

SAS® Studio or SAS® Enterprise Guide®: What's the Best SAS Programming Interface for Me?

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ABSTRACT

In some people, loyalty to an interface can run as deep as loyalty to a football team, and it's been no different for SAS® users. The good news is that a concerted effort is underway to remove the barriers between interfaces and the differences between them so that you can just choose what you use based on where you are. Are you on a desktop? A mobile device? In a conference room? This paper talks you through the integrated future that's under development. In the meantime, this paper helps you to understand what the strengths and weaknesses are of the programming interfaces today so that you can choose wisely. You also learn tips and tricks for working efficiently. The paper focuses on SAS® Studio and SAS® Enterprise Guide®, but it also touches on several of the other SAS programming interfaces that are available, including Jupyter.

INTRODUCTION

When you need to handle an email or take some notes, it's rare that you give a thought to what app you'll use. Usually, you just use what happens to be handy on the device you're on. You take it for granted that your work is coordinated across the devices you use. The same should be true for your SAS coding work. And while there's been good progress, there's still more work to be done before you can seamlessly move between the SAS programming interfaces currently known as SAS Enterprise Guide and SAS Studio. The goal is for you do your work where it's most convenient for you at the time, and as you move around it's easy to pick up where you left off.



Figure 1: Create Code in SAS Enterprise Guide, Run it Offline, Access Same Code in SAS Studio

When this goal is reached, papers like this will be unnecessary. For now, though, there are differences you need to know about to help you choose which interface is best for your work. And there are features you might not be aware of that could make you more efficient. Since things change so quickly, many of the assets in this paper point to living documents on the web so that you can see the current state.

HOW DO I CHOOSE WHERE TO WORK?

Let's start with the big picture then drill down to capabilities and specific functions.

DO I EVEN HAVE SAS ENTERPRISE GUIDE? SAS STUDIO?

There are a few cases where the choice is taken out of your hands:

- On a SAS release older than SAS® 9.4 – SAS Enterprise Guide is your only choice as SAS Studio was introduced in SAS 9.4.
- Not licensed – While most SAS server licenses include unlimited seats for SAS Enterprise Guide, there are some in which only a specific number are licensed. SAS Studio, however, is free with any SAS license; there is no per seat charge.
- Not installed – If it's a case of an IT policy forbidding desktop applications, then you won't be able to use SAS Enterprise Guide. Otherwise, it's a matter of finding a sympathetic administrator to install SAS Enterprise Guide or to configure SAS Studio and provide you the URL to access it.
- On SAS® Viya® – SAS Studio is currently the only native SAS Viya application. You can use both SAS Studio and SAS Enterprise Guide to access a CAS server (submit code, get results, load data, and so on) from a SAS 9.4 environment. A release of SAS Enterprise Guide that is native to SAS Viya is planned.

For the majority of users, both SAS Enterprise Guide and SAS Studio are available. Let's begin to look at what sweeping capabilities are in one versus the other.

WHAT ARE THE MAJOR DIFFERENCES IN CAPABILITY?

You can access an interactive version of this content at http://support.sas.com/software/products/sas-studio/faq/SASStudio_vsEG.htm, which we'll keep up to date as things progress.



Projects

This one is easy. If it's important to have your work organized into a project for you, then use SAS Enterprise Guide. Projects do not yet exist in SAS Studio. If you have existing SAS Enterprise Guide projects (EGP files), you can read them into SAS Studio 3.8 and they will be converted (using SAS Studio process flows, code, and so on). This is a one-way street currently. The future goal is a common project format shared between the applications.

Query Tool

A query tool, basically a point-and-click way of building SQL, has been in SAS Enterprise Guide for a very long time, so it's very robust. The query tool in SAS Studio 3.8 is much younger, so not as full-featured (for example, it does not currently support creating calculated columns). The query tool being built for SAS Studio 5.x is getting a lot closer to the one in SAS Enterprise Guide in terms of what it will be able to do.

Process Flows

Similar situation to the query tool. SAS Enterprise Guide process flows have more features than the process flows in SAS Studio 3.8. More robust flows are coming for SAS Studio 5.x and, again, the goal is to share a common flow.

Code Centricity

SAS Enterprise Guide was introduced as a point-and-click tool for SAS. SAS programmers have been writing code in SAS Enterprise Guide for years and sometimes complain that SAS Enterprise Guide hides code or does a bit more on their behalf than they'd like. SAS Studio was designed for coding in SAS. Specifically, it was designed to appeal to users familiar with the SAS

Windowing Environment (also known as SAS Display Manager or PC SAS). The code editor is front and center and anytime you use an assistive function like a task or query tool, the code being generated is prominently shown. If you're more about coding, SAS Studio is likely going to feel more comfortable. SAS Enterprise Guide continues to be enhanced to add code-friendly features without taking away the point and click.



Flexible Tab Layouts

Both SAS Studio and SAS Enterprise Guide do a good job letting you manage your screen real estate. (See "Organizing Your Workspace" in the next section.) SAS Enterprise Guide wins here since, as a desktop application, it has a lot more options for viewing multiple tabs as well as tearing off tabs to view on another monitor.

Robust Importing

SAS Enterprise Guide has the edge here as there are many ways to import many types of input data via tools and tasks. SAS Studio has a basic import tool that will continue to be improved.



Microsoft Office Integration

This one's straightforward – SAS Enterprise Guide is a Microsoft Windows desktop application, so it can use native Windows protocols to talk to Microsoft Excel, Microsoft PowerPoint, Microsoft Word, and so on. SAS Studio is limited to talking through the SAS server to communicate with Microsoft Office applications and relies on a web browser to upload and download files. SAS Enterprise Guide has by far the better integration.

Background Submit

SAS Studio 3.8 (and eventually SAS Studio 5.x) allows you to right-click on a .sas file and execute it outside of the interface. This means you can disconnect without waiting for it to finish. The next time you log on, you can see the results and log that are placed in the same location as the .sas file. Really handy for long running jobs or just to be able to do several things at once. This functionality is not yet available in SAS Enterprise Guide.

Sharable Tasks

Both SAS Studio and SAS Enterprise Guide allow you to create your own tasks – that is, front ends to your code that you can give to others allowing them to run your code and, optionally, prompt them for changes to the code. Creating SAS Enterprise Guide tasks requires you to use .NET programming (ex. C# or VB.NET). This is not typically in the skill set of most SAS users. As a compiled language, you have full control, but there is a steeper learning curve. SAS Studio tasks, on the other hand, are designed for SAS programmers

and rely on simple XML. With sample tasks to copy as a starting point and many papers and documentation to support task writing, it's easy to get started. An important point to know is that SAS Enterprise Guide currently supports the use of built-in SAS Studio tasks; it does not yet support user-defined SAS Studio tasks, but it will in the future.

Git

Git is a source management system used to track and manage changes to assets like .sas files, which is especially useful when more than one programmer is working on the same set of assets. Many organizations are standardizing their work using Git. SAS Enterprise Guide has basic Git functionality, such as committing changes, viewing history, and comparing versions. Other operations such as cloning a repository, branching, pushing changes, and pulling changes must be done outside of the SAS Enterprise Guide application. SAS Studio 3.8 (and eventually SAS Studio 5.x) has more robust Git functionality, allowing you to work with a repository without having to leave the application. You can clone a repository, push and pull changes, manage branching and merging – all from the SAS Studio interface. Both applications support working with remote repositories (such as GitHub and Atlassian Bitbucket), but SAS Studio currently provides more seamless integration. This functionality will eventually be added to SAS Enterprise Guide.



WHAT ARE THE SPECIFIC FEATURE DIFFERENCES?

The following table lists what features exist in each application called out by release. To explain the release headings, you'll need to know that at the time of this paper, there are two releases of SAS Studio available on SAS Viya (SAS Studio 4.4 and SAS Studio 5.1), one release available on 9.4 (SAS Studio 3.8), and one release of SAS Studio under development that is planned to run on SAS 9.4 and SAS Viya (SAS Studio 5.x). The plan is for SAS Studio 5.x to replace the SAS Studio 4.x series, so SAS Studio 4.x is not shown in the table.

SAS Enterprise Guide 8.1 is due to be released mid-2019 on SAS 9.4. This release brings many SAS Studio features (like the ability to code without a process flow or project) to SAS Enterprise Guide. Ultimately, like SAS Studio, SAS Enterprise Guide plans a release that will run on SAS 9.4 and on SAS Viya, which is not shown on this chart.

It's important to note that this information will change, so for the most up-to-date version, visit http://support.sas.com/software/products/sas-studio/faq/SASStudio_vsEG.htm.

Table 1: Feature Comparison Table

	SAS Enterprise Guide		SAS Studio		
	7.1x	8.1	3.8	5.1	5.x
Programming					
Standard SAS programming	✓	✓	✓	✓	✓
Interactive SAS programming ¹			✓	✓	✓
XML editor			✓	✓	✓
DATA Step debugger	✓	✓			✓

Append log			✓	✓	✓
General					
Background submit			✓		✓
Show list of open items		✓		✓	✓
Command-line interface					✓
Console				✓	✓
Git integration	✓	✓	✓		✓
Keyboard management	✓	✓			✓
Schedule	✓	✓			✓
Stored process support	✓	✓			
Information Map support	✓	✓			
OLAP cube support	✓	✓			
Tab layout		✓	✓	✓	✓
Data					
Quick filter	✓	✓	✓		✓
Expression builder	✓	✓		✓	✓
Freeze columns				✓	✓
Query Builder	✓	✓	✓		✓
Joins	✓	✓	✓		✓
Calculated columns	✓	✓			✓
Where	✓	✓	✓		✓
Having	✓	✓			✓
Import	✓	✓	✓		✓
Max # of rows per page			500	1000	1000
Tasks					
SAS defined	✓	✓	✓	✓	✓
Custom, user-defined ²	.NET	.NET	XML	XML	XML
Hide/show				✓	✓
Organize tasks				✓	✓
Type-ahead filter	✓	✓		✓	✓
CustomCode Insertion Points	✓	✓			
Snippets					

SAS defined			✓	✓	✓
Custom, user-defined	✓	✓	✓	✓	✓
Abbreviations	✓	✓		✓	✓
Hide/show				✓	✓
Organize snippets				✓	✓
Type-ahead filter				✓	✓
Projects and Process Flows					
Project ³	✓	✓			
Process flows	✓	✓	✓		✓
Sub flows			✓		✓
Reference files	✓	✓			
Embed files	✓	✓	✓		✓
Conditional processing	✓	✓			
Integration					
SAS Drive on SAS Viya				✓	✓
Import SAS Enterprise Guide projects			✓		✓
Use SAS Studio Tasks in SAS Enterprise Guide ²	✓	✓			

¹ SAS Studio - improved interactive experience in 5.1

² You cannot yet use custom SAS Studio tasks in SAS Enterprise Guide

³ SAS Enterprise Guide 8.1 – projects are optional

WHAT CAN I DO TO BE A MORE EFFICIENT USER?

In this section, you'll get some tips and, more importantly, links to more info. While links are kind of annoying in a paper, we've included them because many of these assets are living documents that guarantee you'll have access to the latest and greatest information. And there's lots more out there than what's referenced here – just google "sas enterprise guide tips and tricks" or "sas studio tips and tricks."

ORGANIZING YOUR WORKSPACE

This could be subtitled "maximizing your real estate." You might be limited to one monitor or you might have six, but inevitably you want to see a lot more than one thing at a time. Something that's new in SAS Enterprise Guide 8.1 is the ability to have multiple tabs of information open and drag them around as you like. This is something you've been able to do in SAS Studio, though many people don't realize this. <https://communities.sas.com/t5/SAS-Communities-Library/SAS-Studio-tip-How-to-Layout-Tabs/ta-p/476111> is an excellent overview. SAS Studio is limited to dragging things around within your browser window. If you have multiple monitors, you can open multiple browser windows each with its own SAS Studio session, or you can drag a browser window across monitors, then arrange your tabs. But since SAS Enterprise Guide is a desktop app, there

are a lot more options. SAS Enterprise Guide 8.1 allows dragging tabs all around the app or you can just peel off a tab and drag it to a completely different monitor. <https://communities.sas.com/t5/SAS-Communities-Library/The-Future-of-SAS-Enterprise-Guide-and-SAS-Studio-a-SAS-Global/ta-p/457437> has several examples.

MAKING THE MOST OF THE EDITOR

It's fastest to just point you to two excellent articles: for SAS Enterprise Guide, see - <https://blogs.sas.com/content/sasdummy/2017/07/03/sas-program-editor-tricks/> and for SAS Studio, see - <https://communities.sas.com/t5/SAS-Communities-Library/Tips-for-Programming-Efficiently-in-SAS-Studio/ta-p/239367>. There are differences in the editors currently but that will change in the future so that you won't have to remember.

AVOIDING TYPING AS MUCH AS POSSIBLE

Both SAS Enterprise Guide and SAS Studio offer keyboard shortcuts. This is a combination of keys that, when pressed, provide functionality you commonly use – like upcasing a string of text or wrapping comment symbols around a piece of code. There are a lot more than you might realize since keyboard shortcuts are an integral piece of accessibility requirements, making the interface usable to folks with disabilities and folks who just don't want to move their hands from their keyboard. Go to this link to learn about a few in SAS Enterprise Guide - <https://blogs.sas.com/content/sasdummy/2013/10/29/five-keyboard-shortcuts/>. For SAS Studio, just see the keyboard shortcuts section of the user's guide.

You can insert code snippets into the editor with a few keystrokes, which is handy for things you use a lot. In SAS Enterprise Guide, create an abbreviation. (See the Program Editor tricks blog above.) In SAS Studio, use a keyboard shortcut to insert a saved snippet.

SAS Studio also offers the ability to drag table and variable names into code from the libraries pane. (See the tips for programming efficiently in SAS Studio article above.)

WHAT ELSE CAN I USE?

Since we work on SAS Enterprise Guide and SAS Studio, we'd love to say that those are your best options for writing SAS code. And while it's true that they offer lots of goodness specific to SAS, such as interactive syntax help, autocompletes, and easy access to SAS libraries and data sets, it's also true that there are many excellent IDE's and editors out there. Some can be integrated with SAS easily and some you can just use as a separate editor and then submit the finished code to SAS non-interactively or in one of the SAS interfaces.

Jupyter is an example of a popular interface that has good integration options for SAS. Jupyter is a freely available notebook-style interface – Jupyter Notebook, JupyterLab, and JupyterHub are examples. It supports many different languages, so to use it to write and submit SAS code, you go get the SAS kernel from GitHub.

<https://blogs.sas.com/content/sasdummy/2016/04/24/how-to-run-sas-programs-in-jupyter-notebook/> is a good overview with links to all you need. You can even use JupyterLab in SAS® University Edition. It's worth noting that since the notebook style is more and more in demand, a notebook perspective is planned for SAS Studio.

If you already have a favorite IDE or editor, check to see if there are supporting materials to make it more friendly to use with SAS code. You'll still likely need to submit the code outside of the editor but you'll still get to benefit from the editor features you've come to love. Notepad++ is popular and

<https://blogs.sas.com/content/sasdummy/2017/08/25/npp-with-sas/> gives you some tips for using it with SAS. IDM UltraEdit is another one with features that are friendly to SAS.

SAS Enterprise Guide has an **Open in Windows Default** option that makes it easy to edit programs in one of these (or other) editors and then submit it from within SAS Enterprise Guide. If there are things about your editor that you think should be included in the SAS interfaces, let us know!

CONCLUSION

We're looking forward to the time when someone comes across this paper in the future and wonders, "why would anyone have to think about which SAS interface they used?" Maybe at that point we just think about SAS code and it appears on the virtual screen in front of our face. OK, maybe that's a little too far in the future. But you really shouldn't have to think about this type of stuff, you already have enough work to do. So check out the links to see what the progress is and be sure to tell us what you want via the SAS Enterprise Guide or SAS Studio communities and SASware ballot on communities.sas.com.

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