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SAS/ACCESS® Interface to PC Files Data Access Demystified

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ABSTRACT

Based on customer usage scenarios, this paper is a look into the data sources and processes inside SAS/ACCESS® Interface to PC Files for SAS® 9.2. Specific scenarios would include accessing PC data from both UNIX and Windows using the PC Files Server, accessing local data, and accessing new data formats with Microsoft Office 2007.

INTRODUCTION

SAS/ACCESS Interface to PC Files continues to grow in functionality and ability to access different forms of data. With the release of SAS 9.2, SAS/ACCESS Interface to PC Files includes Microsoft Office 2007 data sources. For example, a SAS JMP file is a new file format that you can access with SAS/ACCESS Interface to PC Files. Also new SAS engines are available for accessing data with the PC Files S. Identifying and choosing the correct methods for accessing your data is the secret to demystifying PC files.

This paper focuses on a base set of knowledge that should help you understand the capabilities and power of using SAS to access PC Files. Using this knowledge and the details that are available in the Base SAS 9.2 and SAS/ACCESS 9.2 documentation (see ["Recommended Reading"](#)) should help you become a seasoned SAS/ACCESS to PC Files user.

PC FILES DATA ACCESS – SUPPORTED DATA SOURCES AND PLATFORMS

Accessing many forms of data on a variety of platforms is a strength of SAS/ACCESS Interface to PC Files. This section identifies what, how, and where these data transformations can take place. Note that the import wizards and procedures that are associated with the IMPORT and EXPORT procedures are part of Base SAS® software. If you do not have SAS/ACCESS Interface to PC Files, then you will be able to access only CVS, TXT, and delimited files.

This table identifies the data sources that can be processed with PROC IMPORT, EXPORT and the associated windows wizards, crossed referenced to SAS platforms and releases.

Data Source Description	Data Source Identifier	Import		Export		Supported Platforms	Supported SAS Releases on Platforms
		Wizard	PROC	Wizard	PROC		
Excel using LIBNAME engine	EXCEL EXCEL97 EXCEL2000 EXCEL2002 EXCEL2003 EXCEL2007	Yes	Yes	Yes	Yes	32-bit Windows	9.0 or higher
Excel using XLS file formats	XLS	No	Yes	No	Yes	32-bit Windows 64-bit Windows Linux, UNIX	9.1.3 SP3 or higher
Excel v4 using the ACCESS and DBLOAD	EXCEL4	Yes	Yes	Yes	Yes	32-bit Windows 64-bit	8.2 or higher 9.1.3 SP1 or

procedures						Windows	higher
Excel v5 using PROC ACCESS and DBLOAD	EXCEL5	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows	8.2 or higher 9.1.3 SP1 or higher
Access2000+ using the LIBNAME engine	ACCESS ACCESS2000 ACCESS2002 ACCESS2003 ACCESS2007	Yes	Yes	Yes	Yes	32-bit Windows	9.0 or higher
Access97 using the LIBNAME engine	ACCESS97	Yes	Yes	Yes	Yes	32-bit Windows	9.0 or higher
Access using the PC Files Server	ACCESSCS	No	Yes	No	Yes	64-bit Windows Linux, UNIX	9.1.3 or higher 9.1 or higher
dBase using .DBF file formats	DBF	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows Linux, UNIX	8.2 or higher 9.1.3 SP1 or higher 8.1 or higher
dBase file formats with MEMO support	DBFMEMO	No	Yes	No	Yes	32-bit Windows 64-bit Windows Linux, UNIX	9.2
JMP® using .JMP file formats	JMP	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows Linux, UNIX	9.1 or higher 9.1.3 or higher 9.1 or higher
Paradox using .DB file formats	DB	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows Linux, UNIX	9.2
SPSS using						32-bit Windows 64-bit	9.1.3 SP3 or

.SAV file formats	SAV	Yes	Yes	Yes	Yes	Windows Linux, UNIX	higher
Stata using .DTA file formats	DTA	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows Linux, UNIX	9.1.3 SP3 or higher
Lotus 1-2-3 using .WK1 file formats	WK1	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows	8.2 or higher 9.1.3 or higher
Lotus 1-2-3 using .WK3 file formats	WK3	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows	8.2 or higher 9.1.3 or higher
Lotus 1-2-3 using .WK4 file formats	WK4	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows	8.2 or higher 9.1.3 or higher
comma-separated file	CSV	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows Linux, UNIX Open VMS	8.2 or higher
tab-separated file	TAB	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows Linux, UNIX Open VMS	8.2 or higher
delimiter-separated file	DLM	Yes	Yes	Yes	Yes	32-bit Windows 64-bit Windows Linux, UNIX Open VMS	8.2 or higher
						32-bit	

data files using the client/server model	PCFS	No	Yes	No	Yes	Windows 64-bit Windows Linux, UNIX Open VMS	9.1 or higher
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Table 1. BASE and Windows access methods to PC Files formats

You can access PC files via the following methods as well:

- **LIBNAME Engine**

SAS/ACCESS Interface to PC Files offers SAS library engines that provide transparent access to your data. These engines provide greater flexibility in the way your software interacts with other SAS components. The following figure illustrates the flow of control when you use a LIBNAME engine:

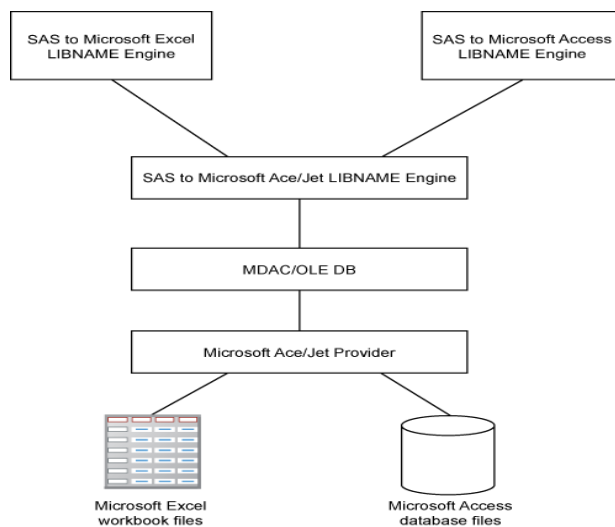


Figure 1. LIBNAME engine flow of control through Microsoft providers

The next example illustrates the use of the LIBNAME engine in a Microsoft Windows environment:

```

/* Set up librefs to Microsoft Access and Excel files. */
libname mydb access path="c:\demo.mdb";
libname myexcel excel path="c:\demo.xls";

/* Use SAS to query the attributes of the data. */
proc datasets lib=my-database;
run;

proc datasets lib=my-excel-library;
run;

/* Extract or process the data using the LIBNAME engine. */
data one;
  set my-database.tab1;
run;

data two;
  set my-excel-library.sheet1;
run;

```

- **Pass-Through Facility**

Passing SQL to a data source can potentially enhance performance. The following example illustrates using the SAS SQL Pass-Through Facility against Microsoft Excel and Access files:

```

/* Use the SQL procedure to access Microsoft Excel under Windows. */
proc sql dquote=ansi;
  connect to excel( PATH="c:\sasdemo\sasdemo.xlsx");
  select * from connection to excel
    (select * from invoice);
  disconnect from excel;
quit;

```

It is important to examine return-code macros that are filled in by PROC SQL. After the QUIT statement processes, use the %PUT macro to examine SQLXRC and SQLXMSG return code and message macros to see if any issues were encountered when the SQL was executed on your data source.

- **ACCESS Procedure**

This procedure is SAS[®] 7 technology that continues to be supported for the file types in Table 3 table below. Using the ACCESS procedure enables you to create views that can read, update, or extract PC files data into a SAS data file.

- **DBLOAD Procedure**

This procedure is also SAS 7 technology that creates PC files and loads them with data from a SAS data set. The DBLOAD procedure is supported by any file formats that are supported in PROC ACCESS.

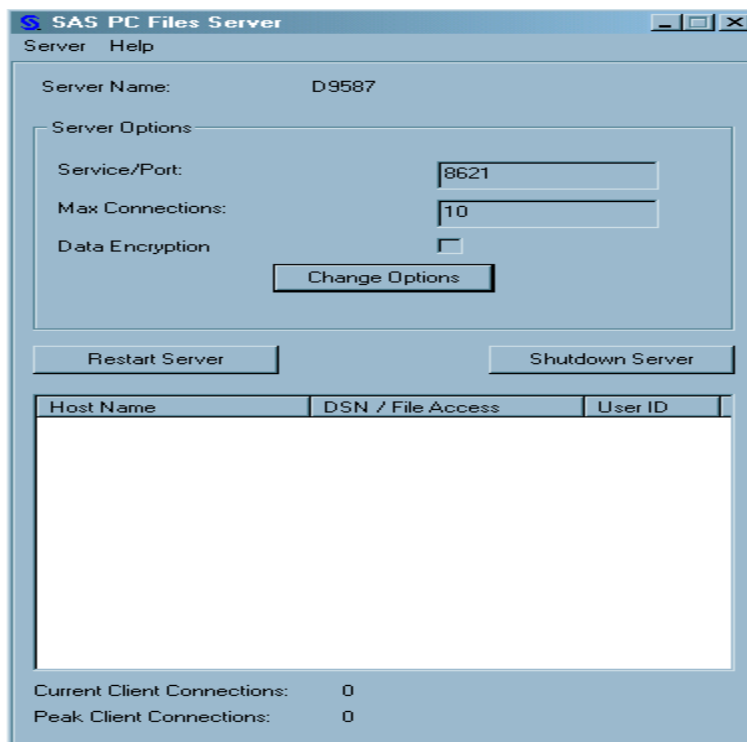
- **DBF and DIF Procedures**

These procedures enable you to convert dBASE (DBF) files and data interchange format (DIF) files to SAS data files.

PC FILES SERVER

Created as a means to allow users who run SAS/ACCESS Interface to PC Files in a UNIX environment to access PC data, the server has grown to allow access to Windows data in a Windows environment as well. This component of SAS/ACCESS Interface to PC Files is a stand-alone server, running outside of SAS, that is used to communicate with the software under UNIX and Windows. This section describes how to operate the server from different UNIX and Window environments.

The PC Files Server can run as a Windows service or as a Windows server. The following dialog box enables you to configure the server or service default parameters:



Display 1. SAS PC Files Server/Service configuration dialog box

The SAS PC Files Server dialog box provides a way to control the server or to specify that values be written to the Windows registry when running the application as a service. See the SAS/ACCESS to PC Files documentation for specific processes of running and configuring the server.

Once the server/service is running, you need to understand how to reach your PC data via the server. The following table outlines how you access the PC Files Server:

Application	Running on Windows 32	Running on Windows 64	Running under UNIX or Linux
PC Files Server	Runs as 32-bit application to interface with Microsoft drivers	Runs as 32-bit application to interface with Microsoft drivers	Not available – Windows only
PC Files Server LIBNAME access using SAS/ACCESS Interface to PC Files	Not available – use local tools and access methods	Communicates with 32-bit application running on windows	Communicates with 32 bit PC File Server application on windows

Table 2. Methods for accessing the PC Files Server

USING THE PC FILES SERVER LIBNAME ENGINE

Once you start the PC Files Server as a server or Windows service, you can access the data using a LIBNAME engine in SAS/ACCESS Interface to PC Files under Windows 64, UNIX, or Linux. The following code examples give you some ideas on the interaction between SAS/ACCESS Interface to PC Files with the PC Files Server. In these examples, SAS is executed under Linux, UNIX, or 64-bit Windows, and it is communicating with the PC Files Server that you started on your Windows data server.

```
/*--- Connect to the PC Files Server with the PC Files LIBNAME engine. ---*/
libname db pcfiles server=D8721 port=8621 path="c:\demo.mdb";
```

It is important to note that you have configured the port on the server/service on the D8721 machine and this machine is available on the network. Since you are using a Microsoft Access database, it needs to be on that server machine as well. If you have a user ID and a password for the Microsoft Access database, you can specify those as arguments in the LIBNAME statement, as shown in this example.

```
libname db pcfiles server=D8721 port=8621 path="c:\demo.mdb" user=micro1
password="tester1";
```

You can also use the LIBNAME engine with the PC Files Server to connect to the following data sources running on your Windows machines:

- Microsoft Excel
- ODBC data sources (such as the Microsoft SQL Server, Oracle, and so on)

To execute ODBC data sources, you must have the data source defined on the PC where the PC Files Server or the service is running. The LIBNAME statement has additional options the LIBNAME that interact with the PC Files Server and the data sources on your Windows machine. These options are detailed in the SAS/ACCESS to PC Files documentation.

ACCESSING PC DATA DIRECTLY UNDER UNIX AND LINUX

If you store Microsoft Excel files on UNIX and Linux file systems, SAS/ACCESS Interface to PC Files offers options for accessing these files directly with PROC IMPORT and PROC EXPORT. Tables 3 and 4 list all of the data sources that are supported by the IMPORT and EXPORT procedures.

DBMS =	Input Data Source PROC IMPORT	Extension
ACCESS	Microsoft Access 2000, 2002, 2003, or 2007 table (using the LIBNAME statement)	.mdb .accdb
ACCESS97	Microsoft Access 97 table (using the LIBNAME statement)	.mdb
ACCESSCS	Microsoft Access table (using the LIBNAME statement)	.mdb .accdb
CSV	delimited file (comma-separated values)	.csv
DBF	dBASE 5.0, IV, III+, and III files	.dbf
DBFMEMO	dBASE 5.0, IV, III+, and III files with memos FoxPro and Visual FoxPro files with memos	.dbf .fpt .dbt
DLM	delimited file (default delimiter is a blank)	.*
DTA	Stata file	.dta
EXCEL	Excel 97, 2000, 2002, or 2003 spreadsheet (using the LIBNAME statement)	.xls .xlsb .xlsm .xlsx
EXCEL4	Excel 4.0 spreadsheet (using PROC ACCESS)	.xls
EXCEL5	Excel 5.0 or 7.0 (95) spreadsheet (using PROC ACCESS)	.xls
EXCELCS	Excel spreadsheet (using the LIBNAME statement)	.xls .xlsx .xlsb .xlsm
JMP	PCFS	.jmp
PARADOX	Paradox .DB files	.db
PCFS	Files on PC Files Server	.*

SAV	SPSS file	.sav
TAB	delimited file (tab-delimited values)	*.txt
WK1	Lotus1-2-3 Release 2 spreadsheet	.wk1
WK3	Lotus 1-2-3 Release 3 spreadsheet	.wk3
WK4	Lotus 1-2-3 Release 4 or 5 spreadsheet	.wk4
XLS	Excel 5.0, 95, 97, 2000, 2002, or 2003 spreadsheet (using file formats)	.xls

Table 3. Data sources supported by PROC IMPORT

DSN =	Output Data Source PROC EXPORT	Extension	Version of File Created
ACCESS*	Microsoft Access 2000, 2002, 2003 or 2007 table (using the LIBNAME statement)	.mdb .accdb	2000 2007
ACCESS97	Microsoft Access 97 table (using the LIBNAME statement)	.mdb	97
ACCESSCS	Microsoft Access table (using the LIBNAME statement)	.mdb .accdb	2000*** 2007
CSV	delimited file (comma-separated values)	.csv	
DBF	dBASE 5.0, IV, III+, and III files	.dbf	5.0
DBFMEMO	dBASE 5.0, IV, III+, and III files with memos FoxPro and VisualPro with memos	.dbf .fpt	5.0
DLM	delimited file (default delimiter is a blank)	.*	
DTA	Stata file	.dta	Version 8
EXCEL4	Excel 4.0 spreadsheet (using proc DBLOAD)	.xls	4.0
EXCEL5	Excel 5.0 or 7.0 (95) spreadsheet (using proc DBLOAD)	.xls	5.0
EXCEL*	Excel 97, 2000, 2002, 2003 or 2007 spreadsheet (using the LIBNAME statement)	.xls .xlsb .xlsx	97 2007 2007
EXCELCS	Excel spreadsheet (using the LIBNAME statement)	.xls xlsb	97** 2007
XLS	Excel 97, 2000, 2002, or 2003 spreadsheet (using file formats)	.xls	97

JMP	JMP file		
PARADOX	Paradox DB files	.db	
PCFS	Files on PC server	.*	
SAV	SPSS file, compressed and uncompressed binary files	.sav	
TAB	delimited file (tab-delimited values)	.txt	
WK1	Lotus 1-2-3 Release 2 spreadsheet	.wk1	
WK3	Lotus 1-2-3 Release 3 spreadsheet	.wk3	
WK4	Lotus 1-2-3 Release 4 and 5 spreadsheet	.wk4	

Table 4. Data sources supported by PROC EXPORT

PROCESSING EXCEL DATA STORED UNDER UNIX AND LINUX

The following table details strategies for accessing data under UNIX and Linux. The table lists valid values for the DBMS= option in PROC IMPORT and PROC EXPORT, what those values are used for, required applications, and the appropriate operating system.

DBMS=	Uses	Requires	Operating Platform
EXCEL	SAS Excel LIBNAME engine	Microsoft Jet or Ace Provider	32-bit Windows
XLS*	file formats technology (used to read and write Microsoft Excel files on UNIX and Linux)		32-bit Windows 64-bit Windows Linux, UNIX
EXCELCS	PC Files LIBNAME engine	PC Files Server Microsoft Excel Driver on 32-bit Windows	64-bit Windows Linux, UNIX
ACCESSCS	PC Files LIBNAME engine	PC Files Server Microsoft Excel Driver on 32-bit Windows	64-bit Windows Linux, UNIX

Table 5. Strategies for accessing data

Using the information in Table 5, you can directly access Excel files stored on a UNIX or a LINUX file system. The following examples illustrate how to access such files:

Example 1: Specifying DBMS=XLS in the PROC IMPORT Statement

```
proc import out=work.invoice
  file="my.unix.path.demo.xls"
  dbms=xls replace;
  . . .more SAS statements. . .
run;
```

Example 2: Creating an XLS File on a UNIX File System

```
libname sdf v9 "my.sas.directory";
proc export data=sdf.invoice
      file="my.unix.path.text.xls"
      dbms=xls replace;
  . . .more SAS statements. . .
run;
```

CONCLUSION

The ability to access many different data sources on a variety of platforms is the key strength of SAS/ACCESS Interface to PC Files. This paper highlights a few key areas and components; however, it is only a peek behind the curtains. To understand the full capabilities of this software and the scope of influence you have with procedure options, you need to study the SAS/ACCESS Interface to PC Files documentation that is listed in the section ["Recommended Reading"](#). This documentation provides the necessary information to demystify the procedures and processes that are associated with SAS/ACCESS Interface to PC Files and the PC Files Server, as well as the interactions between those applications and UNIX, LINUX, and Windows platforms.

RECOMMENDED READING

SAS Institute Inc. 2008. *Base SAS® 9.2 Procedures Guide*. Cary, NC: SAS Institute Inc. Available at support.sas.com/documentation/cdl/en/proc/59565/PDF/default/proc.pdf.

SAS Institute Inc. 2008. *SAS® 9.2 Companion for UNIX Environments*. Cary, NC: SAS Institute Inc. Available at support.sas.com/documentation/cdl/en/hostunix/59542/PDF/default/hostunix.pdf.

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