

Advantage Database Server or Microsoft SQL Server - which one is right for you?

white paper

by Bill Todd

ADVANTAGE
DATABASE SERVER

executive summary

To minimize the cost of deploying database applications, you must match the database management system's features to the application's requirements. Using a complex enterprise database management system for embedded or distributed database applications results in unnecessary licensing, training, development, deployment, administration and support costs.

Advantage Database Server (ADS) is designed for use in embedded and distributed systems so it requires no routine maintenance or support. The first year total cost of ADS is less than 10% of the cost for Microsoft SQL Server. The disk footprint of ADS is 1/50th of SQL Server's yet ADS provides all the features you need including:

- SMP support
- Cluster support
- Cross-platform support
- Transaction control
- Replication
- A rich SQL dialect
- An extensive SQL function library
- A sophisticated query optimizer
- Row level locking
- Triggers
- No lock escalation
- Navigational access
- Declarative referential integrity
- Declarative column and row constraints
- A GUI database development tool
- Drivers for all popular development tools
- A sophisticated security system
- A powerful data conversion utility

Advantage Database Server easily converts applications that use Access, Paradox, dBase, FoxPro or Clipper tables to a client/server architecture. The conversion process is much easier than converting to SQL Server because ADS supports the navigational architecture your application is already designed for. There is no need to convert data access code to SQL and redesign your user interface for SQL's set orientation.

ADS lowers the cost of building new applications because it is much easier to learn and deploy than SQL Server. One measure of product complexity is the length of the vendor's training programs. The requirement to become a certified SQL Server 2000 database administrator is 22 days of classroom instruction and four exams¹. In comparison, the optional ADS training course lasts 2 days. Whether you are deploying your application to one or thousands of locations, ADS delivers the features you need with a 10-to-1 advantage in both cost and ease of use.



right-sizing your database management system

Relational database management systems can be divided into three categories: enterprise, embedded and desktop. Enterprise database management systems support thousands of concurrent users and terabytes of data. They are designed to run in complex environments of multiple server computers and an array of disk drives configured to provide uninterrupted service regardless of hardware failures. DB2, Oracle and SQL Server are the dominant members of this category.

Embedded database management systems are sometimes called application specific or workgroup database management systems, although none of these terms describes them accurately. This class of database management systems is designed to be self-tuning, self-maintaining and require no support staff. They are easier to learn, deploy and support than enterprise products.

Embedded database management systems support one to 1,000 concurrent users and databases up to hundreds of gigabytes. Like enterprise database management systems, products in this class use client/server architecture and provide true transaction support. Client/server architecture improves performance and renders the database invulnerable to damage caused by a hardware or software failure on a client PC. In a client/server environment, client PCs never write to the database file. Instead, they send commands to the database server software. The database server handles all I/O to the database files. This architecture makes it impossible for a client PC to damage the database.

Transaction control is critical for business applications because it ensures the logical integrity of the data. The textbook example of the need for transaction control is transferring \$100 from a customer's savings account to their checking account. This requires two changes to the database, reducing the balance of the savings account and increasing the balance of the checking account. If the system fails, for any reason, after the first change but before the second, the database is left in an inconsistent state. Transaction control ensures that when the database management system is restarted all transactions that were not complete will be undone. In this example, the change that reduced the savings account balance will be rolled back and the data will be returned to its original state.

Because they are self-tuning and require no maintenance, embedded database management systems are ideally suited for several application types. The first of these is an embedded system, for example, an accounting system. In this class of application, the database is an embedded integral part of the application. Embedded database management systems are also perfect for distributed applications where database servers must be deployed to many locations with no on-site support staff. Advantage Database Server is a leader in the embedded database management system category.

Enterprise database management systems can be used for applications that fall within the parameters of the embedded category, but this is not a cost-effective choice. Enterprise database managers have a host of features that may not be needed. A large feature set means complexity. Product complexity increases training, development, deployment and support costs.

The third category is desktop databases, such as Microsoft Access and Paradox. They are primarily end-user tools. Desktop database managers can support a few concurrent users and databases with a maximum size of a few hundred megabytes. They are vulnerable to data corruption due to workstation crashes, do not provide true transaction support and are not suitable for important multi-user business applications.

history

Advantage Database Server is a product of Extended Systems, a publicly traded company founded in 1984. ADS was originally created to bring client/server architecture to the Xbase community. Although it still supports FoxPro and Clipper file and index formats, ADS has grown to include a proprietary database format with advanced relational features like declarative referential integrity and declarative column and row constraints.

cross-platform support

While Windows continues to dominate the desktop PC, the server market has become more diverse. Many existing networks have NetWare servers and other organizations have embraced Linux for its low cost and high reliability.

SQL Server limits your ability to take advantage of other operating systems because it runs only on the Windows operating system. ADS is available on Windows 98/ME, Windows NT/2000/2003, Linux and as a NetWare NLM. With ADS you have flexibility now and in the future.

lock escalation

Both SQL Server and ADS lock individual records to prevent two users from updating the same record at the same time. However, under some circumstances SQL Server escalates record level locks to page or table level locks. This can seriously reduce concurrent access by other users because records become locked that are not changed by the transaction that caused the escalation. This means that other users cannot update those records until the transaction holding the escalated lock ends.

With SQL Server, the database design and all SQL code must be reviewed by a skilled SQL Server DBA to minimize this problem. ADS does not use lock escalation. All locking is done at the record level to ensure maximum concurrency and no administration.

navigational architecture

Migrating an application that uses a navigational database such as Access, dBase, FoxPro, Paradox or Clipper to a SQL database server, such as SQL Server, can be a daunting task. Major changes to the application are required to convert existing record browsing and selection code to SQL. User interface changes are required to move from a navigational environment to a set-oriented environment.

ADS supports both set-oriented SQL access and navigational access. This makes converting existing applications to client/server less costly. A complete suite of drivers lets you use ADS from Visual Basic, Delphi, C++Builder, Visual Studio .NET, C#Builder, JBuilder, Sun ONE Studio, IBM VisualAge for Java, Access, Visual C++, Visual FoxPro, Kylix, CA-Visual Objects, CA-Clipper, Perl, PHP, Xbase++ and any other tool that supports ODBC, JDBC, ADO, ADO.NET, or an API.

administration

When analyzing the cost of an enterprise database management system, it is important to accurately estimate the cost of training a database administrator (DBA). Because administration costs can easily exceed the cost of the software, they are a vital part of the total cost equation.

Microsoft recommends that individuals who “derive physical database designs, develop logical data models, create physical databases, create data services by using Transact-SQL, manage and maintain databases, configure and manage security, monitor and optimize databases, and install and configure SQL Server” obtain DBA certification. The DBA on SQL Server certification is “appropriate for database administrators, database analysts and database developers.”ⁱⁱ

Becoming a certified SQL Server DBA requires at least 20 days of classroom instruction and four certification exams.ⁱⁱⁱ Getting one person certified costs \$7,900 for classroom training plus^{iv} the cost of the exams.

To the initial training cost add the cost of the time the DBA must spend designing the database, reviewing SQL code, establishing backup strategies, determining how often to checkpoint the database to minimize crash recovery time, writing or reviewing stored procedures and triggers, determining the correct server configuration for your application, integrating the SQL Server client and server installations into your application installation and supporting the database after deployment.

Advantage Database Server does not require a highly trained DBA. Because ADS is designed to be self-tuning and requires no maintenance, it is easy to learn, use and deploy. Most developers with a basic understanding of relational databases learn to create databases, define constraints, write stored procedures and perform all other database development tasks easily on their own. If formal training is desired, the ADS training course offered by Extended Systems lasts just two days.

deployment

A SQL Server installation consumes about 200 megabytes of disk space. SQL Server's complexity requires a trained DBA to ensure that the correct options are selected at installation. The SQL Server client must be installed on every client PC. You must use SQL Server's proprietary installer to install both the server and the client.

Advantage Database Server requires less than four megabytes of disk space and the installer requires only two parameters; the data location and the license key. You can call the ADS installer in silent mode from your application's installer to make the server installation invisible. The ADS client is two DLL's that you install in the same directory as your EXE. No custom installer is required.



local server

Many business applications are deployed to individual users. The Advantage Local Server allows Advantage Windows and Linux applications access to data files located locally and in peer-to-peer environments. The Advantage Local Server, a non-client/server solution that can be used to access data on computers that are not running the Advantage Database Server, is available at no cost. Installation consists of adding an additional DLL to the application directory. No separate installation or registration is required. To up-size a single user application to client/server, simply change the application's server connection string to connect to the Advantage Database Server instead of the local server. No additional changes to the application's source code are required and the same application can be deployed to both environments.

The SQL Server solution for single user applications is the Microsoft SQL Server Desktop Engine (MSDE), a version of the full SQL Server engine that requires 50 megabytes of disk space, the same installer as SQL Server, and requires that the SQL Server client be installed. Since MSDE is SQL Server, with a governor to limit the number of users, it suffers from the same disadvantages as the full product. The licensing for MSDE is complex.^v To deploy MSDE, purchase of a Microsoft product that includes a MSDE deployment license is required. If the deployment license is acquired by purchasing a Microsoft Visual Studio or Visual FoxPro product you can only deploy MSDE with applications developed with that product.

The Advantage Local Server does not have these deployment restrictions. Just download it and deploy your application – all at no cost.

cost

The total cost of a database management system is comprised of software licensing, training, development, deployment and support costs. SQL Server requires a trained DBA to install, configure and support the server installation. Deployment costs are higher due to the time required to plan the installation and to install and configure a complex database server. Development costs are higher due to greater training time and the time required to review all database access code to ensure that it does not create lock escalation or other concurrency problems. Support costs are higher because you must have a trained DBA available to deal with abnormal events. The DBA must have local or remote access to the server to analyze performance, change the configuration and correct problems.

ADS is designed for use in embedded systems where the database can be invisible. ADS requires no routine maintenance or support and does not require a trained DBA for installation, configuration or tuning. The following table compares the first year cost of Advantage and SQL Server for an installation that supports 25 users.

25-User Pricing	ADS	SQL Server
Software	\$2,495	\$11,099
Training	\$0	\$7,900
Planning & Installation ^{vi}	\$80	\$1,600
Administration	\$0	\$20,000
Total	\$2,575	\$40,599

Note: Amounts are based on U.S. prices and dollars.

features

The following table compares features offered by ADS and SQL Server. This list is not exhaustive. It includes the features that are important for embedded and distributed database applications and ignores features that are of interest only at the enterprise level.

feature	ADS	SQL Server
SMP support	●	●
Windows NT/2000/2003 cluster support	●	●
NetWare cluster support	●	
Cross-platform support (Windows 98/Me/NT/2000/2003, Linux and NetWare)	●	
SQL access	●	●
Rich SQL function library	●	●
SELECT from multiple databases	●	●
Query optimizer	●	●
Supports the null state for all data types	●	●
Navigational (ISAM) access	●	
Row level locking	●	●
Does not escalate locks	●	
Transaction support	●	●
Automatic generation of sequential keys	●	●
Stored procedures	●	●
Triggers	●	●
Change metadata while database is in use	●	●
Encryption	●	●
Declarative referential integrity	●	●
Declarative row and column constraints	●	●
Replication	●	●
GUI design tool	●	●
.NET data provider	●	●
ODBC driver	●	●
OLE DB provider for ADO	●	●
Native Delphi & C++ Builder components	●	
JDBC driver	●	●
Database encryption	●	●
Table level access control	●	●
Column level access control	●	●
Installed size	4 mb	200 mb
Vendor supplied installer not required	●	
Local server for single user applications	●	
Data compression	●	

conclusion

For many scenarios, including embedded and distributed applications, Advantage Database Server is clearly more cost effective than SQL Server. ADS offers lower licensing costs and does not require a trained DBA for installation, application design or support. ADS is designed as a zero-maintenance embedded database. It requires no on-site support staff making it particularly well suited for deployment to remote locations. ADS supports all popular development environments and provides navigational data access so it is easy to migrate desktop database applications to client/server architecture. Advantage Database Server provides the power needed to satisfy users' demands with a total cost of ownership that will dramatically improve the bottom line of a business.

Bill Todd is president of The Database Group, Inc., a database consulting and development firm based near Phoenix. He is co-author of four database programming books and over 90 articles and has presented over two dozen papers at developer conferences in the U.S. and Europe.

- i <http://www.microsoft.com/traincert/mcp/mcdba/requirements.asp>
- ii <http://www.microsoft.com/traincert/mcp/mcdba/mcdba.asp>
- iii <http://www.microsoft.com/traincert/mcp/mcdba/requirements.asp>
- iv <http://www.dowjones.com/training/html/schedule.htm>
- v <http://www.microsoft.com/sql/howtobuy/msdeuse.asp>
- vi For SQL Server assumes \$80,000 for DBA salary, 40 hours for installation planning and installation and 25% of DBA's time for on-going support.

"Compared to Microsoft SQL Server, converting to Advantage Database Server was fast and we didn't have to re-architect the program."


**—Mark Walker, Director of Development
CCH INCORPORATED - Tax Compliance Group**

"The Advantage Database carries heavy loads of a million plus records with incredible speed. It benchmarked inside our application at 138-times the speed of MS SQL Server."

**—Rod Lueck, Owner and President
Techmate, Inc.**



Extended Systems provides the expertise, strategy and solutions to help enterprise organizations realize their business goals through mobile technology. The company's software and services portfolio includes mobile data management solutions; mobile applications for sales, service and pharmaceutical professionals; mobile application development tools and services; client/server database management system; and Bluetooth and IrDA wireless connectivity software.

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