Optimizing performance in the SAS Enterprise Guide 4.3 program editor

The new program editor in SAS Enterprise Guide 4.3 offers several compelling features for SAS programmers, including syntax suggestions and code completion, integrated syntax reference help, and a built-in code formatter (a.k.a. the "tidy feature"). To achieve these advancements, the editor uses the latest UI rendering technology available on the Microsoft Windows operating system.

However, some customers have reported degraded performance when using the new program editor, as compared to previous versions of SAS Enterprise Guide or SAS for Windows. Common complaints include:

- Program editor is slow to respond when scrolling medium- to large-size programs
- Editor text appears fuzzy

The following is a high-level summary of the actions that you can take that might address these issues:

- Ensure that the device driver for the display adapter on your PC is updated to the most recent version.
- For Remote Desktop users, update the Remote Desktop Client to the most recent version.
- If you have SAS program files that use TAB characters for formatting, replace the TAB characters with spaces.

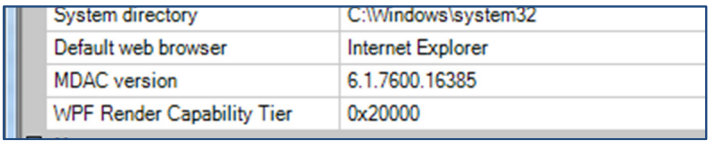
The remainder of this document contains the background about the issues and instructions for how to address them.

About the new program editor, WPF, and DirectX

The new program editor relies on Windows Presentation Foundation (WPF), which is part of the Microsoft .NET Framework and is the latest user interface technology from Microsoft. WPF is rendered to your display using DirectX, a well-established graphics rendering layer that can take advantage of the hardware acceleration capabilities from your computer's graphics card or on-board graphics device.

Note: These performance-related symptoms are **not** due to the rich syntax completion/suggestion features. You *can* disable those features in the Editor Options window, but that action will probably have very little effect on performance.

To ensure that your system is optimized for DirectX rendering:



1. In SAS Enterprise Guide, select **Help->About SAS Enterprise Guide** and click Configuration Details.
2. In the Configuration Details window, scroll down to the Operating System category and make a note of the value for "WPF Render Capability Tier".

A "WPF Render Capability Tier" of 0x00000 indicates that your system relies on software rendering; that is, it is not using any hardware acceleration. A value of 0x10000 or 0x20000 indicates that there is some or full hardware rendering capability.

Often, achieving the rendering tier of 0x20000 is a simple matter of updating the device driver for your display adapter to the most recent level. The instructions for obtaining and installing the most recent device driver will vary depending on the manufacturer of the display adapter; you can use the Device Manager in Windows to see the device driver version you currently have installed, and check for updates.

Updating to the most recent device driver can solve the "fuzzy" fonts problem as well as sluggish performance while scrolling. Even if you find that the current rendering tier reports as 0x20000, it's worthwhile to check that you have the most current device driver for your display adapter.

For a more detailed view of DirectX performance on your system, you can run the DXDiag tool. To start DXDiag, select **Start->Run** and then type **dxdiag**. For more information about DXDiag and how to use it, see this Microsoft TechNet article: http://technet.microsoft.com/en-us/library/cc938991.aspx.

Special Considerations for Remote Desktop Users

If you access SAS Enterprise Guide using a remote desktop client (such as Microsoft Remote Desktop or Citrix), the responsibility for rendering content is shared between the client and the terminal server. You might be able to improve the remote desktop experience for all of your applications (not just SAS applications) by following this guidance:

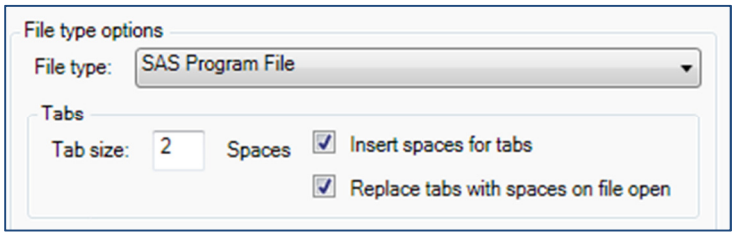
- On Windows XP or Windows Vista, apply the Remote Desktop Connection 7.0 client update. You can find the download from Microsoft at http://support.microsoft.com/kb/969084. Among other improvements, this client update improves the remote display of graphics-intensive applications.
- Change the Remote Desktop Client display options to use 16-bit color depth. (On Windows 7, the default color depth is usually set higher, which increases the number of bytes sent over the network.)
- On slower networks (high latency due to distance, for example), change the Remote Desktop Client experience options to use "WAN" or "Satellite" settings. This allows the Remote Desktop Client to optimize performance for your network situation.

Replacing TAB characters with spaces in your SAS programs

If your SAS programs use the TAB characters instead of spaces for "whitespace" formatting (such as indenting), the program editor may perform more slowly than if you use space characters.

You can change the program editor options to automatically use space characters instead of TABs.

1. Select Program->Editor Options. The Enhanced Editor Options window appears.
2. On the General page, check the two options related to tabs:
   - Insert spaces for tabs
   - Replace tabs with spaces on file open



With these options enabled, you can still use the Tab key to help manage indenting within your programs: the program editor will simply record your preferred number of space characters instead of a TAB character. As you open existing programs, any TAB characters encountered will be replaced with the appropriate number of space characters.

The use of space characters instead of TABs helps to reduce the number of computations that the editor performs in order to determine tab stop locations and align the text of your program. For large program files, this can result in a noticeable performance improvement.