ODBC and GemStone/S

Smalltalk Engineering Team, April 2008

Goal: Internal Education

- People periodically ask about:
  - Reporting tools (e.g., Crystal Reports)
  - Language lock-in (use from non-Smalltalk)
  - "Standard" database tools
- Not proposing a new project
  - We've done well so far without solving these problems
  - Other priorities exist
- Provide information on a possible approach

Agenda

- **What is ODBC?**
- Earlier Attempts
- Another Attempt
- Demo
- Code Review
- Conclusion

What is ODBC? (1)

- "Open Database Connectivity (ODBC) provides a standard software API method for using database management systems (DBMS). The designers of ODBC aimed to make it independent of programming languages, database systems, and operating systems."

  --http://en.wikipedia.org/wiki/Open_Database_Connectivity

What is ODBC? (2)

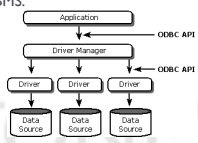
- "Open Database Connectivity (ODBC) is Microsoft's strategic interface for accessing data in a heterogeneous environment of relational and non-relational database management systems. Based on the Call Level Interface specification of the SQL Access Group, ODBC provides an open, vendor-neutral way of accessing data stored in a variety of proprietary personal computer, minicomputer, and mainframe databases.

  "ODBC alleviates the need for independent software vendors and corporate developers to learn multiple application programming interfaces. ODBC now provides a universal data access interface. With ODBC, application developers can allow an application to concurrently access, view, and modify data from multiple, diverse databases."

  --http://support.microsoft.com/kb/110093

ODBC Architecture - 1

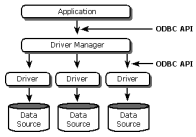
- The ODBC architecture has four components:
  - **Application.** Performs processing and calls ODBC functions to submit SQL statements and retrieve results.
  - **Driver Manager.** Loads and unloads drivers on behalf of an application. Processes ODBC function calls or passes them to a driver.
  - **Driver.** Processes ODBC function calls, submits SQL requests to a specific data source, and returns results to the application. If necessary, the driver modifies an application's request so that the request conforms to syntax supported by the associated DBMS.
  - **Data source.** Consists of the data the user wants to access and its associated operating system, DBMS, and network platform (if any) used to access the DBMS.



--ms-help://MS.MSDNQTR.v80.en/MS.MSDN.v80/MS.WIN32COM.v10.en/odbc/htm/odbcoverview_of_odbc_architecture.htm

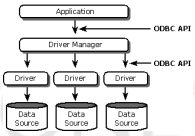
ODBC Architecture - 2

- Examples:
  - **Application:** Crystal Reports, Microsoft Access
  - **Driver Manager:** Provided by Microsoft Windows
  - **Driver:** Provided by database vendor
  - **Data source:** MySQL, PosgreSQL, SQL Server



ODBC Architecture - 3

- Driver developer provides:
  - Setup
    - Executable application to register components
    - Shared library with user interface to create data source
  - Driver
    - Shared library with exports of specified API to be called by Driver Manager and communicate with Data Source.



Appeal of ODBC

- Cross-platform
- Vendor-neutral
- Extensively supported by applications and databases
- Encapsulate (i.e., hide) "strangeness" of OODBMS

Earlier Attempts

- GemAccess for ODBC
  - Released April, 1997
  - Based on third-party framework
    - Parse SQL into "record" lookup
    - Custom code to get "records" from GemStone/S
  - Characterized by most as a "checkbox" feature
- Relational Backpointer Framework
  - Demo at Smalltalk Solutions 2001 (Chicago)
    - Developed by Lutheran Health Systems with GemStone consultants
  - Used parser to convert SQL to Smalltalk
  - Ended with "If only we had ODBC!"

Another Attempt

- What would it take to build an ODBC driver from scratch?
  - Stand-alone executable to register/install DLLs
  - Setup DLL with specified API and GUI
  - Driver DLL with specified API to call database

Prototype/Proof-of-Concept

- Provide specified Driver API
  - Pass as much as possible to GemStone/S
  - Let Smalltalk parse SQL
- Sample Applications
  - Display a single table in Microsoft Access
    - Today's demo
  - Provide backend database for Cincom's STORE
    - Well-defined subset of ODBC API actually used
    - Useful to Smalltalk shops that don't want to use RDBMS
    - Build mindshare around use of GemStone/S

Demo

- Setup Application – Install DLLs
  - Regedit view of registration database
  - Windows Explorer view of C:\Windows\System32
- Setup DLL – Create Data Source Name (DSN)
  - Invoked from Setup Application
  - Invoked from Windows ODBC Data Source Administrator
- Application – Connect to Database
  - Launch Microsoft Access
  - Create new "database" with linked table
  - Select Data Source Name (DSN)
  - Display rows in a table
- Setup Application – Remove DLLs

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Code Review

- Dolphin
  - Setup Application
  - Driver testing
- Visual Studio
  - Setup DLL
  - Driver DLL
- GemStone/S
  - ODBC_Globals

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- Not proposing a new project
  - We've done well so far without solving these problems
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- Provide information on a possible approach
  - Technical challenge of creating and calling a DLL can be solved