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Powering Business-Critical Applications: Business Value of the Couchbase NoSQL Database

Business Value Highlights

$67,487
Benefits per year per database

274%
Five-year ROI

7 months
time to payback

19%
faster new development cycle

40%
faster response time

$5.41 million
in additional revenue per year

17%
more efficient help desk

37%
more efficient database management

IDC OPINION

For today's businesses, digital transformation takes many forms. To compete successfully, enterprises must expand their capability to reach and retain customers, interact more effectively with partners, and empower employees, often while delivering new or enhanced products and services. And this transformation is being made in the context of a rapidly evolving digital world — both customers and employees expect a fast, responsive, intuitive experience when they interact with technology.

To meet modern user expectations, today's applications must run in distributed environments and support millions of users globally with sub-millisecond response times. In response, most applications employ multiple data technologies based on how a technology fits into an application's data layer, which is influenced by the maturity of the application as well as its performance and flexibility needs and storage requirements. It's not uncommon to have multiple systems of record (the authoritative data source), wrapped in layers of caches (temporary data storage for high performance), feeding many sources of truth (the data source that aggregates data from various places for a single view) that are also wrapped in their own caches.

These applications can take the form of highly adaptive web interfaces or mobile apps and can involve technology that attracts and keeps users interacting with the system. And these applications are always seeking to deliver better, more immersive experiences. As a result, they are often not well served by static data management architectures used to record structured internal data and report on it. Instead, enterprises are turning to new technologies that are dynamic and scalable, enabling adaptive business processes and an agile enterprise.

Designed specifically to serve the needs of modern applications, the distributed NoSQL database offered by Couchbase is an example of such a technology. As is the case with so many such technologies, the database system is open source, which enables a dynamic, interactive

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relationship between Couchbase and users. Couchbase does the main work of developing the software, but users constantly test it and offer enhancements and improvements. Couchbase has engaged with IDC to interview its customers and apply some financial metrics to their success.

IDC interviewed organizations that have deployed Couchbase NoSQL database software to increase the scalability and performance of business-critical applications. Study participants reported that the choice and deployment of Couchbase have enabled them to extend the reach and functionality of these applications in a cost-effective and efficient manner and provide the necessary levels of performance for services that have a direct link to top-line business results. IDC calculates that these organizations will realize benefits from Couchbase worth an annual average of $67,487 per Couchbase database over five years, which would result in a five-year return on investment (ROI) of 274%, by:

- Providing needed levels of database scalability to address and meet business goals and objectives
- Leveraging improved database performance to better customer and user experiences
- Making application development efforts more efficient and effective
- Benefiting from DBA and help desk efficiencies in terms of day-to-day time required to run and support databases

MARKET OVERVIEW

The Couchbase product belongs to a market that IDC calls dynamic data management systems (DDMS). The system is called dynamic because unlike a database management system (DBMS), it does not require a predefined schema to accept data and operate on that data. Because this system does not require a schema, developers are free to modify the data structures they store at any time without needing to change a schema and convert the database to the new structure.

IDC forecasts that the DDMS market will grow from $2.1 billion in 2016 to $9.7 billion in 2021, a five-year compound annual growth rate of 35.7%.

The specific segment of this market to which the Couchbase product belongs is document database systems because data is stored in the form of JSON documents. This does not mean that Couchbase has anything to do with content management, however. These

documents are read and written by software and are used to hold and share data within and across applications.

COUCHBASE OVERVIEW

Created in 2011, Couchbase has evolved a geo-distributed, cloud-native NoSQL document-oriented database and key-value store designed to provide both persistence services for the popular open source shared memory caching technology memcached and robust JSON document support. The result is a database used for both persistence-based recoverability of online applications that run on large and scalable clusters and more formal document management, with consistent data storage and structured analytic query and search capabilities. Couchbase customers include key players in the retail and ecommerce, travel and hospitality, media and entertainment, healthcare, financial services, manufacturing and logistics, high tech, and telecommunications industries.

BUSINESS VALUE OF COUCHBASE NOSQL DATABASE SOFTWARE

Firmographics of Study Participants

IDC interviewed seven organizations for this study, asking a variety of quantitative and qualitative questions about the impact of deployed Couchbase databases on their operations, businesses, and costs. Study participants were generally large enterprise organizations; the average number of employees at organizations interviewed was 75,971, with a median of 15,000 employees. The scale of the organizations' operations is reflected in the number of business applications and databases — 1,405 and 1,391, respectively. The sample was diverse by geography and vertical. It included the experiences of organizations based in the United States, France, and the United Kingdom. In addition, the following vertical industries were represented: retail and ecommerce, media and entertainment, healthcare, financial services, manufacturing and logistics, and high tech. Table 1 summarizes this information along with other relevant firmographic attributes.

TABLE 1 Firmographics of Interviewed Organizations

Firmographics	Average	Median
Number of employees	75,971	15,000
Number of IT staff	2,329	550
Number of IT users	37,971	15,000
Number of business applications	1,405	730
Number of databases	1,391	445
Countries	United States, France, and United Kingdom	
Industries	Financial services (2), healthcare, high tech, manufacturing and logistics, media and entertainment, and retail and ecommerce)	

n=7 Source: IDC, 2019

Use of Couchbase Software by Study Participants

Surveyed organizations chose to use Couchbase with the objective of enabling their businesses through supporting certain applications and services with Couchbase database software. In particular, study participants reported needing a database solution that offered scalability and strong performance, which Couchbase offers as a NoSQL database solution, in addition to its proprietary schema and associated toolsets. Examples of drivers for choosing Couchbase included:

- **Scalability and performance:** *"We chose Couchbase because of its performance, ability to scale, and strong design . . . . Over time, I think that the more applications we build on Couchbase, the more we'll benefit from scalability and performance . . . . We would have chosen [the alternative database solution] if we could have done this with it, but we knew it wasn't able to deliver the scalability and performance that Couchbase is delivering."*
- **Performance:** *"We use Couchbase largely because of the performance and replication that we don't get from [our alternative database solution], as well as the flexibility and schema. I don't think we would get the same performance from the [other database] engine that we're using. I don't think that the performance is possible with it, based on what I know."*

As shown in Table 2, at the time of the interview, study participants had deployed 28 Couchbase databases supporting 16 applications with 24TB of data. For these organizations, Couchbase currently makes up a relatively small (13% on average by organization by number of databases) share of their database environments but is focused on supporting business-critical and often customer-facing applications.

TABLE 2 Couchbase Environments of Interviewed Organizations

	Average	Range
Number of Couchbase databases	28	20
Couchbase databases as the percentage of total databases by organization (%)	13	8
Number of applications	16	10
Terabytes (TB)	24	1

n=7 Source: IDC, 2019

Quantifying the Value of Couchbase NoSQL Database Software

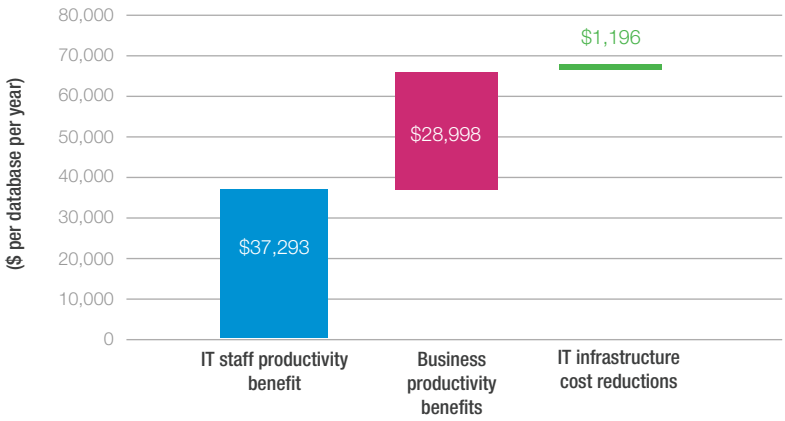
Study participants reported using Couchbase as a NoSQL database solution to increase the scalability and performance of databases supporting certain business-critical applications. With Couchbase, the organizations have extended the reach and functionality of these business applications and services in a cost-effective and efficient manner while providing the needed levels of performance for services and applications that have a direct link to their top-line business results. As shown in Figure 1, IDC puts the overall annual value that surveyed organizations will achieve with Couchbase at an average of $67,487 per Couchbase database ($1.89 million per organization), broken out as follows:

- **IT staff productivity benefits.** Study participants reported that the use of Couchbase has enabled their application development teams, which translates to faster time to market for new applications, features, and services to customers and lines of business. Further, Couchbase databases require less DBA time to manage and support on an ongoing basis. IDC calculates that in total, study participants will realize higher application development productivity and other IT team time savings and efficiencies with an average annual value of $37,293 per database ($1.04 million per organization).

- **Business productivity benefits.** Improved database performance and scalability with Couchbase are supporting the efforts of study participants to better address business opportunities and serve their customers. As a result, they are winning more business. IDC puts the value of higher revenue that they will recognize at an average of $28,998 per database ($812,000 per organization).

- **IT infrastructure cost reductions.** Several organizations have reduced their spending on database licensing with Couchbase compared with alternative or prior approaches. Average annual database licensing savings were quantified at $1,196 per database ($33,500 per organization).

FIGURE 1 Average Annual Benefits per Couchbase Database



n=7 Source: IDC, 2019

Operationally Efficient Database Environment

Study participants reported that Couchbase is serving as an operationally efficient and cost-effective database solution. Most importantly, it has enabled developers who are responsible for the applications and features that require data and content from Couchbase databases while requiring less staff time to manage and support on an ongoing basis. These efficiencies, along with database licensing–related cost reductions and avoidances, make its value proposition in terms of scalability and performance even more compelling.

Application Development

Surveyed organizations confirmed that Couchbase provides significant operational value in terms of their application development efforts. These Couchbase customers can deliver new applications and features in less time, reducing the average development life cycle by 19% for new applications and 18% for new features (see Table 3).

Study participants cited various drivers of achieving these efficiencies with Couchbase for their application development efforts:

- **Visibility,** by using Couchbase as a common database platform for certain types of applications and services
- **Schemas,** with several organizations referencing the Couchbase schemas as enabling developers to avoid time-consuming activities such as table creation and data definition
- **Flexibility,** including the ease of changing data models behind application development

As one manager told IDC: *"Our developers are more productive with Couchbase not only because of the performance but also because of the development tools available and the schema that Couchbase supports. I'd say that from the database side, they are at least two times more productive, and overall, they're at least 40–50% more productive."* Another study participant commented: *"Our developers are more productive with Couchbase because of the mechanics of the schema — with [our other database solution], there is busy work in creating relational schemas, defining data, creating tables, doing upgrades, whereas with Couchbase, there's literally nothing to making a change."*

TABLE 3 Impact of Couchbase on Application Development

	Before/Without Couchbase	With Couchbase	Difference	Benefit (%)
New application development life cycle (weeks)	19.2	15.6	3.6	19
New feature development life cycle (weeks)	4.0	3.3	0.7	18
Number of application developer FTEs, equivalent	125	117	8	7
Application developer value, quantified for IDC model per organization	$12.52 million	$11.68 million	$836,500	37

n=7 Source: IDC, 2019

Ongoing Administration and Support

Study participants are also benefiting from Couchbase as an efficient database platform for the application workloads they are supporting with it. This is reflected in terms of requiring both less DBA time on an ongoing basis for management and administration (37% more efficient on average) and less staff time to support and address problems related to Couchbase environments (17% less time on average) (see Table 4). Drivers of efficiencies mentioned by study participants include ease of management and performance tuning, the schema, and the ability to more efficiently replicate data across their Couchbase environments. As one Couchbase customer explained: *"We have two DBAs spending 25% of their time on Couchbase and would probably need double that with our other database solution. As a result, we're able to move on to the next project faster."*

TABLE 4 Impact of Couchbase on DBA and Help Desk

	Before/Without Couchbase	With Couchbase	Difference	Benefit (%)
DBA FTEs, equivalent	3.6	2.3	1.3	37
DBA hours per Couchbase database per year	244	153	91	37
DBA value, quantified for IDC model	$363,000	$228,400	$134,600	37
Help desk FTEs, equivalent	4.4	3.6	0.8	17
Help desk hours per Couchbase database per year	294	245	49	17
Help desk value, quantified for IDC model	$437,900	$364,800	$73,100	17

n=7 Source: IDC, 2019

Cost-Effective Database Platform

Generally speaking, study participants did not choose Couchbase to reduce their database costs. Nonetheless, it has proven to be a cost-effective database solution, especially in the context of being able to scale it to support the organizations' business operations and run multiple workloads per database. In this context, several survey respondents reported spending less on Couchbase licenses than with an alternative database solution, with one survey respondent commenting: *"We migrated to Couchbase from another database solution, and indicators point to a lot of savings in terms of database licensing cost — probably about 50%."*

Business Impact of Couchbase

Study participants reported using Couchbase databases for certain applications, services, and workloads that require strong scalability and performance. This purposeful use of Couchbase reflects the extent to which supporting business-critical applications with databases running on Couchbase is having a noticeable impact on business processes at these organizations. One study participant linked the use of Couchbase to both its digital transformation efforts and its business: *"I think that broadly, Couchbase has been a core piece of the digital transformation program we are running. Moving to the Couchbase platform has allowed us to scale our business much more quickly."*

Database Scalability and Performance

Study participants consistently cited scalability and performance as among the most significant benefits they achieve with Couchbase. Scalability and performance are especially important for the workloads that they have chosen to support with Couchbase. One interviewed organization said that it uses Couchbase for specific "value heavy" workloads, such as those requiring session or user profile data. The organization also cited the Couchbase internal data structure, which favors very low-latency access to specific pieces of data. With respect to performance, another customer said: *"We don't need to use a separate caching layer with Couchbase; we get the performance we need from the database itself. I know that there are some companies that use Couchbase exclusively for caching, but we also use it for multiple use cases. I think that the performance of applications with Couchbase is a real difference. In some cases, it is up to 10–20 times better."*

The impact of Couchbase is most noticeable in terms of response time, meaning that Couchbase databases respond faster and have lower latency levels than previous or alternative database software used by study participants. IDC's analysis shows that these Couchbase customers have seen an average of 40% reduction in response time. In addition, these organizations reported that Couchbase can support more concurrent users and incurs errors less frequently.

Revenue Impact

For study participants, these scalability and performance benefits with Couchbase translate to value in the form of higher revenue from better serving customers and addressing business opportunities. IDC calculates that these organizations will achieve an average of $5.41 million per year in additional revenue with Couchbase (see Table 5). One study participant commented on the performance impact of Couchbase and the importance for a revenue-generating platform: *"We are supporting a revenue-generating platform with Couchbase, and we'll earn more revenue — about a 10% increase due to improved performance. We're looking at a substantial increase — millions of dollars per year — and I don't think we could have done this with our other database solution."* Another study participant focused on the ease of scaling in a cost-effective manner: *"The end result of using Couchbase is that we think we can increase our number of sites by 10 times over the next year, whereas we wouldn't have had that capacity in the old system."*

TABLE 5 Impact of Couchbase on Business

	Per Organization	Per Couchbase Database
Additional revenue per year	$5.41 million	$193,322
Assumed operating margin	5%	5%
Recognized revenue for IDC's model	$812,000	$28,998

n=7 Source: IDC, 2019

ROI Analysis

IDC interviewed organizations that are using Couchbase as their database solution for supporting business-critical applications. Based on these interviews, IDC has calculated the benefits and costs to these organizations of using Couchbase. 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 of the impact of Couchbase.** In this study, the benefits included revenue gains, operational efficiencies, staff time savings and productivity benefits, and database-related cost reductions.

2. **Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of using Couchbase 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 Couchbase over a five-year period. ROI is the ratio of the net present value (NPV) and the discounted investment. The payback period is the point at which cumulative benefits equal the initial investment.

Table 6 presents IDC's analysis of the benefits and costs for study participants in using Couchbase. IDC projects that study participants will realize discounted five-year benefits worth an average of $239,664 per Couchbase database ($6.71 million per organization), compared with discounted total investment costs of $64,080 per Couchbase database ($1.79 million per organization). This would result in a five-year ROI of 274%, with breakeven on investment occurring in seven months on average.

TABLE 6 Five-Year ROI Analysis

Five-Year ROI Analysis	Average per Organization	Average per Couchbase Database
Benefit (discounted)	$6.71 million	$239,664
Investment (discounted)	$1.79 million	$64,080
Net present value (NPV)	$4.92 million	$175,584
Return on investment (ROI)	274%	274%
Payback period	7 months	7 months
Discount rate	12%	12%

n=7 Source: IDC, 2019

CHALLENGES/OPPORTUNITIES

Dynamic data management systems products are evolving rapidly to meet the shifting needs of users. Technologies are being enhanced and combined in new and different ways. Couchbase is in the middle of this evolutionary movement and will be challenged to continue to compete effectively and differentiate meaningfully as products continue to change. This market space is still new and largely driven by developers. Developers tend to be fickle, and their preferences can change suddenly. Couchbase, like other vendors in this space, must maintain a strong relationship with the developer community and leverage its very interactive open source community to maintain its market momentum. The aim, in this regard, is to enable developers to continue to delight their business users with applications that can adapt in an instant to the rapidly shifting demands of the market. At the end of the day, improved customer experience, successful digital transformation, and other business benefits will drive broader production adoption and lasting value for customers and shareholders.

This is still an early stage in the use of this technology, and the future opportunities for both vendors and users are likely to be quite profound.

CONCLUSION

Organizations must deploy solutions — including database software — that enable them to deliver the dynamic applications — and experiences — that today's users demand. Database solutions must be more adaptable and scalable than in the past and provide organizations with the levels of performance and agility required to serve their customers and support internal users.

IDC's research shows that interviewed organizations are using Couchbase to increase the scalability and performance of databases supporting certain business-critical applications. This has enabled these Couchbase customers to extend the reach and functionality of these business applications and services in a cost-effective and efficient manner while providing the needed levels of performance for services and applications that impact their business results. The result is that they are achieving significant value through their investment in Couchbase, which IDC calculates will result in benefits worth an average of $67,487 per Couchbase database per year and a five-year ROI of 274%.

APPENDIX: METHODOLOGY

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from current users of Couchbase as the foundation for the model. Based on interviews with

seven organizations using Couchbase, IDC performed a three-step process to calculate the ROI and payback period:

- Measure the benefits from the use of Couchbase in terms of IT infrastructure cost savings and avoidances, IT staff time savings and productivity gains, user productivity gains, and revenue attributed to the use of Couchbase.
- Ascertain the investment made in deploying Couchbase and associated migration, training, and support costs.
- Project the costs and savings over a five-year period and calculate the ROI and payback for Couchbase database software.

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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