ODBC - Open Database Connectivity

E-Commerce & Security
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**What is ODBC?**

- **ODBC**
  - “Open Data Base Connectivity”
  - A standard software API specification for using database management systems (DBMS)
  - A component of Windows Open Services Architecture
  - Independent of any programming language, database system and operating system
Goal of ODBC

- Access any data from any application, regardless of which DBMS is handling the data
  - Insert a middle layer between an application and the database management system
    - A database driver
  - This layer translates the application's data queries into commands that the DBMS understands
- Allow application programs to use SQL to access data from any kinds of sources
ODBC Versions

- **Version 1.0 (1993)**
  - Only a few ODBC 1.0 applications and drivers still exist
  - Only on Windows

- **Version 2.x (1994)**
  - Level 1 and 2 conformance changes
  - Introduced some new data types

- **Version 3.0 (1995)**
  - Introduced many new APIs and ODBC descriptor handles
  - Completely backward compatible

- **Version 3.5x (1997)**
  - Introduced UNICODE
ODBC Components

- ODBC Application
- ODBC Driver
- ODBC Driver Manager
- ODBC Data Source
ODBC Components (1)

- **ODBC Application (Front-end client)**
  - Defines and performs the work to be accomplished
  - Requests and terminates a session with a data source
  - Calls API functions that submits SQL statements
  - Defines storage areas and data formats for the results
  - Processes errors and retrieves results

- **Any program that accesses a DBMS, such as a spreadsheet, a mail server, or a report generator, can be designed to use ODBC**
ODBC Components (2)

- **ODBC Driver (Back-end server)**
  - A dynamic link library (DLL)
  - Processes ODBC function calls
  - Establishes a connection to a data source
  - Submits SQL requests to a data source
  - Passes the results to the application
  - Transforms the application’s SQL syntax into the syntax expected by the driver’s associated DBMS
ODBC Components (3)

- **ODBC Driver Manager**
  - A dynamic link library (DLL)
  - The link between an ODBC application and an ODBC driver
  - Loads drivers on behalf of an application
  - Maps a data source name to a specific driver DLL

- **ODBC Data Source**
  - The data to be accessed
  - Also includes the associated operating system, DBMS, network platform, and the required protocol
ODBC Bridges & Gateways

- Provides an ODBC API at one end of the bridge/gateway and another API at the other end

- **ODBC-JDBC Bridges**
  - Consists of an ODBC driver which uses the services of a JDBC driver to connect to a database
  - Application <-> ODBC API <-> JDBC API <-> database

- **JDBC-ODBC Bridges**
  - Consists of a JDBC driver which employs an ODBC driver to connect to a database
  - Java application <-> JDBC <-> ODBC driver <-> database
Implementations

- **Runs on many operating systems**
  - E.g. MS Windows, Unix, Linux, OS/2, OS/400, IBM i5/OS, and Mac OS X

- **ODBC drivers for various databases**
  - E.g. Oracle, DB2, Microsoft SQL Server, Sybase, MySQL, Pervasive SQL, IBM Lotus Domino, FileMaker, MS Access, etc

- **Some important ODBC products**
  - Microsoft ODBC, iODBC (open source), UnixODBC, UDBC (cross-platform)
Example

- Some examples of ODBC in use
  - Access front-end accessing data from a Oracle back-end using Oracle ODBC Driver
    - *Shipped with Access 1.1*
  - Visual Basic front-end accessing data from a dBASE back-end using dBASE ODBC Driver
    - *Part of MS ODBC Database Drivers Pack*
  - C application written with C + ODBC SDK + Win SDK accessing data from an AS/400 using AS/400 ODBC Driver
    - *Available from Rochester Software*