

Using SAS® Enterprise Guide® Projects in SAS® Studio

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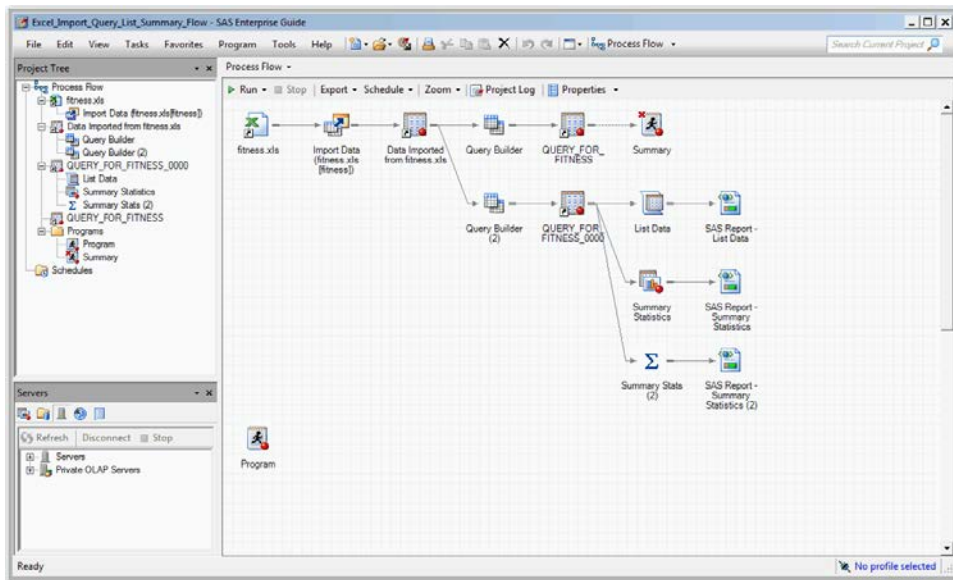
ABSTRACT

You've started learning the SAS® Studio interface since it seems to be a good addition to how you already work with SAS®—being able to access your stuff via your browser from other machines is useful. Opening your SAS program files (.SAS) is easy, but did you know you can also open your existing SAS® Enterprise Guide® projects (.EGP files) in SAS Studio? When you open a SAS Enterprise Guide project in SAS Studio, the process flows in the project are extracted and converted to process flows in SAS Studio. Any elements from the SAS Enterprise Guide project that are not supported by SAS Studio are either converted to different node types or are omitted from the process flow, and you can see the status in the conversion report that is created. This feature was experimental in SAS Studio 3.6 and is production in SAS Studio 3.7.

INTRODUCTION

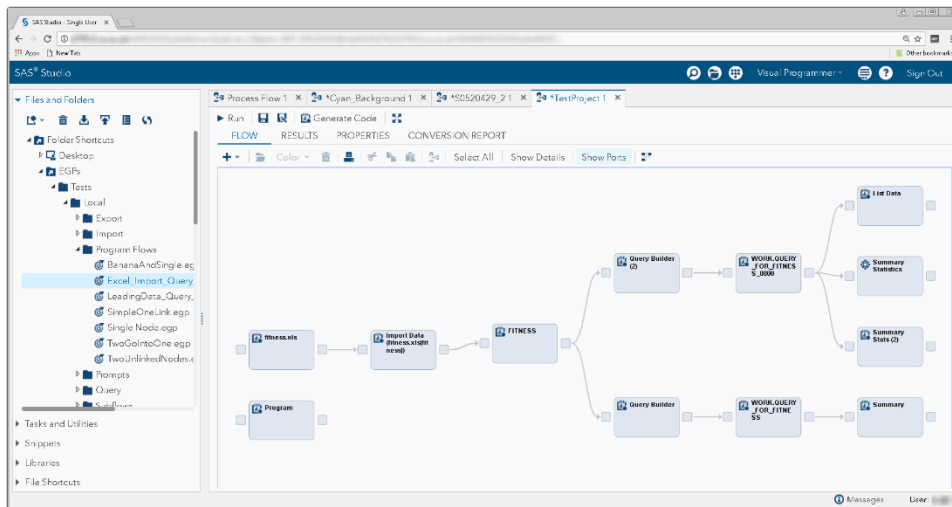
SAS Studio users have been requesting support for SAS Enterprise Guide projects since the introduction of the Visual Programming perspective and SAS Studio process flows. SAS Studio now has a feature that extracts process flows from a SAS Enterprise Guide project file (also referred to as an EGP file in this paper) and converts the process flow to a SAS Studio process flow.

Here is a project in SAS Enterprise Guide.



Display 1: SAS Enterprise Guide Project

Here is the converted process flow in SAS Studio.



Display 2: SAS Studio Process Flow

Elements that are not supported by SAS Studio are either converted to different node types or are omitted from the process flow. A Conversion Report is provided to explain what happened to the nodes in the conversion process.

This paper will help you understand how elements are converted and when a converted process flow might require manual intervention before it will run.

YOUR SERVER ENVIRONMENTS MUST MATCH

In SAS Enterprise Guide, a profile defines the connection between SAS Enterprise Guide and a SAS Metadata Server. The SAS Metadata Server contains metadata definitions for objects such as workspace servers, libraries, and users. This server context is very important for EGP files. In SAS Enterprise Guide, the active connection is saved in the project metadata. (To view the active connection in SAS Enterprise Guide, select **Tools -> Connections**. In the Connections dialog box, select **Profiles**.) Only one profile can be active at a time. If the active profile for the current SAS Enterprise Guide session does not match the profile for the project file that you are trying to open in SAS Enterprise Guide, you are prompted to change profiles. Because SAS Enterprise Guide is a desktop application, you can easily access both your local files as well as any SAS Workspace Servers that your SAS Enterprise Guide session is configured to use.

SAS Studio, as a web interface, behaves differently and can have only one SAS server configuration at a time.

- The Enterprise edition of SAS Studio can be configured to use multiple workspace servers that are defined in the SAS Metadata Server, but you can connect to only one workspace server at a time in SAS Studio.
- The Basic edition of SAS Studio can access only the single workspace server that it is configured to use and the file system available to that server.
- The Single-User edition of SAS Studio accesses the SAS installation on the desktop and is the only edition that can access the local file system directly. (The other editions require you to upload data to the server or access network drives.)

These differences are important to understand when you open a SAS Enterprise Guide project file in SAS Studio. If the environment for the SAS Enterprise Guide project and the environment for SAS Studio do not match, you cannot run the converted process flow in SAS Studio. In addition, you cannot access any nodes within the SAS Enterprise Guide project that are associated with an environment that is not accessible to SAS Studio. The Conversion Report provides warnings about the mismatches.

OPEN A SAS ENTERPRISE GUIDE PROJECT FILE

To open a SAS Enterprise Guide project in SAS Studio:

1. Open the Visual Programmer perspective in SAS Studio.
2. In the **Server Files and Folders** section, expand the appropriate folder and double-click the project that you want to open. You could also drag this project file to the SAS Studio workspace.

Note: Your SAS Enterprise Guide project file must be in a location that can be accessed by SAS Studio. Before opening the project, you might need to move the file to this location.

3. Review any errors or warnings in the Conversion Report. Errors indicate that the process flow cannot execute as expected. Warnings indicate that the process flow might not execute as expected or might need some user modification to run.
4. To view the process flow in SAS Studio, click the **Flow** tab.

You can save the converted flow to a SAS Studio process flow (.CPF) file, and the Conversion Report will persist with it. It is important to understand that the Conversion Report is static and will not reflect any changes made to the converted process flow.

BEHIND THE SCENES

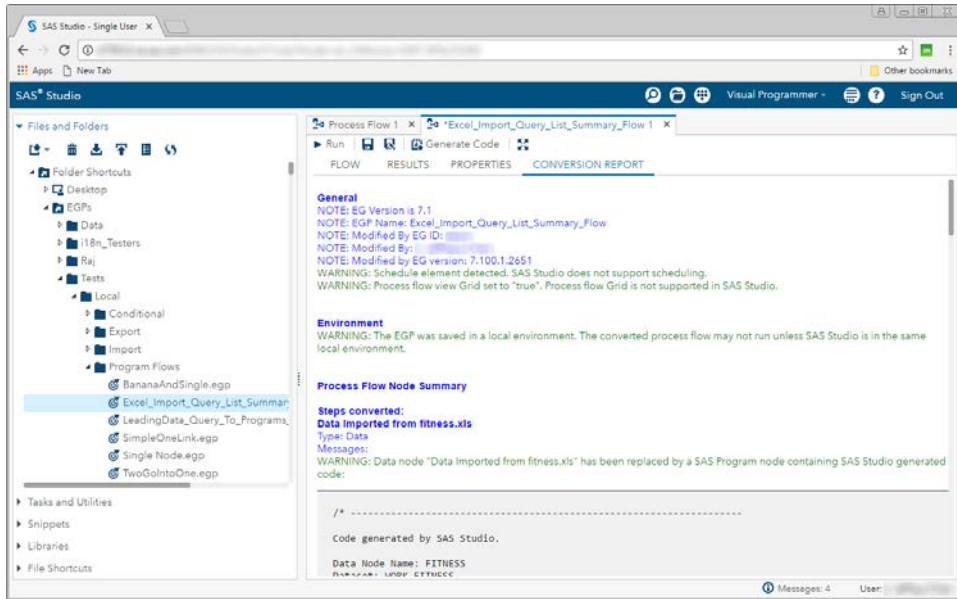
The following processing occurs when an EGP file is converted:

- The EGP file is "unpacked" into a temporary directory.
- The project and its process flow nodes are analyzed to determine if the server context is consistent with the SAS Studio context where the EGP is being opened. Mismatched SAS connection contexts will result in conversion warnings.
- Where possible, nodes in the SAS Enterprise Guide process flow are converted to SAS Studio nodes.
- Multiple process flows in the EGP file become sub-flows in a single SAS Studio process flow.
- Prompts are replaced by generated macro code in SAS Studio. This macro code is added to the beginning of the code that depends on the prompts.

The "unpacked" temporary directory is deleted unless the debug functionality is enabled in SAS Studio.

UNDERSTANDING THE CONVERSION REPORT

When you open an EGP file in SAS Studio, the Conversion Report is displayed. This report lists how each node of the SAS Enterprise Guide process flow was converted and notes any potential problems with the converted SAS Studio process flow. Here is an example of a conversion report.



Display 3: SAS Studio Conversion Report

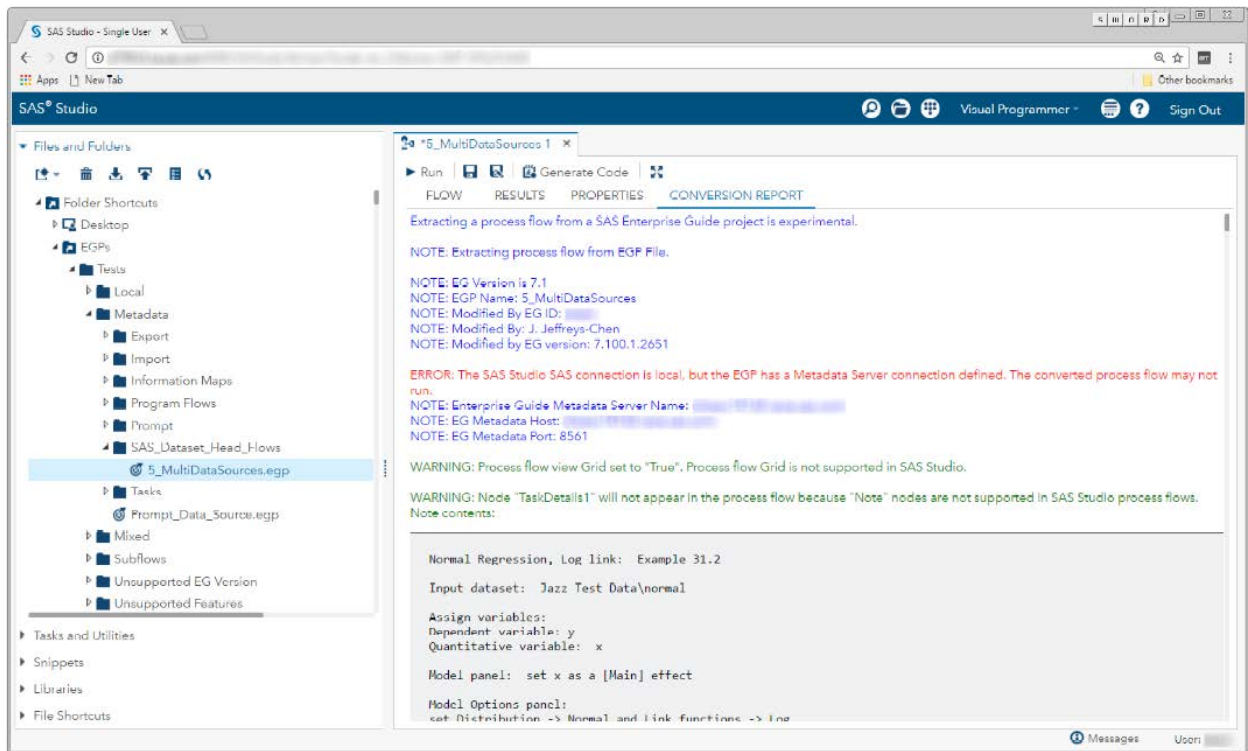
GENERAL AND ENVIRONMENT SECTIONS

The General section provides information about the SAS Enterprise Guide project from the project metadata. This project information includes these items:

- EG Version – release of SAS Enterprise Guide where the EGP was created
- EGP Name – the name of the project
- Modified by EG ID – the user ID of the last person to modify the EGP
- Modified by – the name of the last person to modify the EGP
- Modified by EG version – the release of SAS Enterprise Guide where the EGP was last saved

This section might contain warnings about features that are not available in SAS Studio, such as the grid view and zoom features.

The Environment section provides information about the SAS Enterprise Guide connection environment. If your SAS connection in SAS Studio does not match the SAS connection in SAS Enterprise Guide where the EGP was last saved, you will get an error. If the connections might not match, you get a warning. For example, you are using the Single-user edition of SAS Studio, and the EGP was saved on a desktop installation of SAS Enterprise Guide. If these local connections are not the same, there could be a problem. Here is what the warning would look like:

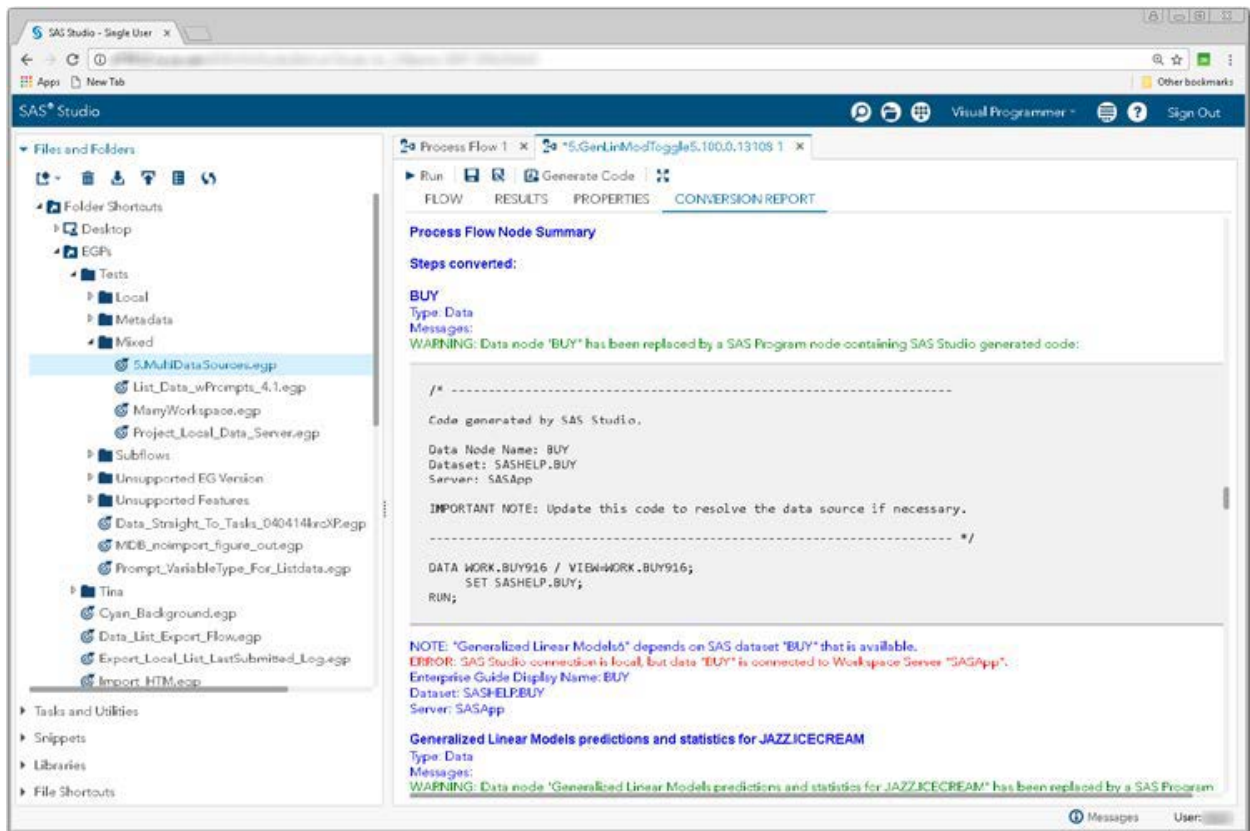


Display 4: Error about Connection Mismatch in SAS Studio

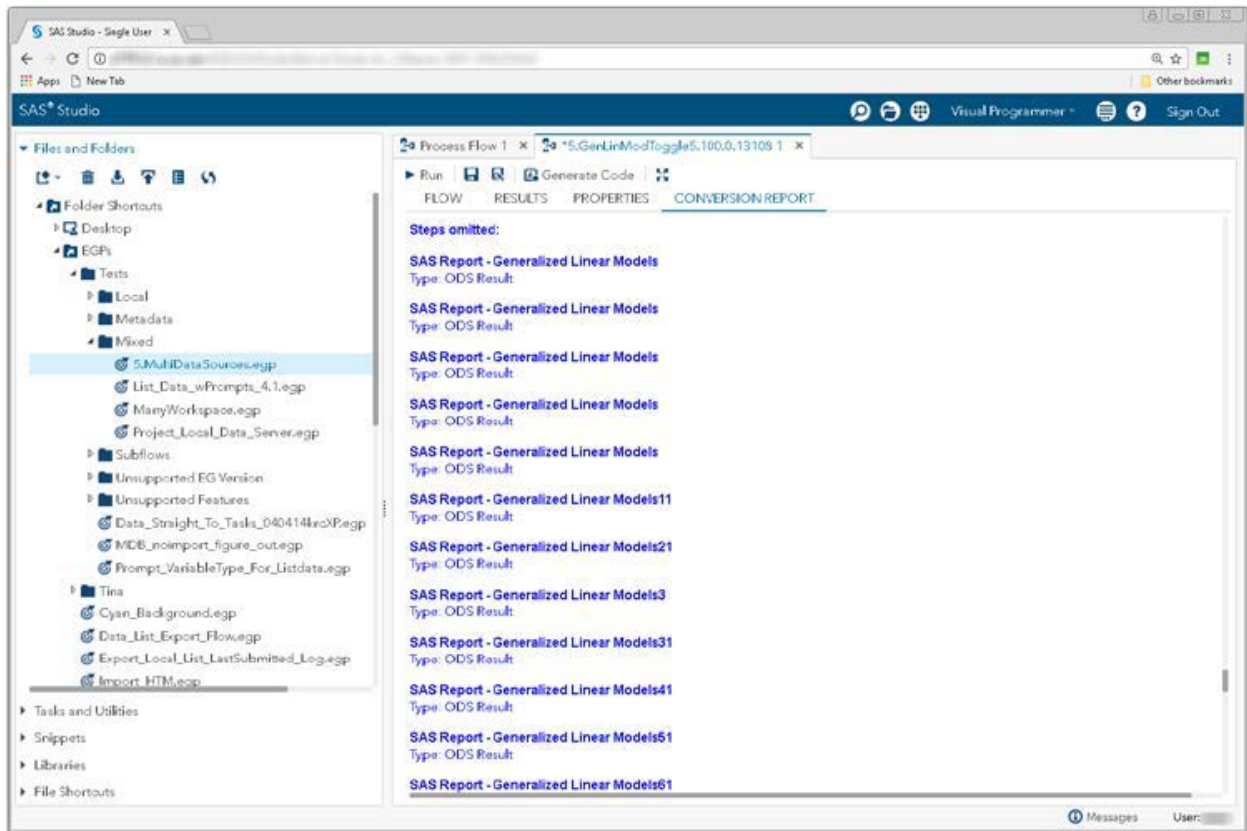
It is very important to make sure that the connections in SAS Studio and SAS Enterprise Guide are the same in order for the converted SAS Studio process flow to be correct.

PROCESS FLOW NODE SUMMARY

This section begins with a listing of the contents of any Note nodes from the EGP file. SAS Studio does not support Note nodes, so note elements do not appear in a converted flow. The Process Flow Node Summary section provides a list of nodes that are included in the converted process flow and a list of nodes that are not included. The lists are in alphabetical order and any errors and warnings associated with a node is listed. Here are examples of converted and not converted nodes.



Display 5: Node Summary Showing Converted Nodes



Display 6: Node Summary Showing Unconverted Nodes

SUPPORTED NODES THAT ARE DIRECTLY CONVERTED

Assuming that the connection environments are the same for the SAS Enterprise Guide project file and your SAS Studio session, some of the nodes in your SAS Enterprise Guide process flow should convert directly.

PROGRAM AND SAS STUDIO TASKS

Program nodes are converted directly to SAS Program nodes in SAS Studio. If the contents of the Program node are stored in a file, the file must be available in order for the contents of the file to be read into the converted Program node.

SAS Studio tasks in SAS Enterprise Guide are converted directly to SAS Studio tasks in SAS Studio. Any options that are specified in SAS Enterprise Guide are included in the converted task in SAS Studio. You can improve the conversion process by updating your project to use SAS Studio tasks where possible rather than SAS Enterprise Guide tasks. For more information, see “Accessing SAS Studio tasks” in the SAS Enterprise Guide Help.

SUPPORTED NODES CONVERTED TO ANOTHER TYPE

Assuming that the connection environments are the same for the SAS Enterprise Guide project file and your SAS Studio session, many of the nodes in your SAS Enterprise Guide process flow should be automatically converted to a node that SAS Studio can support.

DATA

Data nodes in SAS Enterprise Guide are converted to program nodes in SAS Studio. SAS Studio does not currently support Data nodes. The converted Program node contains SAS code that includes the following information:

- Comments about the data location.
- SAS code that samples the contents of the data. The generated code depends on the type of data in the data node.
 - The first 50 lines of any directly readable text file, including CSV files, fixed-length text files, HTML files, and tab-delimited text files are displayed in the program output.
 - Data nodes that represent Microsoft Excel files do not sample the data. The nodes include only comments about the original Excel file.
 - SAS programs that represent SAS data sets create a view of the rows in the data set. You cannot edit the table or perform any other functions in this view.

Note that there are plans for SAS Studio to support Data nodes in a future release.

SAS ENTERPRISE GUIDE TASKS AND QUERIES

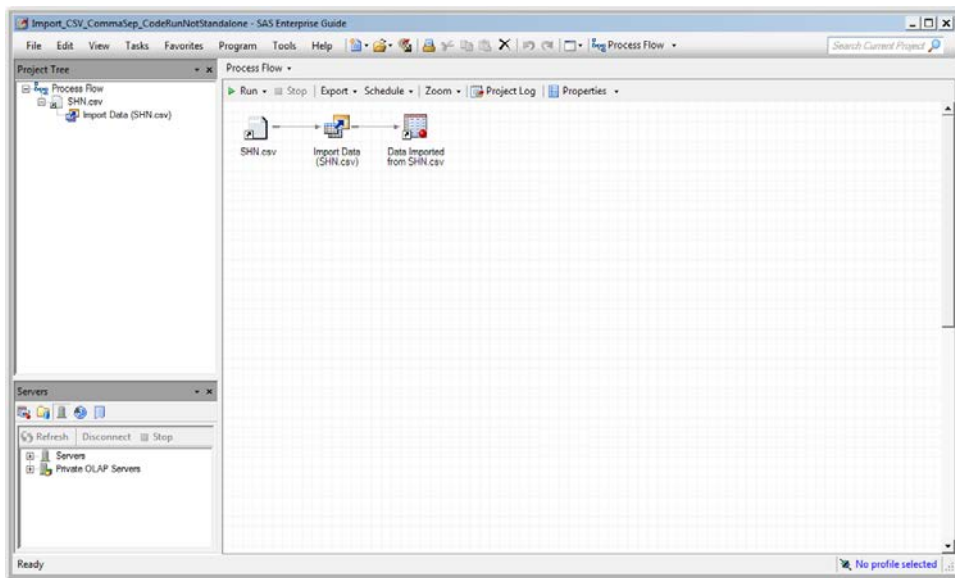
The code that is generated by a SAS Enterprise Guide task or query is converted to a Program node in SAS Studio.

IMPORT DATA

Because an Import Data node in SAS Enterprise Guide does not port directly to an Import Data task in SAS Studio, SAS Studio makes quite a few changes to Import Data nodes to support importing files. First, it's helpful to understand what happens when a CSV file, for example, is dropped into a SAS Enterprise Guide project and the Import Data wizard is used to specify the output data location, delimiter information, fields to import, and other advanced options. The result is three nodes in the SAS Enterprise Guide process flow:

- the input data
- Import Data
- the generated output SAS data set.

Here is what the SAS Enterprise Guide process flow looks like.



Display 7: Import Data Task in SAS Enterprise Guide

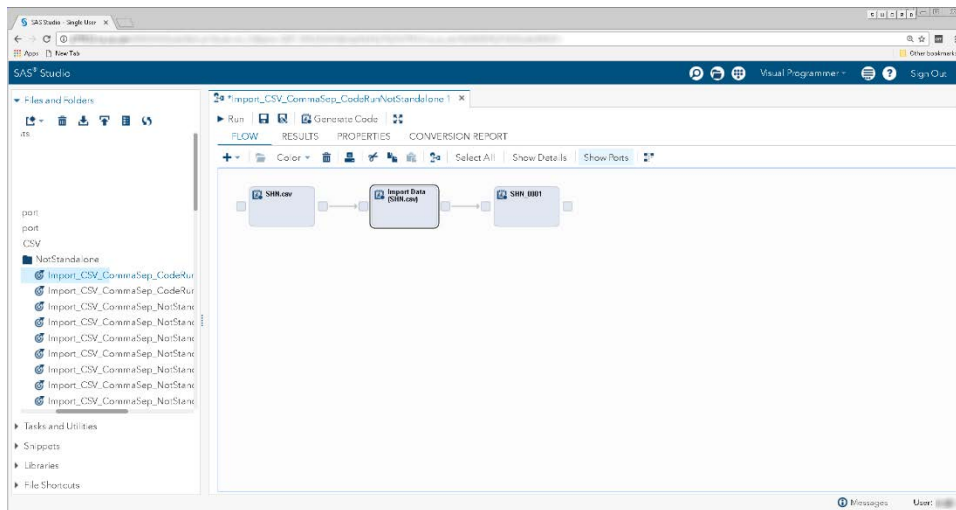
Opening the EGP file in SAS Studio results in representative nodes for each node in the Import Data process flow, but these nodes are remarkably different in SAS Studio.

- The Input Data node is converted to a SAS Program node in SAS Studio. The SAS Program node contains SAS Studio generated code that samples the input file contents or comments about the original file depending on the file type. See the previous section of this paper on Data nodes.
- Import Data node becomes a SAS Program node in SAS Studio. Unlike the Import Data node in SAS Enterprise Guide, the code in the converted SAS Program node can be edited. The contents of this node will be either:
 - code generated by SAS Enterprise Guide if the **Generalize step to run outside of SAS Enterprise Guide** option was selected in the Specify Data step in the Import Task wizard. This code should function the same in SAS Studio and SAS Enterprise Guide when using an identical SAS server
 - code generated by SAS Studio that tries to closely match the functionality provided by the Import Data node in SAS Enterprise Guide.
- The node for the output data is converted to a SAS Program node. When you run the converted process flow, the **Output Data** tab for the converted node contains a view of the imported SAS data set.

There are some limitations:

- SAS Studio does not support importing data from HTML files.
- The **Use SAS/ACCESS Interface** option is ignored. The code that is generated by SAS Studio always uses PROC IMPORT to read an Excel file and then a DATA step to format the data appropriately. All other data types are imported using a DATA step.
- SAS Studio does not remove characters that cause transmission errors from the automatically generated code.

Here is what the SAS Studio process flow looks like.



Display 8: Import Data in SAS Studio

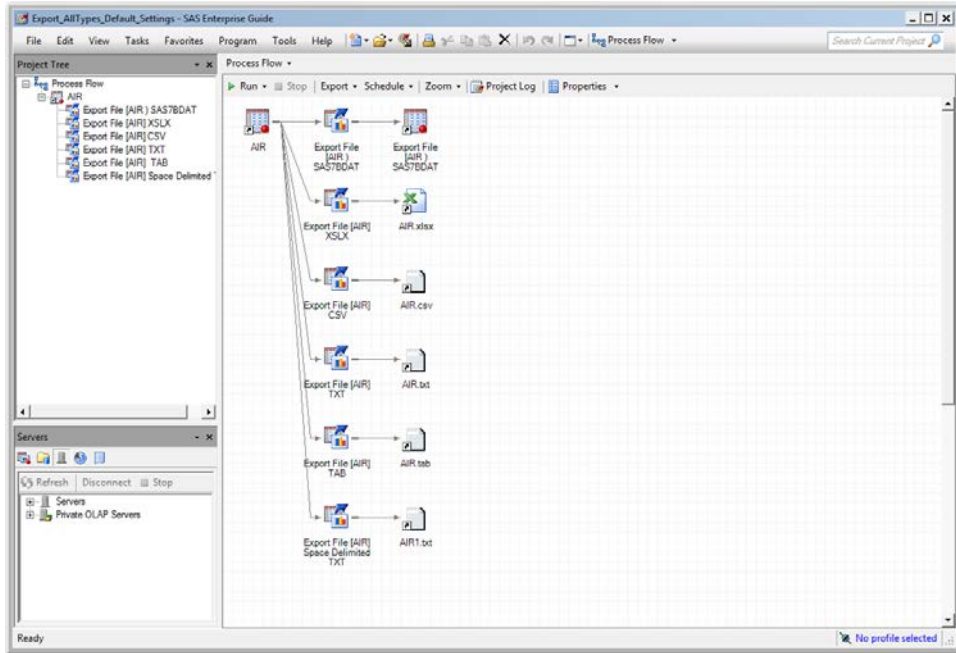
Because the import functionality is different in SAS Enterprise Guide and SAS Studio, you might have to update your import code to make it work exactly the same in SAS Studio.

EXPORT FILE

Just like import data, Export File nodes are very different between SAS Enterprise Guide and SAS Studio. The conversion is treated similarly to the import data conversion. When you export a file in SAS Enterprise Guide, three nodes are created in the SAS Enterprise Guide process flow:

- the input data
- Export File
- the output data

Here is what the SAS Enterprise Guide process flow looks like.

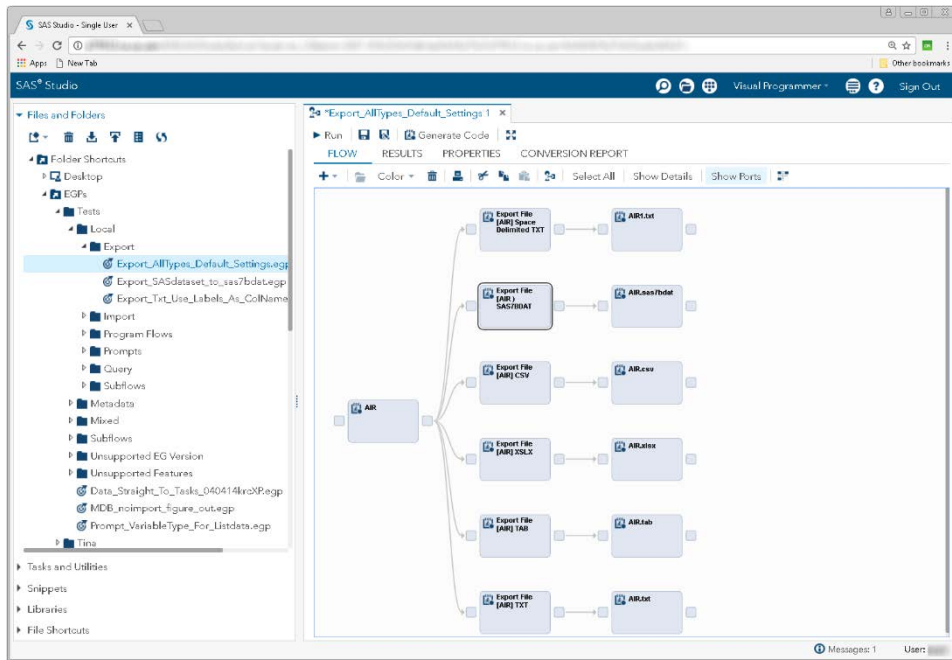


Display 9: Export Data in SAS Enterprise Guide

Here is how these nodes are converted in SAS Studio:

SAS Enterprise Guide Node	SAS Studio Node
Input Data node	Program node that displays the contents of the SAS data set
Export File node	Program node that uses the metadata that is stored in the SAS Enterprise Guide project to generate code that can export the input data set
Output Data node	Program node that samples the output data

Here is what the SAS Studio process flow looks like.



Display 10: Export Data in SAS Studio

UNSUPPORTED NODES

These node types are not currently supported in a SAS Studio process flow:

- Notes - Note: The contents of any Note nodes are written to the Conversion Report in SAS Studio.
- Stored processes
- OLAP cubes
- Code (last submitted code)
- Logs
- Project logs
- ODS results
- SAS Web Report Studio (WRS) reports
- Send email as a step in a project
- Publish elements

PROMPTS

In SAS Enterprise Guide when a process flow containing a program with prompts or a prompt dependent program is run, a dialog box that contains prompts is displayed. When the user enters values in the prompt dialog box, these values are placed in macro variables with names based on the name field in the prompt definition. Some prompts, such as a simple text or numeric input field, create a single macro variable with the prompt name. Other prompts, such as a text range or a numeric range, create multiple macro variables. Multiple nodes can depend on a prompt.

SAS Studio process flows do not currently support prompts. When you convert a SAS Enterprise Guide process flow that contains prompts, code is added to the converted program or task nodes that use

prompts. To view the added code, open the Conversion Report. The added code includes these elements:

- comments about the values that are expected for the macro variables that are created by the prompt, such as types, minimums, and maximums.
- macro variable definitions that the prompts would have created.
- default or blank default values for the macro variables based on the prompt definition.
- deletion of the macro variables at the end of the program unless the prompt definition includes the **Use prompt value throughout project** option. (You can select this check box in the Prompt Manager in SAS Enterprise Guide.)

If you want to run your prompt-dependent code against different prompt values, you must manually change the values in the generated macro variables. If a prompt is used for more than one node, the values of the macro variables must be manually changed in each node to simulate the prompt. Editing the values can be a lot of work if there are many nodes that depend on a single prompt.

If a SAS Enterprise Guide task node has a prompt defined, the converted SAS Studio task node includes the generated macro code. If you want to change the values in the converted task node, you must edit the SAS Studio task (.CTM file). If you want to change these prompt values with a user interface, you can create a SAS Studio task node that contains input controls for each of the macro variables that the prompt would have created.

To manually update a converted process flow to use a SAS Studio task to collect the information that the prompts would have collected, you need to complete these tasks:

1. Write a SAS Studio task that contains input controls for each of the macro variables that the prompts would have created. The prompt replacement code generated by SAS Studio provides information about the macro variables and the attributes of the macro variables that are defined by the prompts.
2. Add the SAS Studio task to your converted process flow.
3. Create links from the output port of the SAS Studio task to the input ports of the SAS Program nodes that depend on the prompt or prompts.
4. In the converted program nodes that depend on the prompts, comment out the call to the macro code that creates and sets global variables. The %SYMDEL code in single input cases can remain.

When using a SAS Studio task to simulate a SAS Enterprise Guide prompt, the task functions like a SAS Enterprise Guide prompt that has **Hide at Runtime** option selected. If you would like to run with different values, you must open the SAS Studio task, change the values, and then run the process flow or program.

For more information and examples, see [SAS Studio Tasks Resembling SAS Enterprise Guide Prompts](#) on GitHub.

A FEW MORE THINGS TO KNOW

These items in a SAS Enterprise Guide project are not currently supported in SAS Studio:

- Project log
- Decision Manager elements
- Data Exploration elements
- Scheduling
- Conditions
- Ordered lists
- Explore Data list
- Git source control

In addition, the following attributes of a SAS Enterprise Guide process flow are not currently supported in a SAS Studio process flow:

- background color
- process flow zoom - Note: In SAS Studio, use the zoom functionality in your browser.
- grid view
- submit to grid

Only EGP files saved with SAS Enterprise Guide 7.1 or later are supported. You cannot save your converted SAS Studio process flows back to SAS Enterprise Guide projects. You cannot open password-protected SAS Enterprise Guide projects in SAS Studio. You must remove the password protection before you convert the file. The ActiveX graphics output format in SAS Enterprise Guide does not look the same in SAS Studio. SAS Studio does not support ActiveX for ODS output.

By default, users can open SAS Enterprise Guide project files in SAS Studio. To prevent users from opening SAS Enterprise Guide files in SAS Studio, SAS Studio Administrators can set the `webdms.allowEGPOpen` property to `false` in the `config.properties` file.

CONCLUSION

The ability to open a process flow from SAS Enterprise Guide in SAS Studio is just one example of the interoperability between the two interfaces. The goal is for SAS Enterprise Guide and SAS Studio to share common assets, so no conversion is needed. This is already true of SAS program files (.sas files) but work still needs to be done to create common project and process flows. In the meantime, although the conversion is only one way (from SAS Enterprise Guide to SAS Studio but not the reverse), it is a helpful tool for not only moving content but also to make you aware of what elements of a SAS Enterprise Guide process flow are most portable.

REFERENCES

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"SAS Studio Tasks Resembling SAS Enterprise Guide Prompts." SAS Institute Inc. Available at <https://github.com/sassoftware/sas-studio-tasks/tree/master/prompts>. Accessed January 23, 2018.

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