



## WHITE PAPER

# Taking a Holistic View of the Total Cost of Data Helps CIOs Optimize IT and Business Gains

Sponsored by: Delphix

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## EXECUTIVE SUMMARY

Data is the lifeblood of business. This means that CIOs can no longer treat data management as just a component of their IT strategy; instead, they need to develop strategies that account for data's core role in driving business-enabling and revenue-generating activities. The key challenges that IT organizations face in doing this include:

- Explosive growth in data and proliferation in its uses have made it harder for organizations to implement proactive strategies for data management.
- Expectations that IT should do more with flat or declining resources encourage short-term cost-reduction thinking versus making data management decisions that ensure long-term business gains.

To ensure long-term business gains while optimizing short-term costs, CIOs need to understand what their "total cost of data" is across their entire organization and make decisions that help IT be a business enabler rather than a bottleneck to value creation. Data virtualization solutions can be a key component in an optimized data management strategy as organizations adopting data virtualization solutions are:

- Transforming database management operations by reducing storage and datacenter costs and making existing IT staff much more productive
- Drawing significantly more value out of data through greater business agility and reduced time to market for applications and data-driven projects
- Increasing business-line productivity and driving additional revenue
- Realizing an average five-year return on investment (ROI) of 461% with Delphix

### Business Value Highlights

Data virtualization solutions (e.g., Delphix Agile Data Platform) delivered a 461% ROI and paid for themselves in 4.3 months through the following:

- Increased the number of development and testing databases maintained by 183%
- Reduced the storage footprint of development and testing database copies by 97%
- Cut time to market for customer-facing applications by 60%
- Reduced the time needed to refresh a database by 99%

## SITUATION OVERVIEW

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The flow of timely and accurate data is vital to companies' business operations. Thus, ineffective management of data creates high costs, even if many organizations still do not have a holistic understanding of all the costs that data imposes on them. When the impact of data on areas such as business intelligence, application development, and business project completion is considered, it becomes clear that data is playing a more critical role than ever in driving business at most organizations. When data negatively affects these activities, it exacts a significant cost on the organization. CIOs looking to optimize their data management strategies must take all these costs into account or risk inhibiting overall business strategies by taking too narrow a view of data's impact on businesses.

In examining organizations' data management efforts, IDC discovered the following:

- Allocating storage and creating testing databases are costly and disruptive.
- Copying data for test purposes is not only time consuming but also error prone and risky from a data security perspective.
- Technology that can provide a test environment without actually copying data and requiring extra storage saves time and storage while reducing risk and increasing flexibility.
- Time saved in application testing means faster application cycle times, which ultimately has a positive business impact, including increased revenue.

### The Costs of Data

Because data is now a business driver and enabler, it creates significant costs that extend beyond the IT domain to business operations. These costs take different forms but often are manifested as increased time to market for applications or other products and reduced business productivity. Often, these business operation costs are more indirect and harder to identify than costs related to IT infrastructure or IT staff time, so companies feel a less immediate impetus to reduce such costs. Nonetheless, as data becomes a central driver of business operations for more companies, companies have little choice but to figure out where the "costs of data" are impacting them and how they can manage or mitigate these costs to ensure the best possible results.

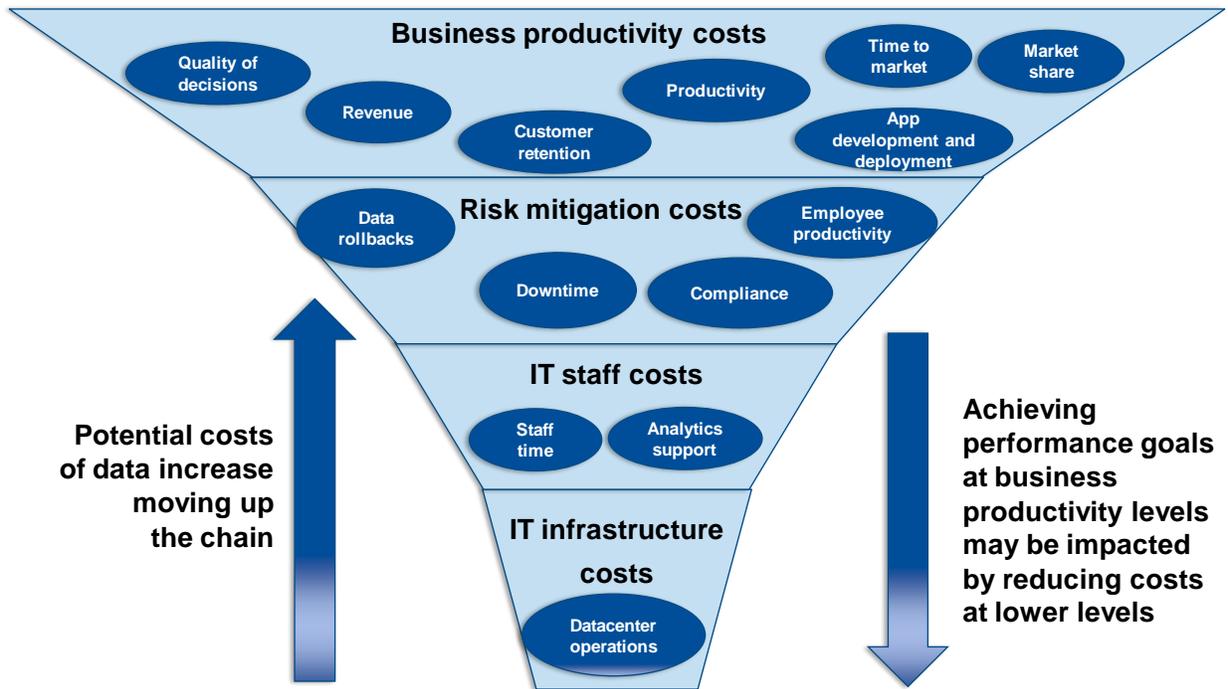
IDC research shows that organizations need to ensure that their data management strategy incorporates key initiatives in the four major cost levels (see Figure 1):

- **IT infrastructure:** Building an efficient, scalable IT infrastructure, which is the key to ensuring low data costs
- **IT staff:** Optimizing IT talent to deliver superior IT services and free up time for innovation
- **Risk mitigation efforts:** Maximizing end-user productivity with reliable and easy-to-use applications
- **Business productivity:** Reducing operational costs and increasing revenue

Businesses often find it challenging to manage their total costs of data because data-related costs at one level are sometimes the result of decisions made to reduce costs at another level: For example, the decision to not create a test database might save money at the IT infrastructure and IT staff levels, but it could impose significant business productivity or revenue costs by delaying the deployment of a revenue-producing application.

FIGURE 1

Overview of Data-Related Costs



Source: IDC, 2014

IT Infrastructure Costs

Data's explosive growth is creating new costs for organizations in their datacenters. Organizations must provision storage for huge amounts of data and testing databases and take on the costs for hardware, software, and the datacenter footprint needed to support the data. In addition, companies must deal with the pressures coming from opposite directions in managing their IT infrastructure costs: They must find ways to fit these additional costs into flat budgets and make sure that decisions about datacenter costs do not have negative consequences for other areas of their organizations. Because the success of business projects and applications hinges on the timely flow of high-quality data, decisions about costs at the datacenter level must be considered in the context of significant potential costs from untimely or corrupted data in terms of reduced non-IT productivity, product or application delays, or even lost revenue.

Case

One Delphix customer explained that it faced significant datacenter-related costs to support the growing number of testing databases its business now requires. The customer estimated that it would have to spend up to \$1 million on storage, other hardware, and floor space to ensure that it could maintain and provide sufficient data to its business units.

## *IT Staff Costs*

IT departments are feeling the burden of rapid data growth rates and the increasingly prominent role that data plays in their businesses. Rapid data growth creates additional demands on staff for administering databases, storage, networks, and systems. More importantly, though, data has turned IT departments into business enablers. Data acts as a tax on IT operations when IT departments cannot do what businesses need them to do because they are too busy "keeping the lights on." Lines of business rely on the prompt delivery of data to support their efforts in areas such as business intelligence, application development and deployment, and completing business projects. This puts pressure on IT departments to ensure that they have sufficient staff resources to support these business efforts through activities such as creating and taking down testing databases, providing data for analytical efforts to end users, and ensuring the integrity and security of company data. In addition, businesses increasingly want their IT departments to function as innovators for drivers of business value, which is hard to do when staff time is tied up on data-related tasks.

### **Case**

One Delphix customer noted that the increased number of testing databases it needed to maintain would require it to hire additional database administrators or move existing employees into database administrator roles. This not only could create additional staff costs but also could mean moving employees away from business-enabling duties to manage these databases.

## *Risk Mitigation Costs*

Data also has costs when it has errors or does not reach the end user in a timely manner. When companies roll back data because of errors, they incur costs such as employee productivity losses and delayed project schedules. Likewise, when data delivery or data integrity issues cause application or system downtime, organizations face widespread productivity losses and put compliance with service-level agreements (SLAs) in jeopardy. These types of costs are often particularly challenging for organizations to manage because they create enduring questions about reliability and data integrity. Moreover, application or system downtime resulting from data-related problems has costs that can rapidly escalate because of reduced productivity for large numbers of non-IT employees.

### **Case**

One Delphix customer incurred significant costs in terms of lost non-IT employee productivity due to data rollbacks. These data rollbacks were due to data-related errors and problems that occurred because the customer did not have sufficient resources to conduct a sufficient number of regression tests on data being used for production.

## Business Productivity Costs

The business productivity of organizations is increasingly dependent on the timely flow of accurate data across their operations. Data is a cornerstone of business enablers such as application development and deployment, business intelligence, business projects, and strategic decision making. Thus an organization suffers when data is delayed, incomplete, or wrong because its business teams cannot build the tools the company needs to carry out its business strategy or even to identify the right strategy. As a result, companies can put their revenue, customer relationships, and ultimately success in terms of market share at risk by not optimizing their data management operations.

### Case

One Delphix customer explained that its project execution capabilities were suboptimal because of the amount of time it took to troubleshoot data-related issues and create new testing databases. The customer estimated that it was doing projects "at least twice as fast" with Delphix, which demonstrates the considerable costs to its business that it was incurring.

## CASE STUDY: THE IMPACT OF USING DELPHIX ON THE TOTAL COST OF DATA

### Study Demographics

In December 2013, IDC interviewed five organizations that had been using Delphix's Agile Data Platform (i.e., data virtualization) for 4-27 months. The interviews were with representatives of companies ranging in size from 270 to 4,500 employees. The organizations are all headquartered in the United States, and several of them have international operations. The five companies come from the following sectors: retail, healthcare, insurance, telecommunications, and manufacturing. IDC designed the interviews to elicit quantifiable information as well as qualitative statements regarding the organizations' use of Delphix's Agile Data Platform. With this information, IDC has evaluated the impact of Delphix's solutions on these organizations and their efforts to lower their total costs of data. Table 1 provides an aggregated profile of the organizations surveyed for this white paper.

**TABLE 1**

### Demographics

Average number of employees	2,554
Average number of internal users	2,171
Average number of IT staff	241
Average years with Delphix	1.6
Average data growth per year — Delphix environment	14%
Average application growth	44%
Database environment — Delphix	Two Oracle, two Oracle/SQL, and one SQL
Industry	Retail, healthcare, insurance, telecommunications, and manufacturing
Region	North America and worldwide

Source: IDC, 2014

Delphix supports Oracle, Microsoft SQL Server, and PostgreSQL databases and data warehouses as well as applications and file systems. Of the organizations interviewed for this white paper, two companies are using Delphix only for Oracle databases, one company is using Delphix only for its Microsoft SQL databases, and two companies are using Delphix for a mix of Oracle and Microsoft SQL databases.

## FINANCIAL BENEFITS ANALYSIS

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The five companies interviewed for this study reported that they have reduced their total cost of data while achieving a number of important IT and business benefits by using Delphix's data virtualization solutions. With Delphix in place, these customers are:

- Saving on storage costs
- Getting much greater utility from development and test databases at minimal additional cost
- Making database replication easy and cost effective
- Increasing the speed of creating development and test databases and conducting database refreshes
- Reducing data-related errors
- Bringing data-driven projects and applications to internal end users and customers in less time
- Increasing business agility and driving higher revenue

According to one company, Delphix's impact on its operations has exceeded its expectations by positively influencing its business as well as its IT operations: "When we bought Delphix, the original reason was all of the terabytes we were avoiding. But now, the main benefit for us is the agility that it gives us – the increase in productivity. We didn't realize when we bought it that the agility would be so great." This company's experience hints at the value that Delphix's data virtualization solutions can provide across organizations.

From interviews with Delphix customers, IDC measured the financial impact to those organizations of using Delphix's Agile Data Platform. IDC estimates that the aggregate benefit of using Delphix averaged \$1.70 million per year, which is equivalent to benefits of \$78,300 per year per 100 users of IT applications within the enterprise. For this study, an average of 85% of total employees in these five organizations were IT users.

Based on interviews, IDC concluded that these organizations are benefiting from Delphix's Agile Data Platform by reducing the total cost of data in the four areas discussed previously in this white paper. Over five years, the organizations are achieving the following annual benefits (see Figure 2):

- **IT infrastructure cost reduction:** Interviewed companies are leveraging Delphix to create and maintain many more copies of their development and testing databases at minimal additional cost. IT infrastructure efficiencies and costs avoided average \$19,300 per 100 users.
- **IT staff productivity gains:** Interviewed companies are making their IT staff's data management efforts more productive with Delphix by avoiding hires and achieving efficiencies. On average, these organizations are realizing IT staff productivity gains of \$40,100 per 100 users.

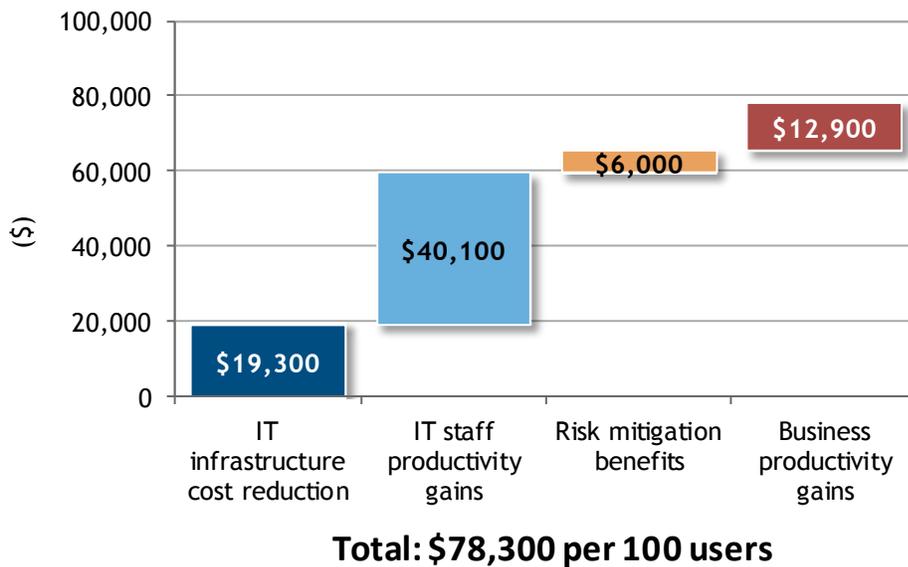
- **Risk mitigation benefits:** Interviewed companies are leveraging Delphix to reduce the frequency of downtime instances and saving time on rollbacks triggered by data errors. On average, these companies are gaining \$6,000 per 100 users in increased non-IT employee productivity by minimizing risk connected to data-related problems and errors.
- **Business productivity gains:** Interviewed organizations are recording higher business productivity and increased revenue with Delphix by speeding up data-driven projects and the application deployment process. On average, the surveyed companies are achieving business productivity and revenue gains of \$12,900 per 100 users with Delphix.

Interviewed companies explained that Delphix's software created value and reduced the cost of data by:

- Enabling them to maintain more database test copies without having to make a significant investment in more storage or hardware
- Reducing the time required to create development and testing database copies significantly
- Allowing development teams to work with more frequently updated development and testing database copies, which provides agility and reduces the likelihood of data-related errors

**FIGURE 2**

**Average Annual Benefits per 100 Users**



Source: IDC, 2014

These companies are transforming their development and test database environments with these technology benefits of Delphix. As a result, their data management efforts are more effective, which is driving efficiencies and creating value across their businesses.

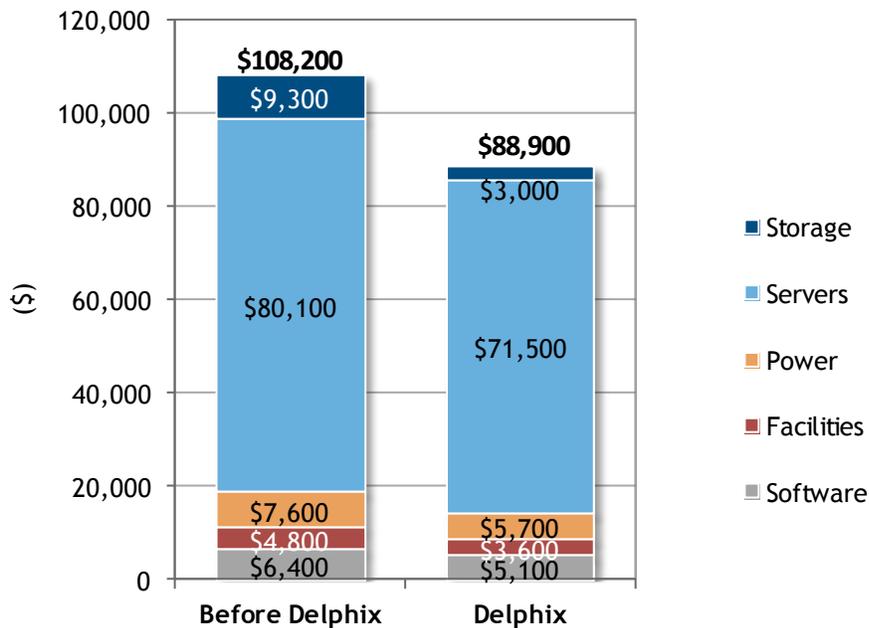
At base, these companies are using Delphix to create virtual copies of development and testing databases at much greater speed, but without incurring additional costs. Because virtual copies of these databases created with Delphix have a storage footprint of only 80GB on average – a 96.8% reduction on the companies' average traditional database footprint of 2.42TB – these companies have the flexibility to create and maintain many more copies of these databases because of reduced storage footprints and costs. As a result, these companies have increased the number of copies per database they maintain from 6.0 to 17.0. One company reported that "within a year, we were running three times the number of environments, but without expanding our storage or hardware needs." By maintaining more development and testing databases, these companies can run more tests and improve the quality and utility of data-driven outputs and applications.

## IT Infrastructure Cost Reduction

Delphix's software is enabling the interviewed companies to avoid and even reduce data-related IT infrastructure costs. With Delphix, these companies can maintain more development and test databases while increasing their IT infrastructure footprint only minimally. Avoided costs are particularly evident for storage and servers, although benefits are also accruing to these companies in terms of their spending on facilities, power, and software. In total, IDC estimates that these companies are recording average IT infrastructure savings and cost avoidances of \$19,300 per 100 users per year (see Figure 3).

**FIGURE 3**

### Average Annual IT Infrastructure Cost per 100 Users



Note: Storage costs reflect Delphix-only environments; other datacenter costs reflect the total datacenter environment.

Source: IDC, 2014

Delphix is changing the framework for how these companies view storage costs for development and test databases by enabling savings on their existing testing environments as well as the expanded testing environments Delphix enables. On average, these companies are saving \$6,300 per 100 users on storage costs. In addition:

- Companies are freeing up physical storage by virtualizing some existing development and testing database copies. One Delphix customer praised its impact, saying that it "lopped off about 30TB in storage right off the bat" with Delphix.
- Companies are leveraging Delphix to build up their development and test database environments while barely increasing storage requirements because virtualized database copies have very minimal storage footprints. As one Delphix customer explained, "We absolutely avoided hardware costs because we're not using as much storage even though we saw an explosion in our environment count. Within a year, we were running three times the number of testing environments, but without expanding our storage needs."

These companies are avoiding other datacenter-related costs with Delphix, including costs related to servers, facilities, power, and software. As with storage, these companies can do much more with Delphix without increasing spending on their datacenters. According to one company, "We're still scratching our heads to figure out how we would have provisioned the environments that we would have needed to do the development projects we're doing with Delphix. We would have had to provision another five to six physical environments at about a million dollars cost" to approach the functionality unleashed by Delphix. IDC calculates that these companies are avoiding an average of \$13,000 per year per 100 users on infrastructure costs.

## IT Staff Productivity

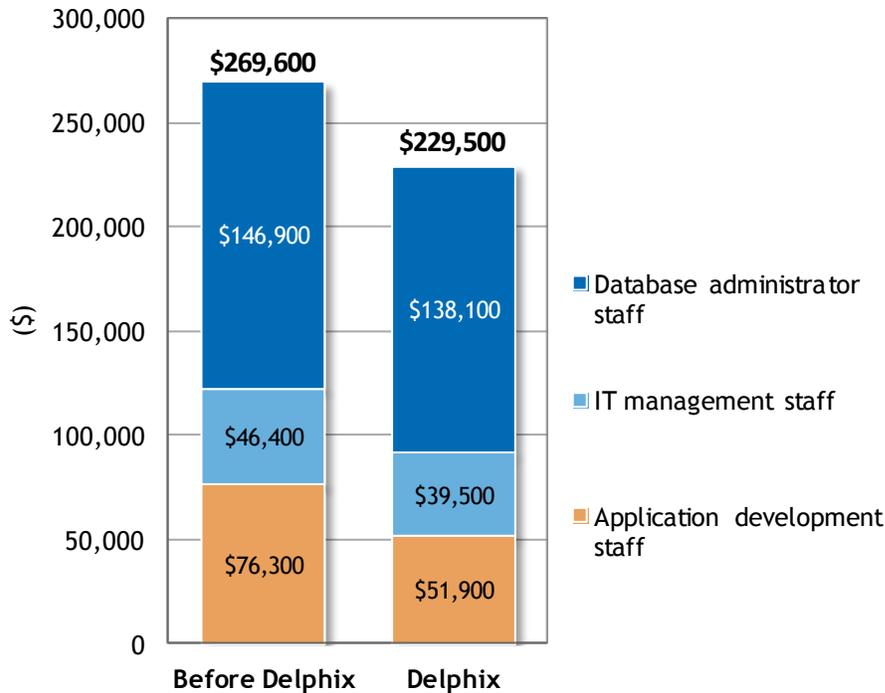
The companies' IT departments have become more efficient and productive as a result of their use of Delphix. In particular, the technological advantages of Delphix such as reduced infrastructure footprint and much faster database copy creation are allowing them to avoid making hires that would have otherwise been needed to achieve the productivity gains seen with Delphix. In total, these companies are seeing increased IT staff productivity benefits of \$40,100 on average per year per 100 users (see Figure 4).

Delphix's impact on IT staff is most evident on database administration and application development:

- Companies report that they would have no choice but to invest in more database administrators to maintain the number of database testing copies in physical form enabled by Delphix. One company explained that "with Delphix, we have about 20 additional testing environments, so we'd have to have a couple of more database administrators." On average, these companies are avoiding costs of \$8,800 per 100 users by not having to hire additional database administrators.
- Companies say that their application development teams are much more productive with Delphix. This productivity stems from their spending far less unproductive time waiting for fresh databases and having to resolve fewer data-related issues. According to one customer, "Once a week with Delphix, we give application developers a fresh database, whereas they'd have to put in a request previously, and we'd do an export and import on the weekend. Now, these developers are probably saving about two weeks of time in terms of getting their databases per testing cycle." As a result, the companies' application development teams are realizing productivity gains of \$24,400 per 100 users.

**FIGURE 4**

**Average Annual IT Staff Productivity Benefit per 100 Users**



Source: IDC, 2014

The companies' ongoing IT operations have also become more efficient as a result of Delphix. Time savings are most significant for database administration duties but are also being recorded for responsibilities ranging from creating and destroying development and test database copies to storage provisioning to uploading and reloading data. One Delphix customer explained how these time savings are impacting its overall efforts: "Staff reallocated due to time savings with Delphix gets to focus on other things that need work, such as automation and innovation." In total, these companies are saving an average of \$6,900 per 100 users in increased IT management staff productivity.

## Risk Mitigation Benefits

Interviewed companies are leveraging Delphix's Agile Data Platform to mitigate risk emanating from their use of data by limiting the frequency of systems downtime and data error rollbacks (see Table 2). In addition, Delphix is helping the companies resolve problems in less time when they do occur. As a result, these companies are avoiding data-related costs by increasing the productivity levels of non-IT employees, which is driving an annual average benefit of \$6,000 per 100 users in non-IT staff productivity gains through risk avoidance.

**TABLE 2**

### Risk Mitigation KPIs

	Before Delphix	With Delphix	Difference	Advantage with Delphix (%)
Annual downtime instances per year	22.7	8.7	14	61.8
Mean downtime recovery time (hours)	5.5	2.2	3.3	60.5
Total downtime hours	124.7	18.8	105.9	84.9
Data management errors per year	7.5	6.5	1	13.3
Mean data management errors recovery time (hours)	5	1.3	3.8	75.0
Total data management errors (hours)	37.5	8.1	29.4	78.3

Source: IDC, 2014

These companies are reducing downtime instances by putting more recently refreshed and higher-quality data into their development and testing databases as a result of using Delphix. Moreover, because they can do database refreshes much faster, companies need less time to fix data-related problems. One company explained that it was no longer spending significant time "chasing bad data" with Delphix and has thus reduced troubleshooting to 30 minutes from several hours.

Interviewed companies are also leveraging Delphix to limit the negative impact of rollbacks caused by data errors by:

- Enabling more robust testing environments
- Allowing companies to carry out more data rollbacks when problems occur

One company noted that it runs 40 regression tests per database during development efforts with Delphix instead of only 5 or 6 without taking any additional time. Another company credited Delphix with enabling it to carry out rollbacks at all because it can refresh a database on the same day rather than waiting two weeks for a refresh.

## Business Productivity Benefits

The companies interviewed for this study also report that they are achieving significant business productivity gains by using Delphix's data virtualization software, including higher revenue. Delphix is helping eliminate data's drag on business operations for these companies and driving business value for them by:

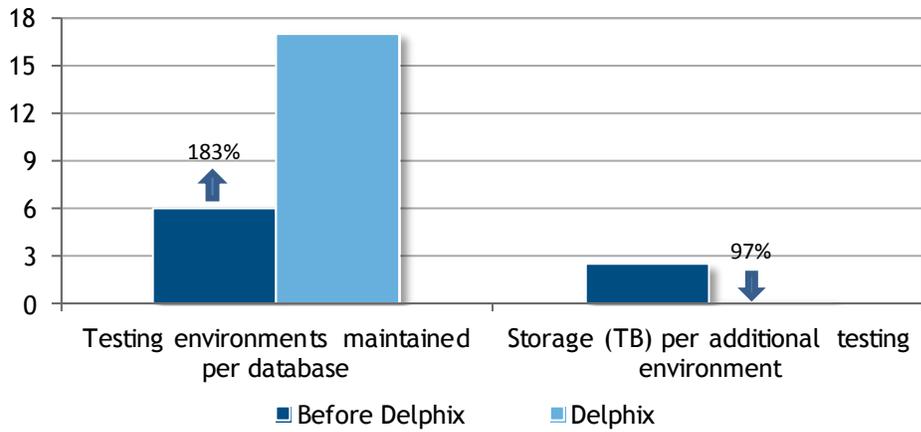
- Reducing the time needed to push applications through to end users and customers
- Allowing companies to undertake more data-driven projects
- Enabling productivity gains for employees across these organizations

Delphix dramatically cuts the time required to prepare a refreshed database copy, which has changed how these companies approach testing their databases. With Delphix, database refresh time has gone from an average of four days to minutes, making the companies' use of data more agile and productive. Faster refreshes mean that more testing is occurring, data quality is higher and more accurate, and employees of all types are spending less unproductive time waiting for data to be provided. As one customer explained, "We've gone from three days to provision an environment where the data was two days stale when it arrived to minutes. That's a complete paradigm shift."

Metrics such as the average time it takes to bring an application to market and to complete an internal upgrade are also improving because of the companies' use of Delphix. The companies reported that they have reduced the average time it takes them to deploy a customer-facing application from more than two months to less than one month because they are getting the needed data much faster with Delphix. According to one Delphix customer, "[T]he time-to-market savings is a benefit. It's helping us to get a better product out, quicker." Delphix is also helping these companies complete internal upgrades 34% faster, meaning that they are only taking five months on average to complete such deployments with Delphix, down from eight months before (see Figures 5 and 6).

**FIGURE 5**

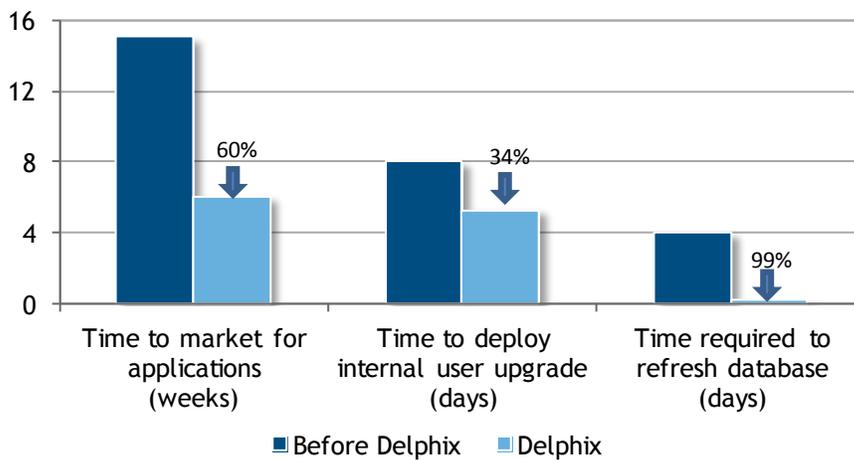
**Database Testing KPIs**



Source: IDC, 2014

**FIGURE 6**

**Time-to-Market KPIs**



Source: IDC, 2014

Interviewed companies report completing 29.4% more data-driven projects per year with Delphix and a strong 8.5% employee productivity gain on projects impacted by Delphix. According to one company, Delphix has helped a team of 100 employees achieve up to a 25% productivity gain by making possible the automation of more than 1,000 reports. As a result, IDC calculates that these companies are recording annual business productivity gains of \$11,100 per 100 users on average.

Several interviewed companies confirmed that they have linked their use of Delphix to higher revenue. As one interviewee explained, "Half of our data-driven projects impact our revenue. So we are speeding up revenue to the company by speeding up completion of these projects and application deployment with Delphix." His company estimated that Delphix was helping it realize at least an additional million dollars in revenue per year by speeding up projects through improved data provisioning. In total, IDC estimates that these companies are recording increased revenue of \$1,800 per 100 users per year on average by using Delphix, assuming a 10% operating margin on additional revenue (see Table 3).

**TABLE 3**

**Business Productivity Enhancements**

<b>Revenue impact</b>	
Annual growth in data-driven projects	29.4%
Revenue increase per year	\$387,500
Operating margin	10%
Annual operating income increase per 100 users	\$1,800
<b>Business operations impact</b>	
Productivity increase with Delphix	8.5%
Increased business-line productivity gain per 100 users	\$11,100

Source: IDC, 2014

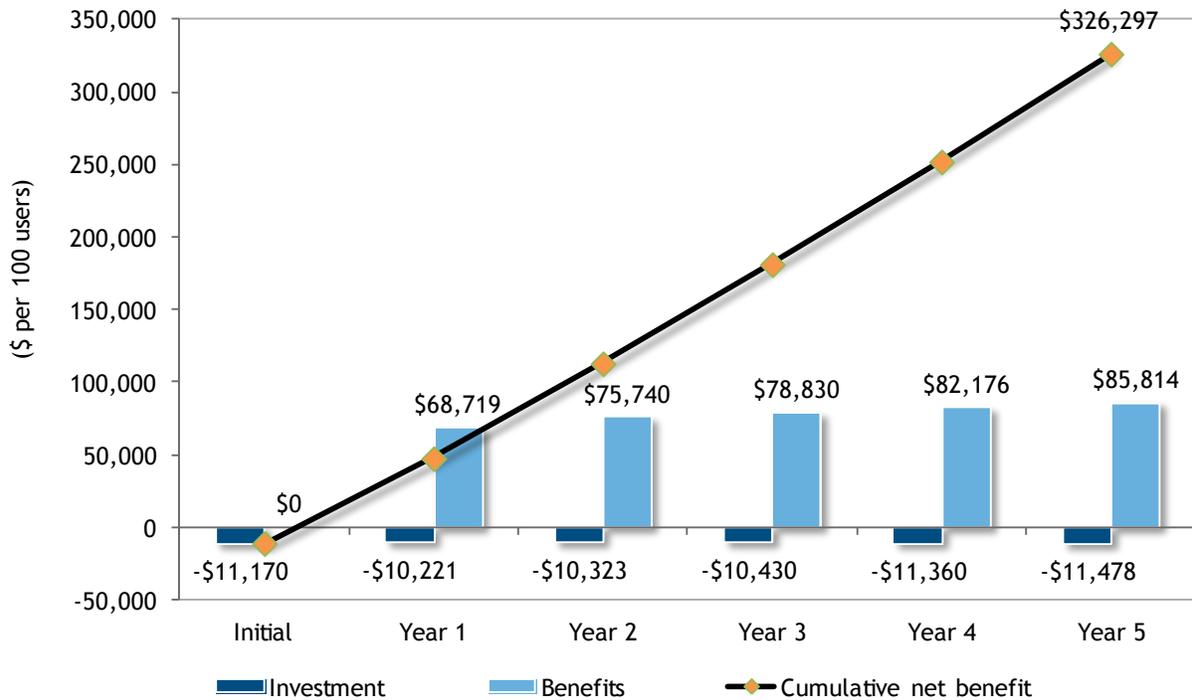
**ROI ANALYSIS**

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

IDC assessed the cost, benefits, and value of Delphix to these companies over a five-year period, as shown in Figure 7. These companies made average initial investments of \$11,200 per 100 users on Delphix and are spending \$10,800 per 100 users each year. These investments will result in average annual benefits of \$78,300, with data growth increasing the value of the benefits each year. Over five years, these companies will realize a cumulative net gain of \$326,300 per 100 users of IT applications.

**FIGURE 7**

**Cost Benefit Analysis**



Source: IDC, 2014

Table 4 presents IDC's ROI analysis for the companies' use of Delphix's software. This ROI analysis is a five-year view of the financial impact of Delphix on these companies.

The five-year ROI analysis shows that on average, the organizations in this study will spend \$49,700 per 100 IT users on Delphix software and achieve \$278,800 in benefits per 100 users of IT. This results in an NPV of \$229,100 per 100 users for their use of Delphix. Based on these results, the organizations saw an average payback period of 4.3 months after their deployment of Delphix and an ROI of 461%.

**TABLE 4**

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**Five-Year ROI Analysis per 100 Users**

Benefit (discounted)	\$278,800
Investment (discounted)	\$49,700
Net present value (NPV)	\$229,100
Return on investment (ROI)	461%
Payback	4.3 months
Discount rate	12%

Source: IDC, 2014

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**CHALLENGES/OPPORTUNITIES**

Storage technology will become faster, cheaper, more flexible, and easier to manage as it evolves. That's great news for database users, but it does not change one fundamental fact: The chief cause of slow database application development, inefficient database testing, and resultant application failures and interruptions in business is not storage per se but the complex tasks associated with making and refreshing test and development copies of databases, including resource deployment, staff time, and recurring tasks for testing. These things don't change regardless of how cheap the storage becomes or how easy it is to use.

In the results detailed previously, IDC found that the use of Delphix, with its delta-based data storage virtualization technology, so drastically reduced the problems associated with data copying and recopying, including resource allocation, server time, and human error, that, on average, the cases studied showed a 461% ROI, with just 4.3 months to full payback of the investment in Delphix. As systems and storage evolve, and as databases become increasingly sophisticated and complex, the hardware may get much cheaper, but the problems associated with development and test data management will become more complex and severe, making the Delphix solution even more relevant in the years ahead.

Storage systems and database management systems will continue to evolve. This means that Delphix will be challenged to keep up with those changes and provide solutions that meet not only the present needs of database application developers but those in emerging areas such as Big Data and cloud database, which are not yet fully realized.

## CONCLUSION

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A substantial roadblock to the agility of the enterprise is its inability to evolve database applications fast enough to meet the changing requirements of a rapidly evolving business climate. A key aspect of this problem is to be found in the cost, risk, and time involved in building and maintaining development and test databases, which are essential to such an evolution. In studying five representative cases, IDC has found that Delphix, with its delta-based data management technology, offers a data storage virtualization capability that overcomes these issues and delivers substantial ROI.

The savings in this area are most impressive with respect to IT staff productivity gains (\$40,100 per 100 users per year), but other operations-related benefits and business benefits resulting from faster time to value were also impressive. Although the storage requirement for test and development systems was drastically reduced in all cases, the more impressive savings was in avoiding all the costly system time required for loads, rollbacks, restores, and other such activities rendered irrelevant by the Delphix technology. The dramatic simplification of database administration tasks saved the time usually spent in defining development and test databases and getting them up and running so that database administrators could concentrate on the more high-value tasks of supporting the applications teams in adjusting and perfecting both the database and its application.

In consideration of these results, anyone faced with the ongoing challenge of defining and managing development and test databases should do the following:

- Investigate how much time and effort is involved in standing up development test databases and in restoring or rolling them back during testing.
- Consider how much administrative effort is required to procure and allocate storage for such databases; most of such storage is likely to contain exactly the same data before and after each test.
- Look at how projects are delayed or deferred because the previously challenges make them too costly or impractical, hobbling the ability of an organization to evolve its database applications to meet business requirements.
- Consider the Delphix product family as a means to overcome these problems and boost both the cost-effectiveness of database application development and the overall agility of the enterprise.

## APPENDIX A: THE DELPHIX TECHNOLOGY

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Delphix products deliver the functionality described previously, and more, by supporting delta-based virtualized storage of data in databases, applications, and file systems; enabling multiple development teams to share the data elements that remain unchanged (usually 90-95% of the total system); and enabling point-in-time test environment resets based on transaction boundaries.

Delphix Engines include three core technologies:

- DataVisor, which efficiently synchronizes data across multiple source databases and data warehouses with full transactional consistency

- Data Version Control (DVC), which tracks, stores, and applies all changes to data
- Delphix File System (DxFS), which virtualizes databases and application datasets by sharing data blocks across environments (Delphix Engines can quickly and efficiently create full read-write clones of small or large databases by virtualizing and sharing the data blocks within databases. Just as server virtualization shares the resources of a physical server across multiple virtual machines, Delphix shares the data blocks of data across multiple virtual database, application, or file system copies while preserving full functionality and performance.)

## Delta-Based Storage

Project teams often create dozens of data or application copies – the majority of which have over 95% identical data. Delphix virtualizes the data across the copies, storing only unique data blocks. Further, DxFS analyzes the block boundaries set in databases and applications, compresses data blocks along those boundaries, and eliminates storage of empty or temporary blocks. Delphix says that its software can reduce project storage needs by more than 10 times while reducing the incremental cost of an additional database by over 100 times. This means, for instance, that Delphix can reduce 10 copies of a 5TB database from 50TB to 5TB with database virtualization. The real power, however, comes from the elasticity of environments – getting more out of current hardware and software resources.

## Rapid Database and Application Cloning

This approach results in virtual cloning; the data is not copied, so no extra storage is needed except for the captured changes. It also means that new test instances can be created on a self-service basis, which greatly reduces time demands for database or application administrators while increasing business time to market. Database application development and testing teams can set up their test instances without needing to schedule staff or batch time to accomplish the task.

## APPENDIX B: IDC METHODOLOGY

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IDC utilized its standard ROI methodology for this project. This methodology is based on gathering data from current users of the technology 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.

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