

# **ADABAS D**

## **The Relational Database System**

### **What does ADABAS D offer?**

ADABAS D provides you with a professional database system which fully implements the relational model - including support for domains, primary keys, updatable join views, referential integrity, triggers and database procedures.

By combining ease of administration with high performance, ADABAS D is an ideal database system for business-critical applications in client-server environments. In fact, the outstanding features of ADABAS D prompted SAP AG to offer this system as one of only very few selected for SAP AG's R/3 commercial application system. Moreover, many other software houses offer a wide range of standard and industry-specific solutions based on ADABAS D.

ADABAS D is a fully portable solution, capable of working on many types of PC and server platforms. As an open system, ADABAS D can be used not only in conjunction with the event-driven 4GL development environment offered under NATURAL ND from SOFTWARE AG, but also with many other third-party tools. Furthermore, the ADABAS D database system offers PC developers and users complete integration with standard Windows tools by providing efficient mechanisms for the transfer of data between applications and a powerful ODBC driver.

### **Scalability and high performance**

ADABAS D's multi-threaded/multi-server architecture ensures high performance on both single-processor and multi-processor systems. Asynchronous logging and group commits guarantee that only those write operations are performed which are absolutely necessary. ADABAS D provides row-level locking, enabling the maximum possible degree of parallel database access. The ADABAS D optimizer is cost-based and employs statistics on value distribution within the database in order to select the best possible access strategy.

### **Optimization of storage space**

By compressing data and by the efficient use of available disk space, ADABAS D drastically reduces data storage requirements, and avoids the tendencies of many other database systems to take up excessive disk space. Furthermore, ADABAS D does without reorganization - tables and indexes grow and contract dynamically without the need for the prior allocation of disk space, as is usual with other databases. Dynamic management of storage space in this way guarantees a consistently high level of performance over the entire service life of any database implemented using ADABAS D.

## 24-hour availability

ADABAS D can be operated around the clock, day in, day out - without interruption. Data record backups, alterations to catalogue objects and adjustment of configurations can all be made while the system is up and running. In other words, the database can be operated without downtime and without the need for continuous operator presence.

## Fault tolerance

ADABAS D is tolerant of hardware faults and includes software which supports the concept of mirrored disks. If a computer should fail within a distributed environment, it is possible for a second computer to keep the system operational by using replicated data.

## Ease of use

ADABAS D has been designed for ease of use, including a configuration process which requires the setting of just very few parameters. Furthermore, ADABAS D is equipped with integrated tools geared to the needs of the database administrator (DBA), experienced users and of end users unfamiliar with SQL.

## Distributed databases

In client-server configurations, ADABAS D can be used either as the central database or it can be distributed across several nodes and a variety of operating systems. In this way, it is possible to distribute ADABAS D databases within a LAN to create a powerful virtual database server. A distributed database can even be used for organizations spanning several geographical locations. For applications and users, the distributed database is transparent, behaving as if it were a central database. Transparency is achieved by a number of functions, such as two-phase commit protocol for distributed transactions, global optimization and hardware- and operating system-independence. Even when implemented as a distributed database, ADABAS D supports complex functions such as referential integrity and updatable join views.

## Synchronized replicas and snapshots

ADABAS D enables replicas of a table to be held in all the local ADABAS D databases of a distributed database. This allows greater local access, reduces the amount of network communications traffic and increases availability. ADABAS D automatically synchronizes the various local replicas. ADABAS D also enables snapshots of data records residing in one database to be held in others. Snapshots are particularly useful for applications designed to support decision-making, and requiring up-to-the-day rather than up-to-the-minute data. Snapshot updates can be period-driven, for instance taking place every night.

## ADABAS D - the chameleon of databases

Despite attempts to standardize SQL, for instance by means of ISO SQL-92, the range of SQL dialects employed by today's databases varies considerably.

ADABAS D supports a remarkable variety of SQL dialects. In other words, existing applications written for a different SQL system can be employed under ADABAS D without having to modify code, simply by the selection of the appropriate SQL mode. As a result, ADABAS D allows the development and implementation of applications in accordance with the most appropriate SQL dialect.

### **ADABAS D**

This is the most powerful of SQL modes, offering a level of functionality which goes beyond that of other SQL systems. For the user, this means maximum productivity combined with optimum performance.

### **ANSI**

This is for users who need the greatest possible portability for their applications; this mode can be employed to restrict SQL mode to ANSI/ISO SQL. It is an option of particular interest to software houses providing solutions for a variety of relational database systems.

### **ORACLE**

Oracle SQL provides compatibility for Oracle-specific SQL extensions and is therefore suitable for Oracle-based application solutions. These can be ported quickly and easily to ADABAS D by precompiling application source code.

### **DB2**

As the name suggests, this SQL mode offers compatibility with DB2. It is designed for users who have decided in favor of DB2 on MVS and who wish to implement a DB2-consistent database strategy within a client-server environment.

## **Controlled access**

ADABAS D provides a comprehensive access authorization concept, featuring four functional user categories and column-oriented access rights. An individual view of data records can be created for each user, ensuring that data is shielded against unauthorized access and manipulation.

## SQL extensions

### **Database procedures and triggers**

ADABAS D database procedures consist of SQL statements and procedural code which are stored together in the database. They are held in compiled format and can be jointly employed by several users. Precompilation and the reduction in network interaction mean a considerable boost to performance. The procedures can be automatically initiated via triggers upon the execution of specific SQL operations. This allows the establishment of complex integrity rules, comprehensive access controls and implied database modifications.

### **LONG columns (BLOBs)**

To facilitate the writing of applications designed to store large amounts of unformatted data (text, graphics, voice recordings, images, etc.), ADABAS D includes the LONG data type.

### **Declarative referential integrity**

ADABAS D ensures data integrity by means of powerful declarative rules and options.

### **Domain integrity**

ADABAS D not only supports table definitions but also the use of domain definitions, which ensure uniform and consistent modelling of data. Domains also allow the definition of integrity conditions on the data element level.

### **Array statements**

In order to improve performance in client-server configurations, ADABAS D supports the use of arrays as host variables. As a result, each SQL statement is able to process several table rows at once, reducing the amount of interaction between client and server.

### **Temporary tables**

ADABAS D allows the definition of temporary tables. With temporary tables, there is no need for catalogue administration, and logging can (optionally) be dropped as well; these tables are simply deleted automatically at the end of a session.

### **Subtransactions**

ADABAS D supports subtransactions for the control of transactions for database procedures and triggers. These can also be employed for accessing libraries with SQL functions and also facilitate easy and effective error handling.

### **Isolation levels**

ADABAS D offers five different isolation levels which can be employed to set a higher or lower degree of read consistency, depending on the application.

### **Optimistic locking**

To simplify the programming of OLTP applications, ADABAS D provides optimistic locks. These allow the development of applications with maximum parallelism but without the need for repetitive and time-consuming read for update.

### **Updatable join views**

Unlike conventional SQL systems, ADABAS D allows modifying operations in join views. This represents a major step forward in terms of the view concept, making it possible to create complex application objects comprising several tables.

### **Outer joins**

The outer join allows rows to be included in the result table even where no corresponding rows exist in the table linked by the join.

### **Scrollable cursors**

ADABAS D goes beyond the limitations of FETCH statement logic (which runs through the SELECT result once sequentially), allowing the user to scroll smoothly forward and backward through results.

## **ADABAS D - the clients**

ADABAS D provides end users, application developers and database administrators with a wide range of easy-to-use client components. The functional advantages of database management by means of ADABAS D are particularly evident under Windows. Using a powerful ODBC driver, ADABAS D provides Windows clients with transparent SQL access to all standard Windows applications and development environments.

## **QUERY**

QUERY provides an interactive SQL database interface which can be employed for entering the full range of SQL statements. QUERY also includes an integrated report generator.

## **EASY**

EASY is a menu-driven tool designed to allow end users to issue queries to individual tables, and to maintain and generate tables within the database. Knowledge of SQL is not required because EASY can be operated intuitively using menus or function keys.

## **LOAD**

LOAD supports the loading and extraction of data records and information in catalogues. In addition, it plays an important role in the ADABAS D installation process and is used for porting entire databases between different operating system platforms and for the distribution of SQL applications.

## CONTROL

CONTROL is an easy-to-use database operating tool employed within ADABAS D for initialization, configuration, restarts and shutdowns, backup and recovery, and for monitoring and checking both operation and performance

## PRECOMPILERS

The ADABAS D precompilers enable SQL statements to be embedded in programming languages such as C/C++ and COBOL. During compilation, syntactic and semantic checks are performed and an easy-to-use tracing function helps to track down faults, so that efficient optimization of applications becomes much easier. Programming languages for which there is no precompiler can access ADABAS D via a call interface. This interface is defined in accordance with the ODBC standard.

## DOMAIN

DOMAIN is a Windows-based database administration tool. It provides information on the static and dynamic properties of database objects such as tables, indexes and synonyms and provides the full range of functionality supported by ADABAS D/DDDL (Data Definition Language) for the menu-driven generation of database objects. DOMAIN also acts as an extended dictionary for ADABAS D, allowing the storage of comments and cross-references.

## OfficePlus

OfficePlus provides Microsoft Office users with a platform for the quick and easy integration of Office products such as Word, Excel, Access and Visual Basic into their ADABAS D environment.