Chapter 1
Introduction to the SAS Providers for OLE DB

About the SAS Providers for OLE DB: Cookbook

How the Cookbook Can Help You Write Applications

The *SAS Providers for OLE DB: Cookbook* provides programming recipes that are designed to jump-start your development efforts in these ways:

- by providing ready-to-use sample code

- by encouraging best practices

- by answering frequently asked questions

You can use the recipes directly or modify them to fit your needs.

Sample code for ADO is written in Visual Basic 6. Sample code for OLE DB is written in Visual C++.

Note: Unless otherwise noted, all of the recipes can be implemented by using either ADO or OLE DB. This statement is true even if the OLE DB method is not discussed in the recipe.

What You Should Know in Order to Use This Cookbook

The cookbook assumes that the following statements are true:

- You know how to program by using ADO.

- You are familiar with the OLE DB architecture and specifications.

- You know how to program in an object-oriented or object-based language such as Visual C++ and Visual Basic.

- You are familiar with the information in resources such as these:

- • Microsoft Corporation. 1998. *OLE DB Programmer's Reference and Data Access SDK*. Redmond, WA: Microsoft Press.

- • The Microsoft Developers Network (MSDN) Library.

- • Sussman, David, and Homer, Alex. 1999. *ADO 2.1 Programmer's Reference*. Chicago: Wrox Press Inc.

- • Wood, Chuck. 1999. OLE DB and ODBC Developer's Guide. Foster City, CA: IDG Books Worldwide.

- • Either you know how to start up the SAS server that you want to access or the server has been started for you.

About the SAS Providers for OLE DB

The SAS providers for OLE DB implement data access interfaces that conform to the OLE DB specification from Microsoft, which is built on the OLE Component Object Model (COM).

- • The SAS local provider supports access to Base SAS data sets that are stored on a Windows system. If you can find a Base SAS data set by using the Windows Explorer, then you can read it by using the SAS local provider. The local provider is available in 32-bit and 64-bit versions. On a Windows XP for x64 system, you can install both versions.

- • The SAS/SHARE provider supports access to Base SAS data sets and Scalable Performance Data (SPD) server data sets via a SAS/SHARE server, as well as third-party relational data sources (with licensed SAS/ACCESS engines).

- • The SAS IOM provider supports access to Base SAS and SPD Server data sets that are managed by SAS Workspace Servers, as well as third-party relational data sources (with licensed SAS/ACCESS engines).

- • The SAS OLAP provider implements the OLE DB for OLAP (ODBO) interface to enable access to cubes that are managed by SAS OLAP Servers.

- • The Base SAS provider supports access to Base SAS data sets available through a local installation of Base SAS, as well as third-party relational data sources (with licensed SAS/ACCESS engines). In this context, the Base SAS installation functions as a local, single-user server.

Data Sources and File Types Supported by the SAS Providers

The following table describes the different data sources and file types that are supported by the SAS providers.

Table 1.1 *Supported Data*

File Type/Data Source and Description	Local Provider	IOM Provider	OLAP Provider	SAS/SHARE Provider	Base SAS Provider
SAS data files Contain both the data and the descriptor information. SAS data files have a member type of DATA.	Yes	Yes	No	Yes	Yes
SAS data views A virtual data set that points to data from other sources. SAS data views have a member type of VIEW.	No	Yes	No	Yes	Yes
Temporary SAS data sets A data set that exists only for the duration of the current program or interactive SAS session. Temporary SAS data sets are not available for future SAS sessions.	No	Yes	No	Yes	Yes
SAS index An auxiliary file that is a summary of a SAS data set. Indexes are never accessed directly, but they can provide faster access to specific observations during SQL evaluation, particularly when your data set is large.	No	Yes	No	Yes	Yes
SAS audit and backup files Auxiliary files that are used to audit the changes made to a data file.	No	No (Changes to the base data set are logged.)	No	No (Changes to the base data set are logged.)	No (Changes to the base data set are logged.)
Interface files Files created by other programs, such as ORACLE, DB2, or Sybase. SAS uses special engines to read and write the data.	No	Yes	No	Yes	Yes
Generation data sets Historical copies of a SAS data set.	Yes, when using `libbname.memname #gennum` in a direct open.	Yes, when using `libname.memname #gennum` in a direct open. (Not valid in SQL statements.)	No	Yes, when using `libname.memname #gennum` in a direct open. (Not valid in SQL statements.)	Yes, when using `libname.memname #gennum` in a direct open. (Not valid in SQL statements.)

File Type/Data Source and Description	Local Provider	IOM Provider	OLAP Provider	SAS/SHARE Provider	Base SAS Provider
SAS OLAP cubes A logical set of data that is organized and structured in a hierarchical, multidimensional arrangement.	No	No	Yes	No	No

Note: For more information about SAS file types, see *SAS Language Reference: Concepts* and the *SAS Procedures Guide*.

For rectangular data sources, if you can launch SAS and access a file, then that file can be accessed by the SAS/SHARE and IOM providers with the proper server configuration.

In addition, if the file is a SAS data set created on one of the supported platforms and you can access the file from Windows Explorer, then that file can be accessed by the local provider. The platforms must be compatible with your PC platform in the following ways:

• They must use the same character set as the PC: ASCII.

• They must not require floating point conversion. PC floating point numbers are IEEE.

Note: When working with data sets that were created in a different environment, the local provider translates numeric values but not character values.

The following operating environments meet the local provider's cross-platform requirements and are supported:

• Solaris

• HP-UX

• RS 6000 AIX

• MIPS ABI

• Intel ABI

• Windows

• OS/2

• AlphaVMS

• ALPHA_OSF

The following operating environments do not meet the local provider's cross-platform requirements and are not supported:

• MVS (ebcdic)

• CMS (ebcdic)

• VAX_VMS (dfloat)

Features Supported by the SAS Providers

These features are common to all of the SAS providers:

• integrated SAS formatting services, which are the included core set of SAS formats used when reading or modifying data

- use of basic OLE DB schema rowsets, which enable consumers to obtain metadata about the data source that they use

The following table lists provider-specific functionality.

Table 1.2 *Feature Comparison*

Provider-Specific Features	Local Provider	IOM Provider	OLAP Provider	SAS/SHARE Provider	Base SAS Provider
supports random access by using the ADO (adOpenDynamic) cursor type and recordset bookmarks	yes	yes	no	yes	yes
supports simultaneous user updates	no	yes	no	yes	yes
supports SQL processing	no	yes	no	yes	yes
provides read and update access to all data sets available in a SAS session	no	yes	no	yes	yes
provides a choice of either exclusive access (member-level lock) or multiple user access (record-level lock) to SAS data files, selectable on a per-rowset open basis	no*	yes	no	yes	yes
provides access to SAS data files via Version 7 and later SAS/SHARE servers	no	no	no	yes	no
provides access to SAS data files on Version 8 and later SAS Workspace Servers	no	yes	no	no	no
provides access to SAS cubes on SAS 9.1 and later SAS OLAP Servers	no	no	yes	no	no
provides access to SAS data files via Version 7 and later Base SAS installations	no	no	no	no	yes
provides read-only access to Version 6 and later SAS data sets created on a Windows system without a SAS session	yes	no	no	no	no

Provider-Specific Features	Local Provider	IOM Provider	OLAP Provider	SAS/SHARE Provider	Base SAS Provider
provides read-only access to transport files and data sets created by SAS Version 7 or later on any of the following platforms: Solaris, HP-UX, RS 6000 AIX, MIPS Intel ABI, Windows, OS/2, OpenVMS. Does not require a SAS session.	yes	no	no	no	no
supports MDX processing	no	no	yes	no	no

* The local provider always enforces member-level locking.