Advantage™ Database Server

KEY FEATURES

- Provides flexibility of data access via native relational SQL or direct navigational database commands
- High performance database engine using optimized data access for all development environments including Delphi, Visual Studio .NET, Visual FoxPro, Visual Basic and more
- Zero administration, easy to install and manage, eliminating the high cost of a DBA
- Complete referential integrity support including primary/foreign key definition and cascaded updates and deletes
- Complete server-based transaction processing eliminates database corruption, drastically reducing support costs
- Database security and encryption support

Advantage Database Server is a complete, high performance client/server data management solution for stand-alone, networked, and Internet database applications. Advantage allows application 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 developers' existing knowledge of popular development tools. Using optimized data access, Advantage provides security, stability, and data integrity with zero administration.

With no mandatory configuration requirements, Advantage is easily installed on existing network infrastructures. Because of the embedded qualities of Advantage,it works tirelessly behind the application, delivering client/server performance, stability, and data integrity that today's mission-critical business applications demand—at a cost structure businesses 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 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 server, where the data is stored, which dramatically reduces network traffic.

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 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 or with an ANSI SQL PSM 2003 standard scripting language. No database administrator and no special training are required to develop Advantage Extended Procedures.

SYBASE® iAnywhere®

KEY FEATURES —CONTINUED

- Fully scalable from local, to peer-to-peer, to client/server environments — with one set of source code
- Protects database applications against network failure and user error through a centralized storage management system
- Triggers are available to provide powerful means to maintain business rules at the database level, independent of the client application
- Replication support provides the capability to distribute changes from tables in one database to tables in a remote database

Full Text Search Capability

Full text searches are used to find records containing data that matches search conditions constructed of search words and phrases combined with logical operators AND, OR, and NOT and the proximity operator NEAR. Any character, memo, and BLOB field can be searched. In addition, full text search (content) indexes can be built on specific fields to provide extremely fast O(Log N) searches. The full text search function CONTAINS can be used in SQL statements and traditional record filters. In SQL SELECT statements, result sets can be ordered with the SCORE() function.

Communications Compression

Communications compression provides reduced network traffic between Advantage clients and the Advantage Database Server. At the positive end of the spectrum, compression may provide a 100% to 500% speedup when using slow networks (dial-up) with encrypted data. In "normal" situations with reasonably fast servers and a reasonably fast network (10/100 Mbit), a 5% to 20% speedup may be possible when using compression.

Optimized Filters

Advantage Optimized Filters (AOFs) provide industry-leading database filtering optimization. AOFs speed table filter and 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.

High-Speed Locking

Advantage Database Server uses an intelligent lock management system that eliminates lock retries and network traffic. Advantage 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.

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, Advantage will open or create the file for the application regardless of the user's network access rights. Advantage 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 database access.

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, columns, 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 user access to individual tables, views, or stored procedures are also verified to make sure that proper rights have been granted. Individual user's access to the tables, columns, 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 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. Advantage encryption engine incorporates a 160-bit, RC4-compatible encryption algorithm that ensures data is secure as it goes over the network.

Triggers

A trigger is a piece of code (similar to a stored procedure) that is executed on the server in response to an insert, update, or delete operation. Triggers can provide a very powerful means to maintain business rules at the database level and are independent of the client application. Due to this independence, triggers are excellent for enforcing complex security authorizations and for providing transparent and independent event logging and auditing.

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. 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 user performing the transaction. The other users 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 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.

Replication

Advantage Replication provides the capability to automatically distribute data changes from one database to another allowing Advantage Database Server to easily maintain identical database information at different locations. The source tables to be replicated and the target database(s) are easily specified and no changes are necessary for applications currently using Advantage data dictionaries. Advantage Replication can be easily added to any Advantage Database Server 8.0 or greater as separately licensed functionality.

ONLINE BACKUP

Online backup capabilities allow Advantage Database Server users the ability to keep multiple copies of database files on different servers and at different physical locations. Advantage backup functionality provides a logically and physically consistent backup even if users are actively modifying the database during the backup. Advantage backup functionality includes full backups and differential backups.

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 database access. Advantage clients can automatically determine if the Advantage Database Server is available directly or via the Advantage Internet Server, or whether the Advantage Local Server must be used. 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 and Management Tools

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

Development:

- Visual SQL debugger. Debug SQL scripts, triggers, stored procedures and user defined functions
- Import and convert other table types (such as Paradox, dBASE, Access, Btrieve, Pervasive and MS 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, test and optimize Advantage SQL queries using a visual query designer and SQL execution plan
- 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
- Compare data dictionaries via the dictionary differentiation tool
- Monitor SQL statement performance as they execute

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 and Delphi for .NET, Borland C++Builder,Microsoft Visual Basic, Microsoft Visual FoxPro, Microsoft Access,Microsoft Visual Studio.Net, Borland C# Builder, Borland JBuilder, Sun ONE Studio, IBM Visual Age for Java, Perl, PHP, CA-Clipper, Visual Objects and many other database development environments.

SPECIFICATIONS

Server Operating System

Novell NetWare 5.x or greater (IP, IPX)
Microsoft Windows x86 (IP, IPX)
Microsoft Windows x86_64 (IP)
Linux x86, x86_64 (IP)

Client Operating Systems

Microsoft Windows
Linux
Any operating system that supports the Java Runtime Environment 1.3 or greate

DEVELOPMENT ENVIRONMENTS

- Borland Delphi (via native TDataSet descendant components, OLE DB Provider for ADO, ODBC Driver, or API)
- C++Builder (via native components, OLE DB Provider for ADO, ODBC Driver, or API)
- Visual Studio.NET (via .NET Data Provider)
- Borland Delphi for .NET (via .NET Data Provider or native TDataSet descendant components)
- JBuilder (via JDBC)
- Sun ONE Studio (via JDBC)
- Visual Age for Java (via JDBC)
- Visual Basic (via OLE DB Provider for ADO, ODBC Driver, or API)
- Access (via OLE DB Provider for ADO, ODBC Driver, or API)
- Visual C++ (via OLE DB Provider for ADO, ODBC Driver, or API)
- Visual FoxPro (via OLE DB Provider for ADO, ODBC Driver, or API)
- Perl (via DBI driver)
- PHP (via PHP Extension)
- Visual Objects (via RDD, OLE DB Provider for ADO, ODBC Driver, or API)
- CA-Clipper (via RDD)
- any development environment that can access ADO/OLE DB, ADO.NET, an ODBC driver, a JDBC driver, or can make a call into a Windows DLL or Linux shared object (via API)

SQL Language Support

support for most of the ANSI SQL-92 standard

ANSI PSM 2003 scripting support

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)

Visual FoxPro-compatible (DBF tables, CDX index files, FPT memo files)

Licensing

Windows

Per server with maximum number of concurrent users (workstations): 1, 2, 5, 10, 15, 20, 25, 50, 100, 250, and unlimited-user servers available

NetWare and Linux

Per server with maximum number of concurrent users (workstations): 2, 5, 10, 15, 20, 25, 50, 100, 250, and unlimited-user servers available

Internet

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

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