Introducing Release 6.11 of the SAS® System for Personal Computers

Carol Rigsbee, SAS Institute Inc., Cary, NC

ABSTRACT

Release 6.11 of the SAS System for Personal Computers provides support for Microsoft Windows 3.1 using Win32s technology, Windows 95, Windows NT, and OS/2® Warp. With this release, the SAS System incrementally improves both its user interface and its interoperability with other PC applications. This paper discusses both new features and incremental enhancements to the user interface. This paper also introduces the SAS System for Windows 95, detailing the new user interface features that are consistent with the new look and feel for Windows 95. Interoperability topics include electronic mail, Lotus Notes, OLE 2.0, the ODBC driver, and access to external DLLs. This paper discusses the support provided by the SAS System on Windows NT to access data sets that are larger than 2 gigabytes.

Throughout this paper, SAS AWS refers to the container window of the SAS System. SAS application windows refer to the windows contained within the SAS AWS.

IMPROVED GUI FEATURES

Additional GUI enhancements to the Release 6.11 SAS System provide a more native look and feel familiar to PC users. Some of the new GUI features include additional and improved tool icons, large and small tools, enhanced custom toolbar support, and tooltips. Other GUI features include a most recently used files list, several keyboard editor enhancements, improvements to the Output window, and improvements to the command line support.

We use industry standard tools on the default toolbar. The Tool Editor browser contains more tools for you to choose from when you create custom toolbars.

You can choose to display the SAS AWS toolbar with either large or small tools. You can specify your preference either through the Preferences dialog or the TOOLLARGE command.

Some SAS applications have added tool entries that replace the default toolbar when that application becomes active. We refer to this new behavior as toolbar switching. If you want to take advantage of this functionality in your SAS/AF® application, then use the Tool Editor to create a TOOLBOX entry. This TOOLBOX entry must use the same library, catalog, and entry name as the PMENU entry of your application window. The toolbar that you create is portable between all Release 6.11 systems, including Open Systems and Macintosh. When your application window becomes active, your toolbar replaces the default toolbar. When your application is not active, the default toolbar replaces your toolbar. Additionally,
you can use the command TOLOAD WINDOW IIibref.catalog. entry in your SCL code to dynamically associate a toolbar with a window. You can choose to disable the switching of custom toolbars either through the Preferences dialog or the TOOL SWITCH command.

Tooltips provide concise help information for the tools on the SAS AWS toolbar, the command bar and the status line. The tooltips display as you move your mouse cursor over these controls. Additional detailed help simultaneously displays on the status line. You can disable the tooltip information through the Preferences dialog or through the TOOLTIP command. The Tool Editor allows you to modify tooltip text as you modify your default tool settings.

You can also specify tooltips for certain objects that you add to your SAS/AF FRAME applications by inserting the tooltip text in your description text string. You can create a toolbar object and specify description strings for each button in the "Enter Values" dialog. For other objects (e.g. image icon, graphics text) when you can enable the "Button" Outline Type and set the "Push button", "Check box", or "Radio button" Button Behavior in the Region Attributes dialog, the object will accept a description. In the description field, enter the description text in the format "Message text\nTooltip". For example, if you want to create a button meaning Calibrate, enter "Start the calibration process\nCalibrate" in the description field. "Start the calibration process" displays on the status line and "Calibrate" appears as the tooltip.

Release 6.11 provides a list of most recently used files on the File menu. Each time you open a file with the Open dialog or save a file with the SaveAs dialog, the SAS System updates this list. If you want to open the file again, you simply select the file name in the list. Four file names display by default but you can change this number through the Preferences dialog. You can also disable this feature through Preferences. This feature was ranked third on 1995 SASware Balot® in the category "SAS System for Personal Computers".

There are several keyboard editor enhancements in Release 6.11. PC-DOS users requested a key to delete from the current cursor position to the end of the current line. In Release 6.04, the END key provided this functionality. This capability is now available with the Alt+Delete key. Double clicking on a word selects the word. Shift+Backspace is the same as Backspace. You can select an entire line with Control+double click. You can use drag and drop to move text. The up and down arrow keys will scroll the Log and Output windows. When you select text in the Program Editor and move the mouse over that area, the pointer becomes an I-beam.

Prior to Release 6.11, if you closed the Output window using the system menu and then displayed output to this window, the Output window did not reopen. You provided feed-
back that this behavior confused you. With Release 6.11, if you close the Output window it will reopen when output displays to the window.

By default, command lines are not available in the SAS application windows. However, if you prefer to use command lines, you can select “Command Line” in the Preferences dialog. Prior to Release 6.11, choosing “Command Line” resulted in application menus no longer being available on the SAS AWS menu bar. Now menus and command lines are available simultaneously.

The filename in the Program Editor, Log and Output title bar is now just the filename instead of the entire path.

**RICH TEXT FORMAT SUPPORT**

Release 6.11 for Windows provides two new TrueType fixed pitch fonts, SAS Monospace and SAS Monospace Bold. These fonts contain several extended ASCII line drawing characters in positions that are normally undefined in an ANSI font. The Sasfont bitmap font also contains these characters at the same character positions. As a result, you can use one FORMCHAR option to access these characters in any of the three fonts. Using these line drawing characters with the TABULATE procedure provides a smooth line drawing capability resulting in tabular output that is more visually appealing. Since the Sasfont bitmap font displays faster and looks better on the display, it is the default display font when you install the SAS System. Since the SAS Monospace font looks better in printed output and because it scales to many point sizes, it is the default printer font. For similar reasons, the SAS Monospace font is the default font used in the Rich Text Format (RTF) clipboard format. The RTF clipboard format, new in 6.11, allows you to copy selected text and tables to the clipboard and to paste them into other applications while preserving the correct appearance. In other words, copying a table generated by PROC Tabulate and pasting it into Microsoft Word will produce a table in the Word document. RTF uses the SAS Monospace TrueType font when the default display font is either Sasfont or SAS Monospace. Otherwise, RTF uses the default display font.

By default, color information is not present in the RTF generated by the SAS System. You may use the option, $RTFCOLOR, to generate color information in the RTF output. If you use this option and paste text into other applications, the color of the text appears as it did in the SAS System.

You can use the Save As dialog to create RTF files containing the content of text windows.

**LIBRARIES DIALOG**

The Libraries dialog displays when you select the file cabinet tool on the tool bar (Windows only). This dialog allows you to quickly create, modify and delete libnames using the familiar PC user interface. Any libname assignment that you create with this dialog can be automatically re-assigned each time you start the SAS System. Using the “Advanced” mode of this dialog allows you to easily create concatenated libraries and specify engine information. You can also display existing libnames with the associated physical directories and display the contents of a library. The context sensitive popup menus allow you to display variables within a data set and entries within a catalog.
DRAG AND DROP SUPPORT

Release 6.11 provides several enhancements to drag and drop support. You can drag selected text out of the Log, Output and all editor windows (Program Editor, Notepad, SCL editor, etc.). You can drag text into all editor windows. If you use non-default dragging, you choose to either move the text, copy the text, or cancel the operation. Default dragging uses mouse button one (usually the left button) and non-default dragging uses mouse button two (usually the right button). Dragging a file into any editor window includes the file. If you use non-default dragging, you choose to either include or submit the file. Dragging a file into any other Display Manager window submits the file for execution. If you move your mouse pointer next to the border of a window while you are dragging text, the window will automatically scroll in the direction you are pointing. Dragging tabular output into another application will preserve the tabular information as mentioned previously in the RTF discussion. There are some implementation differences between OS/2 and Windows; you should refer to the documentation for more details.

IMPROVED HELP

The SAS System help facility uses the Microsoft Windows Help (winhelp) under Windows and Information Presentation Facility (IPF) under OS/2 to display the help text. The result is a help system with a look and feel native to the particular operating system. The SAS Companion, usage notes, all of the SAS sample programs, and the SAS System requirements are available in native help format. There is full text search capability across the entire help system.

CONFIGURING YOUR GUI

While most PC users expect an interactive way to configure the SAS GUI, SAS/AF programmers need programmatic control. Commands exist for all the interactive settings. Also, additional commands exist to control the appearance or behavior of the SAS AWS and the SAS application windows. These commands allow you to create applications using the SAS System and then remove any trace of the SAS System, creating the appearance of a stand-alone application.

The following commands are new for Release 6.11:

- DLGDDE
  - DLGENDLIB
  - DLGLIB
  - DLGLIBMAINT
  - WATTACH
  - WCOPY
  - WEMAILFMT
  - WFILE
  - WNEWTITLE
  - WPASTE
  - WMRU
  - TOOLLARGE
  - TOOLSWITCH
  - TOOLTIPS

Invoke DDE triplet dialog
Close the Libraries dialog
Invoke Libraries dialog
Invoke New Library or Modify Library dialog
Attach current window in E-mail dialog
Executes either store or gstore
Choose format for e-mail attachments
Executes file command, always prompts for
for append or replace
Clears window contents, resets window title to
"Untitled"
Executes either paste or gpaste
Specify x files in menu
(toggle and allow x to be
0-9)
Display small or large
tools
Toggle toolbar switching
Display tooltips

With the option -SPLASHLOCATION, you can specify a bitmap to use as the startup bitmap for the SAS System. You specify either a bitmap file or a bitmap contained within a DLL.
With the option $NOSLEEPWINDOW, you can prevent the information window from displaying when using the SLEEP or WAKEUP functions. SAS/AF users may find the option $HIDECURSOR useful. With this option, you can prevent the text cursor from displaying in output only windows. In the Log and Output windows only a gray cursor displays. Additionally the text cursor does not display when over a constant or protected field, a control (like a radio button), or if no field exists at the current cursor location. This functionality eliminates the blinking text cursor in your FRAME application windows.

If you are unable to tab to all the controls with a SAS/AF FRAME application, use $TABNOPBMENU ALL | FRAME. However, use of this option may prevent you from tabbing to the pushbutton menu bar. The parameter ALL changes the tabbing behavior in every window in the SAS System. The parameter FRAME only changes the tabbing behavior in FRAME windows.

To use the current system font for listboxes, buttons, icon buttons, checkboxes, and radio buttons, you should use $GUIFONT. If you need to create columns in your listboxes, you should experiment with this option as you may not achieve the result that you want. This option is only available when you are using Windows 95.

Using the option $NOSTATUSWIN prevents the status window from displaying in batch mode.

PRINTING

The Print tool on the toolbar now just prints instead of displaying the Print dialog. The option -SYSPRINTFONT is new for Release 6.11. This font allows you to programmatically specify the font name and point size for a particular printer.

WINDOWS 95 GUI SUPPORT

Microsoft Corporation provides many documents that detail the requirements a software developer should follow to provide a great Windows 95 application. The following six key requirements make a Windows 95-based application great from the user's perspective:

1. Use the Win32 Application Programming Interface (API)
2. Provide OLE functionality
3. Follow The Windows Interface Guidelines for Software Design
4. Support Plug and Play events
5. Support quick identification of files
6. Adherence to the common setup guidelines for consistent software installation

We have provided some of this functionality in the SAS System in previous releases. We added additional support in Release 6.11 for the new user interface that Windows 95 provides. In order to take full advantage of this user interface, Release 6.11 provides several enhancements to the SAS System user interface. Release 6.11 uses the new Open, Save As, Font, Print and E-mail common dialogs. These common dialogs, the Preferences dialog and the Tool Editor dialog all provide "What's this help". We added support for the new Windows 95 keys. Keyboards like the Windows Natural keyboard contain these keys. The SAS System honors all system colors and sizing metrics. For example, when you change your window color scheme with the Control Panel, the SAS System windows immediately reflect the new colors. You can change your video settings while the SAS System is active and the new settings are used. The SAS System honors the Explorer's show or hide filename extension setting. Insert mode is on by default. The scrollbars use proportional thumbs. When the SAS System is busy, the icon on the Windows 95 taskbar uses the current "busy" pointer. The menus and the toolbar follow the Windows style guidelines. Accelerators have been modified, the File menu has been improved, Cut and Copy are available only when you select something, and Paste is only available if something is in the clipboard.

The entire SAS System supports long filenames, Universal Naming Convention (UNC) names and shortcuts. Support for UNC names ranked seventh on 1995 SASware Ballot in the category "SAS System for Personal Computers".
The installation for the SAS System follows the setup guidelines for Windows 95 applications. Once you install the SAS System on your PC, you can remove it using the Windows 95 Control Panel. The SAS System CD supports AutoPlay. When you insert the CD in your CD drive, the SAS System installation program automatically executes.

REGISTRY SUPPORT

The SAS System installation process registers all of the SAS System file types. Each file type has a unique icon. When you select a particular SAS System file, the operating system invokes a SAS/AF application to perform a specific action using that file. The operating system invokes the SAS System using an OLE automation server interface. You can modify the action by modifying the SAS/AF application if you have licensed SAS/AF.

WINODWS 95 QUICK VIEWER SUPPORT

SASVIEW provides a standalone SAS data set and catalog Quick Viewer. To invoke SASVIEW, click the right mouse button on a .sd2 or .sc2 file from the Windows 95 Explorer after you install SASVIEW. SASVIEW shows a read-only, scrollable table view of the SAS data set or catalog. If you select a data set, SASVIEW formats the data based on particular format of each variable in that data set. SAS catalog views show the catalog members, entry types, member description, date modified and member size in a tabular form.

This SAS data set and catalog viewer allows you to share SAS data sets and catalogs via email, floppy diskettes, network servers, etc. share your SAS data with other non-licensed users. You can freely distribute SASVIEW to users who have not licensed the SAS System for Windows 95.

APPLICATION INTEGRATION

Release 6.11 provides increased application integration through several new methods. The SAS System supports named pipes, unnamed pipes, DDE, OLE 1.0, system clipboard, and Media Control Interface (MCI) with Release 6.08. Additionally, Release 6.10 provides support for ODBC, external DLL access, and the ability to support import and export of graphics to and from common PC file formats. Release 6.11 adds support for electronic mail and Lotus Notes. Release 6.11 fully supports OLE 2.0.

E-MAIL SUPPORT

E-mail support is available interactively through the Send Mail dialog or programmatically through the DATA step or SCL. This implementation supports both industry standards VIM (Vendor-Independent Messaging) and MAPI (Messaging Application Programming Interface). You can use only one mail system per SAS System invocation. Most popular e-mail packages provide support for either VIM or MAPI.

The Send Mail dialog allows you to enter a note describing the mail message. Data and reports, which are the actual contents of the messages, are sent as attachments. Attachments are files that you saved previously.

When you are using an e-mail package that supports MAPI under Windows NT or Windows 95, the SAS System uses the native e-mail dialog. This dialog allows you to attach the contents of the current SAS window.
You can also access e-mail through the FILENAME statement using the Device type of EMAIL. Additionally, you can embed a set of directives in put statements to allow even more flexibility when writing a data step that conditionally sends multiple e-mail messages.

LOTUS NOTES

Release 6.11 provides a new access engine, NOTESDB, that allows you to add new notes documents to an existing Lotus Notes database. You can use the DATA step or SCL to populate the Notes database. The support for Lotus Notes is available for both Microsoft Windows and OS/2. The SAS System under Windows 3.1 using Win32s supports Notes 3.2 or greater and under Windows 95 and Windows NT supports Notes 4.0 or greater. You do not need to have Notes running to access it from the SAS System, but you must have a workstation copy of Lotus Notes installed on your machine with a valid user ID certification. If you attempt to access a Notes server through the SAS System, the SAS System prompts you for your password to the server. DATA step or SCL code that interacts with a Notes database generally uses the following components:

- A FILENAME statement with the NOTESDB device-type keyword
- PUT statements that contain data directives and the data to place in the Notes database
- PUT statements that contain action directives to control when to send the data to the Notes database.

OLE SUPPORT

Beginning with Release 6.08, the SAS System for Windows provides an OLE 1.0 container for OLE objects through SAS/AF. Since OLE 2.0 technology provides OLE 1.0 support, you can use either OLE 1.0 or 2.0 servers with SAS/AF prior to Release 6.11. The main functionality of OLE 1.0 is the ability to embed or link an OLE object in an OLE container. With Release 6.11, the SAS System fully implements OLE 2.0. New functionality available in Release 6.11 (by using the new technology available in OLE 2.0) includes support for drag and drop of OLE objects, visual editing, automation of objects and OLE control (OCX) support. We support an OLE automation server. A prototype OLE server is also available. With OLE 2.0, you can either edit in place (also known as visual editing) or edit in a separate window (also known as open editing). Visual editing simply allows you to edit an OLE object in the container application. When you edit the object, the container application takes on the user interface of the object's application. The menu, toolbars and status line all switch to the ones normally provided by the object's application.

Automation provides a mechanism to control (script) other applications. This functionality is similar to the functionality currently provided through DDE. Automation allows you to programmatically execute methods that an automation object exposes. It also allows you to set properties within that object programmatically, just as if you selected those settings from the object's menus. For example, with automation, you could programmatically invoke Microsoft Excel, create a worksheet, and populate data in the worksheet using values in a SAS data set. Then you could create a graph with the data, save the graph, and close Microsoft Excel. With automation, you can also dynamically modify the values of a previously embedded Excel object in your FRAME application. If you embed a Microsoft Excel graph, as your data changes, you can update the graph.

Visual Basic programmers are familiar with the concept of VBXs. Third party vendors provide VBXs to extend the control set of Visual Basic. OLE controls (OCX) extend the functionality available in VBXs. Some of the major differences between an OLE object and an OCX are events and ambient properties. The OCX generates events to the OLE container. Events are calls into the SAS System that notify the SAS application when certain changes occur in the OCX. Ambient properties allow a communication between the container and the OCX for modifiable attributes such as font or color changes. For example, if the font in the container changes, the container notifies the OCX so it can also change its font if applicable. OCX support provides you with ac-
cess to more native controls. SAS/AF FRAME applications can use any available 32 bit OCX. In addition with Release 6.11, we supply two OCXs, a text entry and a combo box. Third party vendors may not supply these OCXs and these are the most often user requested native controls.

We provide an automation server that allows external automation controllers, such as Visual Basic, to start up a SAS session. Once the SAS session starts, you can send commands to the SAS System from the controller, in the same format as you would type on the SAS command line. The SAS System exposes properties to allow the caller to control the visible state and the application title. A method is exposed to close the SAS System.

We are currently researching an OLE server implementation by prototyping PROC Insight as an OLE object. We created an Insight object that can create graphs and embed those graphs in other applications. For example, we can create an Insight rotating plot and embed it within a Microsoft Word document. Double clicking on the graph activates the object in place, allowing you to modify the graph. This is a sample of possible functionality provided by an OLE Insight object.

For more in-depth description of the OLE support available in the SAS System, refer to the paper "OLE and the SAS System for Windows Release 6.11".

**ODBC SUPPORT**

ODBC is an industry standard for interoperability between databases from different vendors. SAS supports this standard as both a client and server, allowing data to be retrieved from other databases that support the standard as well as surfacing SAS data sets to PC applications that utilize the interface as clients. "Integrating the SAS System for Personal Computers into Your Enterprise" covers the ODBC functionality for Release 6.11. Please see that paper for additional details.

**ACCESSING EXTERNAL DLLS**

You can access external DLLs through the DATA step or SCL with the MODULE family of SAS call routines and functions. This functionality allows you to access either external DLLs that you create or DLLs that you purchase. You can even access operating system DLLs. To use, you create a SASCBLBTBL attribute table that describes the DLL routine you want to access.

**SUPPORT FOR WINDOWS NT**

Release 6.11 provides the first production release of Windows NT since Release 6.09. The Institute provides two types of licenses for Windows NT users:

1. The SAS System for Windows Workstations - a license providing support for all Windows platforms including Windows 3.1 using Win 32a, Windows 95 and Windows NT.

2. The SAS System for Windows Enterprise - a license providing support for all Windows platforms including Windows 3.1 using Win 32s, Windows 95, Windows NT Workstation, and Windows NT Server.

When running under Windows NT, the SAS System automatically takes advantage of the 64-bit file I/O features of the NTFS file system. As a result, you can create, sort, and subset data sets and manipulate external files greater than the 2 gigabyte size limit placed on other PC environments. The size limit for a SAS data set with NTFS is 4 gigi-gigabytes, or $2^{64}$ bytes, with a maximum number of $2^{30}$ observations.

The SAS System under Windows NT supports a SAS/CONNECT® spawner. This spawner allows a Windows NT machine to service SAS/CONNECT remote requests without requiring you to first log into the Windows NT machine and execute the spawner. Additionally, the spawner honors the access rights of the Windows NT registry with respect to the requesting user id.

For more details on the support provided for Windows NT, refer to the paper "Comparing the SAS System Release 6.11 for Microsoft Windows 95 and Windows NT".
CONCLUSIONS

This paper summarized some of the many features available in Release 6.11 of the SAS System for Personal Computers. Please refer to the SAS Companion for the Microsoft Windows Environment, Second Edition and the OS/2 Environment: Changes and Enhancements of the SAS System, Release 6.11 for more details.

REFERENCES


Mehler, Gary (1996), "Integrating the SAS System for Personal Computers into Your Enterprise", Proceedings of the Twenty-first Annual SAS Users Group International Conference


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