



# Gauging the Total Cost of Ownership for an Enterprise RDBMS

*Sybase® Adaptive Server™ Enterprise*

*An IDC White Paper*

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## **Overview**

What is the cost of building and maintaining a database? How can one compare the cost of deploying one vendor's RDBMS with that of another? Clearly, cost comparisons only begin with initial license price and associated maintenance fees. Any valid comparison must also take into account differences in kinds of systems, software quality, size and expertise of professional staff, and overall maintainability and flexibility of the database over time.

This white paper looks at the various considerations involved in evaluating the total cost of ownership (TCO) for deploying a database using one RDBMS versus another, providing guidelines for making such an evaluation.

We also discuss how Sybase Adaptive Server Enterprise can be measured in this context. IDC conducted detailed interviews with two Sybase customers for this white paper, both of whom report that Sybase offers a range of advantages, not all of which are obvious at first glance. For example, one customer indicated that the high quality and low cost of Sybase support allows it to maintain less database administration staff than would normally be required. Such a "soft," or "hidden," cost reduction wouldn't be apparent until well into the period a database had been used in a production capacity.

## **Elements of a TCO Evaluation for an RDBMS**

There are a number of considerations that need to be taken into account in measuring the TCO of a database, particularly when the aim is to judge one RDBMS against another.

### ***License and Maintenance Fees for the Software***

The most obvious differentiator between RDBMSs is the cost of license and maintenance fees for the product. Initial license fees and ongoing maintenance charges are often paid for up front and are top of mind. One Sybase customer mentioned that Sybase's bundling of

many products at an attractive price point is a definite plus. Whether or not such costs are high or low, they may be the least significant in the overall cost profile.

### ***Administration***

The ease and flexibility of administration of a database can represent a key element in evaluating the TCO.

### ***Personnel Cost***

How difficult is the RDBMS to manage? How hard is it to perform routine actions? How often must one perform maintenance actions, and conversely, how many actions are automated by the system so the administrator need not get involved?

Answers to such questions can have a huge impact on the number of administrators required as well as their level of expertise. “Difficult” databases will require more personnel devoting longer hours to such administrative and management tasks. Our discussions with customers revealed that Sybase fared very well in helping reduce personnel costs.

### ***Training Cost***

The more complex the RDBMS, the more complex and detailed training for database administrators (DBAs) must be. Changes from one release to another can require new version training, and systems with many administration functions may require higher levels of training for more sophisticated operations. Such complexity can lead to “hidden” overhead.

### ***Systems Cost***

The number of system resources required by an RDBMS to manage a database of a given size and complexity, and the degree of efficiency and flexibility exhibited by that RDBMS in using those resources, can directly affect the type, size, number, and cost of system resources.

### ***Storage***

How much disk space will the database require? How efficiently does the RDBMS use disk space? Does it require extra indexes for the schema in question, and how much space will they require? Does the RDBMS require sparse population of disk segments to ensure rapid retrieval? All these factors can affect the amount of disk space required by the database.

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### *Systems Size and Class*

How large a system does the RDBMS require to deliver performance within acceptable parameters? How fast must the processors be? How many are needed to deliver optimum performance for the database in question?

### *Memory*

RDBMS products vary widely in their use of memory, which is very important in optimizing performance by limiting the number of disk I/Os necessary to perform a database operation. How much memory will the RDBMS use to provide optimal performance for a given database?

### *High-Availability Considerations*

Some database implementations require a continuously available database. This may involve creating a hot standby or other clustered system arrangement to ensure that if a system upon which the database server resides fails, another will take over instantly without apparent downtime. The mechanism enabling high availability such as a redundant system is another important factor that affects TCO.

### *Cost-Mitigating Factors*

Some RDBMSs have features that mitigate costs. On one hand, they may provide flexibility and manageability that can enhance use of system resources. On the other hand, they may reduce or even eliminate downtime, which itself carries a cost to the enterprise.

### *Management of Resource Priority and Availability*

If the database server can isolate the resources it uses in performing operations and provide a means for balancing their priority, it can enable more effective systems use, thereby reducing the RDBMS operational cost. Likewise, if the system can enable the performance of some maintenance functions while the database is up and available, it has an advantage over others that require that the system be taken down. Downtime leads to lost productivity and other costs that can be minimized by effective resource management.

### *Degree of Dynamism in the Management Scheme*

The more the system is able to dynamically allocate resources and otherwise adjust itself in flight, the less the DBA must do, and the fewer resources that must be set aside for it. This results in lower personnel and system costs.

## **Evaluating Sybase Adaptive Server Enterprise**

In considering how Sybase Adaptive Server Enterprise (ASE) stacks up in terms of TCO, IDC looks at the factors described above. Sybase ASE offers three key features that help control cost: It is easy to administer; it makes efficient use of resources; and it offers automated optimization of resources. Customers also attest to the ease of backup and the high quality of the software itself, making it a very reliable platform. And when Sybase support is needed, its quality and low cost is a definite advantage.

### ***Easy to Administer***

Sybase ASE has been taking incremental steps to reduce administration costs by making the manipulation of system resources more dynamic. ASE's extendible architecture allows easy, dynamic incorporation of new processors and hardware through such features as the Logical Process Manager. More importantly, Sybase ASE natively controls much of the operating resources, such as memory and threads of execution, thereby making it easy for database administrators to discriminate between jobs. In addition, many of the essential configuration parameters have been made dynamic, which provides the foundation for self-administration of Sybase ASE servers.

### ***Efficient Use of Resources***

Sybase ASE dynamically allocates resources as needed and makes efficient use of memory, disk, and processor power.

One source of information regarding the relative use of system resources is the comparison of Transaction Processing Performance Council (TPC) benchmark results. Although IDC places little value in such benchmark tests because they are generally designed to contrast the cost and performance of different hardware configurations (and therefore more useful in comparing hardware than software products), it is possible from time to time to find tests involving similar hardware configurations and different RDBMS products. The TPC-C benchmark is one for which such comparative results exist. Such a benchmark may not test various nuances that impact RDBMS performance and overall resource utilization under a load in real-world situations. Nonetheless, it can give some idea of how RDBMS product resource utilization may compare.

IDC is aware of multiple TPC-C tests involving large processing environments, including one involving Sybase ASE and at least one other test involving the product of a competing vendor. Each involves an Ultra SPARC II with 64 400MHz CPUs, 64GB of main memory, and 15,624GB of total disk storage. Sybase ASE achieved TPC-C throughput of over 156,873 transactions per minute supporting over 128,000 user connections through 46 client systems. The price/tpmC was \$48.81. This indicates the efficient utilization of available system resources or, conversely, the need for few system resources for a desired throughput by Sybase ASE.

### ***Automated Optimization of Resources***

The use of memory by Sybase ASE can grow automatically as more users, connections, locks, and other essential attributes are added to a production system with change in system loads. With this capability, any unplanned downtime is significantly reduced. In some cases, implementing a solution may involve costs that are not very apparent. In the area of high availability, Sybase ASE has provided a unique dual-node cluster solution that does not mandate additional costs of data partitioning and systems management overhead. Furthermore, the transition from a non-high-availability system to a high-availability system is relatively easy because no additional database partitioning (and its ongoing maintenance overhead) is required, as is the case of cluster-based parallel solutions.

### ***Java on the Server***

Sybase ASE provides support for Java-based object-relational technology. This has significantly reduced the cost of application development that utilizes server-side processing. Using a 3GL language, application developers can easily develop logic using Java-based stored procedures or deploy Enterprise Java Beans (EJB) directly in Sybase ASE. Thus, costs are reduced through processing capabilities at the point where data resides, and in some cases, avoiding purchase of separate application servers for executing data-centric EJB components.

### **Conclusion**

When considering an RDBMS, prospective customers should evaluate the potential TCO by taking into account the factors we have discussed above. They should also consider a host of less tangible factors pertaining to database vendors, such as software quality, vendor reputation, responsiveness of the support staff, willingness to partner, and financial stability. In addition, prospective customers must also ask themselves how far along the technology continuum they want to venture, as some vendors offer “tried and true” solutions, whereas others are happy to be on the “bleeding edge.” Corporate capabilities and goals may favor one approach over another.

In evaluating potential solutions, IDC recommends that one never limit considerations to visible software costs only. Instead, one should consider the very real and ongoing costs of deploying and managing the database over a long period of time. TCO will be made up of visible and hidden costs, all of which should be taken into account before the purchasing decision is made.

In reviewing customer responses to questions in this study, and in examining the overall offerings of Sybase Adaptive Server Enterprise, IDC believes that Sybase offers a number of key features that add up to cost savings in implementation. These include self-administration features, automated failover support, flexible administration, and a range of performance-tuning features. Companies should consider these factors when comparing Sybase with other RDBMS software vendors.

## Fannie Mae

Fannie Mae is the nation's leader in the housing finance system. Its public mission and defining goal "is to help more families achieve the American dream of home ownership." The company is a provider of mortgage funds to lenders, creating products and services that help lenders originate home mortgage loans primarily to low-, moderate-, and middle-income families. Fannie Mae buys these loans and holds them in their portfolio business or securitizes (bundles) them and sell them to investors. Established in its current form as a private, shareholder-owned company in 1968, the publicly traded company has 4,200 employees and is headquartered in Washington, D.C., with five regional offices across the United States.

Fannie Mae has been using Sybase for seven years and runs many of its core applications on Sybase servers, including applications for originating, underwriting, servicing, treasury, and portfolio management. The company maintains 5,900 databases on Sybase, with a total of 6TB of information. Bill Banick, director of database management systems, is responsible for supporting Fannie Mae's database platforms. He has a wide range of experience across multiple database platforms and finds that Sybase Adaptive Server Enterprise has many advantages that make it an attractive investment. Sybase ASE, he notes, is very easy to manage, both administratively and incrementally for performance tuning. It is also a very cost-effective solution, leading Fannie Mae to continue purchasing Sybase servers. In particular, he rates Sybase high in the following areas:

- **Features and functions.** Sybase offers world-class, robust features and functions in an attractive package that is "significantly better than other vendors'," says Banick. "I get a fully functional server together with the client component, and I don't have to pay extra for it. They come as a bundle at a very reasonable cost."
- **Cost of support, coupled with high quality.** Fannie Mae receives "good support from Sybase," enabling it to spend less time managing its Sybase databases.
- **Quality of software.** Sybase's software quality is "very high," says Banick. Unlike some other products he is familiar with, Sybase software is relatively bug free, and it works as it is supposed to. "Sybase has consistently delivered software that is of high quality," he says.

"I think anyone looking for a database would do well to look at Sybase," Banick suggests. "In terms of functionality, cost, and support/reliability, Sybase definitely bears consideration. Over the years, they have consistently met our business requirements at a reasonable cost."

## The Institute for Genomic Research

The Institute for Genomic Research (TIGR) is a nonprofit research institute founded in 1992. It is “committed to the continued expansion of genome sequence information and to the application of this information in basic biological research, medicine, and agriculture.” TIGR’s primary research interests are in structural, functional, and comparative analysis of genomes and gene products from a wide variety of organisms, including viruses, bacteria, plants, animals, fungi, and parasites. TIGR’s scientists and researchers decode the genetic structure of such organisms, determining gene structure, location, and function. It publishes its scientific results on the Web, allowing other researchers from around the world to benefit from its research for purposes such as disease prevention and genetic engineering.

TIGR has been using Sybase since its inception and depends on the database company to run its core operations. Scientists, researchers, lab personnel, and software engineers use Sybase every day. As a nonprofit research institute, TIGR is extremely cost-conscious and needs to run a lean organization. One of the reasons TIGR chose Sybase was its very attractive cost of ownership, especially concerning “hidden costs” such as ongoing maintenance, training, and technical support.

TIGR maintains hundreds of databases with a total of 450GB of information running on five Sybase servers. Michael Heaney, database manager, is responsible for all database issues. He is an enthusiastic advocate of Sybase for a variety of reasons, including reliability, performance, ease of use, response time, and maintenance costs. Sybase is “ridiculously easy to set and maintain,” says Heaney. “Tasks like setting up the logging facilities are very easy. In addition, the performance is absolutely fabulous. Sybase gives me so many different configuration options that I can modify and tune for the best performance. Setting up indexing schemes, implementing large I/O pools within the database server, and tuning memory caches are extremely easy, especially compared to other databases I’m familiar with.”

Heaney is also impressed with Sybase’s backup functionality. “Backups are so easy to do. It’s literally one command. I’ve heard of other vendors that offer a three-day course on how to do backup.” Another area that Heaney praises is technical support. “The Sybase Web site contains a tremendous amount of information as well as downloadable patches that save me a lot of time and aggravation. I’d recommend that anyone looking at databases give Sybase a hard look.”

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