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The Business Value of Oracle Database Appliance

Business Value Highlights

498%
five-year ROI

54%
lower five-year cost of operations

67%
faster deployment of new databases

Less than 1 minute
of unplanned downtime per user per year

61%
more efficient DBA teams

20%
lower cost of infrastructure

EXECUTIVE SUMMARY

Today's relational database management systems (RDBMSs) can deliver great power in handling complex data workloads but can also be expensive and difficult to configure and install, as well as to maintain the installed systems over time. The work involved not only taxes the operations staff but also exposes the database (DBA) system to risk because of improper system configuration and other human error.

One solution to this problem is to use a preconfigured system custom made for the RDBMS. Oracle offers such a system for Oracle Database. It is called the Oracle Database Appliance, which comes ready to go, configured specifically to work with the database system software. IDC conducted this business value study on behalf of Oracle to learn how and to what extent users have benefitted from the use of Oracle Database Appliance.

At OpenWorld 2019, Oracle unveiled the new Oracle Database Appliance X8, which offers a number of improvements over X7 versions, most notably new Intel processors, increased storage, and enhanced networking capabilities making the X8 a more robust, enterprise-class system. The one processor X8-2S, two processor X8-2M and four processor X8-2-HA systems all utilize new 16 core Intel Xeon Gold 5218, 2.3GHz processors. While memory size remains the same as X7-2 models, storage for the X8-2M and X8-2-HA has increased by up to 50% and 68-170%, respectively. Also, customers can add two additional PCIe networking cards on all X8-2 models and choose from up to 24 10GBase-T ports or up to twelve 25/10 GbE ports. Despite the numerous advancements in these systems, the list price of each new ODA X8-2 model remains the same as previous versions.

For the purposes of this research analysis, IDC interviewed organizations running business-critical database and application workloads on the Oracle Database Appliance X7, an engineered system. Study participants described achieving important gains for performance of these workloads, as well as staff and cost efficiencies. This means that they have captured

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strong value through their investment in Oracle Database Appliance, which IDC quantifies as worth an annual average of $41,900 per database ($2.65 million per organization) by:

- **Improving the performance and agility of key database and application workloads**, leading to revenue gains and higher user productivity
- **Minimizing the frequency and impact of unplanned outages**, bringing down the cost of lost user productivity and revenue to almost zero
- **Reducing staffing requirements for day-to-day database and infrastructure activities**, freeing up time for other activities and initiatives
- **Optimizing the cost of infrastructure and licensing**, creating and running more cost-effective Oracle database and application environments

SITUATION OVERVIEW

Installing and configuring a RDBMS involve a certain amount of time, effort, and expertise to carry out. It includes choosing the right server and storage systems to use, initialize, and configure them, then to install and configure the RDBMS software. It also involves tuning the database to best use the features of the chosen infrastructure systems.

All these actions take time and also involve some risk since mistakes can stretch out the time required to finish the job. Often, even after the database is set up and configured, DBAs must, by trial and error, make adjustments to improve performance or overcome other operational obstacles.

In addition to these issues, it must be acknowledged that when users build their database configurations themselves, those configurations entail details that can complicate support situations. When a problem arises, a support call may necessitate the vendor's support team attempting to recreate the problem on a similarly configured system, which can delay resolution of whatever the problem is.

By using a vendor-supplied system of hardware and software that is designed to work together and can be easily deployed, the user avoids the delays and potential errors and other problems involved in installation and configuration of the database server and can get right to work. The user also is ensured that support calls will be simplified because the vendor support team already has the correct configuration readily at hand for testing and problem recreation and resolution. The Oracle Database Appliance is such a preconfigured system.

ORACLE DATABASE APPLIANCE

The Oracle Database Appliance is an engineered system made up of integrated server, storage,networking, and software components. The hardware elements were chosen and assembled specifically by Oracle to support Oracle Database, and the database server software is tuned specifically to deliver performance and scalability on this platform. Since it is a known configuration, support is simple and straightforward. Also, maintenance tasks, including patching, are greatly simplified because the procedures are designed specifically for this system. The aim is to greatly reduce the effort required to maintain and tune the database and its software, freeing up time for more productive work.

THE BUSINESS VALUE OF ORACLE DATABASE APPLIANCE

Study Demographics

IDC interviewed seven Oracle customers for this study. Discussions centered on understanding the impact of Oracle Database Appliance–engineered systems on these organizations' database, IT, and business operations. As shown in Table 1, study participants were of various sizes and industry verticals, with an average employee base of 21,795 (1,500 median) and annual revenue of $6.85 billion ($525 million). They offered the perspectives of organizations in the aviation/transportation, higher education, mining, natural resources, process manufacturing, and retail sectors.

TABLE 1 Demographics of Interviewed Organizations

	Average	Median
Number of employees	21,795	1,500
Number of IT staff	2,199	40
Number of business applications	105	105
Revenue per year	$6.85 billion	$525 million
Industries	United States (4), Canada (2), France	
Countries	Aviation/transportation (2), higher education, mining, natural resources, process manufacturing, retail	

n=7 Source: IDC, 2019

Ease of deployment, time to value:

> *We chose Oracle Database Appliance for its ease of deployment and management. We used to engage multiple teams to build a similar configuration to our Oracle Database Appliances, whereas they come out of the box completely preconfigured . . . We deployed in two days — so the time-to-market value is high.*

Consolidate hardware:

> *We needed to consolidate our datacenter environment because we went to a new production datacenter and we don't have as much space. Oracle Database Appliance is really efficient — we've gone from 8–10 racks to around 2 racks now.*

Performance and efficient management:

> *Improved performance with Oracle Database Appliance is the big win for us — the applications definitely run much faster to the point that we actually have people comment on it . . . Also, we have gone from needing a team for server management of seven to two staff members.*

Choice and Use of Oracle Database Appliance

Interviewed Oracle customers returned to common themes in explaining why they invested in Oracle Database Appliance. Generally, they migrated from distributed server environments and described needing a higher-performing infrastructure foundation for important database and application workloads that also deliver staff time and infrastructure cost efficiencies. They spoke to their selection criteria in more detail:

- **Ease of deployment, time to value:** *"We chose Oracle Database Appliance for its ease of deployment and management. We used to engage multiple teams to build a similar configuration to our Oracle Database Appliances, whereas they come out of the box completely preconfigured . . . We deployed in two days — so the time-to-market value is high."*
- **Consolidate hardware:** *"We needed to consolidate our datacenter environment because we went to a new production datacenter and we don't have as much space. Oracle Database Appliance is really efficient — we've gone from 8–10 racks to around 2 racks now."*
- **Performance and efficient management:** *"Improved performance with Oracle Database Appliance is the big win for us — the applications definitely run much faster to the point that we actually have people comment on it . . . Also, we have gone from needing a team for server management of seven to two staff members."*

Study participants described running substantial database and application environments on their Oracle Database Appliance platforms. As shown in Table 2, they have deployed an average of 13 Oracle Database Appliances for 28 business applications and 63 databases. They have concentrated use on transactional, third-party business and analytics applications/workloads, with several organizations also running data warehousing, Oracle business productivity, and collaboration workloads. About two-thirds of their Oracle Database Appliance capacity is used for production workloads (65%), with the rest for development and testing (17%), backup and recovery (12%), and data warehousing (6%) workloads.

TABLE 2 Oracle Database Appliance Use by Interviewed Organizations

	Average	Median
Number of Oracle Database Appliances	13	2
Number of business applications	28	10
Number of databases	63	10
Number of terabytes	128	10

n=7 Source: IDC, 2019

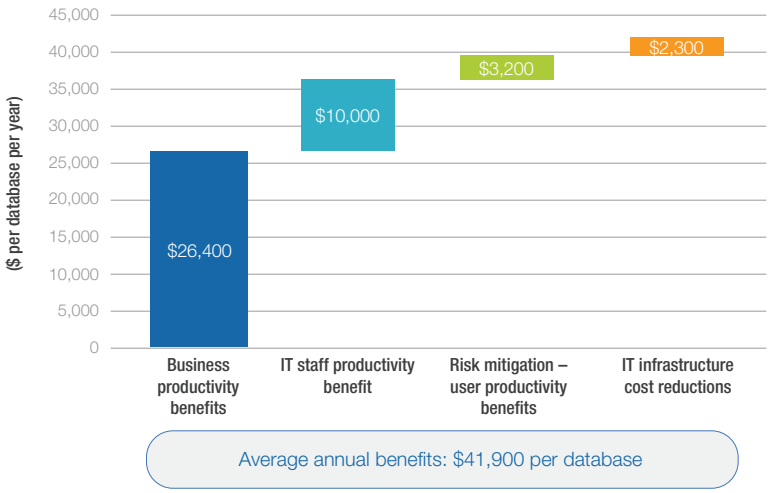
Business Value of Oracle Database Appliance

Study participants reported that the use of Oracle Database Appliance has upgraded their database and application environments in terms of performance, agility, and reliability, which helps them better support their businesses operations. They described accomplishing these performance and operational improvements even as they realize staff and infrastructure cost efficiencies. These benefits result in a strong value proposition for interviewed Oracle customers, which IDC calculates to be worth an annual average of $41,900 per database ($2.65 million per organization) in terms of (see Figure 1):

- **Business productivity benefits:** Improved performance and agility of databases and applications has a noticeable impact on efforts to address business demand and ensure employee productivity. IDC puts the value of higher revenue and employee productivity, which together constitute the majority of value quantified for this analysis, at an annual average of $26,400 per database ($1.67 million per organization).
- **IT staff productivity benefits:** Consolidating databases and applications on a converged platform, along with greater automation and integration, generates efficiencies for DBA, IT infrastructure, and help desk teams. IDC values time savings and productivity gains for these IT teams at an average of $10,000 per database per year ($632,900 per organization).
- **Risk mitigation — user productivity benefits:** Having an IT infrastructure with almost no impactful downtime limits the cost of user productivity and revenue lost to outages and minimizes operational risk. IDC quantifies the value of higher user productivity and revenue at an annual average of $3,200 per database ($204,900 per organization).
- **IT infrastructure cost reductions:** Running a more efficient IT infrastructure means lower operational expenses and reduced database and application licensing costs. IDC estimates these savings to be worth an annual average of $2,300 per database ($142,700 per organization).

Source: IDC, 2018

FIGURE 1 Average Annual Benefits per Database



Source: IDC, 2019

Improved Database and Application Performance

Study participants reported that the databases and applications perform substantially better on their Oracle Database Appliance platforms. As noted previously, they are running varied workloads on Oracle Database Appliance, but performance is critical to many of them, including transactional, business productivity, analytics, and data warehousing workloads. When their legacy IT infrastructure platforms struggled to provide requisite levels of performance, they noted that IT organizations often assumed responsibility for the friction exerted on business operations.

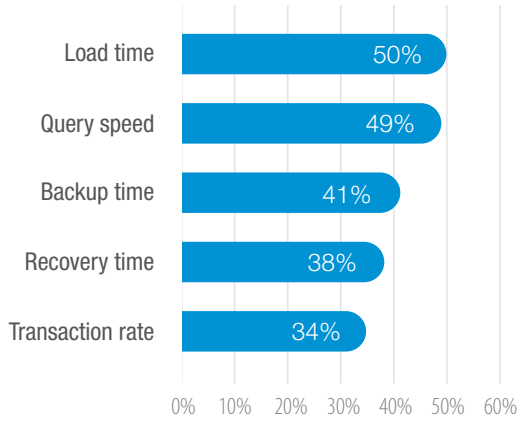
"Query speed is one area where we get performance benefits with Oracle Database Appliances — it's about seven times faster. Our load time for a full database load has gone from around 40 hours to 4 hours, and our backup time has gone from about 6 hours to 20 minutes."

However, by migrating workloads to the Oracle Database Appliance platform, which is tailored for Oracle database and application workloads, study participants have realized substantial improvements in key performance metrics. One organization provided specifics about the impact on its core data-related activities: *"Query speed is one area where we get performance benefits with Oracle Database Appliances — it's about seven times faster. Our load time for a full database load has gone from around 40 hours to 4 hours, and our backup time has gone from about 6 hours to 20 minutes."* Another interviewed organization described both the specific and general performance benefits: *"We have seen website response times for several applications cut in half. But here is the better answer in terms of performance: Oracle Database Appliance is not the bottleneck. It performs fast enough that other people cannot work that fast, which means that IT is no longer the problem."*

Figure 2 demonstrates the significant impact of Oracle Database Appliance on various performance metrics for the databases and applications running on the platform. For example,

data load times have decreased by 50% while queries and transactions are completed in 49% and 34% less time on average, respectively.

FIGURE 2 Performance Benefits



Source: IDC, 2019

More Agile Database and Application Environments

Study participants can also better match their database and IT infrastructure resources to business demand with Oracle Database Appliance. Their legacy IT platforms sometimes failed to offer the flexibility needed to ensure timely delivery of new databases or compute/storage resources for testing, development, and running databases and applications.

Interviewed organizations linked their use of Oracle Database Appliance to much improved agility in terms of delivering new databases and IT resources. Having a common pool of compute and storage capacity means easier and more timely access to IT resources, while automation and purpose-built functionality enable faster database deployment. One study participant commented: *"Before, when we had to provision a new application or database, there was a big process related to provisioning and getting capacity. With Oracle Database Appliance, there's less disruption to the business when there's an unplanned request."*

Table 3 shows the impact for interviewed Oracle customers in total time and staff resources required to deploy new server, storage, and database capacity. It demonstrates significant across-the-board efficiencies, with the most significant relative gains for deployment of new databases, which can be carried out at an average of 67% faster and require 73% less time with Oracle Database Appliance

TABLE 3 Impact on IT Agility

Average per New Deployment	Previous/Other Environment	With Oracle Database Appliance	Difference	Benefit (%)
Deployment of servers				
Time to deploy new server (days)	2.5	1.8	0.7	31
Staff time to deploy new server per instance (hours)	15	8.8	6.2	41
Deployment of storage				
Time to deploy new storage (days)	1.5	1	0.5	32
Staff time to deploy new storage (hours)	1.3	0.7	0.6	47
Deployment of new databases				
Time to deploy new database (days)	2.1	0.7	1.4	67
Staff time to deploy new database (hours)	5.2	1.4	3.8	73

Source: IDC, 2019

More Robust Database and Application Environments

Study participants also benefit from experiencing almost zero impactful unplanned downtime related to their Oracle Database Appliance infrastructures. Although they had architected their previous environments to limit the impact of outages, this is still an important benefit in terms of minimizing operational and business risk associated with unplanned downtime. Of interviewed Oracle customers, only one had experienced any impactful unplanned outages at all, with the others reporting that they had yet to have any such outages. These gains in reliability are reflected in both the total absence of impactful outages and lost productive time per user, which is well under 1 minute per year with Oracle Database Appliance (see Table 4). One study participant cited the reliability and robust nature of Oracle Database Appliance as a key reason for choosing it to run its always-on business: *"We chose Oracle Database Appliance first because of performance as its optimized for Oracle applications. We also considered reliability because we wanted to be sure that our back end would be stable and reliable. We run a 24 x 7 shop, so we cannot have outages."*

TABLE 4 Impact on Unplanned Downtime

	Previous/Other Environment	With Oracle Database Appliance	Difference	Benefit (%)
Unplanned outages per year per organization	11.5	0	11.5	100
Hours of lost productive time per user per year	0.3	0	0.3	100
Value of lost productive time per year in FTEs per organization	1.4	0	1.4	100
Value of lost productive time per year per organization	$97,200	$300	$96,900	100

Source: IDC, 2019

> *"An example of the impact of Oracle Database Appliance is with new locations. For one of them, it took a day rather than a month, and we wouldn't have been manufacturing during that time. If we can't make it, we can't sell it, so we'd lose a month's worth of revenue."*

Improved Business Results and Operational Efficiencies

Study participants have translated improved database and application performance, agility, and reliability with Oracle Database Appliance into business and operational gains. They can better deliver services to customers and extend business operations with ease, which helps them address and win new business. One study participant noted that it can now expand its business in a timely way: *"An example of the impact of Oracle Database Appliance is with new locations. For one of them, it took a day rather than a month, and we wouldn't have been manufacturing during that time. If we can't make it, we can't sell it, so we'd lose a month's worth of revenue."* In total, between revenue gains related to improved performance and time to market and revenue losses avoided through the reduction of unplanned outages, IDC calculates that study participants will gain an average of more than $9.7 million per organization per year in higher revenue ($153,400 per database; see Table 5).

Meanwhile, employees working with databases and applications running on Oracle Database Appliance platforms also benefit from enhanced performance and timely delivery of new functionality. One organization noted that it can now avoid performance bottlenecks that affect users: *"We can better ensure performance with Oracle Database Appliance because we now have two very large pools of resource to work with versus a bunch of little pools of storage, memory, and processing capacity. We can always err in the way of over-provisioning in order to avoid the performance ceiling."* As shown in Table 5, interviewed Oracle customers linked these performance and agility improvements to higher user productivity, which is an operational efficiency, for 266 users of databases and applications, creating significant value as these employees deliver more value to their businesses.

TABLE 5 Business Productivity Benefits: User Productivity and Revenue Gains

	Per Organization	Per Database
Higher user productivity		
Number of users impacted	266	4
Average gross productivity gain	12.50%	12.50%
Equivalent net productivity gain (FTEs)	4.6	0.1
Total recognized value of higher productivity	$320,000	$5,100
Higher revenue, improved performance		
Additional revenue per year	$9.00 million	$142,000
Total recognized value of higher productivity	$1.35 million	$21,300
Higher revenue, reduced unplanned downtime		
Additional revenue per year	$719,600	$11,400
Total recognized revenue per year	$107,900	$1,700

Note: IDC model assumes a 15% margin assumption for recognizing user productivity and revenue gains.

Source: IDC, 2019

> *"For our entire Oracle Database Appliance environment, we have a team of 15 FTEs compared with a 40 FTE team previously . . . Right now, it's about 70% DBA work and 30% hardware, but with more hardware to manage before, it was about 50% DBA and 50% infrastructure. It's a good thing that we can spend more time on DBA activities as opposed to infrastructure."*

More Operationally Efficient Database and Application Infrastructure

Study participants also described achieving operational efficiencies with Oracle Database Appliance. These efficiencies are especially noticeable in terms of the time required to manage and support their database and infrastructure environments. Several interviewed organizations described transferring time savings in infrastructure-related tasks from having a consolidated, centralized, and purpose-built platform to putting a greater focus on databases. One interviewed organization explained: *"For our entire Oracle Database Appliance environment, we have a team of 15 FTEs compared with a 40 FTE team previously . . . Right now, it's about 70% DBA work and 30% hardware, but with more hardware to manage before, it was about 50% DBA and 50% infrastructure. It's a good thing that we can spend more time on DBA activities as opposed to infrastructure."* Another interviewed organization echoed this: *"To actually install and configure, another environment would take more than double the time of Oracle Database Appliance. Also, it would be more heavily weighted toward infrastructure-related activities."*

Overall, IDC's discussions with Oracle customers show the strong value in terms of IT team efficiencies from both a relative and absolute perspective. As shown in Table 6, DBA teams are 61% more efficient on the Oracle Database Appliance platform while IT infrastructure (70%) and help desk (65%) teams are achieving similarly high levels of efficiency. For study participants, this not only contributes to ensuring a lower cost of running databases and applications (refer to Figure 4) but also frees up valuable staff time for other activities: *"We're focusing more on application-side upgrades, with time freed up through use of Oracle Database Appliance; for example, upgrading Windows for other purposes. We're taking those resources that would otherwise have been used and using them for other projects that have been on hold because of lack of resources."*

TABLE 6 Impact on IT Teams

Average per Organization	Previous/Other Environment	With Oracle Database Appliance	Difference	Benefit (%)
Staff time to manage databases (DBAs) per organization (FTEs)	5.5	2.1	3.4	61
Staff time to support infrastructure per organization (FTEs)	2.3	0.7	1.6	70
Staff time to provide help desk support per organization (FTEs)	2.1	0.7	1.4	65

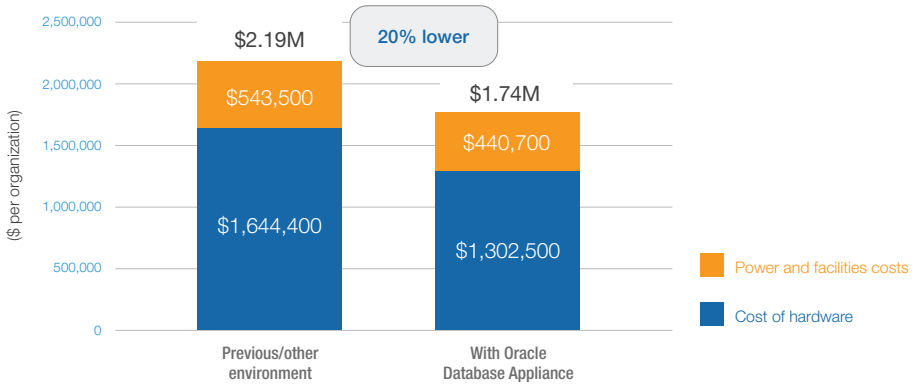
n-7 Source: IDC, 2019

Optimized Cost of Infrastructure

Study participants also linked running databases and applications on Oracle Database Appliance to lower infrastructure costs. They cited several contributing factors, including the ability to avoid over-provisioning hardware with a more distributed infrastructure approach, the ongoing operating cost efficiencies, and the ability to extract more value out of database and application licenses. One study participant commented on hardware and licensing cost efficiencies: *"We have 90 servers with Oracle Database Appliance, but if we used traditional servers, we'd need maybe around 120 . . . [I]f we had the 120 servers instead of the 90, we would be paying probably about 30% more in licensing, about $1 million more per year."* Overall, study participants reported provisioning and running their Oracle Database Appliance platforms at a 20% lower cost than their previous and/or alternative infrastructure environments over five years (see Figure 3).

> *"We have 90 servers with Oracle Database Appliance, but if we used traditional servers, we'd need maybe around 120 . . . [I]f we had the 120 servers instead of the 90, we would be paying probably about 30% more in licensing, about $1 million more per year."*

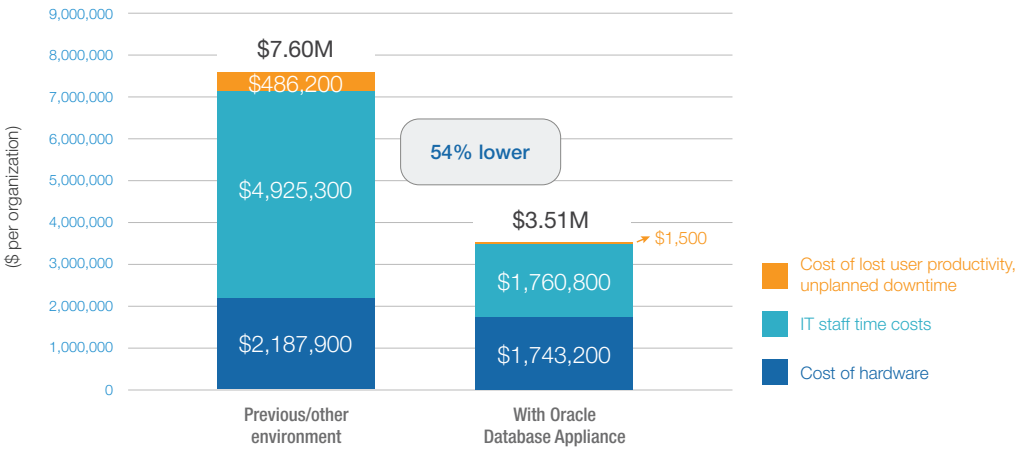
FIGURE 3 IT Infrastructure Costs per Organization for Five Years



Source: IDC, 2019

As shown in Figure 4, IT staff efficiencies, lower hardware and associated costs, and reduced operational cost of unplanned outages all contribute to Oracle Database Appliance having a substantially lower cost of operations over five years. On average, IDC calculates this to be a 54% savings over five years, enabling these Oracle customers to deliver strong database and application performance even as they establish more efficient and cost-effective IT infrastructure foundations for their business operations.

FIGURE 4 Five-Year Cost of Operations



Source: IDC, 2019

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ROI Summary

Table 7 provides IDC's analysis of the financial benefits and costs related to study participants' use of Oracle Database Appliance–engineered systems. IDC calculates that interviewed Oracle customers will achieve discounted benefits worth an average of $147,800 per database over five years ($9.35 million per organization) in higher user productivity and revenue, IT team time savings and efficiencies, and lower IT and database costs. When compared with average five-year discounted investment costs of $24,700 per database ($1.56 million per organization), which includes the cost of procuring Oracle Database Appliances, staff time to deploy and run, and other third-party costs, this would result in an average five-year ROI of 498% and breakeven on investment in 10 months.

TABLE 7 ROI Analysis

	Five-Year Average per Organization	Five-Year Average per Database
Benefit (discounted)	$9.35 million	$147,800
Investment (discounted)	$1.56 million	$24,700
Net present value (NPV)	$7.79 million	$123,100
Return on investment (ROI) (%)	498	498
Payback period	10 months	10 months
Discount rate (%)	12	12

Source: IDC, 2019

CHALLENGES/OPPORTUNITIES

The main challenge facing the Oracle Database Appliance comes in the form of changing user requirements and workloads, which will, in turn, require Oracle to continue to evolve and modify the system to meet those user needs. As hardware continues to evolve, Oracle will also be challenged to incorporate the latest benefits from newer hardware components in the system moving forward.

CONCLUSION

Organizations require modern relational database management systems for optimizing their ability to manage and use data in support of their business operations. However, these RDBMSs can bring challenges in terms of deployment, configuration, management, and performance. In turn, these challenges can potentially lead to higher operational costs in terms of hardware and staff time costs, as well as suboptimal performance, which can exert a drag on business operations and employee productivity levels.

IDC's research demonstrates the value for organizations of using Oracle Database Appliance hyperconverged systems that are designed to support Oracle database workloads. Interviewed organizations reported improving the performance, agility, and reliability of their database and application environments with Oracle Database Appliance, thereby enabling them to better meet requirements from the business for database and transactional workloads. Meanwhile, using Oracle Database Appliance has also allowed them to build and run a more cost-effective infrastructure for their database and other application workloads in terms of both hardware costs and staff time requirements for day-to-day support and management. The result for this sample of Oracle customers is strong value relative to investment costs in Oracle Database Appliance, which IDC projects will lead to an average five-year ROI of 498% and breakeven on their investment in an average of 10 months.

APPENDIX

Methodology

IDC used the following three-step method for conducting the ROI and business value analysis informing this study's results and conclusions:

1. **Gathered quantitative benefit information during the interviews using a before-and-after assessment for interviewed organizations of running databases and applications on Oracle Database Appliance–engineered systems.** In this study, the benefits of using Oracle Database Appliance included IT and database cost savings, IT staff time savings and productivity gains, and higher user productivity and revenue.
2. **Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of deploying and running Oracle Database Appliance and can include additional costs related to migrations, planning, consulting, and staff or user training.

3. **Calculated the ROI and payback period.** IDC conducted a depreciated cash flow analysis of the benefits and investments for the organizations' use of Oracle Database Appliance over five years. ROI is the ratio of the net present value (NPV) and the discounted investment. The payback period is the point at which cumulative benefits equal the initial investment.

IDC's standard ROI methodology was utilized for this white paper. This methodology is based on gathering data from organizations that have deployed and are using Oracle Database Appliance. Based on interviews with seven organizations, IDC performed a three-step process to calculate the ROI and payback period:

- Measure the benefits from use of Oracle Database Appliance in terms of IT and database cost savings, IT staff time savings and productivity gains, and higher user productivity and revenue.
- Ascertain the investment made in deploying Oracle Database Appliance and associated migration, training, and support costs.
- Project the costs and savings over a five-year period and calculate the ROI and payback for the use of Oracle Database Appliance–engineered systems.

IDC bases the payback period and ROI calculations on assumptions that are summarized as follows:

- Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and productivity savings. IDC assumes a fully burdened salary of $100,000 per year for IT staff, including developers, and $70,000 for other employees, with an assumption of 1,880 hours worked per year.
- 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.
- 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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