

Informix Programming Tools For the TI System 1000 Series

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Texas Instruments recently announced the release and support of the Informix* family of database products for the TI System 1000 series of computers. These products include:

Informix-4GL—a fourth-generation language for building database applications without having to program in third-generation languages such as C or COBOL. Informix-4GL greatly expands the programmer's capability to develop and maintain any database application.

Informix-SQL—a relational database based on the industry-standard SQL. It

is the flagship Informix product and includes an inquiry facility for accessing databases, forms, and report generators, and a user-menu interface for easy access to database information.

Informix-ESQL/C (Embedded SQL and Tools for C)—a programming tool that permits the use of SQL statements within a C-language program. With ESQL/C, the programmer's use of embedded SQL does not require any special calling or linkage conventions.

C-ISAM—a set of C-language subroutines that permit users to manipulate B-tree indexed sequential files.

These products provide TI users with their first database on the S1500, and offer a source migration path for SQL programs not only between Informix on the S1000 series, but between databases on different computers where industry-standard SQL is used.

Product descriptions

Informix provides users with a software development environment that is based on an open architecture. Multiple programs have access to file data via a common channel. This architecture provides an integrated solution to data management problems. It also provides an enhancement path for Informix that permits upgrading or enhancing front-ends without impacting the back-end. The Informix architecture is depicted in Figure 1. In this diagram, the SQL Database Agent is the back-end and includes C-ISAM support as well as a query optimizer for efficient operation. All other parts of the Informix architecture are classified as front-ends.

All Informix front-ends and over 500 independent vendor packages talk to the database back-end in the same fashion. This means that diverse applications written in SQL, 4GL, or C can all share the same data. At the lowest level of file access is the Informix C-ISAM indexed

record handler. This "common denominator" is at the heart of Informix file management, and the use of C-ISAM within other TI products makes database files accessible to programs written in other languages.

C-ISAM: Indexed sequential-access method

C-ISAM, the heart of all Informix products, is the ISAM access method used in the database back-end. The back-end is the database equivalent of a run-time package. Using C-ISAM in these "run-times" gives users commonality of data between Informix products as well as between other products that use the C-ISAM access method.

C-ISAM is a library of C-language functions for creating and manipulating indexed files. An index allows the user to quickly find a specific record in a very large file, and to define an order for sequential processing of the file. C-ISAM provides locking, audit trail, and transaction processing capabilities plus efficient data storage and manipulation. Application programs written in languages such as C can be linked with C-ISAM to gain access to C-ISAM key-indexed files. An Informix database file can also be accessed in this way but it is more desirable, and certainly easier, to use Informix-SQL to navigate around in a database.

Informix-SQL

Informix-SQL is a database management system (DBMS). The DBMS is a record-keeping system consisting of programs that perform data management tasks. The primary functions are to organize, store, and retrieve information. A DBMS can also summarize, group, and format information in ways that significantly enhance the information's value. Informix-SQL should be considered a productivity tool rather than just a database. It has 38 commands that permit a user to create, delete, and modify databases. Access to these commands is avail-

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able through an easy-to-use hierarchical menu system.

Informix-SQL includes the following tools, which are designed for application building:

- User Menus—when Informix-SQL is executed, the main menu is displayed.

Through this menu, access to the Informix development tools is made possible for non-programmers.

- Perform—builds custom screens and menus
- Ace Report Writer—produces custom formatted reports

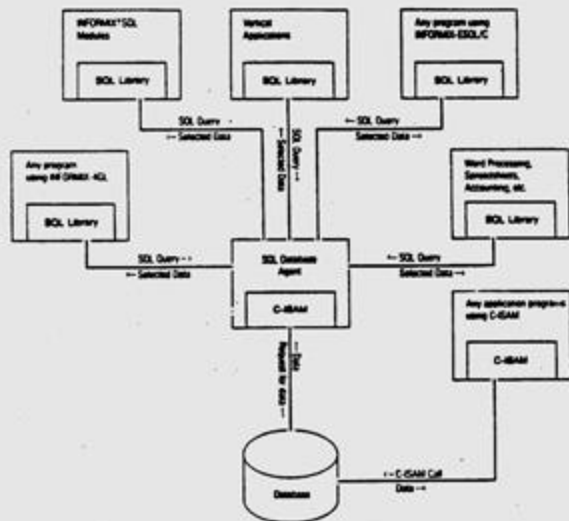


Figure 1. Informix Software dual-process architecture.

- RDSQL—the industry-standard query language. Provides complete database manipulation using English-like query statements.

Informix-SQL is also a "relational" database management system. Two other database technologies and their characteristic(s) are:

- Hierarchical—a tree structure with strict relationships. There is never more than one relationship between two record types. It is a simple data model with few commands and (usually) fast response to queries. Its structure makes inserts/deletes complex and requires null records to support the structure after a delete.
- Networking—the network DBMS tends to model more real-world application requirements. The relationships are not as restricted as in the hierarchical structure, and navigating the database is more general. This type provides improved performance over the hierarchical type because the access paths are well defined.

The relational model means that relationships between data—or information—can be created by joining the information found in different data tables of a database. This single, most important aspect of the relational

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technology means that information in the database need not be duplicated, and that relationships between data entities can be created at the time of query rather than at the time of creation. This designed-in ability to collect disjointed information is a major differentiator of the relational technology. It is a power tool not found in other database technologies.

Informix-4GL

Informix-4GL is a complete data processing language with a specific focus. It was designed as a development tool for the creation of powerful database applications. It provides 76 statements that permit users to develop relational database application programs and management systems. Program development includes a series of menus that guide the programmer through each step of the development process. Although Informix-4GL is a complete data processing language, an interface to the C language is provided for program requirements that the syntax cannot easily do (such as "cosine"). It also permits the use of in-line query language (SQL) statements.

With 4GL the user can:

- Create custom menus, forms, and reports

- Collect input from screen forms
- Use SQL in-line to manipulate a database
- Provide query-by-example forms
- Trap function keys and control (event) keys
- Access debugging tools
- Call 4GL or C library functions.

Those who have written customized database applications in languages such as C, COBOL, Pascal, BASIC, or other third-generation languages, will find the switch to Informix-4GL a simple one. Its use greatly expands the programmer's capability to develop and maintain any database application. Using Informix-4GL is the easiest way to develop a customized database application.

Informix-ESQL/C

Informix-ESQL/C enables the programmer to use SQL statements in a C program to access Informix databases. Informix-ESQL/C has 36 commands that permit the programmer to create new databases and tables, add indexes, and select, delete, and insert information to update a database using Informix-SQL statements in a C-language program.

The ESQL/C package pre-compiles SQL statements to C language statements. After pre-processing is complete, the

resulting C program is compiled, linked, and ready for execution. The ability to embed SQL statements in C programs relieves the programmer from writing specific C code to perform database functions, which significantly reduces program development time.

Informix-ESQL/C is designed for the C programmer who wants to customize a database application or use C functions in PERFORM forms and ACE reports.

Informix-SQL and Informix-4GL will each be the subject of presentations at the TIMIX '87 Symposium.

About the authors:

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