WHITE PAPER

Calculating the True Cost of RDBMS Ownership and How Sybase ASE Stacks Up: A Guide for SAP Business Suite Users

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EXECUTIVE SUMMARY

Relational database management systems (RDBMSs) are systems of software that manage databases as structured sets of tables containing rows and columns with references to one another through key values. They include the ability to optimize storage, process transactions, perform queries, and preserve the integrity of data structures. When used with applications, they provide the beating heart of the collection of business functions supported by those applications. They vary considerably in terms of the factors that impact the total cost of running a database application, yet users seldom perform a disciplined procedure to calculate such costs. Most users choose instead to remain with a single vendor's RDBMS and never visit the question of ongoing hardware, software, and staffing fees. The following conclusions regarding true database costs are based on the research performed for this white paper:

- User organizations should periodically review the total cost of ownership (TCO) for their most significant database applications, including hardware, software, and staff time, and include opportunity costs resulting from inflexibility and poor performance as well.
- User organizations should research alternative RDBMS products and consider how migration of their application data to databases running under such products could reduce such costs.
- Any list of alternative RDBMS products, especially if the database application is SAP Business Suite, the enterprise resource planning (ERP) application from SAP, and a collection of several applications should include Sybase ASE.
- According to the real-world experiences of Sybase ASE customers whose database TCO has been analyzed for this paper, Sybase RDBMS total costs were found to be 28% less than the total costs of the other RDBMSs these companies are using.

METHODOLOGY

IDC identified, screened, and qualified multiple end-user organizations and used the experiences of these organizations as a representative model of the true costs to purchase, deploy, and manage a variety of RDBMS platforms over a five-year period.

This analysis included capturing the operational characteristics of their environment, including the size and nature of the deployments; the costs to maintain and support the RDBMS; the frequency of system and end-user problems, system outages, help desk calls; and the time spent by IT professionals to directly support end users within the organization. We portray the information in terms of costs per 100 users of the applications supported by the databases so that organizations of various sizes can scale the results to match their situation.

This information is used to inform the reader of the true costs of using Sybase ASE in critical environments.

Study Demographics

IDC conducted in-depth interviews with 12 organizations to develop insights into the true costs associated with deploying Sybase ASE in comparison with other RDBMS products.

Table 1 highlights the demographics of the organizations interviewed and analyzed to develop the study presented in this white paper. As noted in Table 1, the commercial customers interviewed were, on average, relatively large organizations with over 12,000 employees and hailed from a variety of industries.

TABLE 1

Demographics

Employees	12,164
IT staff	1,433
Database providers	3
RDBMS database administrators	26
Regions	North America; Europe, the Middle East, and Africa (EMEA)
Industries	Banking, financial services, healthcare, insurance, manufacturing

Source: IDC, October 2011

Of the 12 organizations IDC interviewed, six were running RDBMSs from multiple vendors to support the same type of application, which enabled IDC to compare two RDBMSs within the same organization. The advantage of using this type of comparison is that it eliminates the variances of IT practices that occur when comparing two different companies. The typical organization deployed RDBMSs from three different vendors (seven different vendors were represented in the study); supporting applications from four of six major groups. Many were running high-transaction vertical industry applications such as trading floor applications. The *average* database is 366GB running on one server and supporting 2,355 concurrent users.

IN THIS WHITE PAPER

This white paper discusses ways in which most user organizations fail to take into account, or even acknowledge, key cost factors as they continually pay for their enterprise database applications. It also contains an exposition of the factors involved in calculating the TCO of an RDBMS in relation to an application database for an enterprise based on the established methodology and experience of IDC in performing such calculations. It considers some of the features of Sybase ASE that mitigate database-associated costs, and it provides details regarding the TCO analysis of some Sybase ASE customers.

The reader should learn the issues associated with application database costs, how to calculate such costs, and a useful approach to managing such costs going forward.

SITUATION OVERVIEW

Most ERP users follow the recommendation of the vendor, in combination with the knowledge and experience of their own staff, to choose an RDBMS and to provision it. As time goes by, this configuration is rarely reviewed because the prospect of converting application data from one RDBMS to another is thought to be too complicated and expensive to contemplate. But is it really?

The Problem: Excessive Spending for RDBMS

Often, an RDBMS is chosen based on three criteria: the basic functionality, the license fee, and the expertise of the staff. The reputation of the vendor, or staff opinions regarding the vendor, may bias the choice as well. Most RDBMS products have the same basic functionality, so the question usually comes down to the fee and the staff preference. There are other factors, of course. What amount of system resources is required by the RDBMS for the job at hand in terms of systems and storage? How much staff time is required to manage the database and tune its use of resources (especially storage)? This latter factor is often underestimated.

A lack of understanding regarding costs, both apparent and hidden, inevitably leads to overspending.

Common Mistakes in Assessing RDBMS Costs

Frequently, users have little idea of how much system and storage capacity they need, so they tend to overprovision to be on the safe side. Overprovisioning can lead to excessive staff time spent managing those resources. Also, the staff may not know about, or take advantage of, features in the RDBMS that can save both resources and staff time. Such features include compression, self-management capabilities, advanced tuning tools, optimized buffer management, and so forth.

Failing to take advantage of such features, or choosing an RDBMS that either lacks these features or does not support them well, can result in a database that demands more processor power, more main memory, and more storage space than it should. When these resources are being wasted, the result can be poorly performing applications or applications that require extra effort to adjust to the shifting needs of

the business and to keep available. Poor performance, lack of availability, and lack of flexibility in running a database application can interfere with the ability of an enterprise to execute successfully.

The RDBMS may also demand excessive staff time to manage, and staff time is precious because an agile staff can much more easily adjust IT operations to best suit the business needs of the enterprise.

The Corporate Standard Trap

Often, when looking at an RDBMS to support a new enterprise application, IT will not consider any product that is not considered "standard" in that role. This is unfortunate because RDBMS products evolve over time, and not all RDBMSs are the right fit for all applications. Also, the "standard" may be set based on some arbitrary policy decision such as a site or enterprise license rather than on the merits of the product for a particular job. Sometimes setting a standard in this way can seem to save an enterprise money overall because the license fee structure is so advantageous. However, when all the cost factors involved in running each database instance are added up, the enterprise may find that is not saving money at all; in fact, it may find that this "standard" costs more than it saves.

"But We're Locked in Now … What Can We Do?"

Several objections have been raised to the idea of moving an application from one RDBMS to another. One objection has to do with the knowledge and training of the existing staff. It is thought that expertise in running an RDBMS is so specialized that a database administrator (DBA) team familiar with one could never support another very well, but this is often untrue. ERP databases generally require very little detailed tuning because they are self-managing. This leaves other factors that consume staff time, such as the allocation (and reallocation) of data to storage either by table space or by partition, defining and rebuilding indexes, and reorganizing data, typically through unload/reload operations. These activities are pretty common to all RDBMS products, and any competent DBA can figure out how to do them.

Another objection suggests that the application would need to be changed, which could well be true of internally developed applications that use special features of the RDBMS, including stored procedures. Most commercial applications, however, are designed to be RDBMS neutral so that they can be run on any RDBMS for which they are certified. This means that the application requires no change to move from one RDBMS to another.

A third objection has to do with data conversion, but again, commercial applications tend to avoid nonstandard data types that would require special support for one RDBMS or another. For them, data conversion is fairly straightforward for the most part.

A fourth concern is that the DBA staff has already tuned the database and the associated application SQL (especially queries) running under one RDBMS; moving it would mean tuning the database and its associated SQL using different criteria in order to get maximum performance. Fair enough; but if the overall efficiency and tuning options of the target RDBMS are shown to be superior to those of the current incumbent, isn't it worth some staff training and effort to retune to take advantage of those options?

"Lock in" is a serious issue when dealing with custom applications that take advantage of all the various special features of an RDBMS. It is not really a serious concern when considering the migration of a commercial application.

SAP and Data Migration Options

In the case of SAP and its SAP Business Suite data, this concern is even less significant than it would be for other commercial applications. This is because SAP manages the data using internal mechanisms that are not part of the RDBMS. For this reason, the data may be moved from one RDBMS to another with a minimum of effort, and even the tuning activities for storage performance are relatively simple compared with those of other commercial applications.

The Solution: Calculating the True TCO of an RDBMS and Estimating ROI

When considering TCO, most people stop at the initial cost of acquisition plus the estimated staffing cost. This is only the tip of the iceberg. Proper calculation should be done over a projected five-year period, taking into account data growth, application usage growth, hardware depreciation and replacement, and ongoing staff costs associated with routine tasks such as maintenance operations and database tuning.

Software License and Maintenance

Unless your business is static, your initial license and maintenance costs will not remain stable over five years; they will grow. Most RDBMS vendors charge for licenses on either a named-user or a per-processor basis. As demand grows, one or the other of these metrics will also grow, meaning that you will owe more and more license fees to the software provider. It also means that maintenance, which is usually calculated as a percentage of license cost, will also grow. Getting a sense of that rate of growth is key to understanding this cost factor. In our study, Sybase ASE license costs were 31% less than those of products from other vendors, averaging $17,800 per 100 users over five years.

Servers, Storage, Power, and Floor Space

As your system grows, it will need more resources. Data growth drives storage growth. User demand drives server growth, and sometimes as data grows, the computers must work harder to perform the same operations, so data growth can drive server growth as well. Growth of these hardware systems creates more demand for floor space and power (for the systems themselves as well as air conditioning). Although the costs of processors, memory, and storage are dropping and processors are getting more powerful, most enterprises are growing their systems well out of proportion to those factors, meaning they are experiencing net increases in physical systems and their demand for power and floor space. Organizations in our study are experiencing annual data growth of 44%.

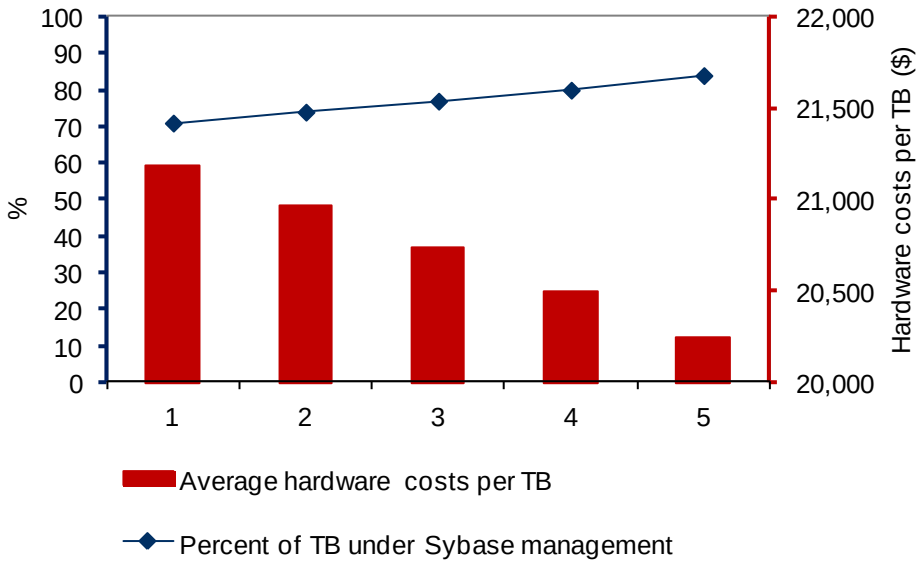
A key to getting a handle on these growing costs is to understand the amount of resources your RDBMS will require in terms of processor power and storage capacity as your data and user demand grow. RDBMS products vary in this regard based on processing efficiency, data compression, and other factors. Sybase RDBMS ASE

installations were more efficient than the other systems, requiring 24% less storage capacity and running on 29% less server processor power. Total hardware costs averaged $55,893 per 100 users over five years.

Organizations in the study have realized the hardware cost advantages of Sybase ASE and are increasing their use of Sybase relative to their other RDBMS platforms. Over a five-year period, as these organizations grow their databases, Sybase will account for relatively more database capacity, but because of its greater efficiency, it will account for less of the total cost. The impact of increasing the reliance on Sybase ASE is a reduction in average hardware costs per TB from $21,187 to $20,250 over five years, saving each company an average of $139,000 (see Figure 1).

FIGURE 1

Increased Hardware Savings with Sybase ASE



Source: IDC, October 2011

Figure 1 illustrates that as the amount of data being managed by Sybase ASE grows, the cost per TB decreases because of ASE's efficiencies in processing, data compression, and other factors.

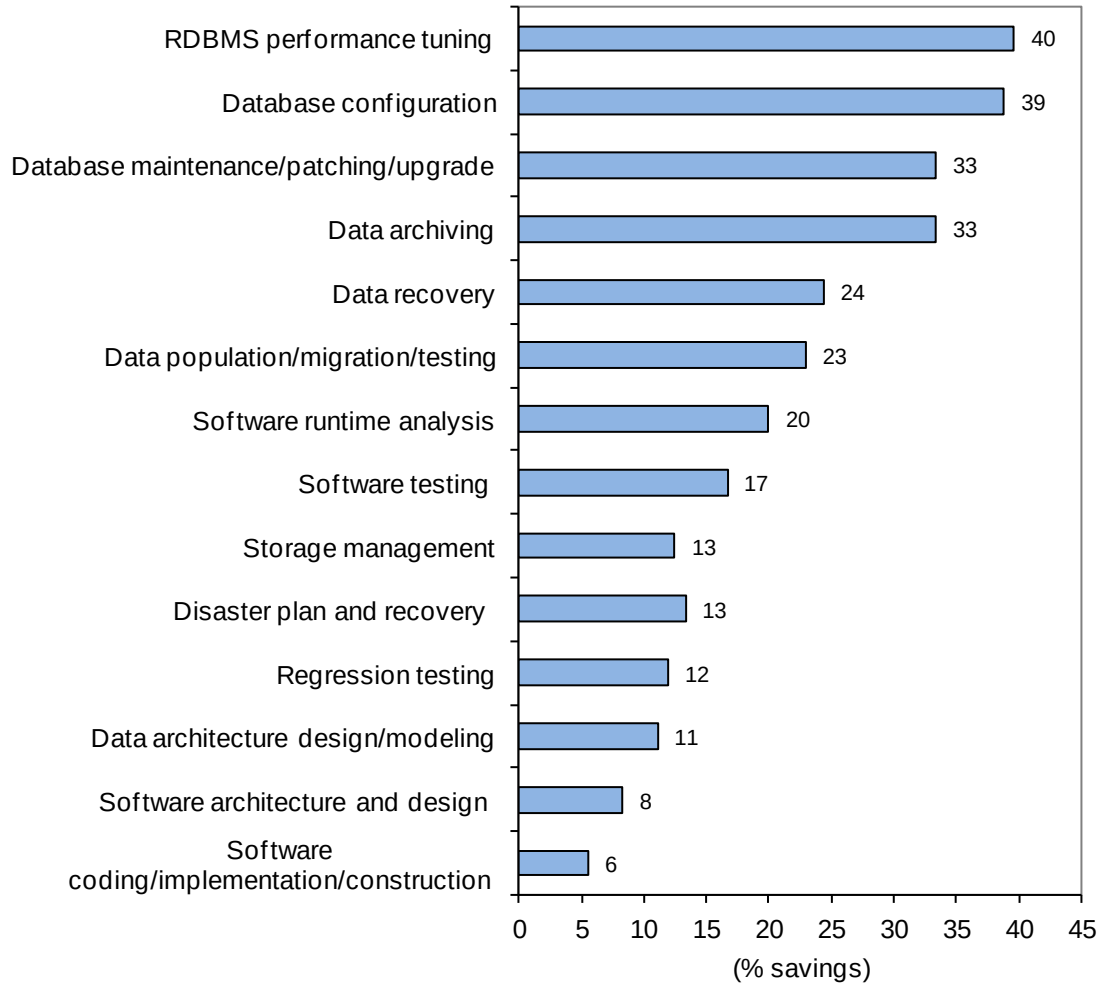
DBA and Other Staffing

As systems become more complex, typically more staff members are required to manage them. When the RDBMS needs more servers and storage, there is generally more staff effort involved in managing those resources and the database's use of them. They also vary depending on the efficiency and self-manageability of the RDBMS. Staff costs are usually underestimated, with the result being that most

enterprises have too few staff members to perform even essential activities, and they have no time to perform high-value tasks that can enable the application to better serve the business. IT staffing is by far the largest cost factor associated with RDBMS operations, averaging $253,862 per 100 users over five years. Sybase ASE required 27% fewer IT staff resources overall. Figure 2 shows how Sybase ASE compared with other RDBMSs in terms of IT staffing by activity.

FIGURE 2

IT Staff Time Savings with Sybase ASE Versus Other RDBMSs



Source: IDC, October 2011

In addition to reduced staffing management costs, Sybase DBAs required 23% fewer hours of training.

Business Value/Opportunity Costs

It is important to understand what role the application plays in the success of the enterprise. What is the value of its operations? What is the business impact when it is not available or when it is running slowly? Could you lose customers? Could sales be impacted? Could key decision makers lack the information they need to make timely decisions?

If the application ran faster or could be more easily adapted to changing business conditions, could you do more business? How much more? What would that be worth? Perhaps you could achieve greater operational efficiency. How much would you save?

In this analysis, IDC measured the impact of an RDBMS on application performance in terms of the time to launch new applications (time to market) and downtime (reliability). We measure downtime as the hours that application users do not have access. For internal users, the cost is measured by the loss of productivity. The value of lost user productivity is a function of the hours lost multiplied by the salary per hour multiplied by a productivity factor (in this study, 50%), which accounts for the fact that users can still be partially productive. Organizations supported by Sybase RDBMS suffered only 3.8 hours of downtime annually per user compared with 7.2 hours for other RDBMSs (see Table 2).

For external users, the cost is measured in lost revenue. In this study, seven of the companies experienced revenue loss because of downtime, with average revenue losses ranging from $22,000 to $2.5 million per hour. Sybase ASE had lower downtime for external-facing applications, translating to additional average annual revenue of $6.6 million. To combine this top-line savings with the bottom-line cost savings, IDC recognizes only the operating profit using a standard (a very conservative) 10% profit margin. In this study, we focused on the downtime effect from internally focused applications only. Including external applications would add another $3,100 per 100 users in annual operating profit, which would reduce the total costs of Sybase ASE by this additional amount.

TABLE 2

The Cost of Downtime in RDBMSs

	Sybase ASE	Other RDBMSs	Savings	%
Unplanned downtime incidents each month	0.58	0.97	0.39	41
MTTR (hours)	0.54	0.61	0.07	12
Annual hours each user is affected by unplanned downtime	3.75	7.17	3.45	48
Total unplanned downtime per 100 users per year (hours)	95.76	155.72	59.97	39
Annual downtime costs per 100 users — end-user productivity ($)	2,452	3,988	1,536	39

Source: IDC, October 2011

On average, organizations using Sybase RDBMS are able to develop and roll out a new application in 16 days compared with 23 days for other RDBMSs. Two-thirds of the companies use Sybase for their custom and highly customized applications, while less than half are using other RDBMSs for custom applications.

Projecting Total Costs Over Five Years

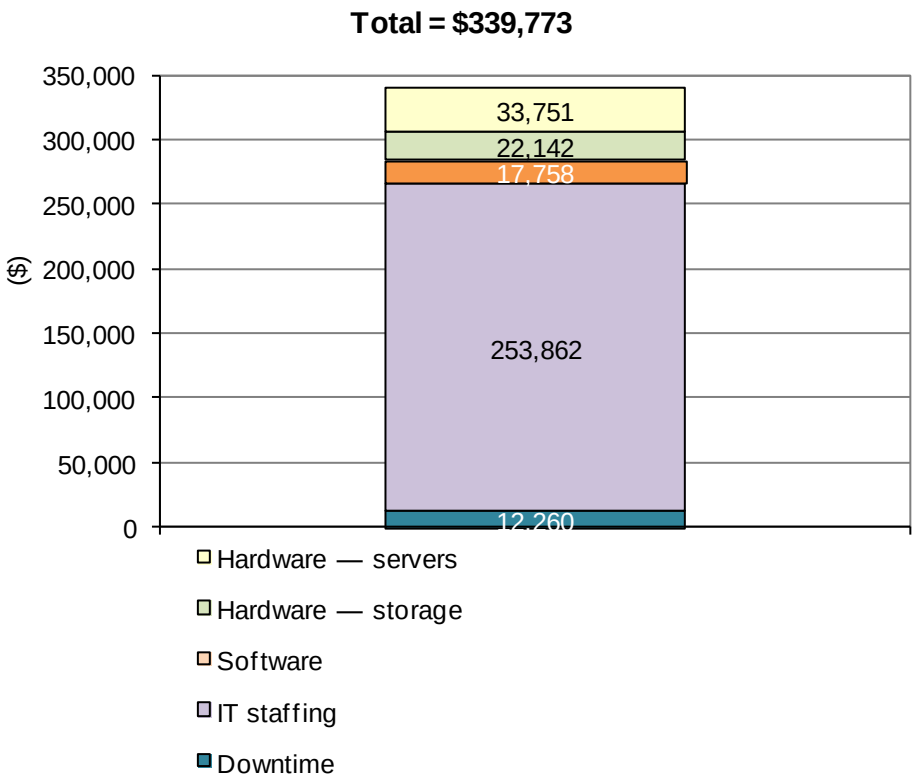
The various cost factors associated with the deployment and operations of a database — as well as the contribution to the total cost — over a five-year period are as follows:

- Hardware — server and storage: 16%
- Software license: 5%
- IT staffing — RDBMS admin, server support, help desk support for database and training: 75%
- Downtime — lost productivity: 4%

Over a five-year period, the total costs for deploying Sybase ASE averaged $340,000 per 100 users or $645,000 per TB (total costs divided by average database size of 240GB multiplied by total number of Sybase ASE databases) (see Figure 3).

FIGURE 3

Sybase ASE Five-Year Total Cost per 100 Users and 240GB Database Size

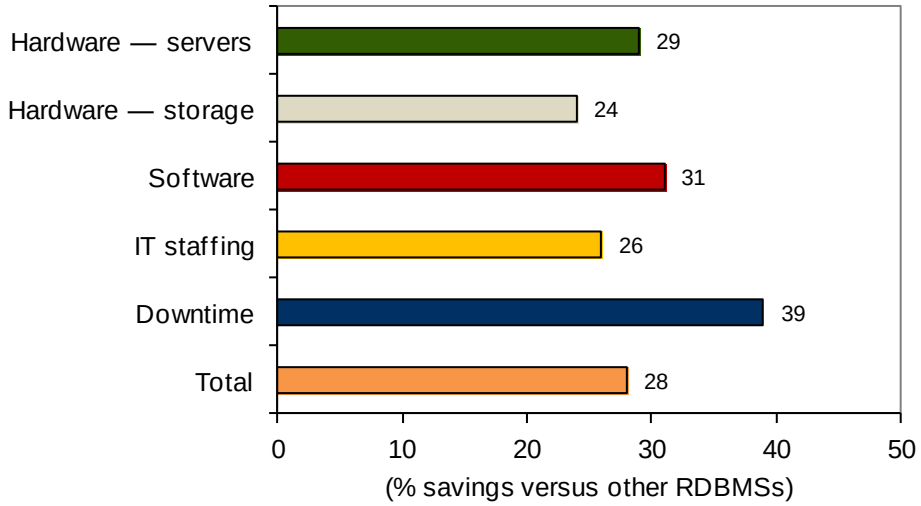


Source: IDC, October 2011

On average, companies in the study estimated the total cost for Sybase ASE to be 28% less than the total cost of other RDBMSs they are using, which will save them about $129,000 per 100 users over five years (see Figure 4).

FIGURE 4

Sybase ASE Five-Year Savings per 100 Users



Five-year savings per 100 users = $128,580

Source: IDC, October 2011

Sybase ASE 15.7 contains a number of features that help control costs by making the system a stingy user of hardware resources, making it easy to optimize operations with a minimum of staff time, and providing maintenance that is augmented by a direct connection to Sybase support. Relevant features include:

- Management features that automate most of the functions that DBAs used to perform manually
- Self-management capabilities that enable the database to tune itself without staff intervention in dealing with many common issues
- Data compression throughout that drastically reduces the storage footprint of the database while simultaneously speeding up its operation (because there is less raw data to manage)
- Storage of large object blocks (LOBs) in-row rather than as separate objects requiring special storage, thus enabling optimized storage and retrieval
- Deferred materialization, which prevents empty tables form consuming any storage

- In-place execution of operations rather than using temporary storage for such functions, saving disk space and avoiding storage overprovisioning
- Utility that can deliver diagnostic data directly to Sybase support, enabling far more efficient support and reducing the requirement for local DBA expertise
- Abstract policy objects that allow security to be defined and managed at a group (such as role or department) level rather than at the level of the individual user, greatly reducing DBA security management time
- Explicit support for structures required by SAP's applications

Customer Experiences and Observations

Federally Chartered Home Lending Institution

This home lending institution lends money to other lending institutions for finance housing and infrastructure development loans. This institution employs 100 people in its datacenter and uses Sybase ASE as its core RDBMS, driving internal applications that manage its loan processing. It is a small but complex database, managed by a single DBA. The institution uses other RDBMSs for some functions but prefers Sybase because of its lower license cost and ease of administration. It believes Sybase requires half the resources, in terms of both hardware and staffing, of competing large RDBMS products. The lending institution is happy with the performance. As the database architect put it, "As far as I'm concerned, Sybase's performance is a good ROI."

Major South African Bank

This major South African bank offers its clients advice, finance, trading solutions, investment opportunities, and research. The bank drives a number of its core applications using Sybase ASE, which handles about a third of the total data management workload for the bank. Despite this, only a quarter of the DBA staff supports ASE. For the most part, ASE supports in-house-developed applications and a few highly customized packaged applications. The other RDBMS products are used for noncustomized packaged applications. ASE's databases total about half a terabyte of mainly transactional data. The staff time spent on tuning, testing, and maintenance of Sybase ASE is roughly half that spent on the other major RDBMS the bank has installed, despite the fact that the databases are of about the same size and complexity.

"We've had Sybase since 1992. It's sort of part of the core of the trading application," said the bank's database technical lead. He indicated that the SAP acquisition was very positive from his point of view. "That's quite an important thing because it puts Sybase in competition with the other guys," he said.

Clinical Services Benefit Management Company

This specialty benefit management company focuses on enhancing the appropriate use of clinical services where established evidence-based guidelines exist. Clinical services currently managed by the company include diagnostic imaging, cardiac imaging services, and specialty drugs. The company runs 100% of its data operations

on Sybase ASE. The IT staff consists of over 120 people, with 3 DBAs. The company's deployment is 100% Unix. The applications are all in-house-developed OLTP. The company has 20 Sybase instances serving 200 concurrent users. The databases are fairly small (below 50GB) but complex. The company has been using ASE for eight years and has experienced zero unplanned downtime. It takes the system down for maintenance three times a year for between one hour and four hours per incident. It chooses to perform the maintenance on Sundays, when it is not operating. The company has never lost data.

The company's director of midrange systems, who has also worked extensively with other major RDBMS products, estimates that he would need 20% more hardware to get the same performance on those products. The simplicity of ASE has made management easy, he said. He never needs to fiddle with settings in Unix or other elements of the environment because ASE enables him to manage all the relevant factors from within its own environment. "With Sybase, it's all included in the Sybase engines. I don't need to go outside Sybase and worry about some kernel parameters or configuration parameters," he said.

CHALLENGES/OPPORTUNITIES

As we mentioned earlier, RDBMS products are constantly evolving. Advantages that Sybase ASE may have over its competitors today may be irrelevant tomorrow because of changes in competing products. Thus, Sybase and its competitors are challenged to continually improve their technology to succeed in addressing customer requirements for efficient, cost-effective, and flexible database support.

CONCLUSION

Most database application users fail to take into account all the cost factors involved in running a given RDBMS. In particular, they tend not to consider costs over time, they tend to underestimate staff time issues, and they fail to calculate opportunity costs resulting from poor performance, lack of availability, or inflexibility of the database in responding to the business needs of the enterprise. They also tend to stick with one brand over time, without ever revisiting that choice based on evolving requirements and costs, even for RDBMS-independent database applications such as those of SAP.

IDC offers the following recommendations to those with budget authority for database applications and their associated resources to ensure that they are getting the best value for their money in the application environment of the business:

- Periodically review the TCO of the RDBMS used to drive the application.
- Consider the cost over a five-year period by reviewing the history of data and user growth and the impact of that growth on servers, storage, and associated fees.

- Consider also how data and user growth has impacted demand for staff time and how staff members could be better utilized if they were not tied up performing routine tasks.
- Collect information about competing RDBMS products, including Sybase ASE, and using best estimates, consider how the costs calculated by the previously discussed methods could be reduced.
- Consider Sybase ASE as a possible migration target (based on the information gathered from Sybase ASE customers for this paper).
- Be open to database conversion for commercial applications such as SAP's. They are not nearly as difficult or risky to convert as one might think.