

Advantage Database Server



Advantage Database Server is a high performance client/server RDBMS for stand-alone, networked, Internet, and mobile database applications. Advantage Database Server allows developers the flexibility to combine powerful SQL statements and relational data access methods with the performance and control of navigational commands. Advantage has native development interfaces designed to leverage existing knowledge of popular development tools. With optimized data access methodology for easily delivering unparalleled performance, Advantage provides security, stability, and data integrity while being completely maintenance-free.

With no mandatory configuration requirements, Advantage is easily installed on the existing network infrastructure. Because of the embedded qualities of Advantage, it works tirelessly behind the application, delivering client/server performance, stability, and data integrity that today's business applications demand.

Performance

The client/server processing and high-speed database engine of Advantage Database Server means significantly less network traffic and better performance. Network traffic and concurrency are formidable problems for non-client/server multi-user database applications. These applications cause large amounts of network traffic because the client machine performs all database processing. Advantage Database Server optimizes multi-user performance by intelligently dividing database operations between the client and the server. Client/server architecture moves the processing of database requests to the file server, where the data is stored, which dramatically reduces network traffic.

High-Speed Locking

The Advantage Database Server uses an intelligent lock management system that eliminates lock retries and network traffic. The Advantage Database Server uses an internal queuing algorithm that allows application locks to occur without making network operating system lock API calls. All locking information is maintained internally in the lock queues. Advantage allows for read-through index locking and immediate index write locking. Read-through index locking increases multi-user index read performance immensely, and the write lock queuing and elimination of lock retries greatly increases multi-user database application performance.

Advantage Extended Procedures

Advantage Extended Procedures are stored procedures that are easy to develop and easy to use. Like traditional stored procedures, Advantage Extended Procedures allow you to execute a set of code at the server where the data resides. This allows you to remove data intensive tasks from the workstations and reduces your network traffic to a single send and receive operation. Unlike traditional stored procedures, however, Advantage Extended Procedures allow developers to write, store, and execute stored procedures on the server using their preferred application development tool. No database administrator is required to develop Advantage Extended Procedures.

- **Provides flexibility of data access via native relational SQL or direct navigational database commands.**
- **High performance database engine making use of optimized data access and locking algorithms**
- **Complete referential integrity support including primary/foreign key definition and cascaded updates and deletes.**
- **Full server-based transaction processing eliminates database corruption, drastically reducing support costs**
- **Database security and encryption support**
- **Fully scalable from local, to peer-to-peer, to client/server environments — with one set of source code**
- **Eliminates cost of ongoing administration —no database administrator required**
- **Fast and easy to install using existing network file system and hardware**
- **Protects database applications against network failure and user error through a centralized storage management system**

Data Sheet

ADVANTAGE
DATABASE SERVER

800-235-7576 ext. 5030

Advantage Optimized Filters

Advantage Optimized Filters (AOFs) provide industry-leading database filtering optimization. AOFs speed filter (SQL WHERE clause) processing by using high-speed indexes to filter out data. No table data is ever read that does not pass the filter (SQL WHERE clause) condition. AOFs drastically reduce the amount of table data that must be retrieved from the disk, which leads to greatly improved performance.

Database Security

Advantage Database Server database security functionality allows you to "hide" files in the database from all users who are not accessing data through an Advantage application. It also allows the system administrator to remove network access rights from all users who could potentially damage the database. Once network access rights have been revoked from users to the database directory and/or files, users cannot maliciously or accidentally corrupt the database by writing to the database, creating new files, or deleting existing files in the database because they no longer have access to those files. When an Advantage application requests that a file be opened or created by the Advantage Database Server, the Advantage Database Server will open or create the file for the application regardless of the user's network access rights. The Advantage Database Server can do this because it is running on the server and is running at a "supervisor" level. Advantage's database security allows your Advantage application to have full control over who can access the database and how the database can be modified. Only Advantage applications may access the database. Non-Advantage applications will have no access to the database.

Flexible User Access Control

Advantage Database Server provides further database security functionality by allowing the creation of user accounts to control the access to the database tables, views and stored procedures. This access control mechanism consists of two database properties: login requirement and access rights verification. The user is verified when connecting to the data dictionary and the user access to individual table, view or stored procedure is also verified to make sure that proper rights has been of granted to the user. Individual user's access to the tables, views, or stored procedures can be specified. User groups can be defined in the database to ease the task of setting up users with similar access rights.

Database Encryption

Advantage Database Server supports encryption of database data. Advantage can physically encrypt record data to protect that data from unauthorized viewing. The Advantage encryption scheme uses a case-sensitive password to encode data, requiring a password to view data in its unencrypted form. Advantage Database Server encryption capabilities provide an easy way to integrate data security over the network. The data stored in tables and memo files on the server is encrypted as

well as the table data passed over the network. If the Advantage application has the correct password, it will be able to decrypt the data on the client. The Advantage encryption engine incorporates a 160-bit, industry standard encryption algorithm that ensures data is secure as it goes over the network.

Database Stability

Advantage Database Server provides database stability and eliminates database corruption by ensuring that every database operation is executed completely or is not executed at all. Entire database update operations are executed on the server. Therefore, if the application, workstation, or network fails, the database operation will either successfully be transmitted to the Advantage Database Server or not transmitted at all. The status of the application, workstation, and network cannot affect the data in your database. By transmitting entire table and index file update operations in one command from the client to the server, Advantage eliminates corruption errors introduced by application, workstation, or network failure.

Transaction Processing System

Advantage Database Server provides the powerful features of a Transaction Processing System (TPS) for your Advantage database applications. The Advantage Database Server TPS allows an application to perform multiple insert, update, and delete operations to any number of tables with complete confidence that either all of the insert, update, and delete operations will be successful or that none of the operations will occur. In other words, Advantage Database Server TPS processes multiple insertions, updates, and deletions as though they were a single operation. If the Advantage applications, the client workstation, or the network were to crash while in the midst of a transaction, the Advantage Database Server will automatically rollback the transaction so that the database is kept in a stable and known state. The Advantage Database Server TPS supports the Read Committed transaction isolation level. Therefore, while updates are being made within a transaction, the Advantage Database Server TPS hides the updates from other users until the data is committed. The uncommitted data is visible only to the application performing the transaction. The other applications view the data as it was before the transaction began. If the transaction is rolled back, no users other than the one who was performing the transaction ever see the uncommitted data. If the transaction is committed, the updated data becomes visible to all users all at once.

Referential Integrity Constraints

Referential integrity constraints verify the validity of data in your database and maintain relationships between records in your database. Advantage supports four categories of constraints:

Unique and Primary Keys: No two rows in a table have the same value for the set of key columns.

Referential Integrity: Parent-child relationships are enforced. Through the use of RI constraints, the database server, instead of your application, can enforce many business rules.

Field-level constraints: Ensure that the data entered for each individual field in a record is logically valid. The field-level constraints include the minimum/maximum allowed value for the field, whether the field can have NULL value, and the error message associated with the constraint verification.

Record-level constraints: Ensure that the data entered for related fields in a record is logically valid before flushing the record to the database. The record-level constraints include a logical expression that defines the relationship between the fields in the record and the error message associated with the constraint verification.

Advantage Internet Server

Advantage Database Server includes Advantage Internet Server functionality that provides a simple, non-HTML solution to access data through the Internet using existing Advantage applications. Advantage Internet Server functionality allows remote users to experience the same security, integrity, and performance available with LAN-based access to the Advantage Database Server, with the added benefit of using the Internet as one's own Virtual Private Network. The non-HTML design of the Advantage Internet Server functionality eliminates the need to maintain two versions of code: one for the LAN and another HTML version for the Internet. The same LAN-based application that can access data via the Advantage Database Server can access that same data across the Internet.

Easy Deployment and No Maintenance

Full Scalability

Advantage applications can be deployed in stand-alone, peer-to-peer, client/server and Internet environments with one set of source code. Advantage does not require a different set of components and code for local, client/server, and remote (via the Internet) database access. Advantage clients can automatically determine if the Advantage Database Server is available, whether the Advantage Database Server is available via the Advantage Internet Server, or whether the Advantage Local Server must be

used because the Advantage Database Server is not available. You only need to write one application with one version of code using the same components or APIs for client/server, local, or Internet file access development. Advantage also has support for mobile applications.

Development and Management Tools

The Advantage Data Architect is a tool designed to assist you in efficiently developing and maintaining Advantage database applications. The following features are available with the Advantage Data Architect:

Development:

- Import and convert other table types (such as Paradox, dBASE, Access, and SQL Server) to Advantage compatible tables.
- Create Advantage Data Dictionaries and define Referential Integrity rules, record and field level constraints, etc.
- Create tables and indexes.
- Restructure existing tables.
- Encrypt/decrypt tables and dictionaries
- Generate and test Advantage SQL queries using a visual query designer.
- Generate code to automatically create tables and indexes using the Advantage Tables to Code Generator.

Configuration:

- Check the client workstation's environment to test and diagnose connection issues with the Advantage Database Server.
- Setup Access Control Lists to define user access rights for users who wish to connect to the Advantage Database Server.
- Create aliases similar to those used by the Borland Database Engine.

Management:

- Manage the database with functionality for rebuilding indexes, packing tables, restructuring tables, and repairing tables.
- Manage Advantage Data Dictionaries with the Advantage Data Dictionary Manager.
- Observe Advantage Database Server activity with the Advantage Management Utility.
- Execute maintenance tasks from within a transaction.

Advantage Client Solutions

Previously developed database applications can be easily converted to access the Advantage Database Server. Advantage client solutions are native and seamless in their implementation replacing existing database drivers with fully compatible Advantage drivers. Advantage client solutions are available at no charge and include solutions for Borland Delphi, Borland Kylix, Borland C++Builder, CA-Clipper, CA-Visual Objects, Microsoft Visual Basic, Microsoft Access, and other database development environments.

Specifications

Server Operating System

Novell NetWare 4.x (IPX)
Novell NetWare 5.x or later (IP, IPX)
Microsoft Windows NT/2000/XP (IP, IPX)
Microsoft Windows 95/98/ME (IP, IPX)
Linux (IP)

Client Operating Systems

Windows 95/98/ME
Windows NT/2000/XP
Linux (kernel version 2.2 and newer)
Windows 3.1x
DOS 3.3 or higher

Development Environments

Delphi (via native components, OLE DB Provider(ADO), ODBC Driver, or API)
Kylix (via native components or API)
C++Builder (via native components, OLE DB Provider(ADO), ODBC Driver, or API)
Visual Basic (via OLE DB Provider(ADO), ODBC Driver, or API)
Access 97/2000 (via OLE DB Provider(ADO), ODBC Driver, or API)
Visual C++ (via OLE DB Provider(ADO), ODBC Driver, or API)
Visual FoxPro (via OLE DB Provider(ADO), ODBC Driver, or API)
CA-Visual Objects (via RDD, OLE DB Provider(ADO), ODBC Driver, or API)
CA-Clipper (via RDD)
Any development environment that can access ADO/OLE DB, an ODBC driver, or make a call into Windows DLL (via API)

Memory Requirements

User configurable with minimum of 1MB required for the Advantage Database Server

SQL Language Support

Support for much of the ANSI SQL-92 standard

Supported File Formats

Advantage proprietary database (ADT tables, ADI index files, ADM memo files)
FoxPro-compatible (DBF tables, CDX index files, FPT memo files)
CA-Clipper compatible (DBF tables, NTX index files, DBT memo files)

Licensing

Windows NT/2000/XP, NetWare, and Linux

Per server with maximum number of concurrent users (workstations):
2, 5, 10, 25, 50, 100, 250 and unlimited-user servers available

Windows 95/98/ME

Per server with maximum number of concurrent users (workstations):
1, 2, 3, 4, 5, and 9 user servers available

Internet

Advantage Internet Connector licensing available for unlimited concurrent Internet user (workstation) access to the Advantage Database Server



Beyond Connected®

Extended Systems – US

5777 North Meeker Avenue
Boise, Idaho 83713
800-235-7576 ext.5030
208-322-7800 ext.5030
208-327-5004 – Fax
GetAdvantage@extendedsystems.com

Extended Systems – Germany

Schwarzwaldstr. 99
71083 Herrenberg
Tel: +49 (0) 7032 / 798 - 0
info@extendedsystems.de

Extended Systems Bristol – UK

7-8 Portland Square
Bristol BS2 8SN
United Kingdom
Tel: +44 (0)117 901 5000
info@extendedsystems.co.uk

For information and a list of distributors visit our web site:

www.AdvantageDatabase.com



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