

Configuration Guide for SAS[®] 9.4 Foundation for Microsoft Windows for x64



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Post-Installation Setup for SAS 9.4 Foundation

About this Guide

The *Configuration Guide for SAS 9.4 Foundation for Microsoft Windows for x64* provides configuration instructions for SAS 9.4 Foundation, which comprises server-side Base SAS and a variety of server-side SAS products (which vary by software order). This document has been updated for [SAS 9.4M8](#) (TS1M8).

The server-side configuration instructions contained in this document are for the configuration of a generic SAS server. For information about configuring OLAP, workspace, and stored process servers, see *SAS 9.4 Intelligence Platform: Installation and Configuration Guide: Introduction to Installing the SAS Intelligence Platform*. This guide can be found at <http://support.sas.com/documentation/cdl/en/biig/63852/HTML/default/p01intellplatform00installgd.htm>

Running SAS 9.4 from a Command Console in any Folder

If you add `{SASHOME}\SASFoundation\9.4` to your system PATH variable, SAS 9.4 can run from a command console in any folder when you type `SAS`. For information about setting the PATH Environment Variable, refer to Microsoft Windows Help.

Additional Resources

Configuring Hadoop-related Software

For information about how to configure Hadoop JAR files and the SAS/ACCESS Interface to Hadoop software, see the *SAS 9.4 Hadoop Configuration Guide for Base SAS and SAS/ACCESS* at <https://support.sas.com/en/documentation/third-party-software-reference/9-4/support-for-hadoop.html>.

For information about configuring the SAS Data Loader for Hadoop offering and its software order, SAS In-Database Technologies for Hadoop, see “Configuring and Administering SAS Data Loader for Hadoop” on page 25 in this guide.

Troubleshooting System Performance Problems

For a list of papers that are useful for troubleshooting system performance problems, see <http://support.sas.com/kb/42/197.html>.

Chapter 1: Post-Installation Setup for the Metabase Facility

In Version 7 of the SAS System, the SAS/EIS Metabase facility was converted to the V7 Common Metadata Repository. The Common Metadata Repository is a general-purpose metadata management facility that provides common metadata services to various metadata-driven applications.

Using the Common Metadata Repository requires a one-time setup of the repository manager. If the repository manager was set up in a previous release, additional setup may not be required. Complete the steps in the following sections before you attempt to use the Metabase Facility. Using the Common Metadata Repository requires a conversion for Metabase Facility users who are using a release prior to Version 7. For more information, see the Version 8 OLAP Server Topic “Converting Legacy Metabases.”

Setting Up the System Repository Manager Files

Complete the following steps to set up the necessary system repository manager files. You must have write access to SASHELP in order to specify the system repository manager.

Note: *This process sets the default location for the repository manager for your site. Individual users may specify their own repository manager location by taking the steps below with the **Write values to system registry** check box cleared.*

1. Create a directory that will be dedicated exclusively to the storage of repository manager files, for example: !SASROOT\RPOSMGR.

Do not use this directory to store other SAS files.

2. At a SAS command prompt, type REPOSMGR and then select **Setup Repository Manager**.
3. In the Repository Manager Setup window, Library defaults to RPOSMGR. For Path, specify the path from Step 1, above, and then select the check box labeled **Write values to system registry**.
4. Click **OK**.
5. In the next dialog box, select **Yes** to generate the necessary repository manager files.

This completes the setup for the System Repository Manager. You can create additional repository managers (a user repository manager, for example) by repeating the steps described above and by using a different path.

Registering the SASHELP Repository in the Repository Manager

The SASHELP repository is used in various samples, including the SAS/EIS Report Gallery templates. Before beginning the steps below, a repository manager must be created (see previous section).

Complete the following steps to register the SASHELP repository in the Repository Manager:

1. At a SAS command prompt, type REPOSMGR and then select **Repository Registration**.
2. In the Repository Registration window, select **New**.

3. In the Register Repository (New) window, type SASHELP (in uppercase) in the **Repository** field, and then type the full directory path where the CORE catalog is located in the **Path** field, for example:

!SASROOT\CORE\SASHELP

4. In the **Description** field, you can type any character string (for example, SASHELP Repository). Click **OK** to close the Register Repository (New) window. Click **Close** to exit the Repository Registration window.

***Note:** Repositories cannot span multiple directories because the path cannot contain concatenated directories. If you have existing metabases in concatenated directories, copy the metabases to a single path that will be referenced as a repository.*

Converting Version 6 SAS/EIS Metabases to Version 8 Repositories

For step-by-step instructions on converting Version 6 metabases to Version 8 repositories, refer to the topic “Converting Existing SAS/EIS Metabases” in the SAS/EIS online Help.

Chapter 2: Post-Installation Instructions for National Language Support (NLS)

This chapter contains information on post-installation configuration for Asian and European language support.

Important: *To run a localized SAS image, your operating system must be configured to use a Windows for x64 regional setting appropriate to the localized image. You may experience unexpected results if the regional setting and the localized image are not consistent. If multiple SAS localizations have been installed on the system, you may need to change the regional setting for each localized SAS image before invocation. For information on how to change or to use regional settings, refer to your Microsoft Windows for x64 documentation.*

Introduction

The SAS Deployment Wizard allows users to decide which set of languages to install for the SAS products that are listed. However, three images are automatically deployed for SAS on all Windows and UNIX machines:

- English
- English with DBCS and
- Unicode Support

When SAS 9.4 Foundation is installed, the installer creates a configuration file named `!SASROOT\sasv9.cfg`. When you open the file, you will find that the `CONFIG` option is the only option that is specified, and it points to another configuration file. That configuration file contains the options used to establish your SAS session, including the `LOCALE` system option that establishes the NLS environment for SAS.

With SAS 9.4 and later, the `ENCODING` system option is set explicitly in the configuration file for single-byte languages and Unicode support. In the first three maintenance releases of SAS 9.4, encoding for DBCS was not set in the configuration file.

Important: *Starting with the fourth maintenance release of SAS 9.4 (SAS 9.4M4), the `ENCODING` option for DBCS is also set in the `sasv9.cfg` file. If you want to change the encoding setting, be sure to contact SAS Technical Support.*

Occasionally, other NLS options are also included in the configuration file.

At least three NLS configuration files are created during the installation process:

- one in `!SASROOT\nls\en` for the default single-byte (SBCS) image that uses English messages
- one in `!SASROOT\nls\1d` for the default double-byte (DBCS) image that uses English messages
- one in `!SASROOT\nls\u8` for the SAS Unicode server

If you have installed any of the localized SAS images, you will find a folder under `!SASROOT\nls` for each. The folders are named with a SAS specific 2-character language code. Each contains its own configuration file with a `LOCALE` option value set to match the localization.

As mentioned previously, the configuration file also contains the `ENCODING` option for single-byte languages. For example, the configuration file for French (`fr`) will have a `LOCALE` value with a French language code.

Selecting the `LOCALE` during SAS Foundation Deployment

The SAS Deployment Wizard (SDW) includes a dialog that enables you to select a locale. By default, the installation uses the current locale on the Windows machine where the SAS Foundation installation is being performed. If you prefer to use a different locale, you can select it in this dialog.

The selected locale is set as the value of the `SAS LOCALE` system option in the configuration file that is used to initialize SAS. If the selected locale matches a localization installed for the SAS Foundation image, the `sasv9.cfg` file for that localization becomes the default configuration file for SAS.

Otherwise, the default configuration file is the configuration file that uses English, which is one of these two files:

- `!SASROOT\nls\ld\sasv9.cfg` for any language that requires DBCS support
- `!SASROOT\nls\en\sasv9.cfg` for all other languages

For example, if the installer selects the Polish localization and the Polish locale, the `LOCALE` system option is set to `pl_PL` and the `ENCODING` option is set to `wlatin2` in both the Polish configuration file and the English configuration file. The Polish configuration file is used to initialize SAS Foundation, by default.

Chinese, Japanese, and Korean DBCS Support

This section explains how to specify Asian font catalogs and how to determine the localization used for Chinese.

Asian Font Catalogs

The default configuration files for Asian language editions already contain font definitions. (However, the configuration file for DBCS extensions does not contain font definitions.) Asian fonts reside in the `SASHELP.FONT`s catalog. Simplified and Traditional Chinese fonts have been added.

Asian font catalogs reside in subdirectories (by language) for easy installation. If you want to change the font catalog, you can specify it in either the configuration file or in your SAS session.

Installing Traditional Chinese Fonts

To use Traditional Chinese fonts, you must install the Traditional Chinese localization. You must also modify your configuration file, as described in the following section.

Specifying the Font Catalog in the Configuration File for Traditional Chinese Fonts

If you are not running a Traditional Chinese localization but you want to use the Traditional Chinese fonts, you must modify the configuration file to set `GFONTx` to

```
-set gfontx !SASROOT/nls/zt/font-name
```

In this statement,

- `x` represents a value from 0-9.
- `font-name` represents the name of the font catalog you want to use.

Specifying the Font Catalog in a SAS Session for Traditional Chinese Fonts

To specify the font catalog in a SAS session, submit the following libref statement:

```
-libname gfontx !sasroot\nls\langcode\font-name
```

In this statement,

- *x* represents a value from 0-9.
- *font-name* represents the name of the font catalog you want to use.

Chinese Localizations

The installer has the option to install localizations for both Simplified Chinese and Traditional Chinese. SAS supports several Chinese-based locales. In some cases, the localization selected for the locale may not be intuitive.

The following table shows which language SAS uses when you select one of the five Chinese locales. Note that the default language may be English.

Locale	Location of sasv9.cfg file	Language
Chinese (China) [zh_CN]	!SASROOT\nls\zh	Simplified Chinese
Chinese (Hong Kong) [zh_HK]	!SASROOT\nls\zt	Traditional Chinese
Chinese (Macau) [zh_MO]	!SASROOT\nls\1d	English
Chinese (Singapore) [zh_SG]	!SASROOT\nls\1d	English
Chinese (Taiwan) [zh_TW]	!SASROOT\nls\zt	Traditional Chinese

Chapter 3: Restricted Options

SAS 9.4 Foundation options can be “restricted” by a site administrator so that once they are set by the administrator, they may not be changed by a user. An option can be restricted globally and by user. To restrict an option, you must add it to the appropriate SAS 9.4 Foundation configuration file and set the permissions so that it cannot be updated by users. The option files are processed by global and then by user. If an option is specified in multiple files, the last occurrence is used.

Global Restrictions

Create the file `!SASROOT\rstropts\rsasv9.cfg` and add options to this file in the normal config file format.

User Restrictions

Create a file of the following format:

```
!SASROOT\rstropts\users\<user ID>_rsasv9.cfg
```

and add options to this file in the normal config file format.

Example:

For user smith, the file name is `smith_rsasv9.cfg`.

Additional information

To determine which options can be restricted, follow this example:

```
Proc Options LISTRESTRICT; run;
```

To verify that an option has been set correctly, follow this example:

1. Assume the option `-EMAILSYS=SMTP` was specified in one of the restricted configuration files.
2. Submit the following code:

```
proc options restrict; run;
```

The SAS log should then show a message similar to this example:

```
Option Value Information For SAS Option EMAILSYS
Option Value: SMTP
Option Scope: SAS Session
How option value set: Site Administrator Restricted
```

The following describes the process when a user attempts to change the option value.

1. Assume the option `-NOTHEADS` was specified in one of the restricted configuration files.
2. Submit the following code:

```
options THREADS;
```

The SAS log should then show a message similar to the following:

```
options THREADS;
```

```
-----
```

```
36
```

```
WARNING 36-12: SAS option THREADS is restricted by your Site  
Administrator and cannot be updated.
```

Chapter 4: Configuring SAS Analytics Accelerator for Teradata

This chapter describes registering user-defined function (UDFs) that are included with your SAS Analytics Accelerator software. These UDFs must be registered in your Teradata database.

Prerequisites

The information in this chapter assumes that you have successfully installed SAS Foundation, including SAS/STAT. To leverage Enterprise Miner and ETS UDFs, you must also install SAS Enterprise Miner and SAS/ETS, respectively.

To successfully install the UDFs and execute them, you must be deploying a Teradata database version 13.00 or later. In addition, the database must have DBCEXTENSION installed to support operations on GLOP sets.

Contact your database administrator to verify that DBCEXTENSION has been installed before taking the next steps.

Database Permissions for Registering the UDFs

Because the SAS Analytics Accelerator UDFs will be registered in database SYSLIB, the Teradata database user account that you use to install the UDFs as described below must have the following privileges for the SYSLIB database.

- CREATE FUNCTION
- ALTER FUNCTION
- EXECUTE FUNCTION
- GLOP
- GLOP MEMBER

To obtain the appropriate permissions, contact your database administrator.

UDF Installation Session Encoding

SAS in-database analytics procedures can be run with all supported encodings. However, the UDF installation step requires LATIN1 for the session encoding. If the system has a different encoding, it can be temporarily set to LATIN1 by changing the configuration file as described in *SAS 9.4 National Language Support (NLS): Reference Guide* at this location:

<http://support.sas.com/documentation/cdl/en/nlsref/67964/PDF/default/nlsref.pdf>.

Registering the UDFs

To register the SAS Analytics Accelerator UDFs in your Teradata database, invoke three installation macros: `udftdstt.sas`, `udftdem.sas` and `udftdets.sas`. These macros have been installed under `!SASROOT/dmine/sasmacro/` as part of SAS Analytics Accelerator.

Note: During UDF installation, SAS creates temporary files under the folder referenced by the “work” library. If the absolute path of this folder is very long, UDF installation can fail due to the limit on external file names in Teradata Warehouse. If you encounter this situation, start the SAS session with the work library temporarily assigned to a directory with shortened path, e.g., “C:\”, and proceed with the installation as described above. After installation is complete, the work library can be reassigned to the original directory. For information about the options available when reassigning the work library, refer to SAS documentation.

To run the macros, submit the following commands in the Program Editor from SAS:

```
ods html select none;
ods listing;
%let indconn = server=myserver user=myuserid password=XXXX
database=SYSLIB;
%udftdstt;
%udftdem;
%udftdets;
proc fedsql nolibs noerrorstop noprompt="(&credentials.)";
  CREATE GLOP SET syslib.sas_vars;
  call DBCExtension.glop_add('syslib.sas_vars', 'SE', NULL,
'dmdb', 'N', 0, 'Y', 'M', 'E', 0, 256000, 1, '00'XB);
  CREATE GLOP SET syslib.sas_dmvars;
  call DBCExtension.glop_add('syslib.sas_dmvars', 'SE', NULL, 'dmine',
'N', 0, 'Y', 'M', 'E', 0, 256000, 1, '00'XB);
quit;
```

The first two statements in the program enable the registration macros to write and read temporary files without these files’ being redirected to the default HTML ODS destination of the SAS dms mode. The INDCONN macro variable provides credentials to connect to the Teradata machine. You must specify the server, user, password, and database to access the machine where you have installed the Teradata data warehouse:

- *myserver* is the server where the Teradata warehouse resides.
- *myuserid* is a valid user ID for that server that is granted the permissions described above.
- XXXX is the password for the user ID that you are using.
- Because the SAS Analytics Accelerator UDFs must be registered in the SYSLIB database, database must be SYSLIB.

The statements executed by PROC FedSQL will create the GLOP sets and add the GLOPs used by SAS analytical procedures while executing the UDFs in the Teradata database.

Alternative to PROC FedSQL

As an alternative to running PROC FedSQL, your database administrator may directly execute the following SQL commands on Teradata through the database client, such as BTEQ:

```
CREATE GLOP SET syslib.sas_vars;  
call DBCExtension.glop_add('syslib.sas_vars', 'SE', NULL,  
    'dmdb', 'N', 0, 'Y', 'M', 'E', 0, 256000, 1, '00'XB);  
CREATE GLOP SET syslib.sas_dmvars;  
call DBCExtension.glop_add('syslib.sas_dmvars', 'SE', NULL,  
    'dmdb', 'N', 0, 'Y', 'M', 'E', 0, 256000, 1, '00'XB);
```

Re-enable the Default HTML ODS Destination

After the UDF registration macros have completed, you can re-enable the default HTML ODS destination by running the following command:

```
ods html select all;
```

Documentation for Using the UDFs

For information about how to use the newly registered UDFs, see the *SAS Analytics Accelerator for Teradata: Guide* at

<http://support.sas.com/documentation/onlinedoc/analyticsaccel/index.html>.

Chapter 5: SAS/ACCESS Interfaces

SAS/ACCESS Interface to Amazon Redshift

The installation of SAS/ACCESS Interface to Amazon Redshift includes the required ODBC driver.

You can use the ODBC administrator to configure a Data Source Name (DSN) to access Amazon Redshift. If multiple users can use the same workstation to access Amazon Redshift, create it as a system DSN.

To create a data source to enable access to Amazon Redshift data:

1. Run **Data Sources (ODBC)** from Administrative Tools in the Control Panel.
2. Click the **User DSN** or **System DSN** tab, depending on the number of users.
3. Click **Add**, and select **SAS ACCESS to Amazon Redshift** from the dialog box.
4. Enter any name in the **Data Source Name** field. This name is used by SAS to identify this database connection.
5. Enter a **Description** for this connection.
6. Supply the hostname or IP address as the name of the server where Amazon Redshift is installed.
7. Type the **Port Number** where the host is listening for Amazon Redshift connections. The default is 5439.
8. Enter the **Database Name** of the database on the Amazon Redshift server.
9. Click **Test Connection** and type your user ID and password.
A test connection is initiated.
10. Click **OK** to close the ODBC Administrator and save the new DSN entry.

SAS/ACCESS Interface to Aster

Installing and Configuring the ODBC Driver and Bulk Loader

Before you configure the ODBC driver, install the bulk loader in `SASHOME\SASFoundation\9.4\` or to another directory that is in the `PATH` environment variable. Once the driver and bulk loader are installed, configure the ODBC data source. SAS recommends (but does not require) that you create the data source using the instructions below. If multiple users may use the same workstation to access the Aster nCluster database, you may choose to create it as a system Data Source Name (DSN) rather than a user DSN.

Complete the following steps to create a data source for Aster nCluster database access:

1. Run **ODBC Administrator** from the Control Panel or **Start** menu.
2. Select the **User DSN** or **System DSN** tab, depending on the number of users who will access the workstation.

3. Click **Add**, and select **Aster Data ODBC Driver for nCluster**. Click **Finish**.
4. Enter any name in the **Data Source** field.
5. Enter the hostname or IP Address in the **Server** field.
6. Enter the port number in the **Port** field.
7. Enter the database name in the **Database** field.
8. Enter the user name in the **User Name** field.
9. Enter the password in the **Password** field.
10. Click **Test**. When a message appears that indicates that the test was successful, click **OK**.
11. Click **Save**.

SAS/ACCESS Interface to Greenplum

SAS/ACCESS Interface to Greenplum uses the Progress DataDirect Greenplum Wire Protocol ODBC driver component. For releases that predate the third maintenance release of SAS 9.4, manual installation of the Greenplum driver is required. To install the Greenplum driver in a supported location, take the following steps:

1. Use Windows Explorer to navigate to the !SASROOT\access\sasmisc directory where the *platformgp1m60.zip* is located and where *platform* is specific to your operating system. This zip file contains a directory that includes the driver and the installation instructions for installing it.
2. Use an unzip utility to unzip the contents to C:\. This step creates the following directory:
C:\gp16.0.
3. Navigate to C:\gp16.0 and follow the instructions in the *Readme.txt* file.

You can use the ODBC administrator to configure a Data Source Name (DSN) to access a Greenplum database. If multiple users may use the same workstation to access the Greenplum database, you can create it as a system DSN instead of a user DSN.

Take the following steps to create a data source for Greenplum database access:

1. Run **Data Sources (ODBC)** from Administrative Tools section of the Control Panel.
2. Click the **User DSN** or **System DSN** tab, depending on the number of users who will access the workstation.
3. Click the **Add** button and choose **SAS ACCESS to Greenplum** from the pop-up window.
If you are running the third maintenance release for SAS 9.4 (9.4M3), select **SAS Access**.
4. Enter any name in the **Data Source Name** field. This name will be used by SAS to identify this database connection.
5. Enter a **Description** for this connection.
6. Enter the host name or IP address of the server where Greenplum resides.
7. Enter the **Port Number** where the host is listening for Greenplum connections. The default is 1433.

8. Enter the **Database Name** of the database on the Greenplum server.
9. Click **Test Connection** and enter your user ID and password. A test connection is initiated.
10. Click **OK** to close the ODBC Administrator and to save your new DSN entry.

Bulk Load

SAS/ACCESS can interface with the Greenplum Client Loader interface for loading large volumes of data. To perform bulk loading, the Greenplum Client Loader Package must be present on the system where you installed SAS.

SAS recommends using the “gpfdist” protocol for bulk loading. For this protocol you must set the GPLOAD_HOME environment variable to point to the location where the gpfdist utility allocates the files to be loaded onto the Greenplum tables. Additional information about how to use the bulk loading feature can be found in the [SAS/ACCESS 9.4 for Relational Databases: Reference](#) documentation.

If you use the Greenplum Wintergreen Server version 5.7 or later for bulk loading, the EXCEPTION= and BL_EXCEPTION_TABLE= data set options are not supported. Greenplum systems that use this version of the Wintergreen server do not support the resulting LOG ERRORS INTO syntax in the submitted SQL code.

SAS/ACCESS Interface to Hadoop

For information about how to configure SAS/ACCESS Interface to Hadoop software, see *SAS Hadoop Configuration Guide for Base SAS and SAS/ACCESS* at <https://support.sas.com/en/documentation/third-party-software-reference/9-4/support-for-hadoop.html>.

SAS/ACCESS Interface to HAWQ

The installation of SAS/ACCESS Interface to Pivotal HAWQ includes the Progress DataDirect Greenplum Wire Protocol ODBC driver component.

You can use the ODBC administrator to configure a Data Source Name (DSN) to access Pivotal HAWQ. If multiple users may use the same workstation to access Pivotal HAWQ, you can create it as a system DSN instead of a user DSN.

Take the following steps to create a data source for Pivotal HAWQ access:

1. Run Data Sources (ODBC) from the Administrative Tools section of the Control Panel.
2. Click the **User DSN** or **System DSN** tab, depending on the number of users.
3. Click **Add** and select SAS ACCESS from the pop-up window.
4. Enter any name in the **Data Source Name** field. This name will be used by SAS to identify this database connection.
5. Enter a **Description** for this connection.
6. Enter the host name or IP address as the name of the server where Pivotal HAWQ resides.
7. Enter the **Port Number** where the host is listening for Pivotal HAWQ connections. The default is 1433.
8. Enter the **Database Name** of the database on the Pivotal HAWQ server.

9. Click **Test Connection** and enter your user ID and password. A test connection is initiated.
10. Click **OK** to close the ODBC Administrator and to save the new DSN entry.

Bulk Load

SAS/ACCESS to HAWQ can use the Greenplum Client Loader interface to load large volumes of data into Pivotal HAWQ. To perform bulk loading, the Greenplum Client Loader Package must be present on the system where you installed SAS.

SAS recommends using the “gpfdist” protocol for bulk loading. To deploy this protocol, you must set the GPLOAD_HOME environment variable to point to the location where the gpfdist utility allocates the files to be loaded into the Greenplum tables. Additional information about how to use the bulk loading feature can be found in the [SAS/ACCESS 9.4 for Relational Databases: Reference](#) documentation.

SAS/ACCESS Interface to Impala

Before you can use SAS/ACCESS Interface to Impala software, the following products are required:

- Base SAS
- SAS/ACCESS Interface to Impala
- Impala ODBC driver

SAS/ACCESS to Impala supports multiple ODBC drivers for communications with Impala.

The default driver used by SAS/ACCESS to Impala is the Cloudera Impala ODBC driver. To use an Impala ODBC driver from a different vendor in SAS/ACCESS to Impala, set either the SAS_IMPALA_DRIVER_VENDOR environment variable or the DRIVER_VENDOR libname option, as shown in the following examples:

Set the environment variable to use the MapR Impala ODBC driver:

```
C:\> set SAS_IMPALA_DRIVER_VENDOR=MAPR
```

Setting the libname option to use the Progress DataDirect Impala ODBC driver:

```
libname implib impala server=impserver schema=default  
DRIVER_VENDOR=DATADIRECT;
```

Currently, the only valid values for the driver vendor are DATADIRECT and MAPR. For more information about selecting a different driver vendor, refer to the SAS/ACCESS to Impala section of the [SAS/ACCESS 9.4 for Relational Databases: Reference](#).

SAS/ACCESS Interface to Microsoft SQL Server

Starting with the third maintenance release for SAS 9.4, the installation of SAS/ACCESS Interface to Microsoft SQL Server includes a Progress DataDirect Microsoft SQL Server Wire Protocol ODBC driver component.

You can use the ODBC administrator to configure a Data Source Name (DSN) to access a Microsoft SQL Server database. If multiple users might use the same workstation to access the Microsoft SQL Server database, you can create it as a system DSN instead of a user DSN.

Take the following steps to create a data source for Microsoft SQL Server database access:

1. Click **Run Data Sources (ODBC)** in the Administrative Tools section of the Control Panel.

2. Click the **User DSN** or **System DSN** tab, depending on the number of users.
3. Click **Add**, and select SAS ACCESS from the pop-up window.
4. Enter any name in the **Data Source Name** field. This name will be used by SAS to identify this database connection.
5. Enter a **Description** for this connection.
6. Enter the host name or IP address of the server where Microsoft SQL Server resides.
7. Enter the **Port Number** where the host is listening for Microsoft SQL Server connections. The default is 1433.
8. Enter the **Database Name** of the Microsoft SQL Server database on the server.
9. Click **Test Connection** and enter your user ID and password. A test connection is initiated.
10. Click **OK** to close the ODBC Administrator and save the new DSN entry.

To enable bulk loading, check the **Enable Bulk Load** check box on the **Bulk** tab of the DSN, or you can add `EnableBulkLoad=1` to the COMPLETE, PROMPT, or NOPROMPT connection string if you are using that method to connect.

SAS/ACCESS Interface to MySQL

SAS/ACCESS Interface to MySQL requires Base SAS and SAS/ACCESS Interface to MySQL to be licensed and installed.

Before you use SAS/ACCESS interface to MySQL, verify that the location of the MySQL client library files (libmysql.dll and libmysql.lib) has been appended to the PATH system variable.

Note: Newer MySQL client libraries also require OpenSSL libraries, which must also be accessible through your PATH environment variable. Check the MySQL documentation for more information about setting up these libraries.

The MySQL client libraries are typically located in `C:\MySQL\bin` or, for more recent versions of MySQL, `C:\Program Files\MySQL\MySQL Server x.x\lib`, where “x.x” corresponds to the major and minor version of your client.

For more information about SAS/ACCESS Interface to MySQL, see the MySQL chapter in [SAS/ACCESS 9.4 for Relational Databases: Reference](#).

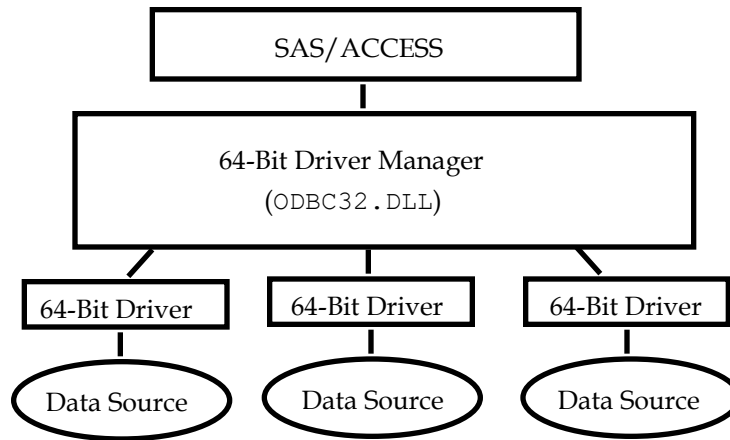
SAS/ACCESS Interface to ODBC

Before you can use SAS/ACCESS Interface to ODBC, the following products are required:

- Base SAS
- SAS/ACCESS Interface to ODBC
- A 64-bit ODBC driver for the source of the data

The ODBC solution supports different technologies by defining a standard interface. SAS/ACCESS Interface to ODBC with ODBC drivers provides access to different databases. An ODBC driver processes ODBC function calls from--and returns results to--SAS/ACCESS. You can obtain drivers from Microsoft, from your database vendor, or from other third-party software vendors.

On Windows for x64, the SAS/ACCESS application calls the 32-bit Driver Manager (ODBC32.DLL), which in turn calls the 64-bit drivers. The following figure illustrates the architecture:



To run standard (64-bit) SAS/ACCESS software on 64-bit Windows, 64-bit ODBC drivers are required.

With SAS 9.4 M1 and later, Base SAS is also available for 32-bit Windows operating systems. If you are deploying 32-bit Base SAS, you must also use 32-bit ODBC data sources. By the same token, users of 64-bit SAS software must have 64-bit ODBC data sources.

You also have the option to run 32-bit SAS on 64-bit Windows, but in that situation, you must use 32-bit ODBC data sources.

In every case, the ODBC drivers that you install must match the “bitness” of your version of SAS, and not necessarily the bitness of the operating system. For example, if you are running a 32-bit version of SAS on a 64-bit Windows computer, the third-party ODBC drivers on that computer must be 32-bit drivers.

The ODBC Driver Manager and Administrator are Microsoft products that are included with all ODBC drivers. When you install an ODBC driver, the ODBC Driver Manager and Administrator are also installed. The ODBC Administrator should appear as an icon in the Control Panel. However, it can also appear in the Start menu.

After you install the ODBC driver, you can use the ODBC Administrator to define and manage the data sources. A data source associates a particular ODBC driver with the data you want to access through that driver. It can consist of information about the data you want to access and its associated operating system, DBMS, and network platform (if any) used to access the DBMS. For information about how to configure your data sources, refer to the documentation provided with your ODBC drivers.

For more information about SAS/ACCESS to ODBC, refer to the ODBC chapter in [SAS/ACCESS 9.4 for Relational Databases: Reference](#). For more information about ODBC, refer to the *Microsoft ODBC 3.0 Programmer’s Reference and SDK Guide*.

SAS/ACCESS Interface to Oracle

In order to use SAS/ACCESS Interface to Oracle, you must install and configure the Oracle client libraries. Refer to the Oracle documentation for instructions. Typically, two steps are required:

- Set the `ORACLE_HOME` environment variable.
Note: This step is not required if you are installing the Oracle instant client.
- Add the directory where the Oracle shared libraries are located to the `PATH` environment variable. This step is required because SAS/ACCESS Interface to Oracle uses Oracle shared libraries and must be able to locate them at your site.

If the environment variables are not set correctly, you will see error messages similar to the following when connecting to Oracle from SAS:

```
ERROR: Unable to load oracle client (oci.dll).
ERROR: Error in the LIBNAME statement.
```

For more information about SAS/ACCESS Interface to Oracle, refer to the Oracle chapter in [SAS/ACCESS 9.4 for Relational Databases: Reference](#).

SAS/ACCESS Interface to PC Files

Use of ACCESS or the EXCEL LIBNAME engine requires the installation of a 64-bit Microsoft ACE driver. If the message “ERROR: Connect: Class not registered” appears while you are using the LIBNAME ACCESS or EXCEL LIBNAME engine, it indicates that you have the incompatible 32-bit Microsoft Access database engine (ACE) installed.

If you have to use the 32-bit ACE driver with 64-bit SAS installed, a 32-bit SAS PC Files Server is required to bridge the “bitness gap” between the ACE driver and PCFILES LIBNAME engine. You can run SAS PC Files Server as a Windows service or as an application server listening to the PCFILES LIBNAME engine.

SAS PC Files Server provides data encryption and Authentication features with default port number 9621, which can be configured through the PC Files Server application console. Note that the bitness (32-bit or 64-bit) of the SAS PC Files server must match that of the Microsoft ACE driver on the same Windows machine.

When you install SAS PC Files Server, select the option to **Start Service Now and Automatically when Windows Starts** dialog box to run SAS PC Files Server as a Windows Service in the background. This is the default setting, which starts the service and sets the service start-up type to “automatic.” To run SAS PC Files Server as a desktop application, verify that this option is cleared.

Note: Only one instance of SAS PC Files Server can run at a given time. You cannot run SAS PC Files Server as a Windows service and as an application server at the same time.

Both server mode and service mode store the server configuration settings in the Windows Registry. If the settings are changed in server mode, the server running in service mode is affected after it is restarted. The default configuration is sufficient for most installations.

To change the configuration options, run the SAS PC Files Server in server mode by taking the following steps:

1. In Windows Services (**Start > Run**, enter `services.msc`), locate and stop the SAS PC Files Server Service.

2. Start the PC Files Server in Server mode by clicking **Start > SAS > PC Files Server**.
3. Change the options that you want to change on the PC Files Server application console.
4. Click the **Shutdown** button to stop the PC Files Server in Server mode.
5. Return to Windows Services and start the SAS PC Files Server Service.

SAS/ACCESS Interface to the PI System

SAS/ACCESS Interface to the PI System requires the installation of the PI System client software that is available from OSISOFT. No additional steps are required to set up the environment and libraries.

Verify that the user ID or user IDs that use SAS/ACCESS Interface to the PI System are known to the PI Server. If required, use PI System Management Tools on the PI Server to create mappings for the specific user IDs.

In addition, verify that the PI System Client is configured to recognize any required PI Server or Servers. You must use the PI System Management Tools on the client computer that is running SAS. The default PI Server is accessed when using LIBNAME without an explicit PI server name.

To test your connection, issue the following commands:

```
LIBNAME x PISYSTEM;
```

(PI System Data Archive server)

```
LIBNAME x PIAF;
```

(PI System Asset Framework server)

Multi-byte Character Sets

The PI System client driver (API) performs some internal transcoding using the Windows System Locale. Therefore, in order to use multi-byte character sets (such as Asian characters), you must set the correct Windows System Locale in **Control Panel > Region and Language > Administrative > Change System Locale**. A restart is required when this setting is changed. In addition, you must start SAS using the correct locale/encoding and also use the following setting in your SAS session:

```
options validvarname=any validmemname=extend;
```

Multi-byte characters may be used for PI System tag descriptors (labels) and string data values, but the use of multi-byte characters as tag names has limitations. For more information, refer to the SAS/ACCESS to the PI System documentation at

<https://support.sas.com/documentation/cdl/en/acpi/69803/HTML/default/viewer.htm>

SAS/ACCESS Interface to R/3

SAS/ACCESS Interface to R/3 requires extensive post-installation configuration before it can be used. For detailed information, refer to the *Post-Installation Instructions for SAS/ACCESS 9.4 Interface to R/3*, available at:

<http://support.sas.com/documentation/installcenter/en/ikr3cg/66652/PDF/default/config.pdf>

SAS/ACCESS Interface to Salesforce

SAS/ACCESS Interface to Salesforce uses the Salesforce SOAP API. Therefore, API access must be enabled for the profiles of any users who will be connecting to Salesforce from SAS.

To enable API access:

1. Visit the Settings area of the Salesforce Administration website.
1. Under the **Administration** heading in the side bar, find the **Users** section and click **Profiles**.
2. Click **New** to create a new profile, or click **Edit** if you want to modify an existing user profile.
3. Verify that the **API Enabled** permission is checked for the selected profile.

Repeat these steps for the user accounts of all users who will make connections to Salesforce from SAS.

SAS/ACCESS Interface to Snowflake

Starting with SAS 9.4M8, the installation of SAS/ACCESS Interface to Snowflake includes a Snowflake ODBC driver component, snowodbcdrv.

You can use the ODBC administrator to configure a Data Source Name (DSN) to access Snowflake. If multiple users can use the same workstation to access Snowflake, create it as a system DSN.

To create a data source in order to enable access to Snowflake data:

1. Run Data Sources (ODBC) from Administrative Tools in the Control Panel.
2. Click the **User DSN** or **System DSN** tab, depending on the number of users.
3. Click **Add**, and select **SnowflakeDSIIDriver** from the dialog box.
4. Specify any name in the **Data Source Name** field. This name is used by SAS to identify this database connection.
5. Specify a **Description** for this connection.
6. Specify the hostname or IP address as the name of the server where Snowflake is installed.
7. Specify the **Database Name** of the database on the Snowflake server.
8. Click **Test Connection** and type your user ID and password.
A test connection is initiated.
9. Click **OK** to close the ODBC Administrator and save the new DSN entry.

SAS/ACCESS Interface to SAP ASE

In SAS 9.4, the administrator or user must install two SAP (Sybase)-stored procedures on the target server. These files are available in a compressed TGZ archive for download from the SAS Support site at <https://support.sas.com/downloads/package.htm?pid=2458>.

The archive includes the following files:

- sas-spcp.txt is a text file containing instructions on how to do the installation.
- sas-spdf.txt is the first of two actual stored procedure scripts for ASE 12.x server.
- sas-spdf_15.txt is the first of two actual stored procedure scripts for ASE 15.x server.
- sassp2df.txt is the second of two stored procedure scripts for ASE 12.x server.
- sassp2df_15.txt is the second of two stored procedure scripts for ASE 15.x server.

The process uses two SAP facilities, `defncopy` and `isql`.

To complete your installation, add `-set sassyb sywx6150` to your `sasv9.cfg` file.

SAS/ACCESS Interface to SAP HANA

SAS/ACCESS Interface to SAP HANA uses an ODBC interface to access SAP HANA.

SAS/ACCESS Interface to SAP HANA requires the 64-bit ODBC driver for SAP HANA. The ODBC driver is part of the SAP HANA Client 1.00.

The following are the prerequisites for configuration of SAS/ACCESS Interface to SAP HANA:

- You have downloaded the SAP HANA client software from SAP Service Marketplace and installed and configured the ODBC driver.
- For more information about how to obtain the software, see the *SAP HANA Master Guide* on http://help.sap.com/hana_appliance/.
- For information about how to install and configure the ODBC driver, see the *SAP HANA Client Installation and Update Guide* at http://help.sap.com/hana_appliance/.

Create a Data Source

After the ODBC client has been installed, you can configure the ODBC data source. SAS recommends (but does not require) that you create a data source, using the instructions below.

If multiple users may use the same workstation to access the SAP HANA database, you can create it as a system Data Source Name (DSN) rather than as a user DSN.

Take the following steps to create a data source for SAP HANA database access:

1. Run ODBC Administrator from the **Control Panel** or **Start** menu.
2. Select the **User DSN** or **System DSN** tab, depending on the number of users who will access the workstation.
3. Click **Add** and select `HDBODBC` from the pop-up window. Click **Finish**.
4. Enter any name in the **Data Source** field.
5. Enter the hostname or IP Address and the port number in the **Server:Port** field.
6. Click **Settings...** for additional advanced parameters. Enter additional parameters. Click **OK**.
7. Click **Connect**.
8. Type the user name in the **User** field, and type the password in the **Password** field.
9. Click **OK**. After a message appears that indicates that the test was successful, click **OK**.
10. Click **OK**.

Bulk Load

The bulk load feature for SAS/ACCESS Interface to SAP HANA uses SFTP to transfer files to the SAP HANA server.

If you want to use the bulk load feature, you must configure SFTP for accessing the SAP HANA server from the SAS server.

SAS/ACCESS Interface to SAP IQ

SAS/ACCESS Interface to SAP IQ (formerly SAS/ACCESS Interface to Sybase IQ) requires the installation of SAP IQ client software, which is available from SAP. On Windows for x64, no additional steps are required to set up the environment and libraries.

SAS/ACCESS Interface to Snowflake

Starting with SAS 9.4M8, the installation of SAS/ACCESS Interface to Snowflake includes a Snowflake ODBC driver component, snowodbcdrv.

You can use the ODBC administrator to configure a Data Source Name (DSN) to access Snowflake. If multiple users can use the same workstation to access Snowflake, create it as a system DSN.

To create a data source to enable access to Snowflake data:

1. Run Data Sources (ODBC) from Administrative Tools in the Control Panel.
2. Click the **User DSN** or **System DSN** tab, depending on the number of users.
3. Click **Add**, and select SnowflakeDSIIDriver from the dialog box.
4. Specify any name in the Data Source Name field. This name is used by SAS to identify this database connection.
5. Specify a **Description** for this connection.
6. Specify the host name or IP address as the name of the server where Snowflake is installed.
7. Specify the **Database Name** of the database on the Snowflake server.
8. Click **Test Connection** and type your user ID and password.
A test connection is initiated.
9. Click **OK** to close the ODBC Administrator and save the new DSN entry.

SAS/ACCESS Interface to Teradata

Before you use SAS/ACCESS Interface to Teradata, verify connectivity by logging into your Teradata account with the Teradata BTEQ utility. If BTEQ is unavailable, establish connectivity as documented in the *SAS/ACCESS Interface to Teradata* white paper, available at <http://support.sas.com/resources/papers/teradata.pdf>.

If BTEQ fails to connect to the Teradata server, you may need an entry in the hosts file on your PC to provide the network address of the Teradata server. Typically, this means adding a dbccop1 entry to your hosts file. For more information about the entry, see your *Teradata Client for Windows Installation Guide*.

Teradata Parallel Transporter

SAS/ACCESS supports the Teradata Parallel Transporter API for loading data using Multiload (TPT UPDATE operator), Fastload (TPT LOAD operator) and multi-statement inserts (TPT STREAM operator). The API also supports reading data using FastExport (TPT EXPORT operator).

Note: TPT API is now the *default and recommended* Method that is used for all Teradata Utility processing in SAS Access Interface to Teradata.

The following two requirements must be met:

1. The TPT API must be installed on the system where SAS Access is installed.

The Teradata installation process installs both 32-bit and 64-bit libraries on x64 platforms, and the 64-bit libraries must be referenced first in the `PATH`. Sometimes the TTU 13.10 installation process places the 32-bit libraries first in the `PATH`, so you may need to verify this, and manually adjust it. From our experience, TTU 14 does not have this issue. The 64-bit libraries must be listed before the 32-bit in your `PATH`! A normal Teradata installation of TPT will create the environment variable `TWB_ROOT`.

Example:

`TWB_ROOT = C:\Program Files\Teradata\Client\13.10\Teradata Parallel Transporter`. You can then reference this `TWB_HOME` environment variable at the beginning of your `PATH` environment variable, as:

```
%TWB_ROOT\bin64\  
%TWB_ROOT\msg64\  

```

This sets the 64 bit libraries and message files first in your `PATH` environment variable.

2. The system variable `TKPATHX8664` must be modified. If the variable does not exist already, it must be added.

To modify the variable, append the directory where `sasiotpt.dll` is located. Typically this DLL is located in your SAS product tree.

Example:

`C:\Program Files\SASHome\SASFoundation\9.4\access\sasexe`
(or the directory path where `sasiotpt.dll` is installed)

To locate and edit the `TKPATHX8664` system variable, follow the instructions for your Windows operating system.

To determine whether TPT is installed correctly, perform a quick test within SAS. Issue a Teradata `libref`, and then invoke `fastload` with a single row:

```
/* quick test to see if TPT is installed correctly */  
/* TPT = YES b default */  
  
Libname x teradata server=mydbc user=dtest pw=xxxxx ;  
  
Data x.new (fastload=yes) ; x=99; run;  
  
NOTE: The data set X.new has 1 observations and 1 variables  
NOTE: Teradata connection: TPT Fastload has inserted 1 row(s).  
NOTE: Data statement used(Total process time):  
  
real time 4.39  
cpu time 0.29
```

TPT or Legacy Teradata Utility (FastExport and Multiload)

The following are the advantages of using TPT instead of Legacy Teradata Utility:

- High performance, multi-session interface for bulk load, bulk update, and bulk export data transfer

- TPT API allows SAS to perform In-Stream Processing via API Calls; no control files or intermediate data movement
- Use of 64-bit libraries on 64-bit operating systems
- Enhanced Performance now, improving in the future
- Configuration is less complex; no loading and launching of separate Teradata utility processes, no inter-process communication links required.
- TPT is integrated with Teradata Active System Management and Teradata Multi Systems Manager suite of support products

Legacy Teradata Utility Configuration

FastExporting

For optimal reads of large tables, SAS/ACCESS can perform *FastExporting*. To perform *FastExporting*, the Teradata FastExport Utility must be present on the system where you install SAS. You must also modify the `PATH` system variable. Append two directory paths to the end of `PATH`:

1. The directory where `fexp.exe` (the FastExport Utility) is located. Often this is `C:\Program Files\Teradata\Client\13.0\bin`.
2. The directory where `sasaxsm.dll` is located (`sasaxsm.dll` is typically located in your SAS product tree, in the `!SASROOT\access\sasexe` directory.)

The FastExport Utility is not required; SAS/ACCESS reads large tables efficiently without it. For more information, see the `DBSLICEPARM` option in your SAS/ACCESS Interface to Teradata documentation. Contact Teradata to obtain the Teradata FastExport Utility.

For more information about SAS/ACCESS Interface to Teradata, see the Teradata chapter in *SAS/ACCESS 9.4 for Relational Databases: Reference*, and the *SAS/ACCESS Interface to Teradata* white paper, which can be found at <http://support.sm/resources/papers/teradata.pdf>.

MultiLoad

SAS/ACCESS can load large volumes of data to non-empty tables using MultiLoad. To perform MultiLoading, the Teradata MultiLoad Utility must be present on the system where you install SAS. You must also modify `Path`, a system variable.

Append two directory paths to the end of `Path`:

1. The directory where `mload.exe` (the MultiLoad Utility) is located. Often this is `C:\Program Files\Teradata\Client\13.0\bin`.
2. The directory where `sasmlam.dll` and `sasmlne.dll` are located (`sasmlam.dll` and `sasmlne.dll` are usually located in your SAS product tree, in the `!SASROOT\access\sasexe` directory.)

The MultiLoad Utility is not required; SAS/ACCESS provides other options for loading tables. For more information, see the `MULTISTMT` option in your SAS/ACCESS Interface to Teradata documentation. Contact Teradata if you want to obtain the Teradata MultiLoad Utility.

SAS/ACCESS Interface to Vertica

Install an ODBC driver version 6.1 or later that is associated with Vertica Analytic Database. To verify that the installation was performed correctly, check the **Drivers** tab in the ODBC Data Source Administrator dialog box in the Control Panel. You will see “Vertica driver” listed on the **Drivers** tab.

SAS Code Examples

1. If the Data Source Name (DSN) is created in ODBC Data Source Administrator, we can use that DSN as in this example:

```
libname db vertica dsn=<dsn name> user=xxx password=xxxxxxx;
```

2. If no DSN is created, we can connect to the database directly, as in this example:

```
libname db vertica server="xxx " port=5433 user=xxx  
password=xxxx database=xxxx;
```

SAS/ACCESS Interface to Yellowbrick

SAS/ACCESS Interface to Yellowbrick uses the ODBC driver for PostgreSQL that is included with Base SAS.

For DSN-less connections, no additional configuration is required.

You can use the ODBC administrator to configure a Data Source Name (DSN) to access Yellowbrick. If multiple users can use the same workstation to access Yellowbrick, create it as a system DSN.

To create a data source to enable access to Yellowbrick data:

1. Run Data Sources (ODBC) from Administrative Tools in the Control Panel.
2. Click the **User DSN** or **System DSN** tab, depending on the number of users.
3. Click **Add**, and select PostgreSQL Unicode(x64) from the dialog box.
4. Enter any name in the **Data Source Name** field. This name is used by SAS to identify this database connection.
5. Enter a **Description** for this connection.
6. Supply the hostname or IP address as the name of the server where Yellowbrick is installed.
7. Type the **Port Number** where the host is listening for Yellowbrick connections. The default is 5439.
8. Specify the **Database Name** of the database on the Yellowbrick server.
9. Click **Test Connection** and specify your user ID and password.
A test connection is initiated.
10. Click **OK** to close the ODBC Administrator and save the new DSN entry.

Chapter 6: Configuring and Administering SAS In-Database Products

Deployment of SAS In-Database products, including the SAS Embedded Process, requires detailed configuration and administration steps.

For the SAS Embedded Process, follow the steps in the Software Order Email (SOE) that contains only one or more SAS Embedded Processes. For all other components, follow the steps in your SOE and QuickStart Guide to perform the initial deployment. Then refer to the chapter of the *SAS In-Database Products: Administrator's Guide* that corresponds to your particular database. This chapter contains instructions about how to install and configure the in-database deployment packages for your specific database.

These in-database deployment packages are required to enable the following actions:

- using the SAS Scoring Accelerator
- using the SAS In-Database Code Accelerator
- using the SAS Data Loader for Hadoop
- reading and writing data to a Hadoop Distributed File System in parallel for High-Performance Analytics
- publishing formats
- using the SAS_PUT function
- using any other software that requires the SAS Embedded Process

When you have completed the instructions described there, your software will be ready for use.

The *SAS In-Database Products: Administrator's Guide* is located at <http://support.sas.com/documentation/onlinedoc/indbtech/>

Configuring and Administering SAS Data Loader for Hadoop

SAS Data Loader for Hadoop is deployed in a two-part process that uses two SOE messages.

The first part of this process deploys the SAS In-Database Technologies for Hadoop components. This collection of technologies includes the following products and components:

- SAS/ACCESS Interface to Hadoop *
- SAS Embedded Process for Hadoop *
- SAS In-Database Code Accelerator for Hadoop
- SAS Data Quality Accelerator for Hadoop
- SAS Quality Knowledge Base (QKB)
- Other components

* For the SAS Data Loader for Hadoop to operate, these products and components require additional configuration. A system administrator installs and configures these SAS products and components.

SAS recommends configuring the following products and components in the following order:

1. SAS/ACCESS Interface to Hadoop – For information about SAS/ACCESS configuration, see *SAS 9.4 Hadoop Configuration Guide for Base SAS and SAS/ACCESS* on the SAS 9.4 Hadoop support page: <https://support.sas.com/en/documentation/third-party-software-reference/9-4/support-for-hadoop.html>.
2. SAS Embedded Process for Hadoop – The SAS Embedded Process is included in an in-database deployment package. This package must be deployed on the Hadoop cluster. For information about deploying the SAS Embedded Process, see the *SAS In-Database Products: Administrator's Guide* at <http://support.sas.com/documentation/onlinedoc/indbtech/>.
3. SAS Data Quality Accelerator for Hadoop – If you use the Software Deployment Manager, the SAS Data Quality Accelerator is installed silently when you start the in-database package deployment. You can also deploy this component manually. For more information, see the *SAS In-Database Products: Administrator's Guide* at <http://support.sas.com/documentation/onlinedoc/indbtech/>.
4. SAS Quality Knowledge Base – The SAS QKB component can be installed using the SAS Deployment Wizard, or you can install it manually. For information about this component, see the *SAS In-Database Products: Administrator's Guide* at <http://support.sas.com/documentation/onlinedoc/indbtech/>.

Note: The *SAS In-Database Products: Administrator's Guide* also describes tasks for configuring your Hadoop cluster and security.

SAS Data Loader for Hadoop vApp

The second part of the deployment process for SAS Data Loader for Hadoop sets up the SAS Data Loader for Hadoop vApp. This part of the process requires you to use a separate software order (that is, a separate Software Order Email) to install and configure the SAS Data Loader vApp on a client machine. As part of this client configuration, you must request Hadoop connection and security information from the system administrator who installed SAS In-Database Technologies for Hadoop.

The *SAS Data Loader for Hadoop: vApp Deployment Guide* contains information about how to install and configure the vApp on a client machine to enable the SAS Data Loader for Hadoop.

For more information, see the documentation for the SAS Data Loader for Hadoop on the following site: <http://support.sas.com/documentation/onlinedoc/dmdd/>.

Chapter 7: Post-Installation Setup for SAS/ASSIST Software

This chapter describes how to add an optional master profile to SAS/ASSIST software. You can use a master profile to override the default settings as sent by SAS. This allows you to provide a customized setup for SAS/ASSIST software. With the master profile, you can control the profile options of all SAS/ASSIST users from one central place. For information on the profile options, refer to *SAS/ASSIST Administrator's Guide*.

Adding a Master Profile

Complete the following steps to add a master profile to SAS/ASSIST software:

1. Specify the location of the master profile by creating a new directory that all users of SAS/ASSIST software will have read access to.

All users with write access to this directory will automatically also have write access to the master profile in SAS/ASSIST software. Select a name that conforms to the naming conventions at your installation. The name of this new directory must be stored in an entry in the SASHELP library. This requires that you have write access to the SASHELP library.

On line 1 of the Editor window of the SAS Display Manager System, type the physical pathname of the master profile directory. Execute the Save command to store this in the SASHELP.QASSIST catalog. For example:

```
SAVE SASHELP.QASSIST.PARMS.SOURCE
00001 S:\SAS\ASSIST\PARMS
00002
00003
```

The location of the master profile is now known by SAS/ASSIST software.

2. Create the master profile.

The first time SAS/ASSIST software is started, a master profile is created if SASHELP.QASSIST.PARMS.SOURCE contains the name of an existing physical pathname, and the person who starts SAS/ASSIST software has write access to this physical pathname.

3. Customize the master profile by starting SAS/ASSIST software and selecting **Setup > Profiles > Master/group...**

If you have write access to the SAS library containing the master profile, you can specify default values for your installation. New users will use these values as they start SAS/ASSIST software.

Note: If you restrict values by typing R in **Status**, users will not be allowed to change the values you define.

You can run SAS/ASSIST software in two different styles - workplace or block menu. The block menu can be new style or old style. You can control this using the profile options below.

Run workplace:

```
SAS/Assist style: Workplace
```

Run block menu new style:

SAS/Assist style:	Block Menu
Save selections on end:	Yes
Menu Style:	New

Run old style:

SAS/Assist style:	Block Menu
Save selections on end:	Yes
Menu Style:	Old

By setting the default values in the master profile, you can control if users should use the new or old style of SAS/ASSIST software. In addition, there are many other profile options. For more information on these options, refer to SAS/ASSIST Administrator's Guide.

4. Create group profiles.

From the master profile, it is possible to create group profiles to allow groups of users to have different setups. The master profile controls group profiles and user profiles when a user is not a member of any group. All users are indirectly controlled by the master profile when option values are set to a restricted (R) status.

From **Setup > Master/Group...**, select **Tools > Create Group Profile**. To add users to a group profile, select **Tools > Update User Group**. By default, the user ID is found in the macro variable &SYSJOBID. This value is set in the option user ID in the master profile (option type System Administration). Change the value if your site uses another variable to keep the user ID. If the value name starts with &, it is a macro variable; otherwise, it is an environment variable, which is set before you start up SAS 9.4

Chapter 8: SAS/CONNECT Configuration

TCP/IP is the access method supported for SAS 9.4 on Windows for x64. For information about the access methods supported by other systems, refer to the *SAS/CONNECT User's Guide*. This document can be found at

https://go.documentation.sas.com/?docsetId=connref&docsetTarget=n0rmffwsiolvnyn16cp_hsbkwwq0c.htm&docsetVersion=9.4.

Note: The APPC access method is no longer supported for the Windows operating system.

Storing and Locating SAS/CONNECT Script Files

Several sample script files are shipped with SAS/CONNECT software. SAS/CONNECT software uses these script files to establish a connection to a remote SAS session.

The SASSCRIPT configuration option points to the location of the SAS/CONNECT script files. The SASSCRIPT option is used by SAS/ASSIST software and can be used by user-written SCL applications.

Under Windows, the script files are installed into the !SASROOT\CONNECT\SASLINK directory by default. The following line is added to the SASV9.CFG file when SAS/CONNECT software is installed:

```
-SASSCRIPT !SASROOT\CONNECT\SASLINK
```

To move the script files to another directory, you must edit the SASV9.CFG file and update the SASSCRIPT option with the new directory location. This option can also be specified from the **Tools/Options/System/Communications/Networking and encryption** selection in DMSEXP mode.

TCP/IP

TCP/IP is the access method supported for SAS 9.4 on Windows for x64. SAS/CONNECT software supports Microsoft's TCP/IP System Driver, which is provided with Windows.

Configuring the SAS Windows Spawner Program

The SAS Windows Spawner is stored in the !SASROOT directory and can be executed manually from the !SASROOT directory at any time. You can run the SAS Windows Spawner as a service by executing `cntspawn` with the `-install` option. By default, the SAS Windows Spawner will be installed to run with security. For complete documentation on the Windows Spawner and the supported options, see the *SAS/CONNECT User's Guide*.

Note: If you are upgrading to SAS 9.4 and you run a spawner from a previous release as a service, you should stop and delete the existing spawner service. The SAS 9.4 CONNECT spawner can then be installed as a Windows service.

By default, when the SAS Windows Spawner is installed as a Windows service, it runs under the LocalSystem user ID that has all required User Rights for running the SAS Windows Spawner.

If you do not install the SAS Windows Spawner as a Windows service (run it from your system prompt), the Windows user ID that is used to start the SAS Windows Spawner must be the local Administrator of the machine and must have the following User Rights:

- act as part of the operating system
- bypass traverse checking (the default is everyone)
- increase quotas
- replace a process level token
- log on locally (the default is everyone)

The Windows user ID specified at login needs only the User Right to “log on as a batch job.”

Chapter 9: Post-Installation Configuration for SAS/IntrNet Software

This chapter has information for your SAS/IntrNet installation. It will help you install, configure, and test your SAS/IntrNet components.

The procedures for installing SAS software using the SAS Deployment Wizard are described in other documentation and are not available in this chapter. In addition, the installation of a web server is not described in SAS documentation because it is the administrator’s responsibility.

When SAS/IntrNet software has been installed, configured and tested using the procedures described in this chapter, review the latest version of the SAS/IntrNet product documentation online at <http://support.sas.com/documentation/onlinedoc/IntrNet/index.html>. The “What’s New” page at this web site lists any recent changes to the product or documentation.

Overview

All SAS/IntrNet installations are made up of two components:

1. The SAS/IntrNet server (also referred to as *the Application Server*). This is where SAS Foundation is installed.
11. CGI Tools (also referred to as *the Broker*). This is where the `broker.cfg` file and its supporting files are installed.

When you install SAS/IntrNet, select one of the following installation options:

- Type A - The SAS/IntrNet server and CGI Tools components are both installed on the same machine. The web server must be installed before starting the SAS installation.
- Type B -The SAS/IntrNet server component is installed on one machine and the CGI Tools component is installed on a different machine. The web server must be installed on the CGI Tools machine prior to installing CGI Tools.

Type A and Type B require different installation steps:

Type A Installation Steps	Type B Installation Steps
Confirm that the web server (IIS, Apache etc.) is installed on the same machine as your SAS/IntrNet software.	Confirm that the web server (IIS, Apache, etc.) is installed on the machine where you will install CGI Tools.
Install your SAS products. Select CGI Tools for the Web Server in the Select Products to Install menu.	On the application server machine, start your SAS installation. Clear CGI Tools for the Web Server in the Select Products to Install menu.
	On the web server machine, start your SAS installation. Clear all products except CGI Tools for the Web Server in the Select Products to Install menu. <i>(Optional)</i> Select the IntrNet Monitor or Connect Drivers.

Type A Installation Steps	Type B Installation Steps
Test the Broker.	
Configure a Socket Service.	
Start the Socket Service.	
Test the Socket Service.	

Refer to your web server’s documentation for its installation procedures.

Installing and Configuring SAS/IntrNet Software

Install Your Web Server Software

Refer to your web server’s documentation for its installation procedures.

Install Your SAS Software

Refer to your *QuickStart Guide* for a description of how to start your SAS software installation.

If you are performing a Type A installation (as described in the “Overview” above), take the following steps:

1. Confirm that your web server software is installed before starting your SAS software installation.
2. Check “CGI Tools for the Web Server” in the **Select Products to Install** dialog box.

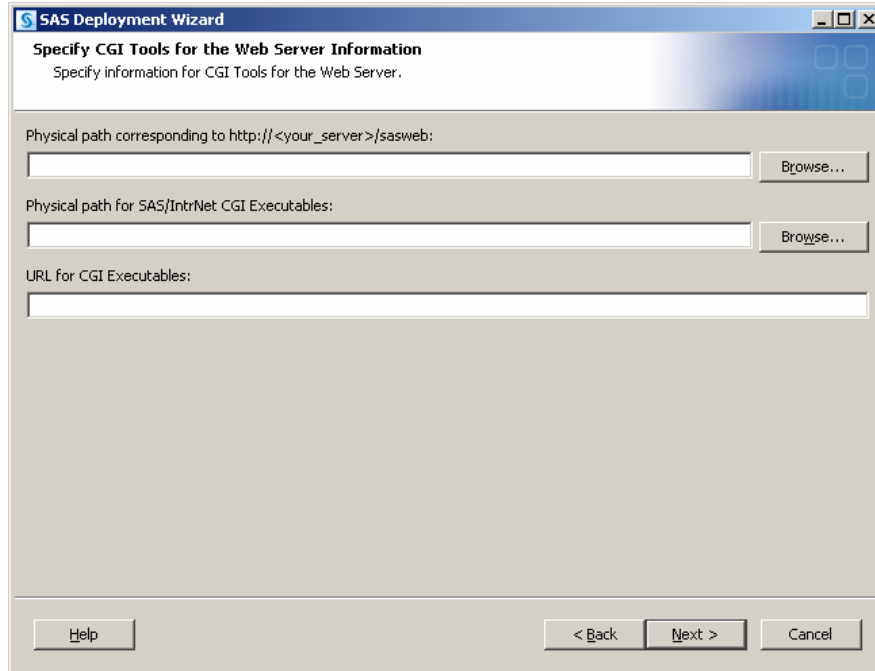
If you are performing a Type B installation (as described in the “Overview” above), take *both* of the following steps:

1. Install the SAS software on the SAS System side, unchecking “CGI Tools for the Web Server” in the **Select Products to Install** dialog box.
2. Start the SAS software install on the web server and check “CGI Tools for the Web Server” in the **Select Products to Install** dialog box. SAS/IntrNet Monitor and SAS/CONNECT Driver for Java are optional selections. Uncheck everything else.

CGI Tools Installation Dialogs

The following windows appear for CGI Tools for the Web Server for all installations. For information about the fields, click **Help** on any dialog box.

Customary entries are documented following each dialog box shown below. Customize the entries according to your environment.



The following are examples of common entries for popular web servers. Customize your entries according to your own web server environment. These fields will tell SAS where your web server software is located.

Physical path corresponding to `http://<your_server>/sasweb`:

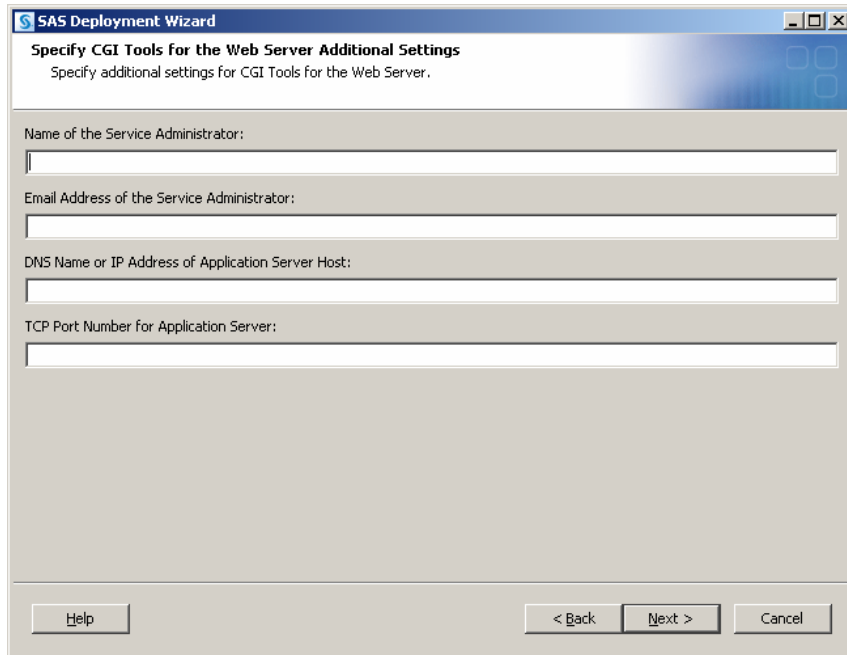
- IIS: `C:\Inetpub\wwwroot\sasweb`
- Apache (Windows): `C:\program files\Apache Software Foundation\Apache2.2\htdocs\sasweb`
- Apache (UNIX): `/usr/local/apache2/htdocs/sasweb`

Physical path for SAS/IntrNet CGI Executables:

- IIS: `C:\Inetpub\scripts`
- Apache (Windows): `C:\program files\Apache Software Foundation\Apache2.2\cgi-bin`
- Apache (UNIX): `/usr/local/apache2/cgi-bin`

URL for CGI Executables:

- IIS: `http://<web_servername>/scripts`
Example: `http://abcserver.comp.com/scripts`
- Apache (Windows): `http:// <web_servername>/cgi-bin`
Example: `http://abcserver.comp.com/cgi-bin`
- Apache (UNIX): `http://<web_servername>/cgi-bin`
Example: `http://abcserver.comp.com/cgi-bin`



Note that your entries on this dialog box are added to the `broker.cfg` file. The `broker.cfg` file is a text file that can be edited after the installation is complete.

Name of the Service Administrator:

(Optional) Enter the name of the administrator (for example, John Doe).

Email Address of the Service Administrator:

(Optional) Enter the email address of the administrator (for example, NetAdmin@comp.com).

DNS Name or IP Address of Application Server Host:

Enter the DNS name or IP address of the application server host where SAS Foundation is installed.

TCP Port Number for Application Server:

The customary default port is 5001, but you can use any valid, available port on your system between 256 – 65535.

Installing CGI Tools and SAS Foundation on Machines with Different Operating Systems

Your SAS Foundation software might be running on an operating system that is different from your CGI Tools operating system. For example, SAS Foundation might be installed on a Windows system and your CGI Tools might be installed on a UNIX system. The CGI Tools installation from the SAS Deployment Wizard will detect the destination operating system and install the appropriate operating system-specific software.

You must make the SAS Software Depot available to the installer on the destination CGI Tools system. Select one of the following methods, based on the facilities at your site:

- Launch the setup from a SAS Software Depot that resides on a remote system. A cross-platform file access method, such as NFS or SAMBA, might be required to connect the two systems.
- Create media from an existing depot using the SAS Deployment Wizard and use that medium on the host machine. This process is described more thoroughly in the *SAS Deployment Wizard and SAS Deployment Manager 9.4: User's Guide*, available from Install Center, <http://support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf>

Note: SAS/IntrNet operation requires TCP/IP connectivity between the SAS Foundation system and the CGI Tools system, regardless of the operating systems where these components are installed.

Test the Web Server

To determine whether the web server is running, launch the browser on the web server browser and enter `http://localhost`. If the web server is running, a web page is returned.

If you do not see a web page, debug or reinstall your web server before continuing.

Internet Information Services (IIS) 6.0+ Post-Install Configuration for Broker

In IIS 6.0 and later, manual steps are required to enable IIS to recognize the Broker as an application. For more information, visit <http://support.sas.com/kb/23/931.html>.

Test the Application Broker

To verify that CGI Tools was installed correctly and can access the `broker.cfg` file, point your web browser to the following URL:

Windows:

IIS: `http://<web_servername>/scripts/broker.exe`

Apache: `http://<web_servername>/cgi-bin/broker.exe`

Other hosts:

`http://your_webserver/cgi-bin/broker`

Replace *your_webserver* with the name of the web server. Change the URL path if you installed CGI Tools to a different directory. You should see a web page similar to the following:

```
SAS/IntrNet Application Dispatcher
Application Broker Version 9.4 (Build 1502)
Application Dispatcher Administration
SAS/IntrNet Samples
SAS/IntrNet Documentation - requires Internet access
```

If you do not see this page, you must debug your web server installation before continuing. Verify that your web server is enabled for CGI execution in the directory where you installed the Application Broker (`broker.exe` and `broker.cfg` files). This directory was determined by what was entered for **Physical path for SAS/IntrNet CGI Executables** during the CGI Tools installation described above.

Configure a Default Application Dispatcher Service

You must create a default Application Dispatcher service to run any of the sample programs supplied with SAS/IntrNet. Use the SAS Deployment Manager, which is accessible from the Start menu, to create the default service.

Take the following steps to create and start the default service:

1. From the Start menu, select **Programs** ➔ **SAS** ➔ **SAS Deployment Manager**.
2. When the Choose Language window opens, select the desired language and click **OK**.
3. The SAS Deployment Manager (SDM) displays the Select SAS Deployment Manager Task window. Under **SAS/IntrNet Service Tasks**, select **Create Socket Service** and click **Next** to continue.
4. The Specify Service Name window opens. The default value for the Service Name field is `default`. Create this as your first service because it is used when you run the samples. Click **Next** to continue.
5. The Specify Service Directory window opens. The SDM selects a default service root directory based on the location that you selected for user files when you installed SAS Software. This default location is recommended for most users, but you can use the **Browse** button to select a different directory. Click **Next** to continue.
6. The Specify Service Ports window opens. Type the TCP/IP port number that you reserved for the default Application Dispatcher service. Click **Next** to continue.
7. The Specify Administrator Password window opens. A password is not required for the default service. You can add an administrator password later if you use this service for production applications. Click **Next** to continue.
8. The Summary window opens. It indicates `Stage 1: Create Socket Service`.
 - If the information you have entered is correct, click **Start**.
 - To change any of the values you entered, click the **Back** button to step backward through the windows.
9. The In Progress window displays while SDM creates the service.
10. The Deployment Complete dialog opens when the task has completed.
 - If the service is created correctly, a green checkmark appears next to the **1. SAS/IntrNet** under **Stage 1: Create Socket Service**.
 - If there was a problem, a yellow exclamation or red X appears. Check the log for a description of the problem. The logs reside in `SASHOME\SASFoundation\9.4\intrnet\sasmisc`.

- From the Start menu, select **Programs** ➔ **SAS** (or other program group where SAS is installed) ➔ **IntrNet** ➔ **default Service** ➔ **Start Interactively**. Your default Application Server should now be running.

Starting and Stopping the Default Service

To start or stop the default service, click **Start** and select **Programs** ➔ **SAS** (or another program group where SAS is installed) ➔ **IntrNet** ➔ **default Service** ➔ **Start Interactively**.

Your default application server should now be running.

Testing the Socket Service

- To verify that the service was installed and started correctly, point your web browser to this URL:

Windows:

IIS: `http://<web_servername>/scripts/broker.exe`

Apache: `http://<web_servername>/cgi-bin/broker.exe`

Other hosts:

`http://your_webserver/cgi-bin/broker`

Replace *your_webserver* with the name of the web server. Change the URL path if you installed the Application Broker to a different directory. You should see the following web page: SAS/IntrNet Application Dispatcher

Application Broker Version 9.4 (Build 1502)

Application Dispatcher Administration

SAS/IntrNet Samples

SAS/IntrNet Documentation - requires Internet access

- Click on the **Application Dispatcher Administration** link to see if the Application Broker can read the `broker.cfg` file. The Application Dispatcher Services web page opens.
- Verify connectivity between the Application Server and the web server. Click the **Application Dispatcher Administration** link and then click the **ping** link under **SocketService default** heading. If the ping is successful, you should see:

Ping. The Application Server <hostname>:<port_number> is functioning properly.

- To complete installation testing, type this URL in your browser address line:

Windows:

IIS:

`http://your_webserver/scripts/broker.exe?_service=default&_program=sample.webhello.sas`

Apache:

`http://your_webserver/cgi-bin/broker.exe?_service=default&_program=sample.webhello.sas`

Other hosts:

```
http://your_webserver/cgi-bin/broker?_service=default&_program=sample.webhello.sas
```

You should see the string “Hello World!” in large bold type in your browser. If you do not, add the debug option to create a log:

Windows:

IIS:

```
http://your_webserver/scripts/broker.exe?_service=default&_program=sample.webhello.sas&_debug=131
```

Apache:

```
http://your_webserver/cgi-bin/broker.exe?_service=default&_program=sample.webhello.sas&_debug=131
```

Other hosts:

```
http://yourwebserver/cgi-bin/broker?_service=default&_program=sample.webhello.sas&_debug=131
```

Save the log page in the browser to provide to SAS Technical Support.

Configure Additional Services

This chapter describes how to configure only a simple default Application Dispatcher service. There are many reasons you may want to configure additional services, including segregating applications by security or performance requirements and implementing more scalable servers. See the “Using Services” section of the SAS/IntrNet Application Dispatcher documentation at <http://support.sas.com/documentation/onlinedoc/intrnet/index.html> information on configuring additional services, using the Load Manager, and adding pool services.

Chapter 10: Configuring Encryption

In SAS 9.4 – SAS 9.4M7, SAS/SECURE was included with SAS Foundation in order to provide encryption. Beginning with SAS 9.4M8, SAS Foundation servers use the cryptographic libraries that are available from the operating systems that are supported by SAS.

Each SAS-supported cipher suite might not be available from all operating systems. When this issue is encountered, use a cipher suite that is supported by both SAS and that operating system, or install a third-party SSL provider for use by SAS.

Compare the list of SAS-supported TLS protocols to those supported by Microsoft Schannel SSP Protocols in TLS/SSL (Schannel SSP) and the list of SAS-supported cipher suites to those cipher suites included in TLS/SSL (Schannel SSP) supported by Microsoft.

For more information, see [Encryption in SAS 9.4](#).

SAS/SECURE for Windows and Java Clients

In SAS 9.4 – SAS 9.4M7, in order to deploy encryption between a non-SAS client and a SAS server, installing the SAS/SECURE client components on the client machine was a required step. SAS/SECURE software included client components that non-SAS System client applications used to communicate with a SAS server in a secure environment.

The SAS/SECURE components needed by Windows clients were installed by running the SAS Deployment Wizard to access the SAS/SECURE Windows Client Components.

The SAS/SECURE components for Java clients provided encryption support for Java applications. You could incorporate this support into applications that are written using the following components:

- SAS/SHARE driver for JDBC
- SAS/CONNECT driver for Java
- IOM Bridge for Java

The required SAS/SECURE components were installed automatically by the SAS Deployment Wizard.

FIPS-Compliant Encryption

FIPS stands for Federal Information Processing Systems, and its 140-2 standard defines the security requirements for cryptographic modules. The 140-2 standard is detailed in the following document: <http://csrc.nist.gov/publications/fips/fips140-2/fips1402.pdf>.

The ENCRYPTFIPS option is an option added to SAS/CONNECT spawners, IOM spawners, and Base SAS so that the communication encryption will be compliant with FIPS 140-2. The ENCRYPTFIPS option is required for FIPS-compliant encryption.

If you use ENCRYPTFIPS, the NETENCALG option must be set to AES or SSL. In Windows 7 and later versions of Windows, you must enable the System cryptography: Use FIPS-compliant algorithms for encryption, hashing, and signing setting under your Local Security Policy or as part of a Group Policy. This setting instructs applications to use only cryptographic algorithms that are FIPS 140-2 compliant and are in compliance with FIP- approved modes of operation.

For more information about FIPS and encryption in general, refer to [Encryption in SAS 9.4](#).

Chapter 11: Post-Installation Setup for SAS/SHARE

This chapter discusses the use of the TCP/IP access methods with SAS/SHARE. TCP/IP is the access method that is supported for SAS 9.4 on Windows. For information about the access methods supported by other systems, refer to the *SAS/SHARE 9.4: User's Guide* at the following location: <http://support.sas.com/documentation/onlinedoc/share/index.html>.

Using the TCP/IP Communications Access Method

Communication between a SAS/SHARE server and user is handled by the TCP/IP communications access method, a part of SAS 9.4 that uses underlying communications software to exchange messages and data. The TCP/IP access method requires Microsoft's TCP/IP Network Protocol communications software.

Note: The APPC access method is no longer supported for Windows operating systems.

To use the TCP/IP access method, you must have the supporting software on each workstation where a SAS/SHARE server or user will execute.

System Configuration for the TCP/IP Access Method

SAS/SHARE supports Microsoft's TCP/IP Network Protocol, which is provided with Windows for x64.

To define server names in the TCP/IP SERVICES file, take the following steps:

1. Locate the SERVICES file.

This file is located under the \Windows directory path, depending on the specific Windows operating system and upgrade method. For example, under a machine configured with a Windows 7 operating system, the directory path is named

```
<drive letter>:\Windows\System32\drivers\etc
```

2. Specify the server names and port assignments.

Each SAS/SHARE server that runs on a network must be defined as a service in the SERVICES file. Each entry in this file associates a service name with the port number and protocol used by that service. An entry for a SAS/SHARE server has the form:

```
<server name>          <port number>/<protocol>      # <comments>
```

The server name must be 1-8 characters in length. The first character must be a letter or underscore. The remaining characters can include letters, digits, underscores, the dollar (\$) sign, or the at (@) sign. The port number must be higher than 1024, as any port equal to or less than 1024 is reserved. The protocol must always be TCP.

An entry for a server with the name MKTSERV might look like this:

```
mktserver          5000/tcp      # SAS server for Marketing and Sales
```

The server name is specified with the `SERVER=` option in the `PROC SERVER` statement in the server's SAS session and in the `PROC OPERATE` and `LIBNAME` statements in user and server administrator programs. If the server name is not defined, specify "`__<port#>`", two consecutive underscores followed by the port (for example, `server=__5012`).

For more information about the options used with `PROC SERVER` and `PROC OPERATE` procedures, refer to the *SAS/SHARE 9.4 User's Guide*.

Client-Side Components

SAS/SHARE includes client components that are used outside of your SAS installation. These components are available from the SAS 9.4 Software Download site and are described below:

SAS/SHARE Data Provider

The SAS/SHARE data provider enables you to access, update, and manipulate SAS data using OLE DB- and ADO-compliant applications on Windows platforms.

SAS ODBC Driver

The SAS ODBC driver enables you to access, update, and manipulate SAS data from ODBC-compliant applications on Windows platforms.

SAS/SHARE Driver for JDBC

The SAS/SHARE driver for JDBC enables you to write applets, applications, and servlets that access and update SAS data. The Java Tools package that includes the SAS/SHARE driver for JDBC also includes the SAS/CONNECT driver for Java. If you are writing Java programs using these interfaces, you may also want to use the tunnel feature. This optional feature can be used with the Java applets that you write to solve some common configuration problems.

SAS/SHARE SQL Library for C

The SAS SQL Library for C provides an application programming interface (API) that enables your applications to send SQL queries and statements through a SAS/SHARE server to data on remote hosts.

NLS Information

Sites that develop or support international applications that use SAS/SHARE software should refer to [Chapter 2: Post-Installation Instructions for National Language Support \(NLS\)](#) on page 3.



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