

Configuring a SAS® Business Intelligence Client with the SAS® Server to Support Multilingual Data

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ABSTRACT

As the pharmaceutical industry has become an increasingly global enterprise, more and more companies are processing multilingual data. In order for a SAS® Business Intelligence client to support this type of data, the language environment must be configured correctly between the SAS® client and the SAS server. Proper configuration includes the correct locale setting on the client side and the correct encoding on the server side.

This paper, written for SAS users and SAS administrators, introduces several methods for configuring an effective and optimized multilingual working environment for SAS clients such as SAS® Enterprise Guide®, SAS® Data Integration Studio, and SAS® Enterprise Miner™. One item of particular interest in the paper is a unique approach to setting the workspace server to different encoding values on a per-user basis.

The methods that are discussed apply to SAS servers in both the Microsoft Windows and UNIX operating environments. Each method's advantages and disadvantages are detailed, along with an example scenario that illustrates when the method is best used. SAS® Enterprise Guide® 7.11 and SAS® 9.4 Unicode Server are used, respectively, as the client and server in the examples.

INTRODUCTION

In the world of software applications, handling multilingual data is an important aspect of gaining and maintaining success in the industry. SAS is a leader in this area, offering powerful and flexible applications that help you handle multilingual data. For example, you can use SAS sessions with different session encodings to process the corresponding encoded data.

However, when you use a SAS session as a server in a business-intelligence (BI) environment, the ability to use multiple encodings is limited because you can use only one session as the default server. Therefore, you can only set one encoding as the default server encoding. This behavior limits users on the client side to dealing with multiple-encoded data only through the BI environments. The SAS BI environment allows multiple SAS Application Servers (for example, multiple SAS Workspace Servers) to exist. By customizing the default BI configurations, you can deploy those SAS Application Servers to connect to different SAS sessions with different encodings. This scenario enables the BI client to support multiple data encodings. However, all of these configurations must be implemented by a SAS administrator on the server side.

But client users often want to know whether there is a way for them to configure the server session encodings from the client side. The answer is yes. By implicitly setting the ENCODING system option in the server configuration file, you can configure the server session encoding dynamically based on the client locale. Usually, the SAS server encoding is determined by the ENCODING option in the SAS configuration file. However, when the ENCODING option is not explicitly specified in the SAS configuration file, that server encoding is determined, instead, by the LOCALE option in the configuration file. Beginning with SAS 9.4, the ENCODING system option is set explicitly in the configuration file for single-byte languages and for Unicode support. It is not set for double-byte languages.

In SAS BI environments, the BI client's locale can be passed to the server side, where it overwrites the SAS server locale. Client users can use this behavior to their advantage by setting the locale on the client side to obtain the encoding that they want. The best choice for implementing this scenario is to use an English edition of SAS that has double-byte character set (DBCS) support. This choice is the best because the ENCODING option is not explicitly set, by default, in the configuration file. This particular implementation supports both single-byte character set (SBCS) and DBCS data.

The following sections discuss several methods for deploying a multilingual working environment for a SAS BI configuration from both the server and client sides. Ensure that the SAS encodings mentioned in this paper are supported by your operating environment.

Important Note: Before you make any changes to system files in the following sections, **be sure to make backup copies of those files.**

METHODS OF CONFIGURATION: SERVER SIDE

This section introduces five methods that you can use to change the server encoding for BI clients. In these methods, the configuration is deployed at the **!SASROOT** level, the **SASAPP** level, and the individual SAS Application Server level, respectively. By customizing the batch file (Windows) or script file (UNIX) for the SAS Workspace Server, you can set the workspace server to different encoding values for individual users.

METHOD 1: CHANGE THE SAS® SYSTEM DEFAULT ENCODING GLOBALLY

The method that is illustrated in this section changes the SAS default encoding at the **!SASROOT** level. This change affects the entire SAS® System, including SAS® Foundation and all SAS servers (for example, SAS Workspace Server, SAS® Stored Process Server, and SAS® OLAP Server).

The following sections provide the steps for making this change in the Windows and UNIX operating environments.

Windows Operating Environments

Under Windows, you modify the **!SASROOT** configuration file, as follows, to change the encoding:

1. Locate the `sasv9.cfg` file in the **!SASROOT** directory.

Note: Throughout this document, **!SASROOT** specifies the directory path for your SAS installation.

2. In this directory, open the `sasv9.cfg` file with Microsoft Windows Notepad. You should see a `-CONFIG` option similar to the following example in this file. For this example, English is the default language for SAS:

```
-config "!SASROOT\nls\en\sasv9.cfg"
```

3. In the directory path, change `en` to the SAS two-character language code that you want to use. If you have installed any of the localized SAS images, you will find a folder under **!SASROOT\nls** for each localization. The folders are named with two-language character codes that are specific to SAS

In this example, `en` is changed to `u8`, so that the default SAS encoding becomes UTF-8:

```
"!SASROOT\nls\u8\sasv9.cfg"
```

UNIX Operating Environments

Under UNIX, you need to change the symbolic link of the SAS executable file under the **!SASROOT** directory, as follows:

1. Navigate to the **!SASROOT** directory.
2. Set the symbolic link for **!SASROOT/sas** (the executable file) to the appropriate SAS language invocation script. For example, if English is the default language for SAS, the symbolic link is the following:

```
sas -> bin/sas_en
```

To change the default encoding to UTF-8, use the appropriate UNIX commands to change the symbolic link to the following:

```
sas -> bin/sas_u8
```

For a list of language codes that are used in the invocation scripts, see "SAS Invocation Scripts" in "Chapter 7 – Post-Installation Configuration for National Language Support (NLS)" in the *Configuration Guide for SAS 9.4 Foundation for UNIX Environments*. (support.sas.com/documentation/installcenter/en/ikfdtnunxcg/66380/PDF/default/config.pdf)

Advantages and Disadvantages

Advantages to this method:

- This change is simple to implement.
- Having just one file and location to change makes server management easier.

Disadvantages this method:

- This change affects all SAS users and SAS servers.
- Only one encoding value is available for all servers.
- This change limits users on the client side to dealing with multiple-encoded data only through BI environments.

METHOD 2: CHANGE THE ENCODING FOR THE SAS® APPLICATION SERVER

Modifying the SAS configuration file on the SAS Application Server enables all SAS servers under the **SASApp** directory level to support different encodings. Unlike the global change described for Method 1, Method 2 does not change the default SAS language or the SAS encoding.

The following sections provide the steps for making this change in the Windows and UNIX operating environments.

Windows Operating Environments

By default, the value for the `-CONFIG` option in the **SASApp** directory's configuration file points to the **SASROOT** configuration file. However, with Method 2, you can change the option so that it points directly to the configuration file for an individual SAS session, which resides in the `!SASROOT\nls\xx\` directory. In this path, **xx** specifies the two-character language code.

Change the `-CONFIG` option, as follows:

1. Open the `sasv9.cfg` that resides in `SAS-configuration-directory\Lev1\SASApp\`.
2. Add comment delimiters around the `-CONFIG` option, as shown below:

```
/* -config "!SASROOT\sasv9.cfg" */
```

3. Add a new `-CONFIG` option that points to the directory with the encoding that you want to use (in this case, **u8**, which specifies a UTF-8 session).

```
-config "!SASROOT\nls\u8\sasv9.cfg"
```

UNIX Operating Environments

Under UNIX, you need to assign a new value to the `SAS_COMMAND` environment variable (in the `Lev1` directory) that points to the invocation script that you want to use. In this following example, the invocation script is `sas_u8`.

To make this change:

1. Open the `level_env_usermods.sh` file that resides in `SAS-configuration-directory/Lev1`.
2. Add the following entry under the `USERMODS_OPTIONS=` option that appears in the `level_env_usermods.sh` file:

```
export SAS_COMMAND=$SASROOT/bin/sas_u8
```

Advantages and Disadvantages

Advantages to this method:

- This change only affects SAS servers that are under the **SASApp** directory level, and it only affects BI client users.
- The default encoding in the SAS System is not changed.

Disadvantages to this method:

- The encoding for the SAS Application Server is different from the SAS System default encoding. The SAS administrator needs to know about this inconsistency because it makes server management more complicated.
- This method does not benefit BI users who do not need a different encoding. For example, users who use SAS OLAP Server have different encoding requirements than users who use SAS Workspace Server.

METHOD 3: CHANGE THE ENCODING FOR A SINGLE WORKSPACE SERVER

With this method, you modify the configuration file for a single workspace server only. To do that, you need to modify the `-CONFIG` option so that it points to the SAS session's configuration file for a specific encoding.

The following sections provide the steps for making this change in the Windows and UNIX operating environments.

Windows Operating Environments

Under Windows, you modify the `sasv9.cfg` file that resides in `SAS-configuration-directory\Lev1\SASApp\WorkspaceServer`, as follows:

1. Open the `sasv9.cfg` file and add comment delimiters around the `-CONFIG` option, as shown below:

```
/* -config "SAS-configuration-directory\Lev1\SASApp\sasv9.cfg" */
```

2. Add a `-CONFIG` option that points to the a different encoding session (in this example, a UTF-8 session):

```
-config "!SASROOT\nls\u8\sasv9.cfg"
```

3. Copy all of the contents of the `sasv9.cfg` file in `SAS-configuration-directory\Lev1\SASApp\` except for the following `-CONFIG` option:

```
-config "!SASROOT\sasv9.cfg"
```

4. Paste the copied contents of the `SASApp` `sasv9.cfg` file to the `sasv9.cfg` file that you opened in step 1.

After you paste the contents, the file should appear as follows:

```
/* sasv9.cfg */
/*
/* This configuration file contains the specific options that the SAS
/* Workspace Server needs.
/*
/* It includes the standard configuration file for this application
/* server and then it adds on the additional options that are needed
/* by the workspace server.
/*

/* Include the configuration files. */
-config "!SASROOT\nls\u8\sasv9.cfg"

/* Set options. */
-metaautoresources "SASApp"
-sasinitialfolder "SAS-configuration-directory\Lev1\SASApp"

-insert set sasautos "SASEnvironment/SASMacro"
-set APFMTLIB "SASEnvironment/SASFormats"
-insert fmtsearch APFMTLIB

-NOPRNGETLIST
-rsasuser

-emailsys SMTP
-emailhost xxxx.xxx.sas.com
-emailport xx

-netencralg "SASProprietary"

-metaprofile "SAS-configuration-directory\Lev1\metadataConfig.xml"
-metarepository "Foundation"

```

(code continued)

```

-metaprotocol BRIDGE
  /* Include the autoexec files. */
-autoexec "SAS-configuration-directory\Lev1\SASApp\appserver_autoexec.sas"
  /* Insert the path to the user-specific configuration file. */
-config "SAS-configuration-directory\Lev1\SASApp\sasv9_usermods.cfg"
  /* Allow pass through for CONNECT based events */
-connectevents
  /* Set options */
-logconfigloc "SAS-configuration-
directory\Lev1\SASApp\WorkspaceServer\logconfig.xml"
  /* Include the autoexec file. */
-autoexec "SAS-configuration-
directory\Lev1\SASApp\WorkspaceServer\autoexec.sas"
  /* Insert the path to the user-specific configuration file. */
-config "SAS-configuration-
directory\Lev1\SASApp\WorkspaceServer\sasv9_usermods.cfg"

```

5. Save the updated sasv9.cfg file.

UNIX Operating Environments

Under UNIX, you need to assign a new value to the SAS_COMMAND environment variable. This new value points to the invocation script that supports the encoding that you want. The SAS_COMMAND environment variable is in the WorkspaceServer_usermods.sh script file that resides in *SAS-configuration-directory/Lev1/SASApp/WorkspaceServer*.

To assign the new value:

1. Open the WorkspaceServer_usermods.sh script file. Under the USERMODS_OPTIONS= option that appears in the script file, change the SAS_COMMAND path to point to the new encoding (in this case, **sas_u8**, which is a UTF-8 session).

```
export SAS_COMMAND=$SASROOT/bin/sas_u8
```

2. Save the file.

Advantages and Disadvantages

Advantages to this method:

- This method is used in a deeper-level directory, which has less of an effect on the SAS BI system.
- This method only changes the server encoding for the workspace server. All other servers maintain their original encoding.

Disadvantages to this method:

- This method requires the SAS administrator to have a better understanding of the management of this level of the SAS BI structure.
- You need to be careful in making the changes that are used in this method because an incorrect configuration can cause serious server-connection issues.

METHOD 4: CONFIGURE MULTIPLE WORKSPACE SERVERS TO SUPPORT DIFFERENT ENCODINGS

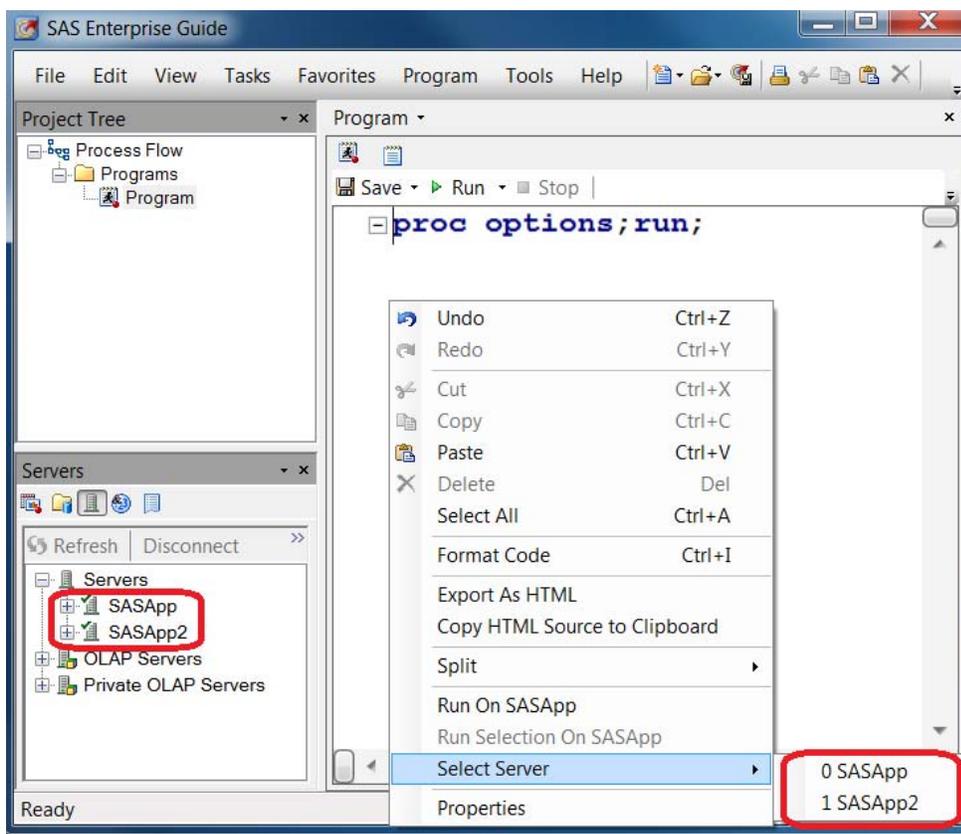
Methods 1-3 only use one server encoding. However, this section introduces a method for supporting multiple server encodings in the same BI environment installation. Method 4 works by deploying multiple SAS Workspace Servers, as explained in the next section.

Deploying Multiple SAS® Workspace Servers

To deploy multiple SAS Workspace Servers:

1. Rerun the SAS® Deployment Wizard (using the same deployment plan that you used previously) to install a SAS Workspace Server.
2. Create a second SAS Application Server context (for example, `SASApp2`) in the same configuration directory.
3. Perform the post-installation configuration steps as you are directed by the SAS® Deployment Wizard. Because you just installed only SAS Workspace Server, you can use the approach in [Method 2](#) to configure SAS Workspace Server to support one, unique encoding.
4. Repeat steps 1-3 for each additional workspace server that you want to install, configuring a unique encoding for each server.

Now, you should see multiple SAS Application Servers available in the SAS client, as shown in this example from SAS Enterprise Guide:



For more details and a step-by-step implementation of this method see the SAS Technical Paper "Adding Additional SAS Workspace Servers to Support Multiple Encodings." (support.sas.com/resources/papers/AddingAdditionalSASWorkspaceServerstoSupportMultipleEncodings.pdf)

Advantages and Disadvantages

Advantages to this method:

- SAS administrators understand the concept of creating additional workspace servers.
- Additional servers are easy to maintain.
- It is easy for client users to select the additional servers.
- This method is more cost efficient than adding another entire BI installation on a different physical server.

Disadvantages to this method:

- This method requires extra work (rerunning SAS Deployment Wizard) to install and configure each server.
- There is still an associated cost factor (the labor) for making a change that might be a one-time job requirement.

METHOD 5: CONFIGURE A SAS® WORKSPACE SERVER ENCODING FOR INDIVIDUAL USERS OR FOR A GROUP

This method customizes the SAS build in a batch file (Windows) and a script file (UNIX) for the workspace server. By checking the user ID, we can assign a specific server session encoding to that user.

In the following example, a Simplified Chinese SAS session is assigned to a user account named `david`, and a UTF-8 session is assigned to the user account `sasdemo`.

Windows Operating Environments

To implement this method under Windows, you need to modify the `WorkspaceServer_usermods.bat` file. This file is located, by default, in the `SAS-configuration-directory\Lev1\SASAPP\WorkspaceServer` directory. Using the Windows environment variables `%USERID%` and `%USERDOMAIN%`, you can then set the values for the `-CONFIG` option so that it points to the encoding configuration file (for this example, the `zh` and `u8` encodings):

```
REM /*-----*\
REM |
REM | Script to extend WorkspaceServer.bat via user modifications.
REM |
REM \-----*/

REM The first IF statement below is the default USERMODS_OPTIONS= option that
initializes USERMODS_OPTIONS= ". Set the USERMODS_OPTIONS= option.

REM The IF statements below assign two different encodings for SAS Workspace Server,
dependent on different users and domains. The user account DAVID is assigned to the
SAS Simplified Chinese (ZH) server. The user account SASDEMO is assigned to the SAS
Unicode (U8) server. The /I flag toggles case sensitivity.

if /I %username%==david (
    @if /I %userdomain%==domain1 (Set USERMODS_OPTIONS=-config
"!SASROOT\nls\zh\sasv9.cfg" ) else (Set USERMODS_OPTIONS=)

if /I %username%==sasdemo (
    @if /I %userdomain%==domain2 (Set USERMODS_OPTIONS=-config
"!SASROOT\nls\u8\sasv9.cfg" ) else (Set USERMODS_OPTIONS=)
```

UNIX Operating Environments

Under UNIX, you need to modify the `WorkspaceServer_usermods.sh` script file, which is located, by default, in *SAS-configuration-directory/Lev1/SASApp/WorkspaceServer*. Under the `USERMODS_OPTIONS=` option in that file, add the following code:

```
if [ $USER=david ] then
    export SAS_COMMAND=$SASROOT/bin/sas_zh

elif [ $USER=sasdemo ] then
    export SAS_COMMAND=$SASROOT/bin/sas_u8
    else SAS_COMMAND=$SASROOT/sas
fi
```

Advantages and Disadvantages

Advantages to this method:

- You do not need to change the SAS default encoding or deploy additional servers for different encodings.
- This method does not affect the default installation and configurations.

Disadvantages to this method:

- If users need support for different encodings, more SAS accounts must be created and configured to accommodate that support.
- You must be very careful with the customizing the script and batch file to avoid serious server-connection issues. If issues occur, troubleshooting them might be difficult.

METHODS OF CONFIGURATION: CLIENT SIDE

The section "[Methods of Configuration: Server Side](#)" illustrates several ways to change the encoding on the server side. All of those methods must be handled by a SAS administrator. But client users want to know whether they can implement the server session encodings themselves from the client side? The answer is yes. There are cases in which you, as the client user, can make the encoding changes. The following sections explain under what circumstances you can make such changes.

SET AN ENGLISH EDITION OF SAS® WITH DOUBLE-BYTE CHARACTER SET (DBCS) SUPPORT AS THE DEFAULT SAS® SERVER SESSION

The best method for changing your encoding on the server side involves changing the client locale. However, as a prerequisite, the SAS administrator must set the server configuration to an English edition of SAS that has DBCS support. The administrator can use any method that is described in the previous section to implement this configuration.

Note: The examples that are illustrated in the next sections use [Method 1: Change the SAS System Default Encoding Globally](#).

Windows Operating Environments

Under Windows, the administrator sets the `–CONFIG` option in the `!SASROOT` configuration file so that it points to the configuration file for the English edition of SAS with DBCS support. The `–CONFIG` option should look similar to the following:

```
-config "!SASROOT\nls\ld\sasv9.cfg"
```

UNIX Operating Environments

Under UNIX, the administrator changes the symbolic link for the `!SASROOT` executable to the invocation script of the English edition of SAS with DBCS support, as shown below:

```
sas -> bin/sas_dbcs
```

INTERACTION BETWEEN THE LOCALE AND THE ENCODING

By default, there is no explicit setup of the system `ENCODING` option in the `sasv9.cfg` configuration file for an English edition of SAS with DBCS support. As such, the session encoding is determined by its default session locale, which is Japanese. In the SAS BI environment, the BI client locale can pass to the server side, overwriting the SAS server locale setting. Therefore, the client locale can be passed dynamically to the server to change the default SAS session encoding.

For example, suppose you have a Russian edition of SAS Enterprise Guide that is connected to a Windows SAS server (which is an English edition of SAS with DBCS support). The Russian locale is passed to the server, and it overwrites the default Japanese locale in the server. Therefore, the server session encoding (`WCYRILLIC`) is decided by the Russian locale.

For a table of locale values and their corresponding encodings, see Table 20.2 (Default Values for the `ENCODING`, `DFLANG`, `DATESTYLE`, and `PAPERSIZE` System Options Based on the `LOCALE=` System Option) in "Chapter 20: Values for the `LOCALE=` System Option" of the *SAS® 9.4 National Language Support (NLS): Reference Guide, Fourth Edition*. (support.sas.com/documentation/cdl/en/nlsref/67964/PDF/default/nlsref.pdf.)

Therefore, in this circumstance, the client locale can determine the server session encoding. This change happens at runtime and does not destroy the server configuration. By using the configuration of SAS English with DBCS, both SBCS and DBCS client users can take advantage of this method on the same backend SAS server.

Advantages and Disadvantages

Advantages to this method:

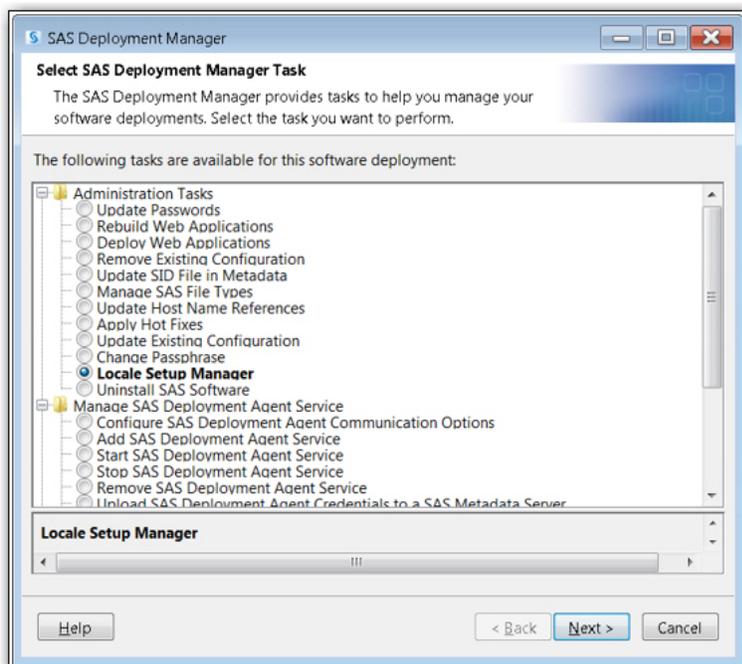
- BI client users can select the encoding instead of requesting it from the administrator.
- You can change the server session encoding dynamically, and it does not affect the static server configuration.
- Both SBCS and DBCS users can take advantage of this method.

Disadvantages to this method:

- As a prerequisite to using this method, the administrator has to set the `–CONFIG` option to point to a single SAS session without having an encoding explicitly specified.
- You cannot achieve a UTF-8 server session by changing the locale on the client side.
- The locale and encoding are dependent on the interface language of the client machine.

CHANGE THE LOCALE OF A BI CLIENT

You can change a client locale in various ways, depending on the SAS product you use. The easiest way to make such a change is to use the Locale Setup Manager (a component of the SAS® Deployment Manager) if you have it installed, as shown below:



For more information about the Locale Setup Manager, see “Change Locale and Region Settings (Windows and UNIX only)” under “Administration Tasks” (“Chapter 6: SAS Deployment Manager Tasks”) in the *SAS® Deployment Wizard and SAS® Deployment Manager 9.4: User’s Guide*. (support.sas.com/documentation/installcenter/en/ikdeploywizug/66034/PDF/default/user.pdf)

If you do not have Locale Setup Manager installed, you can use a different method for changing the locale. The following sections introduce typical methods for changing the client locale for SAS Java applications, SAS Enterprise Guide, and SAS web applications.

SAS® Java Applications

To change a client's locale for applications that are based on Java, add the following **JavaArgs** entries to the application-name.ini file. This file typically resides in *SASHOME*\application-name\release-number under Windows:

```
JavaArgs_n=-Duser.language=xx  
JavaArgs_n=-Duser.country=yy
```

In this example:

- *n* represents the next number in the sequence of Java arguments.
- *xx* represents the two-character language code.
- *yy* represents the two-character country code.

For example, if you want to change to a French locale, use these arguments (which assumes the next **JavaArgs** entry is 16):

```
JavaArgs_16=-Duser.language=fr  
JavaArgs_17=-Duser.country=FR
```

After you enter these **JavaArgs** entries, the interface language changes based on the value of the locale that you assign. If the interface language does not change after you add the arguments, the SAS application is not localized

yet for that language. For example, the Thai language is not available for SAS Data Integration Studio currently, but its locale value can still be passed to the server side.

SAS® Enterprise Miner™ and SAS® Web Applications

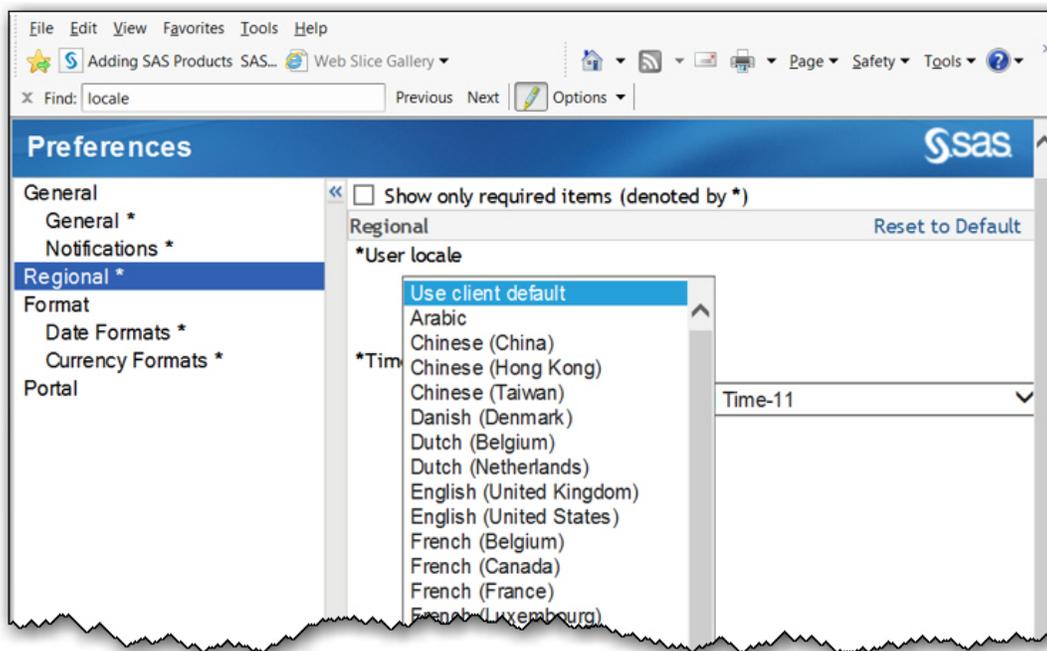
For SAS Enterprise Miner and some SAS web-application clients, you must use SAS Preferences Manager to control the client locale setting. *SAS Preferences Manager* is a web application that enables you to manage your SAS application preferences and settings. You can start the SAS Preferences Manager from your web browser by submitting the following URL:

`http://server:port/SASPreferences`

For example, your URL might be similar to this one: `http://your-machine-name:80/SASPreferences`

To use SAS Preferences Manager:

1. In the left selection pane, select **Regional**. The **User locale** selection appears in the right pane.
2. Select your preferred locale and click **OK** at the bottom of the page to save your settings.



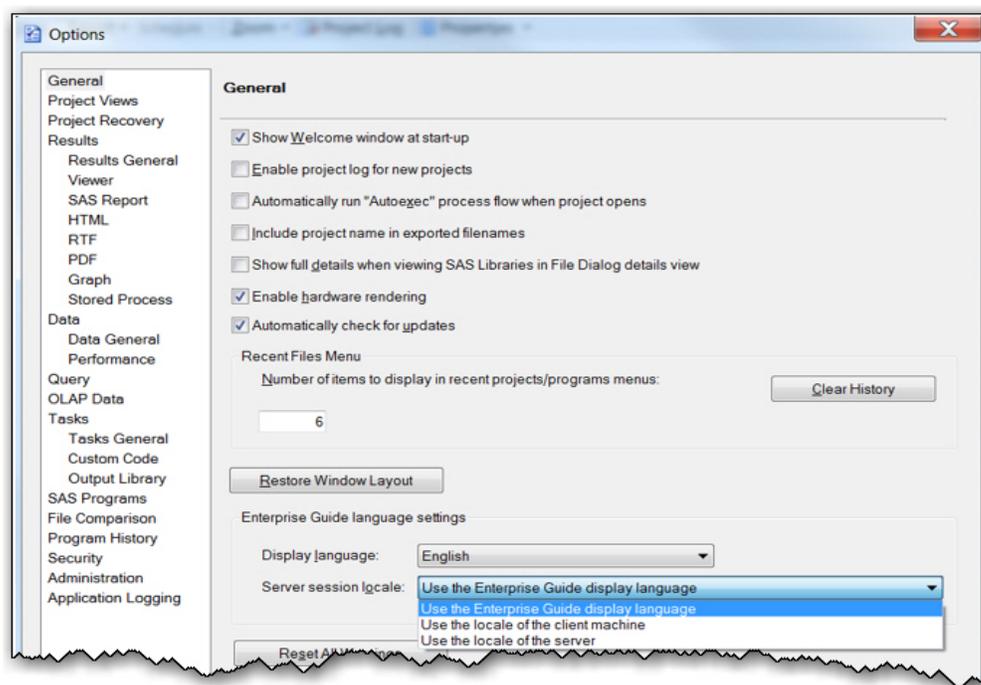
For more information about SAS Preferences Manager, see "Chapter 1: Working in the Middle-Tier Environment" of *SAS® 9.4 Intelligence Platform: Middle-Tier Administration Guide, Third Edition*. (support.sas.com/documentation/cdl/en/bimtag/68217/PDF/default/bimtag.pdf)

SAS® Enterprise Guide®

The locale for SAS Enterprise Guide is determined by its interface language, by default. There are several localized editions of SAS Enterprise Guide that are available. During the installation process, you can specifically select each edition that you want to install.

To set up a different locale for SAS Enterprise Guide:

1. Navigate to **Tools ► Options ► General**. You should see drop-down lists for **Display language** and **Server session locale**. Three options are listed for **Server session locale**, as shown below:



You use these options as follows:

- **Use the Enterprise Guide display language:** With this option, the server locale corresponds to the language for your SAS Enterprise Guide interface. For example, if you have a Russian edition of SAS Enterprise Guide, then the server locale will be Russian as well.
- **Use the locale of the client machine:** With this option, the server locale becomes the same as the Windows locale.
- **Use the locale of the server:** With this option, the SAS server uses the SAS System locale that is set in the SAS configuration file. The locale setting from the client side does not affect the server locale or encoding.

CONCLUSION

This paper presents several methods for both users and administrators to configure an ideal language environment that enables SAS Business Intelligence clients to handle multilingual data. SAS administrators can modify the BI configuration on the server side to provide different scenarios based on user and business requirements. Also, by using an English edition of SAS with a DBCS-supported configuration, SAS client users can dynamically adjust the encoding on the server. All of these methods significantly reduce the costs that are associated with setting up additional, physical BI environments to support different data encodings.

RESOURCES

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