



Informatica[®] PowerExchange for SAS
10.2

User Guide

Informatica PowerExchange for SAS User Guide

10.2

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Preface

The *Informatica PowerExchange® for SAS User Guide* provides information about reading data from SAS and writing data to SAS. The guide is written for database administrators and developers who are responsible for developing mappings that read data from or write data to SAS.

This guide assumes that you have knowledge of SAS and Informatica Data Services.

Informatica Resources

Informatica Network

Informatica Network hosts Informatica Global Customer Support, the Informatica Knowledge Base, and other product resources. To access Informatica Network, visit <https://network.informatica.com>.

As a member, you can:

- Access all of your Informatica resources in one place.
- Search the Knowledge Base for product resources, including documentation, FAQs, and best practices.
- View product availability information.
- Review your support cases.
- Find your local Informatica User Group Network and collaborate with your peers.

Informatica Knowledge Base

Use the Informatica Knowledge Base to search Informatica Network for product resources such as documentation, how-to articles, best practices, and PAMs.

To access the Knowledge Base, visit <https://kb.informatica.com>. If you have questions, comments, or ideas about the Knowledge Base, contact the Informatica Knowledge Base team at KB_Feedback@informatica.com.

Informatica Documentation

To get the latest documentation for your product, browse the Informatica Knowledge Base at https://kb.informatica.com/_layouts/ProductDocumentation/Page/ProductDocumentSearch.aspx.

If you have questions, comments, or ideas about this documentation, contact the Informatica Documentation team through email at infa_documentation@informatica.com.

Informatica Product Availability Matrixes

Product Availability Matrixes (PAMs) indicate the versions of operating systems, databases, and other types of data sources and targets that a product release supports. If you are an Informatica Network member, you can access PAMs at

<https://network.informatica.com/community/informatica-network/product-availability-matrixes>.

Informatica Velocity

Informatica Velocity is a collection of tips and best practices developed by Informatica Professional Services. Developed from the real-world experience of hundreds of data management projects, Informatica Velocity represents the collective knowledge of our consultants who have worked with organizations from around the world to plan, develop, deploy, and maintain successful data management solutions.

If you are an Informatica Network member, you can access Informatica Velocity resources at <http://velocity.informatica.com>.

If you have questions, comments, or ideas about Informatica Velocity, contact Informatica Professional Services at ips@informatica.com.

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You can contact a Global Support Center by telephone or through Online Support on Informatica Network.

To find your local Informatica Global Customer Support telephone number, visit the Informatica website at the following link:

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If you are an Informatica Network member, you can use Online Support at <http://network.informatica.com>.

CHAPTER 1

Introduction to PowerExchange for SAS

This chapter includes the following topics:

- [PowerExchange for SAS Overview, 7](#)
- [PowerExchange for SAS Architecture, 7](#)
- [User Authentication, 8](#)

PowerExchange for SAS Overview

PowerExchange for SAS provides connectivity between Informatica Developer and SAS. It is an extension of the Informatica data integration tools, and facilitates the use of SAS data objects in your data integration processes.

PowerExchange for SAS consists of the following components:

Client Component

Extends the Developer tool capabilities to facilitate the registration and use of SAS data objects.

Data Integration Service Component

Extends the Data Integration Service so that it can read data from and write data to SAS.

Model Repository Service Component

Extends the Model Repository Service so that it can store SAS metadata.

Communication Component (SPI Server)

Completes all the tasks that are requested from the machine that hosts the SAS data objects.

PowerExchange for SAS Architecture

The central component of the architecture for PowerExchange for SAS is the Communication component, which is also known as the SPI Server. The SPI Server is a multithreaded TCP/IP listener service. It is

installed on the machine that runs SAS, and handles requests from the Developer tool and the Data Integration Service.

When you use the Developer tool to import SAS data objects, the Client component requests the metadata from the SPI Server. The SPI Server starts an SPI session to retrieve the information from SAS and then passes this information to the Client component. When you save the SAS data objects, the Model Repository Service component saves them to the Model repository.

When you run a mapping that contains a SAS source or target, the Data Integration Service uses the Data Integration Service component to start a session with the SPI Server. The SPI Server accesses SAS data and passes it back to the Data Integration Service component for processing the data.

User Authentication

User authentication is required to connect to an SPI Server.

PowerExchange for SAS users are classified as normal users and administrators.

Normal users

Normal users have the permission to connect to the SPI Server and fetch table metadata when importing SAS data objects. They also have the permission to initiate requests to read data from or write data to SAS.

Administrator users

Administrator users have the same permissions as normal users. Additionally, administrator users have the permission to remotely stop the SPI Server.

User Administration

You can administer users locally. Use the SPI Server Configuration tool to add or remove a user, change a password, or change the type of a user.

After you install PowerExchange for SAS, two users are defined with default passwords being equal to the user names.

CHAPTER 2

PowerExchange for SAS Installation and Configuration

This chapter includes the following topics:

- [PowerExchange for SAS Installation and Configuration Overview, 9](#)
- [Installing PowerExchange for SAS, 10](#)
- [Installing the Client Component, 10](#)
- [Installing the Data Integration Service Component, 10](#)
- [Installing the Communication Component, 11](#)
- [Configuring the Communication Component, 13](#)
- [Release Information, 15](#)

PowerExchange for SAS Installation and Configuration Overview

To install and configure PowerExchange for SAS, perform the following steps:

1. Install PowerExchange for SAS.
2. Configure the Communication component.

Prerequisites

Before you install PowerExchange for SAS, perform the following tasks:

1. Install the Informatica services.
2. Install the Informatica clients. When you install the Informatica clients, the Developer tool is installed.
3. Create a Data Integration Service and a Model Repository Service in the Informatica domain.

Installing PowerExchange for SAS

When you install PowerExchange for SAS, you install the following components that allow the Developer tool to access SAS:

- Client component. Allows you to import SAS metadata, create mappings, and create connection objects by using the Developer tool.
- Server component. Allows the Data Integration Service to run SAS sessions.
- SPI Server component. Allows the Developer tool and Data Integration Service to access the SAS host.

You can use the Full Installation option to install all the components simultaneously.

Installing the Client Component

Install the Client component on the machine where you installed Informatica Data Services.

1. Unzip the client installer directory.
2. At the command prompt, navigate to the location where the `installClient.bat` file is stored in the client installer directory.
3. At the command prompt, enter the following command: `installClient.bat <InformaticaClientInstallationDirectory>`

For example, enter `installClient.bat C:\Informatica\9.6.1\clients`.

The Client component is installed.

Installing the Data Integration Service Component

If you configure the Data Integration Service to run on primary and backup nodes, install the Data Integration Service component on each node that is configured to run the Data Integration Service process. When you install the Data Integration Service component, the Model Repository Service component also gets installed.

You can install the Data Integration Service component on Windows or UNIX operating systems.

Installing the Data Integration Service Component on Windows

To install the Data Integration Service component on Windows, perform the following steps:

1. Unzip the server installer directory.
2. At the command prompt, navigate to the location where the `installServer.bat` file is stored in the server installer directory.
3. At the command prompt, enter the following command: `installServer.bat <InformaticaServerInstallationDirectory>`

For example, enter `installServer.bat C:\Informatica\9.6.1`.

The Data Integration Service component is installed.

Installing the Data Integration Service Component on UNIX

To install the Data Integration Service component on UNIX, perform the following steps:

1. Unzip the server installer directory.
2. At the command prompt, navigate to the location where the `installServer.sh` file is stored in the server installer directory.
3. At the command prompt, enter the following command: `installServer.sh <InformaticaServerInstallationDirectory>`

For example, enter `installServer.sh C:\Informatica\9.6.1`.

The Data Integration Service component is installed.

Installing the Communication Component

Install the Communication component, also known as the SPI Server, on the machine that runs the SAS environment that you want to connect to.

The Communication component does not connect to the Model repository. The configuration is stored locally.

Installing the Communication Component on Windows

On Windows, the Communication component runs as a Windows service.

To install the Communication component on Windows, perform the following steps:

1. Run `setup.exe` from the following location: `<DownloadLocation>\Win32\setup.exe`
2. Click **Yes** to install PowerExchange for SAS.
The **Welcome** window appears.
3. Click **Next** and select a directory when you want to install the Communication component.
Click **Browse** to find a directory or use the default directory.
4. Click **Next**, select **SAS Communication Component**, and click **Next**.
5. Select a Start menu folder for program shortcuts and click **Next**.
A confirmation page appears.
6. Click **Install**.
The **Communication Component Setup Wizard** appears.
7. Click **Next**.

8. On the **SPI Server Configuration** page, enter the following information and click **OK**:

Property	Description
Port Number	TCP/IP port number for the SPI Server listener process.
Log File Path	Absolute path to the log file. Default is <code>C:\PowerExchange for SAS</code>
SAS Pre Post Code	Defines if SAS exits are allowed. Default is No.
Application Path	Absolute path to the SAS executables. Default is <code>C:\Program Files\SAS\sas.exe</code>
Working Directory Path	Directory path for the SAS working environment. Default is <code>C:\testdata</code>
Autoexec Name	Name of the autoexec file. Default is <code>autoexec.sas</code> .

9. Click the **Users** button to add, edit, or delete users, or to change user attributes.
10. Click **OK**.
11. Review the license agreement and click **Yes**.
The Communication component is installed.

Installing the Communication Component on UNIX

Install the Communication component with a user account that has authorization to start SAS and to access the SAS data that you want to read or write. PowerExchange for SAS uses the user account to access the SAS data.

To install the Communication component on UNIX, perform the following steps:

1. Enter `sh install.sh` at the prompt.
2. Enter the path to the Informatica installation directory.
By default, the server components are installed in the following location: `<Informatica installation directory>/<version folder>`
3. Select a directory where you want to install the Communication component.
4. Follow the instructions and select **Install SAS Communication Component**.

The Communication component is installed.

The following libraries are installed with the SPI Server binaries:

- `libicuuc.<ext>.34`
- `libicui18n.<ext>.34`
- `libicudata.<ext>.34`

where `<ext>` stands for the shared library extension for the UNIX operating system that you use. For example, `libicuuc.so.34` applies to the Linux operating system.

Include these libraries in the system library path by using one of the following options:

- Add the SPI Server installation directory to the library search path. For example: `export LD_LIBRARY_PATH=/home/PowerExchange/ForSAS:$LD_LIBRARY_PATH`
- Move the library files to a directory that exists in the library search path. For example: `/usr/local/lib`

Configuring the Communication Component

To configure the Communication component, use the configuration tool to maintain the configuration files.

The configuration file is located in the directory when you installed the Communication component.

Configuring the Communication Component on Windows

To start the configuration tool on Windows, use the SPI Server Configuration in the Start menu. Use SPI Server Configuration tool to configure the TCP/IP port where the SPI Server listens, the location of the SPI Server log file, and the SPI Server users and passwords.

You must also configure the SAS environment.

- Working Directory Path: Enter the directory from which SAS runs.
- Autoexec Name: Enter the file name that SAS uses as the initialization file.

In the SAS initialization file, you can assign SAS libraries or libnames that must be accessible by the Developer tool to access the SAS metadata, and by the Data Integration Service to access the SAS data.

The following snippet shows a sample SAS autoexec file: `xe "SAS autoexec file:`

```
/*
  Sample SAS autoexec file
*/
LIBNAME whdata 'W:\data\saswhdata' ;
LIBNAME oltp 'W:\data\sales\2008Q1' ;
```

For more information about valid LIBNAME syntax and options, see the SAS documentation.

User Administration on Windows

You can add or remove users, and change the user password or the user administrator property.

To perform user administration on Windows, perform the following steps:

1. In the **Configuration** dialog box, click **Users**.
2. In the **User Administration** dialog, make the necessary changes, and click **Close**.

Configuring the Communication Component on UNIX

To start the configuration tool on UNIX, perform the following steps:

1. At the shell prompt, navigate to the SPI Server installation directory.
2. At the shell prompt, enter `./spiconfig`.
3. Select an option that you want to change.
The configuration tool prompts you for a new value.
4. Select **Users** to enter the user administration details.

Configuring the SAS Autoexec File

Use the SAS autoexec file named `autoexec.sas` to configure the SAS environment.

Session and User Identification

The name of the SPI Server user who accesses the SAS environment is passed to the environment where SAS runs.

The values of this property can thus be used for conditional initialization logic in the SAS autoexec script.

The following system variable provides the user name to the SAS process:

System Variable	Available	Description
TBPC_USER_NAME	client/server	Name of the connected SPI Server user.

You can use the SAS function `sysget()` to retrieve system variables.

For example:

```
/* Store system variables into SAS macro variables: */
username = sysget("TBPC_USER_NAME");
/* Use the SAS macro variables to code logic: */
.....
.....
/* End of logic */
```

When the Developer tool initiates a connection to the SAS machine, the system variables that are unavailable for client connections contain no meaningful information. The system variable values default to `"_NONE_"`.

Reading SAS Character Columns with Binary Zeros

SAS supports binary zero bytes in character columns. However, the Developer tool does not support characters with binary zeros. You can replace binary zeros with NULL characters before passing data to the Developer tool.

To replace binary zeros with NULL characters, assign the macro variable `CHCKNLLS` in the SAS autoexec file. Add the following line in the SAS autoexec file:

```
%let CHCKNLLS=YES;
```

Starting the Communication Component on Windows

On Windows, the SPI Server runs as a Windows service called Informatica SPI Server.

You can start and stop this service in the following ways:

- Set Startup type to manual. Start and stop the service by using the Windows Service Manager.
- Set Startup type to automatic. The service starts automatically when you start the Windows system.
- Use a Windows command line or script file. To start, enter the following command: `net start "Informatica SPI Server"`. To stop, enter the following command: `net stop "Informatica SPI Server"`.

Starting the Communication Component on UNIX

On UNIX, the SPI Server is an executable that runs as a daemon process.

To start the SPI Server, navigate to the directory in which you installed the SPI Server and enter the following command:

```
spiserver
```

Check the SPI Server log file to make sure that the server started successfully. For more information about the location of the log file, see ["Configuring the Communication Component" on page 13](#)

To stop the SPI Server, enter the following command:

```
spiserver stop <host> <portnumber> <administrator name> <password>
```

You can build an initialization script to start the SPI Server automatically when the system starts. For more information, see your system documentation.

Note: If the SPI Server does not shut down normally, it might not restart. If this issue occurs, remove the SPI Server lock file in the SPI Server working directory, and then restart the SPI Server.

Release Information

New Features

You can read data directly from a SAS data file.

CHAPTER 3

SAS Connections

This chapter includes the following topics:

- [SAS Connection Overview, 16](#)
- [SAS Connection Properties, 16](#)
- [Creating a SAS Connection, 17](#)

SAS Connection Overview

Use a SAS connection to access the SAS data.

Create a connection to import SAS data set metadata and create data objects, preview data, and run mappings. When you create a SAS connection, you define the connection attributes that the Data Integration Services uses to connect to the SAS database.

SAS Connection Properties

You can create and manage a SAS connection in the Administrator tool or the Developer tool.

Note: The order of the connection properties might vary depending on the tool where you view them.

When you create a SAS connection, you enter information for metadata and data access.

The following table describes SAS connection properties:

Property	Description
Name	Name of the SAS connection.
ID	String that the Data Integration Service uses to identify the connection. The ID is not case sensitive. It must be 255 characters or less and must be unique in the domain. You cannot change this property after you create the connection. Default value is the connection name.
Description	Description of the connection. The description cannot exceed 765 characters.
Location	Domain where you want to create the connection.
Type	Type of connection.

The following table describes the SAS connection properties for data access:

Property	Description
Host	Host name of the machine that runs the SPI Server.
Port	Port number of the machine that runs the SPI Server. Must correspond to the port number that you used while configuring the SPI Server.
User Name	User name. Must be configured in the SPI Server configuration.
Password	Password for the user.

Creating a SAS Connection

Create a connection in the Developer tool before you create a SAS data object.

1. Click **Window > Preferences**.
2. Select **Informatica > Connections**.
3. Expand the domain in the **Available Connections** list.
4. Select **Enterprise Applications > SAS** and click **Add**.
5. Enter a connection name.
6. Enter an ID for the connection.
7. Optionally, enter a connection description.
8. Select the domain where you want to create the connection.
9. Select SAS as the connection type.
10. Click **Next**.
11. Configure the connection details for metadata access and data access.
12. Click **Test Connection** to verify the connection to SAS.
13. Click **Finish**.

CHAPTER 4

SAS Data Objects

This chapter includes the following topics:

- [SAS Data Object Overview, 18](#)
- [SAS Data Object Views, 18](#)
- [SAS Data Object Overview Properties, 19](#)
- [Importing a SAS Data Object, 19](#)
- [SAS Data Object Read Operation Properties, 20](#)
- [Creating a Data Object Read Operation, 22](#)
- [SAS Data Object Write Operation Properties, 23](#)
- [Creating a Data Object Write Operation, 26](#)

SAS Data Object Overview

A SAS data object is the representation of data that is based on a SAS data set. You can configure the data object read operation properties and write operation properties to determine how data can be read from SAS sources and written to SAS targets.

Import the SAS data set into the Developer tool to create a SAS data object. Create a data object read operation or write operation for the SAS data object. Then, you can add the data object operation to a mapping.

SAS Data Object Views

The SAS data object contains views to edit the object name and the properties.

After you create a SAS data object, you can change the data object and data object operation properties in the following data object views:

- Overview view. Use the Overview view to edit the SAS data object name, description, and data sets.
- Data Object Operation view. Use the Data Object Operation view to view and edit the properties that the Data Integration Service uses when it reads data from or writes data to SAS data set.

When you create mappings with a SAS source or target, you can view the data object properties in the **Properties** view.

SAS Data Object Overview Properties

The SAS Overview section displays general information about the SAS data object and detailed information about the SAS data set that you imported.

You configure the following general properties for a SAS data object:

Name

Name of the SAS data object.

Description

Description of the SAS data object.

Connection

Name of the SAS connection. Click **Browse** to select another SAS connection.

You can view the properties for the SAS data set that you import:

Name

Name of the SAS data set.

Type

Native data type of the SAS data set.

Description

Description of the SAS data set.

Importing a SAS Data Object

Import a SAS data object to add to a mapping.

1. Select a project or folder in the **Object Explorer** view.
2. Click **File > New > Data Object**.
3. Select **SAS Data Object** and click **Next**.
The **SAS Data Object** dialog box appears.
4. Enter a name for the data object.
5. Click **Browse** next to the **Location** option and select the target project or folder.
6. You can choose the **Access Type** as **Connection to SAS** or **File Import**.
7. If you choose **File Import**, click **Browse** in the **Resource Location** field to choose a SAS file on the local machine.
8. If you choose **Connection to SAS**, click **Browse** next to the **Connection** option and select the SAS connection from which you want to import the SAS data set metadata. Perform the following steps:
 - a. To add a table, click **Add** next to the **Selected Resources** option.
The **Add Resource** dialog box appears.
 - b. Select a table. You can navigate to it or search for it.
 - Navigate to the SAS data set that you want to import and click **OK**.

- To search for a data set, enter the name of the data set you want to add. Click **OK**.
- c. If required, add more tables to the SAS data object.
- You can also add tables to a SAS data object after you create the data object.
9. Click **Finish**.
- The data object appears under Data Objects in the project or folder in the **Object Explorer** view.

SAS Data Object Read Operation Properties

The Data Integration Service reads data from a SAS data set based on the data object read operation properties. The Developer tool displays the data object read operation properties for the SAS data object in the Data Object Operation section.

You can view or configure the data object read operation from the output and source properties.

Output properties represent the data that the Data Integration Service passes into the mapping pipeline. Select the output properties to edit the port properties and specify the advanced properties of the data object read operation.

Source properties represent the data that the Data Integration Service reads from the SAS data set. Select the source properties to view data such as the name and description of the SAS data set, create key columns to identify each row in a data object read operation, and create key relationships between data object read operations.

Output Properties of a Data Object Read Operation

General Properties

The general properties list the name and description of the data object read operation.

Ports Properties

The output ports properties list the data types, precision, and scale of the data object read operation.

You configure the following output ports properties in a data object read operation:

Name

Name of the port.

Type

Data type of the port.

Precision

Maximum number of significant digits for numeric data types or maximum number of characters for string data types. For numeric data types, precision includes scale.

Scales

Maximum number of digits after the decimal point for numeric values.

Description

Description of the port.

Source Properties

The sources properties list the SAS data sets in the data object read operation.

Query Properties

The Query properties allow you to specify Filter and Join conditions in the data object read operation.

You can configure the following Query properties:

Filter

The Filter type defined for a SAS source. You can specify a where clause condition while reading the SAS data.

Join

The Join type defined for a SAS source. This is an optional property.

Advanced Properties

The advanced properties allow you to specify data object read operation properties to read data into SAS data sets.

You can configure the following advanced properties in the data object read operation:

Trace

Boolean property to implement the SAS trace option. Use the SAS trace option to toggle verbose logging.

PreSASCode and PostSASCode

Facilitates the invocation of a SAS Macro or a SAS %include statement to be executed just before or just after the reading of the SAS Source object. The SPI Server must be configured to allow the execution of SAS exits. The SAS Macro to be invoked must be defined in the autoexec.sas file that is part of the SPI Server configuration.

Table Name

The name of the table to read from SAS.

Library Path

The library name associated with the SAS table from which the Data Integration Service reads the data.

SAS File Path

The path to the directory that contains the SAS file from where the Data Integration Service can read data directly.

Source Properties of the Data Object Read Operation

The source properties represent the data that is populated based on the SAS data sets that you added when you created the data object. The source properties of the data object read operation include general and column properties that apply to the SAS data sets.

You can view the source properties of the data object read operation from the **General**, **Column**, and **Advanced** tabs.

General Properties

The general properties display the name and description of the SAS data set.

Column Properties

The column properties display the data types, precision, and scale of the source property in the data object read operation.

You can view the following source column properties of the data object read operation:

Name

Name of the column property.

Type

Native data type of the column property.

Precision

Maximum number of significant digits for numeric data types or maximum number of characters for string data types. For numeric data types, precision includes scale.

Scales

Maximum number of digits after the decimal point for numeric values.

Description

Description of the column property.

Is Primary Key

Determines if the column property is a part of the primary key.

Format, Informat, Length, and Label

Determines the SAS field attributes. You can edit the SAS field attributes. However, you cannot change the length for string fields. The length for string fields follows the precision value on the **Columns** tab.

[Advanced Properties](#)

The advanced property displays the physical name of the SAS data set.

Creating a Data Object Read Operation

You can create the data object read operation for one or more SAS data objects. You can add a SAS data object read operation to a mapping as a source.

1. Select the data object in the **Object Explorer** view.
2. Right-click and select **New > Data Object Operation**.
The **Data Object Operation** dialog box appears.
3. Enter a name for the data object operation.
4. Select **SASDataRead** as the type of data object operation.
5. Click **Add**.
The **Select Resources** dialog box appears.
6. Select the SAS data set for which you want to create the data object read operation and click **OK**.
You can select only one data object for a data object read operation.
7. Click **Finish**.
The Developer tool creates the data object read operation for the selected data object.

Joining tables in SAS

You can join tables in SAS by selecting the tables into one data object read operation. The SAS system performs the join.

The attributes related to the table join can be accessed through the **Join** tab in the Query properties of Output Properties of a data object read operation:

- **Join Type.** Supported join types are the inner join, full outer join, left outer join, and right outer join. Note that only in the case of an inner join more than two tables can be joined.
- **Join Condition.** You can define the condition that defines the join to be executed. The join condition is entered using the join condition builder dialog that you can access by clicking the button next to the join condition field. For a full description of valid join conditions in SAS, see the SAS documentation. If no join condition is specified, a join condition will be generated based on the existing primary key and foreign key relations between the sources as defined for the data objects.
- **Left table.** When you select left outer join or right outer join as the join type, this option lets you define which of the two participating tables is to be considered as the left table.

Reading Data Directly from SAS Files

You can directly read data from SAS files.

When you create a SAS data object, select the access type as **File Import** to import metadata from a SAS file. In the **Resource Location** field, specify the directory on the local machine where the SAS file resides.

In the SAS data object read operation advanced properties, specify the SAS file path from where you want to read the data. When you run the mapping, the Data Integration Service uses the specified path to read data directly from the SAS file.

Note: You cannot read data directly from SAS files created with character data compression `COMPRESS=YES` or `COMPRESS=CHAR`.

SAS Data Object Write Operation Properties

The Data Integration Service writes data to a SAS data set based on the data object write operation properties. The Developer tool displays the data object write operation properties for the SAS data object in the Data Object Operation section.

You can view or configure the data object write operation from the input and target properties.

Input properties represent the data that the Data Integration Service passes into the mapping pipeline. Select the input properties to edit the port properties and specify the advanced properties of the data object write operation.

Target properties represent the data that the Data Integration Service writes to the SAS data set. Select the target properties to view data such as the name and description of the SAS data set, create key columns to identify each row in a data object write operation, and create key relationships between data object write operations.

Input Properties of a Data Object Write Operation

The input properties represent the data that the Data Integration Service passes into the mapping pipeline. Select the input properties to edit the port properties of the data object write operation. You can also specify advanced data object write operation properties to load data into SAS data sets.

The input properties of the data object write operation include general properties that apply to the data object write operation. They also include port, source, and advanced properties that apply to the data object write operation.

You can view and change the input properties of the data object write operation from the **General**, **Ports**, **Sources**, and **Advanced** tabs.

General Properties

The general properties list the name and description of the data object write operation.

Ports Properties

The input ports properties list the data types, precision, and scale of the data object write operation.

You can configure the following input ports properties in a data object write operation:

Name

Name of the port.

Type

Data type of the port.

Precision

Maximum number of significant digits for numeric data types or maximum number of characters for string data types. For numeric data types, precision includes scale.

Scales

Maximum number of digits after the decimal point for numeric values.

Description

Description of the port.

Targets Properties

The target properties list the SAS data sets in the data object write operation.

Advanced Properties

The advanced properties allow you to specify the data object write operation properties to load data into SAS data sets.

You can configure the following advanced properties in the data object write operation:

Load Type

Configure the load type for the target.

Trace

Boolean property to implement the SAS trace option. Use the SAS trace option to toggle verbose logging.

Compress

Boolean property to implement the SAS compress option. When you enable the SAS compress option, target SAS data sets will be stored with compressed content.

PreSASCode and PostSASCode

Facilitates the invocation of a SAS Macro or a SAS %include statement to be executed just before or just after the loading of the SAS target object. The SPI Server must be configured to allow the execution of SAS exits. The SAS Macro to be invoked must be defined in the autoexec.sas file that is part of the SPI Server configuration.

Index Name (For Update Strategy)

Name of the index that defines the composite key to be used for the load type 'update-else-insert'. This option is used only in the case of a composite key.

Target Properties of the Data Object Write Operation

The target properties represent the data that is populated based on the SAS data sets that you added when you created the data object. The target properties of the data object write operation include general and column properties that apply to the SAS data sets.

You can view the target properties of the data object write operation from the **General**, **Column**, and **Advanced** tabs.

General Properties

The general properties display the name and description of the SAS data set.

Column Properties

The column properties display the data types, precision, and scale of the target property in the data object write operation.

You can view the following target column properties of the data object write operation:

Name

Name of the column property.

Type

Native data type of the column property.

Precision

Maximum number of significant digits for numeric data types or maximum number of characters for string data types. For numeric data types, precision includes scale.

Scales

Maximum number of digits after the decimal point for numeric values.

Description

Description of the column property.

Is Primary Key

Determines if the column property is a part of the primary key.

Advanced Properties

The advanced property displays the physical name of the SAS data set.

Creating a Data Object Write Operation

You can create the data object write operation for one or more SAS data objects. You can add a SAS data object write operation to a mapping as a target.

1. Select the data object in the **Object Explorer** view.
2. Right-click and select **New > Data Object Operation**.
The **Data Object Operation** dialog box appears.
3. Enter a name for the data object operation.
4. Select **SASDataWrite** as the type of data object operation.
5. Click **Add**.
The **Select Resources** dialog box appears.
6. Select the SAS data set for which you want to create the data object write operation and click **OK**.
You can select only one data object for a data object write operation.
7. Click **Finish**.
The Developer tool creates the data object write operation for the selected data object.

Configuring Load Types

Load Type is a SAS target property that specifies how the Data Integration Service writes data to the physical SAS data object.

You can configure the following load types:

- Full load
- Append load
- Update Else Insert load

You can specify the load type in the **Advanced** tab of the Input Properties of a data object write operation.

Full Load

By default, the Data Integration Service uses full load when writing to a SAS data set. When you use full load, a SAS data set is created from the output, overwriting any existing data set. All attributes defined for the target definition is applied to the SAS data set, including indexes and (in)formats.

Append Load

With an append load, the Data Integration Service appends the mapping output to an existing SAS data set. If the layout of the target definition and the existing SAS data set do not match, an error condition occurs in the SAS processing. This error appears in the log file.

Update Else Insert Load

To update row values by an identifying key, choose the Update Else Insert Load. A proper key must be defined for the existing SAS data set to which the output is to be applied.

APPENDIX A

SAS Data Types Reference

This appendix includes the following topics:

- [SAS Data Types and Formats, 27](#)
- [Character Data, 27](#)
- [Numeric Data, 27](#)
- [Date Time and Datetime Data, 28](#)

SAS Data Types and Formats

SAS stores data that uses numeric and character data types. You can specify additional data type information by using SAS formats. SAS formats determine how the data is presented to the end user.

Character Data

The length attribute from SAS specifies the number of characters allowed in the column. The Developer tool uses this value as the scale attribute in the data object definition.

Numeric Data

For numeric data, the Developer tool uses the SAS format assigned to the column to determine the right precision and scale values.

For example, if the SAS format of a numeric column is 10.2, the column will be presented using 10 positions in total, including a decimal point and two digits after the decimal point. This is translated to a precision of 9 and a scale of 2.

If no format is assigned to a numeric column, the Developer tool assigns a default precision of 10 and scale of 0. This may not be adequate to hold the data. Adjust precision and scale manually to get a definition for the column that is adequate to hold the data you expect for the column.

Date Time and Datetime Data

All Date, Time and Datetime columns are represented in SAS by numeric columns.

The format of the column usually indicates the intended use of the numeric column, but supported formats differ between SAS releases and localized versions. For this reason, when importing a SAS data object, the Developer tool does not attempt to determine whether a numeric column should be interpreted as a Date value, Time value, or Datetime value. These data types are available in a SAS data object definition, but you must manually assign them. The necessary conversion will then be done automatically.

APPENDIX B

SPI Server Configuration Parameters

This appendix includes the following topic:

- [SPI Server Configuration Parameters, 29](#)

SPI Server Configuration Parameters

The following table lists the SPI Server configuration parameters:

Section	Parameter	Description	Example
ServerConfig	Portnumber	TCP/IP port number for the SPI Server listener process.	11080
ServerConfig	SasAppPath	Full path to the SAS executable.	c:\progs\sas\V8\sas.exe
ServerConfig	SasWorkingDir	Directory path for the SAS working environment.	d:\spi\work
ServerConfig	SasAutoExec	Autoexec file that contains the library definitions.	autoexec.sas
ServerConfig	LogFile	Specifies the location of the server log file.	d:\spi\spiserver.log
ServerConfig	SasLogMax	Number of SAS log files stored by the server for reader sessions and writer sessions. Minimum is 12. Default is 256.	256
ServerConfig	SASPrePostCode	Allow SAS exits (Yes/No).	Yes
ServerConfig	SpTimeout	Number of seconds that the SPI Server waits for SAS to start. Increase this value on very slow networks and when using a lengthy PreSAS command.	10

Section	Parameter	Description	Example
SpiUsers	<username>	Encrypted password.	89FD2A5347541028C9FA9A26A9057FF7
SpiAdmins	<username>	Encrypted password.	200CEB26807D6BF99FD6F4F0D1CA54D4

APPENDIX C

SAS Error Messages

This appendix includes the following topics:

- [Client Messages, 31](#)
- [Data Integration Service Messages, 33](#)
- [Communication Component Messages, 38](#)

Client Messages

Cannot connect to the SPI server, host = <host name>, port = <port number>, error = <error code>.

Explanation: The SPI Server TCP/IP port is not accessible.

User Response: Check the Communication component and network configuration. Verify that the SPI Server is running.

Cannot create field <field name>.

Explanation: The field cannot be defined in the repository.

User Response: Check for related messages.

Cannot initialize Windows Sockets.

Explanation: The Windows network environment is not properly configured.

User Response: Contact the Windows system administrator.

Failed to access config file data, wrong file format.

Explanation: The configuration file is accessible, but the content is invalid.

User Response: Check the configuration file.

Failed to add menu item <item name>.

Explanation: Internal error.

User Response: Contact Informatica Global Customer Support.

Failed to close the session.

Explanation: Internal error.

User Response: Check the environment for a temporary network or operating system failure. Contact Informatica Global Customer Support.

Failed to load config file: <file name>, the file doesn't exist or it is not valid config file.

Explanation: The configuration file is not accessible.

User Response: Make sure the configuration file exists and is accessible.

Failed to open the help file: <file name>.

Explanation: The help file could not be found or could not be opened.

User Response: Check the client installation.

Failed to retrieve metadata, error code = <error code>.

Explanation: SAS does not start.

User Response: Check the SAS environment. Try to start SAS manually, and check the error messages from SAS.

Failed to retrieve SAS session log, error code = <error code>.

Explanation: The SAS log file could not be retrieved from the SAS machine.

User Response: Check the SPI Server log file for more information.

Failed to retrieve session ID.

Explanation: Internal error.

User Response: Contact Informatica Global Customer Support.

Failed to save config file: <file name>.

Explanation: The configuration file could not be saved.

User Response: Check the file system.

Library information is not available.

Explanation: The SAS session did not return the expected metadata.

User Response: Check the SAS log for error conditions.

No information available about table <table name>.

Explanation: The SAS session did not return the expected metadata.

User Response: Check the SAS log for error conditions.

No selection has been made.

Explanation: You tried to edit a field attribute before selecting an attribute.

User Response: Make a selection before attempting the edit.

Nothing has been selected for import.

Explanation: No items have been selected in the table tree.

User Response: Select an item.

Received data has not valid format or the imported table/view has no columns.

Explanation: This should not occur in normal situations.

User Response: Check the SAS environment and the assigned library or table for abnormal conditions.

Session open request failed, host = <host name>, port = <port number>, error = <error code>.

Explanation: The SPI Server cannot initialize a session.

User Response: Check the SPI Server log for additional information.

SPI server login failed because of wrong user name or password.

Explanation: Authentication to the SPI Server failed.

User Response: Use the correct credentials to connect to the SPI Server.

The specified length of a numeric field is out of range (a valid value for SAS must be in the range from <value> to <value>). It will be set to the default value.

Explanation: The field length is invalid.

User Response: Enter a valid length or accept the default value.

Version mismatch is detected. The client version is not compatible with a server you are trying to connect to.

Explanation: The Client component of PowerExchange for SAS is not of the same version as the Communication component.

User Response: Make sure you install both components from the same version.

Data Integration Service Messages

10017 A version mismatch is detected. The client version is not compatible with a server you are trying to connect to.

Explanation: The Data Integration Service component of PowerExchange for SAS is not of the same version as the Communication component.

User Response: Make sure you install both components from the same version.

11010 Data field length exceeds the maximum value.

Explanation: The value for the length of the field is larger than that allowed by SAS.

User Response: Enter a valid length. Check SAS documentation for valid lengths.

10001 Cannot connect to the SPI server, host = <host name>, port = <port number>, error = <error code>.

Explanation: The SPI Server TCP/IP port is not accessible.

User Response: Check the Communication component and network configuration. Make sure the SPI Server is running.

10002	Session open request failed, host = <host name>, port = <port number>, error = <error code>.
Explanation:	The SPI Server cannot initialize a session.
User Response:	Check the SPI Server log for additional information.
10003	Failed to retrieve a session ID.
Explanation:	Internal error.
User Response:	Contact Informatica Global Customer Support.
10004	Failed to close the session.
Explanation:	Internal error.
User Response:	Contact Informatica Global Customer Support.
10005	Requested not supported data type, field = <field name>, data type = <data type enumeration>.
Explanation:	Internal error.
User Response:	Contact Informatica Global Customer Support.
10006	Failed to retrieve SAS session log, error code = <error code>.
Explanation:	The SPI Server cannot read or pass the SAS log file.
User Response:	Check the existence and permissions of the SAS log file.
10007	Failed to retrieve connection attributes.
Explanation:	Internal error. The SPI Server cannot read or pass the SAS log file.
User Response:	Contact Informatica Global Customer Support.
10008	Failed to retrieve a host name.
Explanation:	Internal error. Failed to retrieve the host name from the SAS database connection.
User Response:	Contact Informatica Global Customer Support.
10009	Failed to retrieve a port number.
Explanation:	Internal error. Failed to retrieve the port number from the SAS database connection.
User Response:	Contact Informatica Global Customer Support.
10010	Failed to retrieve a library name from the extension field.
Explanation:	Internal error. Failed to retrieve the value of the LibraryName metadata extension.
User Response:	Contact Informatica Global Customer Support.
10011	SAS code generation failed, not supported data type: <data type enumeration>.
Explanation:	Internal error.
User Response:	Contact Informatica Global Customer Support.

10012	Unexpected command received, command code = <command code>
Explanation:	Internal error.
User Response:	Contact Informatica Global Customer Support.
10013	The session has been aborted.
Explanation:	The session has been aborted by the user.
User Response:	Run the session again.
10015	SPI server login failed because of wrong user name or password.
Explanation:	Authentication to the SPI Server failed.
User Response:	Use the right credentials to connect to the SPI Server.
10016	Failed to retrieve 'trace' attribute from the extension field.
Explanation:	Internal error. Failed to retrieve the value of the Trace session property.
User Response:	Contact Informatica Global Customer Support.
10020	Failed to expand library name parameter.
Explanation:	Internal error. Failed to expand the mapping parameter specified for the library name.
User Response:	Contact Informatica Global Customer Support.
10021	Failed to expand table name parameter.
Explanation:	Internal error. Failed to expand the mapping parameter specified for the table name.
User Response:	Contact Informatica Global Customer Support.
10022	Failed to retrieve Pre SAS Code from the extension field.
Explanation:	Internal error. Failed to retrieve the value of the PreSASCode metadata extension.
User Response:	Contact Informatica Global Customer Support.
10023	Failed to retrieve Post SAS Code from the extension field.
Explanation:	Internal error. Failed to retrieve the value of the PostSASCode metadata extension.
User Response:	Contact Informatica Global Customer Support.
10028	Open SAS code not allowed.
Explanation:	Specified SAS code is not allowed.
User Response:	Enter allowed SAS code.
10031	Opening parenthesis not matched.
Explanation:	Unmatched opening parenthesis found in the SAS code.
User Response:	Correct the SAS code with proper closing parenthesis.
10032	Opening quote char not matched.
Explanation:	Unmatched opening quote found in the SAS code.

User Response:	Correct the SAS code with proper closing quote.
10033	Invalid value for Pre/Post SAS Code.
Explanation:	Specified SAS code is incorrect. See the log file for more information.
User Response:	See the SAS documentation.
10035	The repository is not licensed for PowerExchange for SAS, or the license has expired.
Explanation:	There is no valid license to use PowerExchange for SAS.
User Response:	Install the proper license keys.
11004	Failed to retrieve the source table.
Explanation:	Internal error. Cannot retrieve the table metadata for the SAS source object.
User Response:	Contact Informatica Global Customer Support.
11006	Failed to retrieve data, error code = <error code>.
Explanation:	SAS does not start.
User Response:	Check the SAS environment. Try to start SAS manually and check the error messages from SAS.
11007	Failed to retrieve a where clause from the extension field.
Explanation:	Internal error. Failed to retrieve the value of the WhereClause metadata extension.
User Response:	Contact Informatica Global Customer Support.
11009	Failed to retrieve metadata extension attributes.
Explanation:	Internal error. Cannot retrieve the mapping level SAS table object metadata from the mapping.
User Response:	Contact Informatica Global Customer Support.
11010	Data field length exceeds maximum value.
Explanation:	The value for the length of the field is larger than that allowed by SAS.
User Response:	Specify a valid length. Check SAS documentation for valid lengths.
11012	Failed to expand where clause parameter.
Explanation:	Internal error. Failed to expand the mapping parameter specified for the where clause.
User Response:	Contact Informatica Global Customer Support.
11013	Failed to retrieve 'Join Type' from the extension field.
Explanation:	Internal error. Failed to retrieve the join type from the mapping.
User Response:	Contact Informatica Global Customer Support.
11014	Failed to retrieve 'Join Condition' from the extension field.
Explanation:	Internal error. Failed to retrieve the join condition from the mapping.
User Response:	Contact Informatica Global Customer Support.

11018	For %s Only two sources per source qualifier are supported.
Explanation:	More than two tables participate in the join and the join is not an inner join.
User Response:	Limit the number of tables to two or specify an inner join.
11019	Failed to get the Primary key - Foreign key relation for creating the Join.
Explanation:	Failed to retrieve the primary key and foreign key relations from the mapping where no join condition was specified.
User Response:	Create primary key and foreign key relations in the data object, or specify a join condition.
15001	Failed to retrieve the target table.
Explanation:	Internal error. Cannot retrieve the table metadata for the SAS target object.
User Response:	Contact Informatica Global Customer Support.
15002	Failed to send data, error code = <error code>.
Explanation:	SAS does not start.
User Response:	Check the SAS environment. Try to start SAS manually and check the error messages from SAS.
15003	Failed to retrieve target instances.
Explanation:	Internal error. Failed to retrieve the target instance from the session.
User Response:	Contact Informatica Global Customer Support.
15006	Failed to retrieve indexes information from the extension field.
Explanation:	Internal error. Failed to retrieve indexes from the metadata extension.
User Response:	Contact Informatica Global Customer Support.
15007	Failed to load index information from the extension field.
Explanation:	Internal error.
User Response:	Contact Informatica Global Customer Support.
15008	Failed to retrieve key index information from the extension field.
Explanation:	Internal error. Failed to retrieve the key index metadata extension.
User Response:	Contact Informatica Global Customer Support.
15009	Failed to retrieve load type attribute from the extension field.
Explanation:	Internal error. Failed to retrieve the value of the load type property.
User Response:	Contact Informatica Global Customer Support.
15010	Failed to retrieve 'data compression' attribute from the extension field.
Explanation:	Internal error. Failed to retrieve the value of the Compress session property.
User Response:	Contact Informatica Global Customer Support.

Communication Component Messages

A version mismatch is detected, the client connection has been rejected.

Explanation: The Data Integration Service or Client component of PowerExchange for SAS is not of the same version as the Communication component.

User Response: Make sure you install both components from the same version.

Failed to create SAS data code file <file name>.

Explanation: The indicated file could not be created in the working directory as specified in the Communication component configuration.

User Response: Check the configuration and the directory permissions.

Failed to generate SAS dummy log file.

Explanation: No empty SAS log file could be created.

User Response: Check the file and directory permissions, and the Communication component configuration.

Failed to open SAS log file <file name>.

Explanation: The SAS log file could not be opened.

User Response: Check the file and directory permissions, and the Communication component configuration.

Failed to receive data from SAS, errno = <error message>.

Explanation: SAS does not start.

User Response: Check the SAS environment. Try to start SAS manually, and check the error messages from SAS.

Failed to send data to SAS, errno = <error message>.

Explanation: SAS does not start.

User Response: Check the SAS environment. Try to start SAS manually, and check the error messages from SAS.

Failed to set SAS working directory <directory path>.

Explanation: Could not set the indicated path as the current working directory.

User Response: Check the existence of the directory and its permissions, and the Communication component configuration.

Failed to start SAS session, errno = <error message>.

Explanation: SAS does not start.

User Response: Check the SAS installation and the Communication component configuration.

Failed to stop SPI server, errno = <error message>.

Explanation: The SPI Server could not be stopped by using the spiserver command.

User Response: Make sure you specified the right host name and port number.

Failed to write data to SAS data code file <file name>.

Explanation: Could not write the data to the indicated file.

User Response: Check the file permissions.

SAS session time out expired.

Explanation: The SAS process does not end.

User Response: Check the SAS log for possible problems.

SAS session wait failed.

Explanation: Internal error.

User Response: Contact Informatica Global Customer Support.

Unexpected command received, message ID = <message ID>.

Explanation: Internal error.

User Response: Contact Informatica Global Customer Support.

Unknown message received.

Explanation: Internal error.

User Response: Contact Informatica Global Customer Support.

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