

extend[®]8

Interoperability Suite

Acu4GL[®] | COBOL-to-RDBMS Interface



Want the power and flexibility of a relational database management system (RDBMS) such as Oracle[®], Microsoft[®] SQL Server, or DB2[®], but you don't want to abandon your investment in COBOL? Acucorp has the solution for you—a seamless COBOL-to-RDBMS bridge known as Acu4GL. Prefer to access an ODBC data source such as Microsoft Access? Acu4GL can help there, too. Wherever your data, in whatever form it resides, rest assured you can access it from ACUCOBOL-GT[®].

EXECUTIVE OVERVIEW

Acu4GL is a patented interface technology designed to bridge the worlds of third-generation COBOL and fourth-generation Structured Query Language (SQL). There are six Acu4GL interfaces in all:

- Acu4GL for Oracle
- Acu4GL for Microsoft SQL Server
- Acu4GL for DB2
- Acu4GL for Sybase
- Acu4GL for Informix
- Acu4GL for ODBC

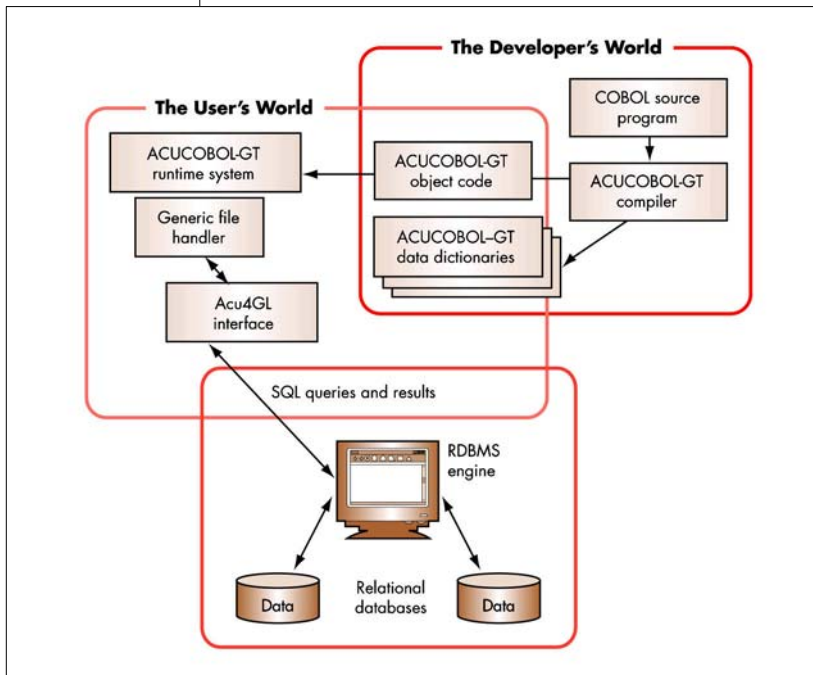
With an Acu4GL interface, you can benefit from relational database technology without learning SQL, rewriting your application or spending time and money retraining.

The Acu4GL technology provides:

- Transparent access from COBOL to data in relational databases or data sources that comply with the Open Database Connectivity (ODBC) standard
- Automatic translation of COBOL I/O statements into SQL or ODBC instructions that the database understands
- The ability to combine the power of a native database engine with the reliability of COBOL

With Acu4GL for ODBC, ACUCOBOL-GT users can access data in multiple data sources, databases and file systems—all from a single interface.

The Acu4GL product line is part of Acucorp's **extend[®]8** family of solutions designed to help you access your corporate data in whatever form it exists.



The Acu4GL Environment Acu4GL gives COBOL users transparent access to data in your RDBMS.

ACU4GL VERSION 8 HIGHLIGHTS

Transparent Data Access

With Acu4GL, database access is automatic and transparent to the end user. As the ACUCOBOL-GT runtime module executes your COBOL application in the foreground, Acu4GL runs behind the scenes to match up the requirements of COBOL and the RDBMS. The translation between COBOL and SQL is transparent even to the COBOL programmer.

Automatic Data Mapping

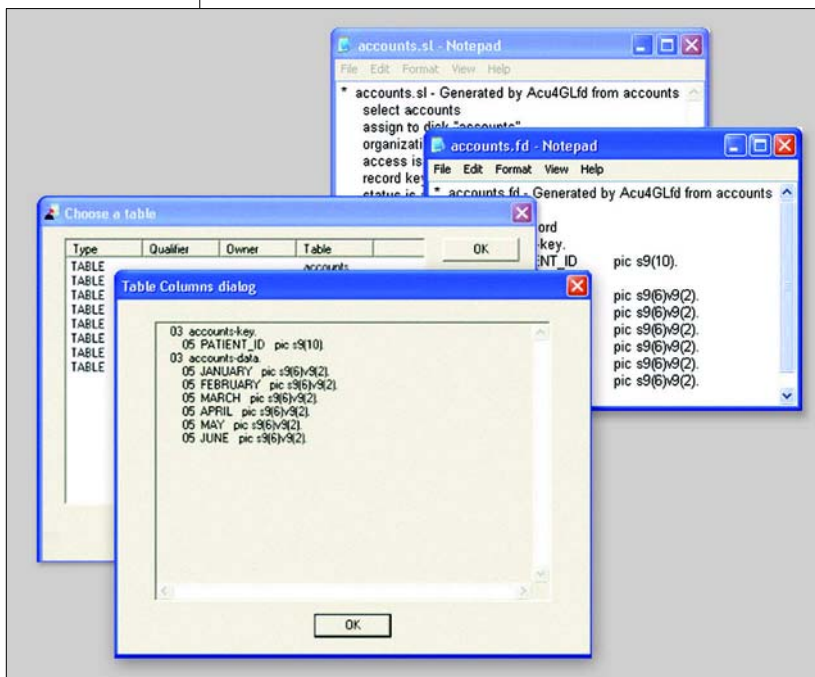
Acu4GL uses data dictionaries to map COBOL data items to database fields. These dictionaries are also called eXtended File Descriptors (XFDs) because they're based on standard COBOL file descriptors (FDs). To generate XFDs, you specify the "-Fx" option when you compile your COBOL program. The ACUCOBOL-GT compiler then generates an XFD for every indexed data file in your program.

Insulation from SQL and Database Rules

Because Acu4GL handles all translation for you, there is no need for you or your development staff to know SQL or to understand the unique language requirements of your database. You do not have to enforce database rules either. Acu4GL utilizes the full power of the database engine for this. Any violations are returned to the COBOL program as I/O error conditions. If new constraints are added or changes made to the database structure, you do not have to recode your COBOL application. You don't even have to recode to change databases. You just use the appropriate Acu4GL interface.

Control Over Database Structure

For those who want control over how the database table is built, Acu4GL supports the use of directives. Directives are special comments that you place into an FD in your COBOL source code to guide the building of the data dictionaries, which in turn guide the building of the database table. You can specify column names, assign columns the DATE type, map elementary items of a group together, and more. Because directives are placed into your code as comments, they do not affect the functionality of your application in a non-database environment.



Graphical FD Utility for Windows Acu4GL includes a graphical utility for creating COBOL FDs and SELECT statements from ODBC data source tables.

Direct Access to SQL Commands

Though Acu4GL is designed to handle SQL transparently, it also provides a means to issue SQL commands directly using a utility program called **sql.acu**. You can call this program from COBOL or you can execute it from the command line. The **sql.acu** program is not designed to perform statements that return data such as the SELECT statement.

Flexible Configuration

There are several variables that can be set in your runtime configuration file to influence Acu4GL processing. Some are database-specific, but most apply to all databases. Using configuration variables, you can specify the location of your data files and XFDs, column case, Julian base date and more.

FD Creator

For ODBC-compliant data sources, Acu4GL includes a graphical utility that can help you analyze tables and create File Descriptors and SELECT

statements for your program. The utility, known as **acu4glfd**, generates an FD listing the names of the columns in a table and their associated data types and a SELECT statement for the file. You can COPY the FD and SELECT statement into your COBOL program and modify them as required for your purposes.

Internet Access

With Acu4GL, you can access data in your RDBMS over the Internet as well as a local or wide-area network. You define the file path using database client software—such as the Oracle client or DB2 Connect client. The ACUCOBOL-GT Web Runtime is also enabled for Acu4GL, giving your users the ability to invoke your COBOL program from a Web page and access your relational database transparently from any location in the world.

Performance

Although you do not have to modify your code to use Acu4GL, you may want to add or modify code to tune performance. For instance, you might use a WHERE constraint to specify boundaries on queries that are generated or additional SELECT criteria to shift more of the data processing onto the database server. This is often the most effective way to speed table searches.

To optimize performance, you may want to restructure data, or you may want certain files to remain in Acucorp's Vision file system. Processing speed is fastest with Vision. Alternatively, you may want to embed SQL for batch or record-level processing. (Acucorp offers an ESQL precompiler and connects to industry-standard ESQL precompilers as well.) We recommend the use of a database administrator for performance tuning and configuration management.

ACU4GL VERSION 8 FEATURES AND BENEFITS

| FEATURE | BENEFIT |
|---------|---------|
|---------|---------|

General Acu4GL Features

The following features are common across the Acu4GL product line.

General

Native database usage The interfaces in the Acu4GL product line access the database through its native “engine” and communicate with the engine using standard SQL. Acu4GL for ODBC communicates with the ODBC driver, allowing for access to ODBC-compliant data sources. This ensures that all database rules and standards are enforced and that the full relational integrity of the database is maintained.

VIEW support Because Acu4GL communicates in standard SQL, many of the more advanced features of relational databases, such as VIEWS, are accessible. A VIEW is a “logical record” that you define in your database system. It is a subset of one or more database tables. This facilitates program conversion and simplifies future changes to databases. It also lets you control user access to sensitive data.

Flexibility

Bi-directional table searches Acu4GL supports bi-directional table reads (READ PREVIOUS). All START and READ operations are supported for primary keys, alternate keys, and alternates allowing duplicates. This allows users to move easily through data in both forward and backward searches.

Automatic table structuring Acu4GL automatically sets up the database structure to create new database tables. For existing databases, flexible file descriptors match COBOL data items to existing database columns. This enables flexible access to all types of data.

WHERE constraint Acu4GL lets COBOL developers specify selection criteria in data requests. These criteria are added to the WHERE clause of the SQL queries generated by the Acu4GL interface. This provides boundaries to queries being generated and optimizes the working set of data that satisfies each query. It also allows you to shift more of the data processing onto the database server.

Unlimited XFD key columns Acu4GL doesn't limit the number of key columns it parses from XFD files. This allows your applications to access data from files with any number of key columns. (Please note that the target database may limit the number of columns in an index.)

Support for single- and mixed-case identifiers Some databases support tables with names that don't comply with SQL-92 standards by allowing mixed-case identifiers. For these databases, Acu4GL also supports mixed-case identifiers, so end users are able to access these tables.

File and directory mapping With configuration variables, you can map directory specifications to databases and file names to table names. This enables users to have files of the same name, which would normally go into separate directories, as separate names in a single database.

Security

User login All interfaces in the Acu4GL product line provide login and password validation for users via configuration variables. With Acu4GL for ODBC, this information is optional. This ensures that only authorized users gain access to the data source.

Password protection

Acu4GL lets you set the password assigned to the database account associated with the user name. This ensures that only authorized users gain access to the data source.

Record locking

Acu4GL provides methods of record locking for use when multiple users are accessing data. This ensures data integrity and provides flexibility.

Acu4GL for Oracle

Acu4GL for Oracle provides the following additional features.

Performance

Cursor caching

Acu4GL for Oracle makes use of cursor caching to process Oracle RDBMS data efficiently. A cursor is a prepared query, saved in a parameterized format. When a like function is to be performed on a different record (such as a READ NEXT), Acu4GL can perform the task by executing the saved query with new parameters. This improves performance by eliminating the need to regenerate the query.

Transaction Management Support

Transaction logging facility

With Acu4GL for Oracle, all file operations that are part of a transaction are logged. This provides a tracking mechanism in case of transaction failure.

Customizable transaction logging variables

Acu4GL for Oracle provides semi-automated ways to handle transaction logging based on the setting of environment variables. This lets users choose the best logging method for their situation.

COMMIT/ROLLBACK support

Once transactions are logged, they can either be committed or rolled back (undone) by the program. If a program or system fails, the database's management tools can be used to reconstruct complete transactions. This protects transaction data from being lost.

Security

Database privileges honored

Acu4GL for Oracle honors privileges implemented in the Oracle RDBMS. Unless you have DBA privileges, or special privileges provided by Oracle, you can't delete a table you don't own or create a table under another user's name. This protects data from unauthorized access.

Troubleshooting

Error mapping

With Acu4GL for Oracle, you can use a text file to map database-specific errors to COBOL errors. This simplifies troubleshooting and provides more intuitive error handling.

Configuration Options

Binary sort order

Configuration variables let you specify a binary sort order for returned records, rather than the default native language sort order.

Variable-length character fields

Configuration variables let you include or leave out spaces in fields that pass to variable-length fields. This allows your applications to interact with international databases.

Acu4GL for Microsoft SQL Server and Acu4GL for Sybase

Both Acu4GL for Microsoft SQL Server and Acu4GL for Sybase provide the following additional features.

Performance

- Fast access option** Acu4GL for Microsoft SQL Server and Acu4GL for Sybase provide a way to optimize certain files for forward sequential access. This improves response time of READ NEXT operations.
- Configurable data access functions** To optimize performance, Acu4GL for Microsoft SQL Server and Acu4GL for Sybase provide the ability to configure certain data access functions. For instance, you can disable locking, keep database connections open, adjust the size of network packets, disable update validation, specify row counts for SELECT statements, and more. This lets you fine-tune performance based on custom requirements.
- Stored procedures** Acu4GL for Microsoft SQL Server and Acu4GL for Sybase allow you to create a set of ACUCOBOL-GT stored procedures for accessing database tables. You can create procedures for inserting, deleting, reading, and updating records as well as starting a file. Acu4GL checks for stored procedures whenever it opens a database file. This enables the end user to improve performance by using stored procedures for common I/O requests.

General

- Subordinate tables** Acu4GL for Microsoft SQL Server and Acu4GL for Sybase offer the SECONDARY TABLE directive, which can be used to indicate that the next data item may be placed into a subordinate table, if more than one table is necessary to accommodate the data. Up to 26 subordinate tables can be created from a single record description. This helps when the data to be stored exceeds the capacity of a single table.

Flexibility

- Customizable cursor declaration** Acu4GL for Microsoft SQL Server and Acu4GL for Sybase provide three configuration variables for customizing the declaration of cursors. The values of these variables are placed verbatim into the DECLARE phrase when a cursor is built. This allows you to fine-tune cursor declarations for different situations or database versions.
- Configurable number of columns** Acu4GL for Microsoft SQL Server and Acu4GL for Sybase let you specify the maximum number of columns allowed per table. They adhere to the limits specified by their respective databases, but developers can place a specific upper bound if desired. This adds flexibility.
- Configurable row length** Acu4GL for Microsoft SQL Server and Acu4GL for Sybase let you specify the maximum number of bytes allowed per table row. They adhere to the limits specified by their respective databases, but developers can place a specific upper bound if desired. This adds flexibility.
- Drop-down query support** Acu4GL for Microsoft SQL Server and Acu4GL for Sybase can inform the database when a SELECT statement is of the drop-down variety instead of a single large query. This provides flexibility in the type of query you can send the database.

Acu4GL for DB2

Acu4GL for DB2 provides the following additional features.

Transaction Management Support

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| Transaction logging facility | With Acu4GL for DB2, all file operations that are part of a transaction are logged. This provides a tracking mechanism in case of transaction failure. |
| Customizable transaction logging variables | Acu4GL for DB2 provides semi-automated ways to handle transaction logging based on the setting of environment variables. This lets users choose the best logging method for their situation. |
| COMMIT/ROLLBACK support | Once transactions are logged, they can either be committed or rolled back (undone) by the program. If a program or system fails, the database's management tools can be used to reconstruct complete transactions. This protects transaction data from being lost. |
| Commit flexibility | You can indicate the conditions under which you want to issue a commit. Such as when the number of record locks = zero, or the number of WRITE, REWRITE, and DELETE operations reaches a certain number. You can also specify whether to issue commits anytime or only if the runtime is not currently in a transaction. |

Troubleshooting

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|----------------------|---|
| Error mapping | With Acu4GL for DB2, you can use a text file to map database-specific errors to COBOL errors. This simplifies troubleshooting and provides more intuitive error handling. |
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Acu4GL for Informix

Acu4GL for Informix provides the following additional features.

Performance

- | | |
|-----------------------------------|--|
| Cursor caching | Acu4GL for Informix makes use of cursor caching to process Informix RDBMS data efficiently. A cursor is a prepared query, saved in a parameterized format. When a like function is to be performed on a different record (such as a READ NEXT), Acu4GL can perform the task by executing the saved query with new parameters. This improves performance by eliminating the need to regenerate the query. |
| Customizable cursor limits | Acu4GL for Informix lets you specify the number of cursors available to your application by setting a configuration variable, MAX_CURSORS. This lets you optimize application workload and response time. |

Transaction Management Support

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|-------------------------------------|--|
| Transaction logging facility | With Acu4GL for Informix, all file operations that are part of a transaction are logged. This provides a tracking mechanism in case of transaction failure. |
| COMMIT/ROLLBACK support | Once transactions are logged, they can either be committed or rolled back (undone) by the program. If a program or system fails, the database's management tools can be used to reconstruct complete transactions. This protects transaction data from being lost. |

Troubleshooting

Error mapping

With Acu4GL for Informix, you can use a text file to map database-specific errors to COBOL errors. This simplifies troubleshooting and provides more intuitive error handling.

Acu4GL for ODBC

Acu4GL for ODBC provides the following additional features.

Flexibility

Multiple database support

Acu4GL for ODBC is designed to work with any ODBC-compliant data source whose driver supports core ODBC driver functions and the level 1 functions SQLColumns and SQLTables. This allows users to access data in many different data sources.

Local or remote data access architectures

Acu4GL for ODBC can be used for local data access (front-end application communicating with local database) or remote data access (front-end application communicating over a network with remote databases). This allows you to place your data where it makes the most sense.

Transaction Processing Support

Transaction logging facility

With Acu4GL for ODBC, all file operations that are part of a transaction are logged. This provides a tracking mechanism in case of transaction failure.

Customizable transaction logging variables

Acu4GL provides semi-automated ways to handle transaction logging based on the setting of environment variables. This lets users choose the best logging method for their situation.

Transaction support

Acu4GL for ODBC provides a configuration variable to ensure that one transaction ends before a new one begins. If a program or system fails, the database's management tools can be used to reconstruct complete transactions. This protects data from corruption during a transaction.

Commit flexibility

You can indicate the conditions under which you want to issue a commit. Such as when the number of record locks = zero, or the number of WRITE, REWRITE, and DELETE operations reaches a certain number. You can also specify whether to issue commits anytime or only if the runtime is not currently in a transaction.

Troubleshooting

Error mapping

With Acu4GL for ODBC, you can use a text file to map database-specific errors to COBOL errors. This simplifies troubleshooting and provides more intuitive error handling. Individual error maps can be provided for different data source drivers giving you maximum flexibility in working with multiple data sources.

SYSTEM REQUIREMENTS

The system requirements are different for each Acu4GL product. To discuss the system requirements for your site, and for additional information, contact an Acucorp Sales Professional at the office nearest you.

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Acucorp offers a wide variety of consulting and training assistance as part of our business solutions. Technical experience in analysis, development and project management is available to provide the level of support your business requires.

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