

Embedded SQL

Embedded SQL is a method of combining the computing power of a programming language and the database manipulation capabilities of SQL. Embedded SQL statements are SQL statements written inline with the program source code of the host language. The embedded SQL statements are **parsed** by an embedded SQL **preprocessor** and replaced by host-language **calls** to a code library. The output from the preprocessor is then compiled by the host **compiler**. This allows programmers to embed SQL statements in programs written in any number of languages such as **C/C++**, **COBOL** and **Fortran**.

The SQL standards committee defined the embedded SQL standard in two steps: a formalism called **Module Language** was defined, then the embedded SQL standard was derived from Module Language.^[1] The SQL standard defines embedding of SQL as *embedded SQL* and the language in which SQL queries are embedded is referred to as the *host language*. A popular host language is C. The mixed C and embedded SQL is called **Pro*C** in Oracle and Sybase database management systems. In the PostgreSQL database management system this pre-compiler is called ECPG. Other embedded SQL pre-compilers are **Pro*Ada**, **Pro*COBOL**, **Pro*FORTRAN**, **Pro*Pascal**, and **Pro*PL/I**.

1 Systems that support Embedded SQL

1.1 IBM DB2

IBM DB2 version 9 for Linux, UNIX and Windows supports embedded SQL for C, C++, Java, COBOL, FORTRAN and REXX although support for FORTRAN and REXX has been deprecated.^[2]

1.2 SAP Sybase

SAP Sybase ASE 15.7 supports Embedded SQL for C and COBOL as part of the Software Developer Kit Sybase.^[3]

SAP Sybase SQL Anywhere supports Embedded SQL for C and C++ as part of the SQL Anywhere database management system *SQL Anywhere*.^[4]

SAP Sybase IQ supports Embedded SQL for C and C++ as part of the Sybase IQ database management system

Sybase IQ.^[5]

1.3 Oracle Corporation

Ada Pro*Ada was officially desupported by Oracle in version 7.3. Starting with Oracle8, Pro*Ada has been replaced by SQL*Module but appears to have not been updated since.^[6] SQL*Module is a module language that offers a different programming method from embedded SQL. SQL*Module supports the Ada83 language standard for Ada.

C/C++ Pro*C became Pro*C/C++ with Oracle8. Pro*C/C++ is currently supported as of Oracle Database 11g.

COBOL Pro*COBOL is currently supported as of Oracle Database 11g.

Fortran Pro*FORTRAN is no longer updated as of Oracle8 but Oracle will continue to issue patch releases as bugs are reported and corrected.^[7]

Pascal Pro*Pascal was not released with Oracle8.^[7]

PL/I Pro*PL/I was not released with Oracle8. The *Pro*PL/I Supplement to the Oracle Precompilers Guide*, however, continued to make appearances in the Oracle Documentation Library until release 11g. As of release 12c, the Pro*PL/I has been removed from the Oracle Documentation Library.^[7]

1.4 PostgreSQL

C/C++ ECPG is part of PostgreSQL since version 6.3.

COBOL Cobol-IT is now distributing a COBOL pre-compiler for PostgreSQL

1.5 Altibase

C/C++ APRE is an embedded SQL precompiler provided by Altibase Corp. for its DBMS server.

1.6 Data Access Corporation

With DataFlex 3.2 and Visual DataFlex you can pass SQL statements via one of the Data Access CLI connectivity kits to Microsoft SQL Server, IBM DB2 or any ODBC supporting database. The results can be retrieved and processed.

1.7 Microsoft SQL Server

COBOL Cobol-IT is distributing a Embedded SQL pre-compiler for COBOL.

1.8 MySQL

COBOL Cobol-IT is distributing a Embedded SQL pre-compiler for COBOL.

2 Systems that do not support Embedded SQL

2.1 Microsoft SQL Server

Embedded SQL for C has been deprecated as of Microsoft SQL Server 2008 although earlier versions of the product support it.^[8]

2.2 MySQL

MySQL does not support Embedded SQL.^[9]

3 Embedded SQL through domain-specific languages

- LINQ-to-SQL embeds a SQL-like language into .NET languages.
- JPA embeds a SQL-like language through Criteria API into Java.
- jOOQ embeds a SQL-like language into Java.

4 See also

- Language binding
- Pro*C/C++
- SQL/OLB

5 References

- [1] “The Module Language Concept”. *SQL*Module for Ada Programmer’s Guide, Release 8.0, Chapter 1. Introduction to SQL*Module*. Oracle Corporation. Retrieved 2008-07-14.
- [2] “DB2 Database for Linux, UNIX and Windows”. *Developing Embedded SQL Applications*. IBM. Retrieved 2009-04-10.

- [3] “EmbeddedSQL”. *SAP Sybase Products*. SAP Sybase. Retrieved 2012-09-05.
- [4] “SAP Sybase SQL Anywhere”. *SAP Sybase Products*. SAP Sybase. Retrieved 2013-05-02.
- [5] “SAP Sybase IQ”. *SAP Sybase Products*. SAP Sybase. Retrieved 2013-05-02.
- [6] “Ada Support in Version 8”. *Oracle9i Database Migration, Release 2 (9.2), Chapter 5. Compatibility and Interoperability*. Oracle Corporation. Retrieved 2008-07-14.
- [7] “Language Alternatives”. *Pro*COBOL Precompiler Programmer’s Guide, Release 8.0, Chapter 1. Introduction*. Oracle Corporation. Retrieved 2008-07-14.
- [8] “Deprecated Database Engine Features in SQL Server 2008”. *SQL Server 2008 Books Online (March 2009)*. Microsoft. Retrieved 2009-04-10.
- [9] “An Open Pre-Compiler for Embedded SQL”. *MySQL DevZone Articles*. Mysql. Retrieved 2009-04-10.

6 External links

- Introduction to Pro*C Embedded SQL
- Embedded SQL with Pro*C
- SQL*Module for Ada Programmer’s Guide, Release 8.0
- ECPG, PostgreSQL 8.3 Documentation

7 Text and image sources, contributors, and licenses

7.1 Text

- **Embedded SQL** *Source:* http://en.wikipedia.org/wiki/Embedded_SQL?oldid=666243724 *Contributors:* Docu, EagleOne, Mrzaius, Liao, MassGalactusUniversum, Yurik, Fred Bradstadt, Syced, FlaBot, Ysangkok, Bgwhite, HeavyStorm, Rwww, SmackBot, Elonka, CR-Greathouse, Krauss, Chiragjayswal, Taketarou~enwiki, Shamatt, TXiKiBoT, Addbot, GhettoBlaster, Luckas-bot, Meskes~enwiki, Informationanalyst, Shawn Y.H. Kim, Lukaseder, Satellizer, DhirendraNaik, DavOsk, E1328167 and Anonymous: 24

7.2 Images

7.3 Content license

- Creative Commons Attribution-Share Alike 3.0