

The Nashville Release of the SAS[®] System for Windows

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ABSTRACT

The Nashville Release of the SAS[®] System for Windows provides support for Windows 95, Windows 98, and Windows NT 4.0. With this version, the SAS System continues to improve in the areas of user interface, application integration, and setup. This paper discusses both new features and enhancements in these areas. Additionally, this paper also discusses the support provided by the SAS System for Windows NT.

INTRODUCTION

This paper provides an overview of the Nashville Release. You should view this paper as an introduction but should refer to the SAS documentation for more details. Additionally, refer to "Introducing Release 6.12 of the SAS System for Personal Computers" for a summary of enhancements added in Release 6.12. The Nashville Release continues to provide incremental enhancements to the user interface of the SAS System. In order to create a Windows application that best utilizes the Windows feature set, we follow the GUI standards documented in *The Windows Interface Guidelines for Software Design*.

GUI FEATURES

GUI enhancements in the SAS System Nashville Release continue the trend to provide a more native look and feel familiar to PC users. Some of the GUI features include a new editor, a print preview utility, additional printing options, Application Workspace (AWS) enhancements, and Microsoft IntelliMouse[™] support.

ENHANCED EDITOR

An enhanced editor is new in Version 8 of the SAS System. This editor is only available on the Windows platform. The editor's many features should make it an attractive alternative to the existing Program Editor.

A key feature of the enhanced editor is color coding and syntax checking of SAS programs. This capability allows you to more easily detect coding errors such as unmatched quotes.

Another important benefit of the enhanced editor is the

ability to edit multiple files at the same time. This is a highly requested feature for the SAS System.

PRINT PREVIEW

To see how the contents of a window will appear as printed output, select the window you want to preview and then select `Print Preview` from the `File` menu (or click the `Print Preview` tool bar button).

In the `Print Preview` window, you can use the `Next` and `Previous` buttons to navigate through the pages to be printed. The current page number and total number of pages are displayed at the bottom of the window. You can also magnify your view of the current page (by 100%) by clicking `Zoom`, or by simply clicking inside of the page. To reduce your view, click `Zoom` or inside of the page again.

In the `Print Preview` window, you can navigate by using the following shortcut keys:

Key	Full-Page mode action	Zoom mode action
PgDn	Advance to next page	Scroll down on current page
PgUp	Back to previous page	Scroll up on current page
Ctrl-PgDn	none	Scroll right on current page
Ctrl-PgUp	none	Scroll left on current page
Ctrl-Home	Go to first page	Go to first page
Ctrl-End	Go to last page	Go to last page

The command, `DLGPRTPREVIEW`, can be used to invoke the `Print Preview` window.

PRINTING OPTIONS

The `SYSPRINT` option and `FILENAME` statement have been modified to be more consistent with how printers are identified today on PCs. Port names are no longer required. Instead, the printers are now identified using the printer name as recognized by the operating system. Continued support for the Release 6.12 format is provided as much as possible. The Release 6.12 syntax and the new Nashville Release syntax are shown below.

```
Release 6.12
Options sysprint="port"
```

```

"[print mgr print name]"
Filename x printer "port";

Nashville Release
Options sysprint="printer name"
"[print-to-file filename]";
Filename x printer "printer name";

```

More improvements to printing include the addition of new options to provide programmatic control of settings previously available only in interactive dialogs. Below is a list of the new options:

ORIENTATION

Specifies orientation of printed output on paper

LEFTMARGIN

Specifies left margin for printed output

RIGHTMARGIN

Specifies right margin for printed output

TOPMARGIN

Specifies top margin for printed output

BOTTOMMARGIN

Specifies bottom margin for printed output

PAPERSIZE

Specifies size of paper used for printing

PAPERSOURCE

Specifies bin to use paper from

DUPLEX

Controls whether and how printed output is duplexed

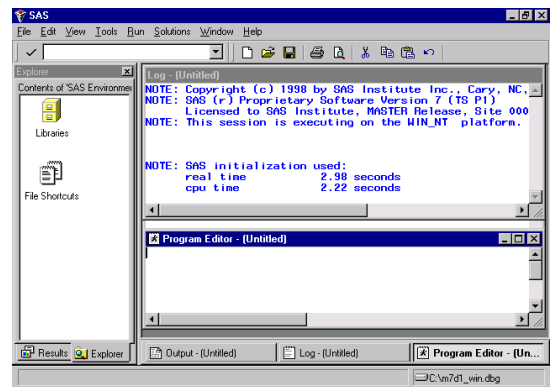
COPIES

Specifies number of copies to print

Another improvement to printing is the addition of a Page Setup dialog from which you can interactively change orientation, margins, paper size, and paper source. This new dialog replaces the functionality for setting orientation and margins that was previously accessible from the Print Setup dialog. An important aspect of this change is that there is now one global setting for orientation and margins, rather than a different setting for each printer. This makes the SAS System more consistent with other Windows applications, in which orientation and margin settings are normally independent of the currently selected printer. The Page Setup dialog can be invoked by selecting Page Setup from the File menu, by clicking the Page Setup button on the Print Setup dialog, or by issuing the **DLGPAGESETUP** command.

AWS ENHANCEMENTS

Several enhancements to the AWS, the main SAS System window, have been added in this release. These include changes to the toolbar and command bar, the addition of a WindowBar, and the addition of Docking View. Below is a snapshot of the initial SAS System environment.



The SAS System uses industry standard tools on the default toolbar. The Customize dialog provides a way for you to create custom toolbars. In this version the toolbar uses the flat style to be more consistent with other Windows applications.

The SAS System supports a command bar for easy entry of commands. In previous releases of the SAS System, commands were not preserved when exiting the SAS System. In the Nashville Release commands entered via the command bar are saved when exiting. The number of commands saved is configurable in the Preferences dialog. With the Preferences dialog you can also select whether to order the commands by most recently used.

Another new command bar feature is AutoComplete. With AutoComplete enabled the SAS System attempts to match characters as they are typed in the command bar with previously entered commands. If a match is found, the command will be completed in the command bar for you with the added portion of the command selected. You may press enter to execute this command or continue typing to finish your command. AutoComplete may be disabled in the Preferences dialog.

An additional enhancement to the toolbar and the command bar is support for resizing them. Many users have requested the ability to have a larger command bar area.

The WindowBar is a new addition in the Nashville Release and is an alternative to the window list. The WindowBar allows quick and easy access to the current set of windows in use in the SAS System. To disable the WindowBar use Preferences or use the **WWINDOWBAR** command.

The Docking View occupies an area on the left side of the AWS. If a SAS System window

displays in the Docking View, it is considered docked. Windows that are used for navigating, such as the Explorer and Results windows, typically display here. Double-clicking an item in a docked window displays the new window to the right of the Docking View. The docking view area can be resized by clicking on the splitter that separates the docking view from the other SAS System windows. Docking view can be disabled in Preferences or by using the `WDOCKVIEW` command.

A new option, `WEBUI`, is available in Version 8 of the SAS System. This support is relevant for users who have Microsoft Internet Explorer 4.0 or greater. If you have Web style Desktop selected in the Internet Explorer options, you may prefer to use the same configuration in the SAS System. The SAS Explorer is one example in which you will notice the effects of this option.

PROGRAM EDITOR ENHANCEMENTS

The Program Editor continues to be enhanced to provide more native Windows editing capabilities. Some enhancements in this version include improved selection and AutoSave support.

Here is a list of changes related to text selection:

- Use the CTRL-DELETE key to delete the current word instead of the whole line.
- Use the ALT key as you hold down the mouse button and drag the mouse to select a rectangular block (or column) of text.
- Use the SHIFT key in combination with the mouse button to extend the selection of a text area. (You can use this feature only within the current page.)
- When copying text to the clipboard, the text stays selected in the SAS system after the copy has occurred.
- When pasting text into the SAS system when an area is marked, the marked text is replaced with the new text.

AutoSave support is now available in the editor windows in the SAS System. AutoSave works in the Program Editor Window and in the new Enhanced Editor windows. The default interval for saving the contents of an editor window is 10 minutes. The interval is configurable in the Preferences dialog.

INTELLIMOUSE

The SAS System provides support for the Microsoft IntelliMouse. The IntelliMouse is a modified mouse that includes a rotating wheel (wheel control) that enables

new forms of navigation. The IntelliMouse is supported in windows within the SAS System that use a vertical scrollbar for scrolling the window contents.

The IntelliMouse provides an alternative mechanism for scrolling. With the IntelliMouse you can now use your mouse to scroll instead of interacting with the navigation controls on the screen. To scroll with the IntelliMouse, you rotate the wheel control forward or backward, which is equivalent to pressing the up arrow or down arrow on the scrollbar.

The IntelliMouse also supports AutoScroll. To initiate AutoScroll click the mouse wheel, then move the mouse away from the origination point. The contents of the window will start to scroll in the direction you move the mouse. The farther away you move the mouse from the origination point, the faster the contents will scroll. Pressing a key, clicking a mouse button, or rotating the mouse wheel will terminate AutoScroll mode.

You can modify settings for the IntelliMouse through the Control Panel mouse settings. See the Microsoft documentation for more information about the IntelliMouse.

RICH TEXT FORMAT SUPPORT

The SAS System provides two 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. Using these line drawing characters with the TABULATE procedure provides a smooth line drawing capability resulting in tabular output that is more visually appealing.

You can use the Save As dialog to create RTF files containing the content of text windows. The command, `WRITFSAVE`, saves the contents of the current text window to an RTF file.

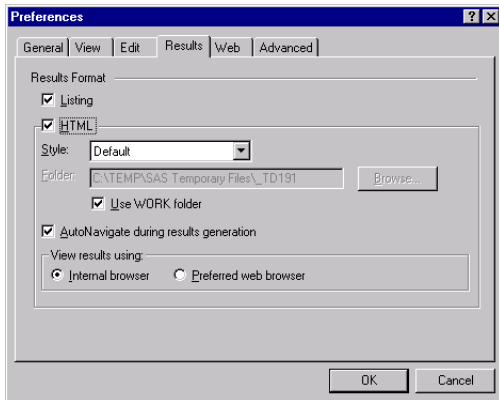
HTML SUPPORT

With the Nashville Release the SAS System can also generate output in HTML format. Please refer to the paper "ODS for Data Analysis Output As-You-Like it in Version 7" for more information about how to accomplish this with the SAS System. You should also see the following section on Preferences for available settings within the SAS system.

PREFERENCES

Additional preference settings have been added to give users more control of the SAS System

environment. The Preferences dialog has also been updated to use a tabbed dialog to categorize settings. See the Preferences snapshot below with the Results Tab selected.



The Results Tab lets you select a results format of HTML, Listing, or both. If you enable HTML format, you can select what style to apply to the generated output and where to place the resulting HTML files. You can also choose whether you want your HTML results displayed in an internal browser or in your preferred web browser. You need Microsoft Internet Explorer 3.02 or higher installed on your machine to display results in the internal browser. Selecting to use the preferred web browser would enable the display of HTML in the browser configured on the Web Tab in Preferences. If AutoNavigate is enabled, results will be progressively displayed in the configured browser as HTML is generated.

More new preference settings are listed below:

Hide cursor in non-input windows

This setting suppresses the display of the cursor in SAS windows that do not allow text input.

Disable scrollbar focus

This setting prevents scrollbars that exist internal to the window dressing from getting focus. This prevents the flashing thumb bar that sometimes occurs in windows that use scrollbars in this way.

Save settings on exit

Enabling this option causes the saving of window placement settings when you exit the SAS System.

OPEN AND SAVE AS DIALOGS

In previous releases of the SAS System filetypes and filenames for the Open and Save As dialogs were associated with the dialog instead of the active window. With this version filetypes and filenames are associated with the window that invokes the dialog. These changes allow the window that invokes the dialog to set the default file-

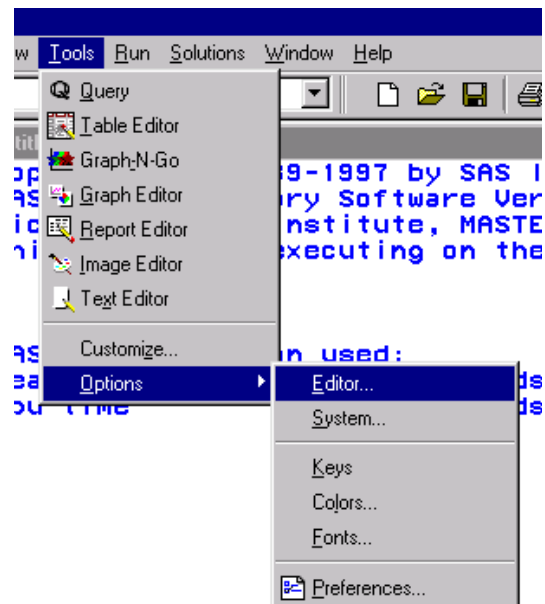
type and filename.

The **DLGOPEN** command has been enhanced to extend support for long filenames. The previous format of the command did not support complex filters. Complex filters include filters with spaces and apostrophes. The enhanced syntax is:

```
DLGOPEN longfilter =
"a b.sas|b's.sas".
```

MENU CHANGES

The menus in the Nashville Release have been redesigned to be more compatible with Microsoft Office applications. The most obvious change is the removal of the Options menu item and the addition of the Tools menu item. Most items from the Options menu now exist on the Tools menu. Below is a picture of the new Tools menu.



IMPROVED HELP

The SAS System help facility uses HTML help for this release. Some of the documentation available in this format includes usage notes, the SAS sample programs, the Windows companion, and the SAS System requirements.

FONT SCRIPTING

The capability to specify the script (codepage) to be used with a font is a new feature in the Nashville Release. This feature allows you to use fonts that have codepages other than the default codepage currently in use by the SAS System. This feature is useful for international users of the SAS System or users that use more than one character set at a time. For example, users can now create SAS/AF® FRAME entries that use a Cyrillic, Greek, and Western European font at the same time.

OLE/ACTIVEX

OLE 2.0, which the SAS System has supported since Release 6.10, provides many features that you can use to enhance your SAS/AF FRAME entries and SAS/EIS® applications. The SAS System OLE support consists of OLE container (including support for ActiveX controls), OLE automation controller, and OLE automation server. For a 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 6.12".

To enhance our support of OLE we have added the ability to automate an OLE server on a remote machine using DCOM (distributed common object model). With this functionality you could access Microsoft Excel data that exists on someone else's machine and use it within your SAS/AF PROGRAM.

To use DCOM you must run the dcomcnfg utility on the remote machine to set up permissions to run applications. Please refer to the DCOM help topic available with the Windows System for more information.

APPLICATION INTEGRATION

The Nashville Release of the SAS System continues the evolution of the SAS System's integration with other applications. In addition to communications possible with pipes, DDE, Lotus Notes interface, and external DLL access, support for communication through e-mail is also possible.

Communication to applications such as Lotus Notes Mail or e-mail packages is handled through MAPI support in the SAS System. As long as basic mail services are installed, the SAS System will use the MAPI client interface to allow postings to packages like Microsoft Ex-

change Server and Lotus Notes Mail. Since each of these client packages (starting with Notes Release 5) support connectivity with SMTP (Simple Mail Transfer Protocol), the SAS System can also post mail to SMTP/POP3-style internet mail systems by utilizing these client packages. In addition, if an administrator has set up routing for specific mail recipient identifiers to locations such as public folders, the SAS System can be used to direct mail directly into Microsoft Exchange Server public folders for collaborative data viewing.

UNIVERSAL ODBC DRIVER

The Universal ODBC Driver allows other applications to access SAS data without requiring availability of the SAS System. This driver is new since Version 6 and supplements the basic SAS ODBC Driver that provides ODBC data access through the Base SAS System. While the SAS ODBC Driver provided both read and write access to data through the SAS System, the Universal driver provides read-only access.

This driver is significant because it allows other applications, such as Microsoft Excel, to directly access data stored in SAS formats without requiring the SAS application software. For organizations storing large amounts of SAS data on PC networks, this driver opens up the server data to more applications than ever before.

The Universal ODBC Driver is sold separately and operates only on Windows platforms. The driver provides access to the standard data sources, including: SAS data sets, Version 6 CFO Vision Financial Database (FDB) files, Version 6 SAS multi-dimensional database (MDDDB) files, and JMP files. New for Version 8, the Universal ODBC Driver also provides access to SAS Transport Files, so that data from any SAS platform can be accessed by remote applications. For direct, native access, the Universal ODBC Driver also supports access to Version 6 SAS data generated on other platforms, such as UNIX or OpenVMS directly.

You can download an evaluation copy of the Universal ODBC Driver from the SAS Institute web site (<http://www.sas.com>), following the links to Demos/Downloads, ODBC Drivers, and SAS Universal ODBC Driver. This driver is also available for purchase at the same web location. Note that this driver is a single-time purchase item that will continue to be useful without renewal or other fees in the future. However, upgrades are not included in the base purchase

price.

SAS ODBC DRIVER

The SAS ODBC Driver has also been enhanced in the Nashville release to improve reliability and performance. This Driver requires the presence of the SAS System on either the local PC or it can use TCP/IP to access a remote SAS System on another PC or any other system on which the SAS System is located. This driver provides read/write access to data on the remote SAS System. Both this driver and the Universal ODBC Driver can function well in web-based environments in which server-side processing is used and the driver is available on the web server. For this type of use, the drivers have been made more robust to support higher levels of concurrent access and user load.

Although the SAS ODBC Driver is included with a purchase of the Base SAS System, you can also download the latest version of the SAS ODBC Driver for use on any Windows PC to be used with SAS System servers on any platform. The download is available from the same location from which the Universal ODBC Driver is available (under <http://www.sas.com>, following links to Demos/Downloads, ODBC Driver, and the SAS ODBC Driver).

SAS SYSTEM VIEWER

The free SAS System Viewer has been enhanced to accompany the Nashville Release of the SAS System. In addition to supporting data formats from Version 6 through Version 8 (excluding SAS catalogs, FDB, and MDDB files past Version 6), it has enhancements in several areas.

Improved Printing Support

The Viewer now handles pagination embedded in SAS System monospace output files. When these types of files are browsed, they can be correctly viewed and printed. For consistency with the SAS System, the SAS Monospace font is included with the Viewer and used by default.

Workbook View Support

When viewing multiple windows simultaneously, the Viewer allows the selection of a tabbed workbook view to facilitate navigation.

Data Subsetting Support

To facilitate the viewing of very large SAS data sets, the Viewer can be configured to subset the number of observations being viewed. This allows much larger data files to be viewed without exhausting system memory. The Viewer supports a maximum display of 65,536 rows of data at a time, equivalent to the limit of Microsoft Excel. More data can be viewed by paging through subsets of data.

SAS Transport File Support

The SAS System Viewer supports collaborative viewing of data generated on any platform on which the SAS System operates through the ability to read files stored in the SAS Transport File format. This format is publicly documented and has remained consistent since Version 5 of the SAS System. Files of this type typically use the extension .XPT or .STX (consistent with their use in the SAS JMP product) and are recognized by the Version 8 SAS System Viewer.

HTML output Viewing Support

Since the Nashville Release of the SAS System supports the generation of output in HTML for web-based use, the Viewer also supports viewing this output as well. If you are using Microsoft Internet Explorer 4.0 or greater, the Viewer will allow you to browse SAS HTML output as well as other SAS filetypes in a consistent manner.

You can download the free SAS System Viewer from the SAS Institute web site (<http://www.sas.com>), following the links to Demos/Downloads, Base SAS Software, and the desired version of the SAS System Viewer.

SETUP ENHANCEMENTS

The basic operation of the SAS System Setup program has been enhanced in a number of areas.

Multiple user support

To facilitate multiple users on the same computer, Setup defaults to allow users to use separate SASUSER and SASWORK locations. By placing these folders in locations separate from the main SAS System image, network installations can be more easily shared, and NT users can avoid conflict between users of the SASUSER folder. By default, Setup will use the system settings for the main system TEMP directory for the base location of SASWORK temporary files. Setup also uses a default of the user's USERPROFILE (on Windows NT and Windows 2000) or location of "My Documents" (on Windows 95 and 98) as a base location for SASUSER user-specific files.

Another benefit of this configuration is that automated utilities (such as the Disk Cleanup utility in Windows 98) will look in this location for files that can remain after an abnormal shutdown. In conjunction with these utilities,

SAS System temporary files can be easily cleaned up along with files from other standard applications.

Use with Roaming User Profiles

As site administrators migrate to Roaming User Profiles, the default configuration suggested by the SAS System Setup program will support them. Roaming Profiles are user areas that are stored on a fileserver and copied to the local system when the user logs in on a client system. If the user travels or uses a variety of systems, this ensures that the user's settings and documents travel with them to each new system. By virtue of the SAS System use of standard USERPROFILE settings for SASUSER files, SAS System settings also travel with them as the user logs in to a new, remote system.

Use with Microsoft Terminal Server

Terminal Server is a special version of Windows NT 4.0 that allows multiple users to log in to a single NT system remotely and see their user display on a remote monitor. Defaults used in the SAS System Setup program support this operation. Again, since USERPROFILE settings are used, specific user directory locations are used, and the multi-user security enforced by Terminal Server works with the SAS System. In addition, since multiple users have separate and protected TEMP directories, SASWORK directories are also protected on multi-user systems and avoid multi-user conflict situations.

Multiple installation support

Setup now handles separate invocations, and a single uninstall will correctly remove all previously installed SAS System files.

New dialog selections

In response to user suggestions, the Setup dialogs have been reorganized so that **Personal**, **Client**, and **Server** installations can be more easily selected and performed. In addition, Server installations are more configurable in the Version 8 Setup application to take administrative privilege requirements and other server-related requirements into account.

Please refer to the paper, "Taking Advantage of the SAS System on Windows NT" (also in these Proceedings) for more details on NT-specific features available in the Nashville Release of the SAS System.

OPERATION ON WINDOWS NT

In addition to indirectly benefiting from Windows NT-specific features, such as the 64-bit capabilities of NTFS and SMP (symmetric multi-processing) support, the Nashville Release of the SAS System takes advantage of several other capabilities on the Windows NT platform.

NT-specific performance enhancements

The SAS System takes advantage of NT features that improve the performance of input and output on the NT platform. These include optimizations for both sequential and random I/O, and are most beneficial when operating on large amounts of data stored on Windows NT Server. In addition, various algorithms have been re-coded to maximize their performance on high-end computer hardware.

Scatter/Gather I/O

For large data processing requirements, this type of operation has been added to Windows NT (starting with NT 4 Service Pack 3). The SAS System can take advantage of this advanced form of I/O for greater throughput performance for certain types of operations.

Support for Very Large Memory on Advanced Processors

With the availability of the Pentium II Xeon processor, Intel-based servers gained the ability to access memory beyond the four gigabyte boundary. Using an architecture called ESMA (Extended Server Memory Architecture), an application can utilize this memory for very large-scale tasks. ESMA requires a driver available from Intel Corporation, and provides access to 8 to 32 gigabytes of RAM.

The SAS System Version 8 takes advantage of ESMA as either a very large disk cache or in-memory library. When ESMA is utilized effectively, the speed of input/output operations can be greatly improved since the SAS System doesn't have to wait for a relatively slow (compared with RAM) disk drive system to respond to data requests. When in use, Windows NT memory and disk caching algorithms are bypassed, leaving them able to respond to smaller requests more effectively. In the ideal case of utilization of ESMA, the amount of real, elapsed time required to accomplish a processing task approaches the CPU time, which is typically far smaller when large amounts of data are involved.

NT monitoring tools

The SAS System takes advantage of Windows NT system utilities, such as Performance Monitor and Event Log, for more accurate diagnostics and monitoring when deployed in a distributed server environment.

SAS Configuration file customizability

Features of the Nashville release allow a system administrator to specify a grouping of SAS System configuration files (formerly called

CONFIG.SAS, now called SASV7.CFG or SASV8.CFG) to be arranged to meet enterprise deployment needs. Configuration files can be nested (including one another) so that standard settings can be used for a wide-scale use, and user-specific overrides or additions can supplement the standard configuration.

Microsoft System Management Server (SMS) Support

The Nashville Release of the SAS System takes advantage of SMS to provide remote, unattended installation of the SAS System. For organizations utilizing SMS, this greatly facilitates the distribution of software during installation time, as well as for updates.

Please refer to the paper, "Taking Advantage of the SAS System on Windows NT" (also in these Proceedings) for more details on NT-specific features available in the Nashville Release of the SAS System.

CONCLUSIONS

This paper summarized some of the many features available in the Nashville Release of the SAS System. Enhancements in the user interface, Windows integration, and setup program areas continue to move the SAS System into the future. Taking advantage of the capabilities of Windows NT is just another way in which we are trying to deliver a solid Windows application.

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