivers and SQL. This study investigates the value of Amazon Redshift in greater detail.

The Business Value Of Amazon Redshift

Study Demographics

IDC interviewed eight AWS customers about the value and costs associated with their use of the Amazon Redshift data warehousing solution. Interviews explored topics related to the organizations' data warehousing operations, such as costs, support time requirements, reliability, flexibility, and ability to support the organizations' analytics and business operations. These organizations represented the experiences of a mix of small, midsize, and large organizations in a number of verticals.

Interviewed organizations cited a common dependence on data and analytics to support their business operations. These organizations are leveraging Redshift's compression capabilities to maintain an average of 1,650TB of data to support 55 business applications in their Redshift environments, with two organizations having sizable environments at more than 1PB of data. Most interviewed organizations migrated to Amazon Redshift from an on-

premises data warehousing solution, although two of the organizations were previously using other cloud-based data warehousing solutions (see Table 1).

TABLE 1

Demographics of Interviewed Organizations		
	Average	**Median**
Number of employees	3,000	500
Number of IT staff	792	175
Number of IT users	2,900	500
Total number of business applications	266	100
Data supporting business applications in Amazon Redshift (TB)	1,650	47
Number of business applications in Amazon Redshift	55	18
Countries	United States	
Industries	Advertising, B2B services, financial services, IT/data services, IT services, media, retail, and telecommunications	

n = 8
Source: IDC, 2016

Data Warehouse Performance and Scalability with Amazon Redshift

Interviewed organizations reported that Amazon Redshift supports their business operations with improved performance, scalability, access, and flexibility. With Redshift in place, more users have access to more robust and timely data and data-dependent applications perform better. Refer to Figure 1, which demonstrates the extent to which these organizations are improving key data warehousing–related performance indicators with Amazon Redshift. Interviews with AWS' customers show that these improvements enable them to leverage evermore data from their operations to create insights that generate improved business outcomes and operational efficiencies in the form of higher employee productivity levels.

Data Warehousing Elasticity and Scalability

Amazon Redshift's flexibility as a data warehousing platform stands as another core benefit for interviewed organizations. Several organizations said that they were able to largely eliminate

"The best way for me to put it: I have absolutely no concerns about scaling anymore with Amazon Redshift. In other environments, you can cluster and scale, but it requires a lot more hardware and a lot more man-hours. [With] Redshift, I can start making it happen with a couple [of] clicks of a button."

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earlier concerns about scaling their data warehousing environments in a cost-effective way to match business demand. Whereas, with their legacy environments, these organizations may have needed to overprovision or slow down business processes to provision more capacity, they can add to their Redshift environments in near real-time. This makes the organizations' data warehousing environments more elastic and minimizes concerns that capacity or provisioning will impede their businesses. One interviewed organization explained: *"The best way for me to put it: I have absolutely no concerns about scaling anymore with Amazon Redshift. In other environments, you can cluster and scale, but it requires a lot more hardware and a lot more man-hours. [With] Redshift, I can start making it happen with a couple [of] clicks of a button."*

Another organization commented: *"Redshift makes us much nimbler and gives us much more ability to react to business needs. We can now quickly launch a data mart if needed, and it's not a three-week endeavor."*

Expanding User Access to Data Warehousing Environment

Interviewed organizations have benefited from increasing user access to their data warehousing platforms with Amazon Redshift. In particular, it enables the use of more data and higher levels of concurrent use compared with the organizations' legacy data warehousing solutions. Amazon Redshift is an SQL data warehouse solution and uses industry-standard ODBC and JDBC connections. Many popular BI and analytics software vendors have certified Amazon Redshift with their offerings to enable customers to continue to use existing tools. As a result, there is no need to train users on new tools. Also, more employees can leverage analytics to do their jobs, which contributes to the ability of the organizations to derive value from their data and analytics environments. One organization commented: *"We've given 100 more people direct access to Redshift, and they are doing things they couldn't before, and it impacts business decisions. For example, they can now verify something against data, and if the data doesn't support their decision, they can pivot. The whole point is trying to move the needle on our key metrics, and I think we're getting 1% more revenue because of this."*

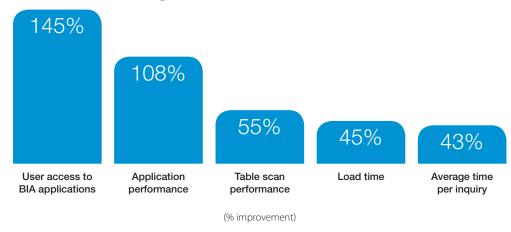## Improved Data Warehousing Performance

With Amazon Redshift, interviewed organizations have realized significant performance improvements to their data warehousing environments. Improving the performance of data warehousing–related workloads was a core consideration for a number of organizations in choosing Redshift. Figure 1 demonstrates the extent to which these organizations have achieved this core objective. On average, the organizations have substantially improved the performance of applications reliant on their data warehousing environments and defined metrics such as table scan performance, load time, and time per query.

"Our load time has drastically improved. I would say that we're getting double the speed with Amazon Redshift. The load time obviously depends on the size of the table, but with our legacy system, it took on average about an hour, and now, with Redshift, it typically takes 30 minutes or so."

One interviewed organization noted: *"Our load time has drastically improved. I would say that we're getting double the speed with Amazon Redshift. The load time obviously depends on the size of the table, but with our legacy system, it took on average about an hour, and now, with Redshift, it typically takes 30 minutes or so."* These types of performance improvements mean that employees who create value with data have more robust and timely access to query results and reports, which enables them to support business operations more effectively.

FIGURE 1

Data Warehousing Performance KPIs

145%	108%	55%	45%	43%
User access to BIA applications	Application performance	Table scan performance	Load time	Average time per inquiry

(% improvement)

Source: IDC, 2016
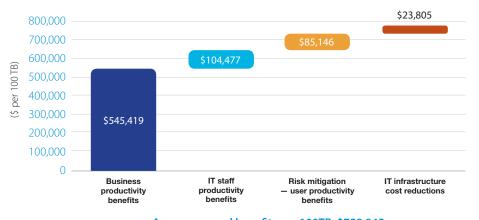
Business Value Analysis

Amazon Redshift has become a core component of interviewed organizations' analytics operations, which are significant contributors to the organizations' business operations. AWS' customers described Redshift as providing them with a cost-effective, high-performing, and scalable data warehousing platform that integrates with their business intelligence and SQL tools. As a result, these organizations achieve better business outcomes through improved use of data and make data-related operations more efficient and cost effective. On the basis of interviews with these organizations, IDC projects that they will realize annual average business benefits worth $758,845 per 100TB ($12.52 million per organization) per year over five years in the following areas (see Figure 2):

» **Business productivity benefits:** Having a higher-performing and elastic data warehousing solution that can handle rapidly increasing amounts of data enables organizations to drive more value with timely insights from their analytics and data. Interviewed organizations are translating these insights to higher revenue through improved business results and increased employee productivity levels, which IDC

calculates will have value worth an average of $545,419 per 100TB ($9.00 million per organization) per year over five years.

» **IT staff productivity gains:** By automating provisioning and administrative tasks, Amazon Redshift requires less staff time to deploy, manage, and support than interviewed organizations' legacy platforms. In addition, application developers leverage Redshift's flexibility to deliver more value to their organizations through more timely delivery of applications and services. IDC puts the value of IT staff-related time savings and efficiencies at an average of $104,477 per 100TB ($1.72 million per organization) per year over five years.

» **Risk mitigation — user productivity benefits:** Data warehousing operations experience fewer user- and business-impacting outages with Redshift, meaning that organizations lose less productive employee time and potential revenue to outages. IDC projects that the organizations will save an average of $85,146 per 100TB ($1.40 million per organization) per year over five years.

» **IT infrastructure cost reductions:** Moving to a variable spend model and leveraging Redshift's scalability and data compression capabilities reduce the need to potentially overprovision data warehousing environments, while moving to Amazon Redshift enables operational cost savings in areas such as power and facilities. IDC calculates that these organizations will save an average of $23,805 per 100TB ($0.39 million per organization) per year over five years and spend an average of 52% less per organization with Amazon Redshift than with their previous or alternative approach.

FIGURE 2

Average Annual Benefits per 100TB

Average annual benefits per 100TB: $758,845

Source: IDC, 2016

Business Productivity Benefits

For interviewed organizations, having a higher-performing, more accessible, and scalable data warehousing platform — as discussed previously — leads to better business outcomes and operational efficiencies. In particular, organizations are able to leverage more data to create business- and operations-impacting insights. Seven of the eight interviewed organizations said that Redshift has supported better business outcomes, with several organizations citing specific ways in which Amazon Redshift has helped them improve business results and help employees work more productively:

» **Keeping more data in data warehousing environment.** One organization noted: "Redshift enables us to keep incrementally more data online than our previous data warehousing environment."

» **Getting better analytics.** One organization reported creating a positive feedback loop through improved analytics: *"We get better insight with Amazon Redshift and apply that insight into our service. Essentially, we create a feedback loop that benefits our business. In the last year, I think we've gained 10% more customers because of this."*

» **Generating business insights.** The ability to generate impactful insights from data is beneficial. One organization commented: *"We're continually looking at trends and understanding user behavior, and Redshift is allowing us to do that better. I'd say that we're attracting more users of our services as a result because we're able to do this more efficiently on Redshift."*

» **Matching data warehousing capacity to business demand.** Ensuring the capacity needed to address business opportunities means that organizations will not miss out on growth chances.

» **Having more timely delivery of data-driven applications and services.** One organization explained: *"If we wanted to launch a new product using legacy infrastructure, our normal life cycle was about 8–12 months. Now with Amazon Redshift, we can do it in months. So this helps us get to revenue faster — millions of dollars per year of additional revenue by delivering services faster."*

These advantages of Redshift enable organizations to work with and create more timely and relevant insights from data. As a result, interviewed organizations are leveraging these insights and having a more scalable, cost-effective data warehousing solution to better address business opportunities and ensure that their employees have the data-driven insights needed to be more effective. In other words, these organizations have been able to use Redshift to turn their data warehousing operations into value generators. The impact on

"We get better insight with Amazon Redshift and apply that insight into our service. Essentially, we create a feedback loop that benefits our business. In the last year, I think we've gained 10% more customers because of this."

their businesses and operations is evident: Table 2 shows that the organizations attributed capturing significant amounts of additional revenue ($319,300 per 100TB per year) and enabling discrete groups of users reliant on data to be much more productive (an average of 16% higher productivity for over 500 employees per interviewed organization). Further, these organizations benefited from a less quantifiable but still important benefit of Redshift, knowing that they have the scalability required to support business growth, which provides confidence that they will not find their data warehousing environments standing as a bottleneck to higher revenue or employee enablement.

TABLE 2

Business and User Impact

	Per Organization	Per 100TB
Revenue impact		
Additional revenue per year	$5.27 million	$319,300
Assumed operating margin	15%	15%
Higher operating margin per year	$790,200	$47,900
User productivity impact		
Number of users impacted	515	31
Average productivity gain	16%	16%
Additional productive time	110,600 hours	6,702 hours

Source: IDC, 2016

"We have a seven-person business intelligence team. With Redshift, we are spending more time finding creative ways of coming up with reports instead of trying to fiddle with the system to figure out how to do things. I'd say that 50% of their time can be shifted to more productive work."
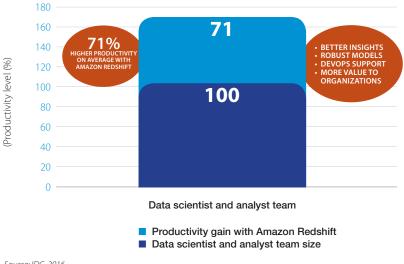
Amazon Redshift has also benefited teams responsible for creating organizational value using data. Employees on teams such as data scientist, business intelligence, and business analyst rely on getting the data they need in a timely, reliable, and robust fashion to package it into deliverables and insights that support business decisions or that underpin applications or customer-facing services. Interviewed organizations attributed productivity gain for these teams at an average of 71% to Amazon Redshift. They traced these efficiencies back to performance improvements, increased user access to data, and the ability to scale to support new use cases and requirements (see Figure 3).

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FIGURE 3

Data Scientist and Analyst Productivity Impact

Source: IDC, 2016

IT Staff Efficiencies

Amazon Redshift has enabled more efficient IT staff operations for the interviewed organizations. In particular, the move to Amazon Redshift has made application development teams more effective by increasing agility while limiting the amount of time that database administrators and other IT infrastructure teams must devote to maintaining and administering their data warehousing environments. Table 3 shows that application development teams that rely on their organizations' data warehousing environments deliver more applications and features in less time with Amazon Redshift. Interviewed organizations cited factors such as higher quality of data feeding into applications, largely eliminating capacity and provisioning bottlenecks, and being able to implement continuous delivery as drivers of the efficiencies for their application development teams. As a result, one organization explained, *"New applications and features don't have any shelf life now. They just go into production all the time."*

"New applications and features don't have any shelf life now. They just go into production all the time."

TABLE 3

Application Development KPIs

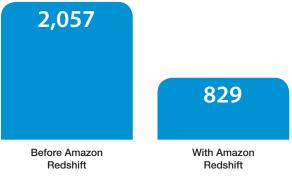|	Before Amazon Redshift	With Amazon Redshift	Difference	Change (%)
Time to deploy new business application (hours)	6.3	4.0	2.3	37
Number of new business applications per year	12.3	18.4	6.1	50
Time of application developer per business application (hours)	1,682	1,054	627	37

Source: IDC, 2016

> "By migrating data to Redshift, we've been able to manage the data warehousing environment more efficiently, which is giving us time to come up with new ideas and to understand how to refine the system. We're better supporting our ongoing business needs … and coming up with new ideas to understand how our systems are performing."

In addition, with Amazon Redshift, interviewed organizations must devote less time to managing and supporting their data warehousing environments. To a large extent, these efficiencies relate to using the Redshift cloud-based platform that requires less staff time to manage and maintain and features such as unified tools, automated patching and maintenance, and increased visibility (see Figure 4). One interviewed organization noted: *"We have fully automated monitoring with Amazon Redshift for cluster monitoring, so it probably takes one hour per year of staff time now. I would say that we used to spend three to four weeks a year in total. Now, no one looks at it unless something goes wrong."* These organizations need an average of 60% less IT staff time with Redshift to carry out administrative and management tasks related to supporting their data warehousing environments. Organizations mentioned efficiencies in administration, disaster recovery, and patching as especially noteworthy, thanks to automation with Redshift in the context of its cluster management capabilities. This is especially valuable for the organizations when it frees up IT staff time to drive more value with data. One organization reported doing this: *"By migrating data to Redshift, we've been able to manage the data warehousing environment more efficiently, which is giving us time to come up with new ideas and to understand how to refine the system. We're better supporting our ongoing business needs … and coming up with new ideas to understand how our systems are performing."*

FIGURE 4

IT Staff Efficiencies — Data Warehousing Environments

```
  2,057

                        829
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 Before Amazon       With Amazon
   Redshift            Redshift
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(Hours per 100TB per year)

Source: IDC, 2016

Risk Mitigation and Availability

Interviewed organizations experience fewer unplanned data warehousing–related outages
with Amazon Redshift. Because the organizations rely on analytics to support their businesses,
having a highly reliable data warehousing is nonnegotiable. Interviewed organizations have
reduced the impact of unplanned outages on their employees by an average of 72% with
Amazon Redshift, reporting benefits from no longer having a single point of failure and being
able to rapidly provision capacity as needed when capacity constraints might have previously
impacted performance levels. Further, Redshift features such as automatic replication and
backup within clusters and continuous replication of data help ensure uptime for interviewed
organizations. In addition, several interviewed organizations mentioned that they are
saving staff time on regulatory compliance because Amazon can provide vertical-related
certifications on their behalf (see Table 4).

TABLE 4

Risk Mitigation and Unplanned Downtime

	Before Amazon Redshift	With Amazon Redshift	Difference	Change (%)
Number of instances of unplanned downtime per year	11.6	3.3	8.3	72
MTTR (hours)	2.9	2.0	0.9	30
Productive time lost per 100TB per year (hours)	2,433	692	1,741	72

Source: IDC, 2016

Interviewed organizations reported that Amazon Redshift is serving as a cost-effective data warehousing platform. They benefit from not needing to make substantial up-front investments in hardware to upgrade on-premises platforms and reduce costs related to maintenance, power, and datacenter space. In addition, Redshift enables the organizations to pay for only the capacity they need. Having a variable spend model reduces the total cost of ownership for their data warehousing platforms and improves their ability to leverage data to support business growth.
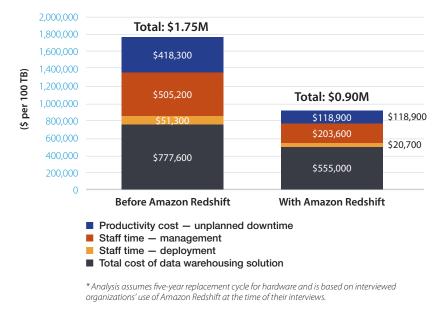
AWS' customers also cited other cost-effective features of Redshift. In particular, data compression supports more cost-effective operations. One organization reported going from 20TB of capacity to 6TB with Redshift, thanks to its data compression capabilities. For most organizations, these efficiencies result in Redshift being considerably more cost effective compared with on-premises platforms. One organization commented: *"We would have had an on-premises solution that probably would have cost close to $900,000, and we would pay the standard 15% per year for maintenance, so it would be $100,000 per year. So with Amazon Redshift, we're spending half of our annual expense compared with an on-premises system." On an organizational level, interviewed organizations reported that Redshift will cost an average of 52% less over five years compared with their previous or alternative data warehousing approach.*

The cost efficiencies contribute to Amazon Redshift having a much lower cost of operations than interviewed organizations' previous data warehousing environments. For purposes of this analysis, IDC has assumed a five-year hardware replacement cycle, so it has compared the cost of operations for these organizations over a five-year period based on how they were using Amazon Redshift at the time of their interviews. IDC projects that with Amazon Redshift, these organizations will have an average of 49% lower cost of operations over five years, with organizations that have migrated from on-premises data warehousing solutions reducing their cost of operations by an average of 61% (see Figure 5).

ROI Analysis

"We would have had an on-premises solution that probably would have cost close to $900,000, and we would pay the standard 15% per year for maintenance, so it would be $100,000 per year. So with Amazon Redshift, we're spending half of our annual expense compared with an on-premises system." On an organizational level, interviewed organizations reported that Redshift will cost an average of 52% less over five years compared with their previous or alternative data warehousing approach."

FIGURE 5

Five-Year Projected Cost of Operations per 100TB*

($ per 100 TB)

Total: $1.75M

$418,300
$505,200
$51,300
$777,600

Total: $0.90M

$118,900 $118,900
$203,600
$20,700
$555,000

Before Amazon Redshift   **With Amazon Redshift**

- ■ Productivity cost — unplanned downtime
- ■ Staff time — management
- ■ Staff time — deployment
- ■ Total cost of data warehousing solution

* Analysis assumes five-year replacement cycle for hardware and is based on interviewed organizations' use of Amazon Redshift at the time of their interviews.

Source: IDC, 2016

IDC interviewed eight organizations using Amazon Redshift as their data warehousing platform and recorded their results to inform this study's analysis. IDC used the following three-step method for conducting the ROI analysis:

1. **Gathered quantitative benefit information during the interviews using a before-and-after assessment.** In this study, the benefits included staff time savings and productivity gains, user productivity increases, increased revenue, and data warehousing–related cost reductions.

2. **Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the annual costs of using Amazon Redshift and can include additional costs related to the solution, such as 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 Redshift over a five-year period.** For purposes of this study, IDC based benefits and costs on organizations' level of use of Amazon Redshift at the time interviews occurred. 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.

TABLE 5

Five-Year ROI Analysis

	Per Organization	Per 100TB
Benefit (discounted)	$44.26 million	$2.68 million
Investment (discounted)	$7.77 million	$0.47 million
Net present value (NPV)	$36.49 million	$2.21 million
Return on investment (ROI)	469%	469%
Payback period	5 months	5 months
Discount rate	12%	12%

Source: IDC, 2016

Table 5 presents IDC's analysis of the average discounted benefits, discounted investment, and ROI for the AWS customers interviewed for this study. These organizations will invest an average discounted total of $471,311 per 100TB per year over five years, primarily in annual subscription costs. In return, IDC projects that these organizations will realize average discounted benefits worth $2.68 million per 100TB per year over five years through their use of Amazon Redshift. This would result in an average five-year ROI of 469% and a breakeven time of five months.

Challenges/Opportunities

Cloud deployment of data warehousing is growing rapidly, given the agility and cost savings it delivers. IDC has predicted that by 2020, spending on cloud-based big data and analytics technology for both structured and unstructured data analytics will have grown 4.5 times faster than spending for on-premises solutions. This means a huge potential market for analytics solutions in the cloud. AWS is well positioned to exploit this opportunity.

This is a massive opportunity and, in the long run, will drive a competitive market with multiple players, including AWS. To maintain its current position, AWS will need to continue innovating in this space to support the rapid adoption and meet the demands of the next wave of customers. AWS has a leadership position in this space, which it can maintain through its breadth and depth of analytics services and its integrated platform that addresses the entire analytics chain ranging from data ingestion and processing to data warehousing, visualization, and prediction.

Summary And Conclusion

Exploding data volumes and the business imperative to leverage data to generate additional value in the form of more productive and efficient business operations have pushed organizations to consider new approaches for their data warehousing environments. Not only do the organizations need a data warehousing platform that can meet performance requirements when handling and processing huge amounts of data, but their platforms must also provide the agility, scalability, and flexibility they need to meet constantly evolving demand from customers and lines of business. The challenge of providing this agility while also maintaining cost-effective data warehousing environments has led more organizations to consider solutions with cloud capabilities.

IDC's interviews with organizations using the Amazon Redshift data warehousing platform demonstrate that they are achieving these objectives. The organizations reported the following benefits:

» They are better able to create value with data and analytics as a result of improved data warehousing performance and agility.

» They can scale their Redshift environments in a cost-effective and efficient manner.

» They have reduced risk related to data warehouse availability and performance.

» They benefit from lower administration costs related to both Redshift's functionality and migrating data warehousing operations to the cloud.

On the basis of these results, it seems clear that it would behoove most enterprises to consider Amazon Redshift as their data warehouse platform, especially as they increasingly require the flexibility and agility of the Amazon Redshift warehouse for enabling the digital transformation.

Appendix

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from current users of Amazon Redshift 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 migration, 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 three-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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