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SAS® Enterprise Guide: A Revolutionary Tool!

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ABSTRACT

Whether you are a novice or a pro with SAS, Enterprise Guide has something for everyone. Your organization can leverage the powerful ETL, analysis and reporting capabilities of SAS with a comfortable GUI. New SAS users can begin working with EG, using wizards to import data, perform analysis and generate reports quickly and easily. Experienced SAS programmers can use EG to increase efficiency, decrease coding errors, and leverage new functionality available to programmers only in EG. All users can focus on the content of the analysis, rather than details of the coding which will increase efficiency, leverage unutilized functionality and streamline processes.

INTRODUCTION

Enterprise Guide is an interface for SAS Software. It allows a user to code SAS programs in a "Process Flow" or use point-and-click interfaces to modify, analyze, and report data. It can increase the efficiency of your programming staff, who can leverage both the coding and the wizard interfaces. Enterprise Guide also empowers non-technical users with SAS "Guided Analytics", allowing them to manipulate data, create reports and graphs, and conduct analysis, all without having to become an expert coder. Enterprise Guide is a wonderful tool for organizing all SAS processes in a central "Project". SAS users can organize code, results, and logs in a flow-chart like system that offers overall management of entire SAS processes. Enterprise Guide is a comprehensive Enterprise Wide Solution that truly has something for everyone.
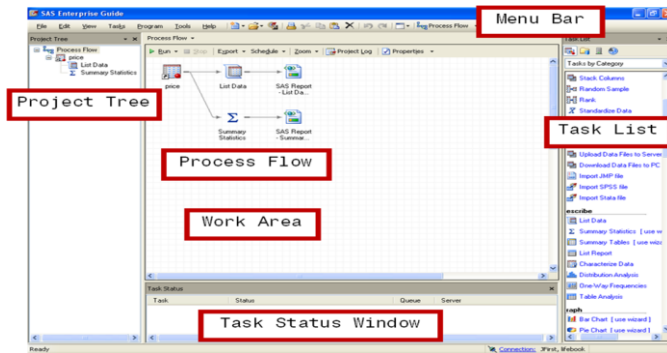

Figure 1: Parts of Enterprise Guide

EMPOWER NON-TECHNICAL USERS WITH SAS "GUIDED ANALYTICS"

LIBERATE YOUR IT DEPARTMENT AND ANALYSTS

Many SAS users do not have an IT background and/or do not have the time to learn to become expert coders. These users may need to conduct simple data manipulation, statistical analysis, and distribute reports. While SAS is an excellent tool for these job duties, analysts may struggle with how to complete tasks without extensive knowledge of SAS coding practices.

Many organizations do not have IT staff that is dedicated to creating SAS queries and reports, and in these cases, the analysts must create their SAS processes alone. In the organizations that do have IT staff that is dedicated to assisting analysts with SAS programming, IT staff is usually very busy and managing a heavy workload. This can lead to analysts waiting for simple queries, reports, and small modifications. With the point-and-click interfaces of Enterprise Guide, analysts can complete many of these tasks on their own.
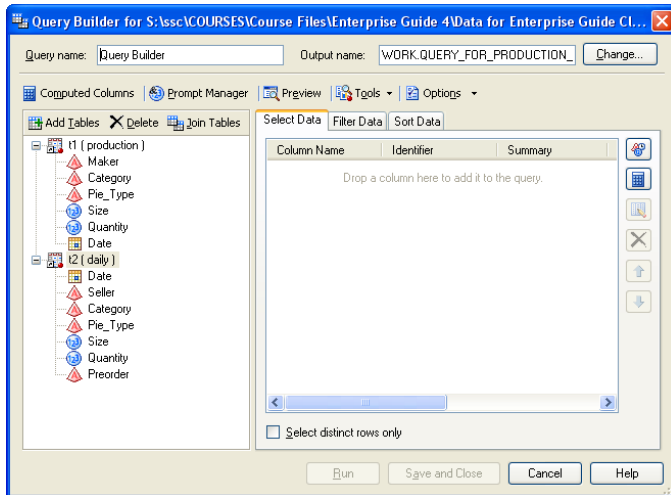
Figure 2: The Query Builder in SAS Enterprise Guide 4.3

Display 2 shows an example of what analysts can do in Enterprise Guide. Within this one point-and-click interface, analysts can join tables, select variables, filter data, sort data, change the dataset they are working with, compute columns, set up prompts, dedup observations, change query options, add titles and footnotes, limit output, and more. It is all very intuitive, easy to understand and use, and makes these tasks easy for non-programmers. Behind the scenes the Query Builder builds code that can be reused, modified, and further utilized. So, these simple tasks do not require the support of a SAS programmer in IT.

Analysts can access a variety of data sources, including SAS, Excel, and databases. With the appropriate privileges and SAS products (ex: SAS/ACCESS for Oracle, Integration Technologies, etc.) analysts can access virtually any data source, across platforms.

ADDING A SAS DATA SET TO A PROJECT

To add a SAS data set to a project, the user takes advantages of familiar Windows commands (File menu →Open →Data → Local Computer or SAS Servers → the location of the data set →Open). Then the SAS data table is open in the Work Area. Icons representing the data table appear in the Process Flow and Project Tree. Now the SAS data set can be used in tasks and queries.
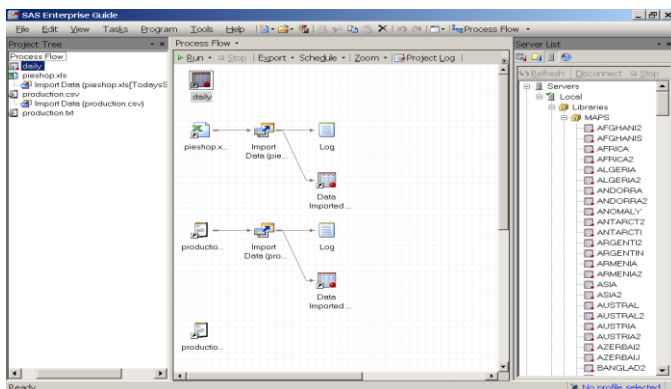
Figure 3: The user can view the data and libraries available on a server, using the Server List.

EXCEL IMPORT DATA WIZARD

Excel data can be imported through a GUI wizard. As data is imported, it can be modified: dropping fields, changing variable attributes, which worksheet or cells to import, and more. It can all be done without coding!
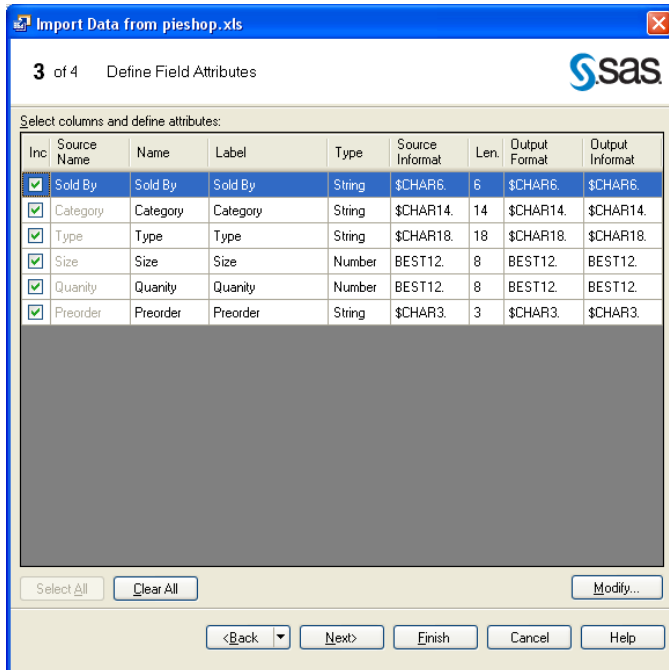
Figure 4: Importing Excel Wizard

IMPORTING TEXT FORMAT DATA

Importing text data is just as simple. This can also be done with a wizard. The user can specify whether it is fixed width (and then use a drag and drop ruler to define columns) or if it is delimited (and then specify the delimiter).
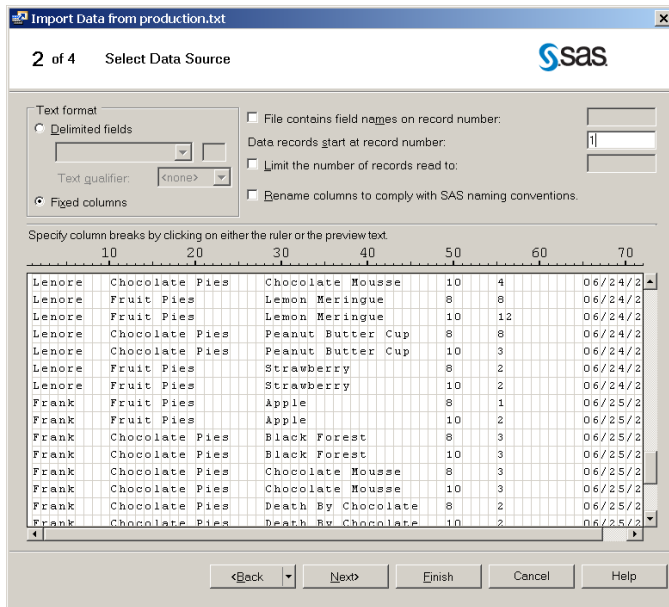

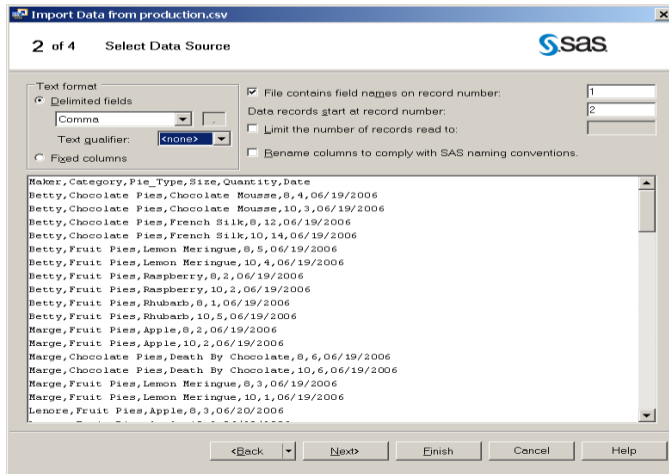**Figure 5: Example of a fixed width file**

Figure 6: Example of a delimited file

TASKS

A task is a specific action that can be executed on data. Can be customized through a step-by-step process, then run or saved. It's analogous to a procedure in SAS. Tasks can be used to analyze and classify data, compute statistics and carry out statistical tests, create tables and reports, or generate graphs.

To open a task window, in the Process Flow or Project Tree , highlight a data set. Then select a task from the Task List or the Tasks menu. In the Task Window, one may edit and filter data, assign variables to task roles (which determine how variables will be used in the task), and make selections specific to the task.
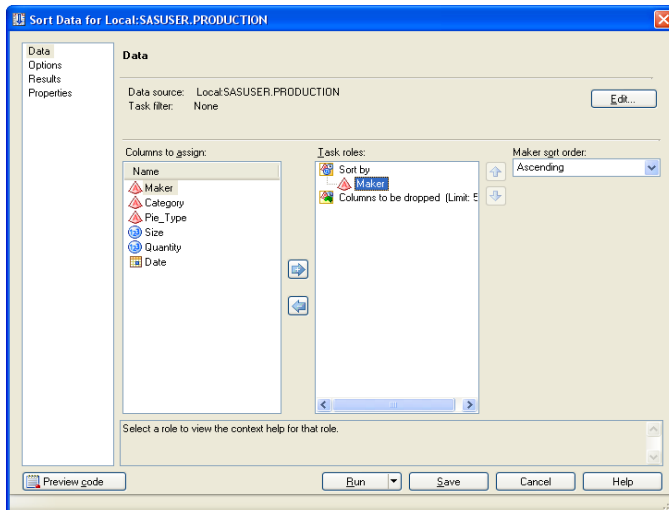

Figure 7: Sort Task Wizard

The user can save the task, which will close the task window, create objects in the Process Flow, save all the roles and options, but it does not execute or generate output. If a user runs the task, it will execute according to the options you have specified and generate output. Tasks can also be modified, both before and after they have been run.

WARNINGS AND ERRORS

To view the log for a task, in the Process Flow, find the name of the task. Under the task name, double click the **Log** node. Or double click the task.

Figure 8: Warnings are denoted by a yellow triangle over the task icon.
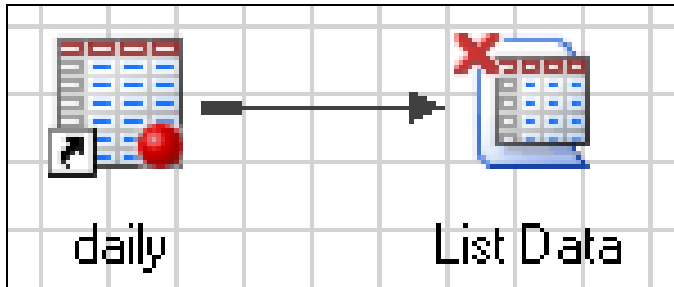

Figure 9: Errors are denoted by a red X over the task icon.

QUERY BUILDER

The Query Builder is an intuitive, easy to understand interface for preparing data for analysis and reporting. Queries are easy for non-programmers, and the simple tasks don't require the support of a SAS programmer. The Query Builder builds code that can be reused and modified.

The query builder can join tables, select variables, filter data, sort data, change column attributes, change data sources, compute columns, set up prompts, de-dup observations, change query options, add titles/footnotes, limit output, and more.
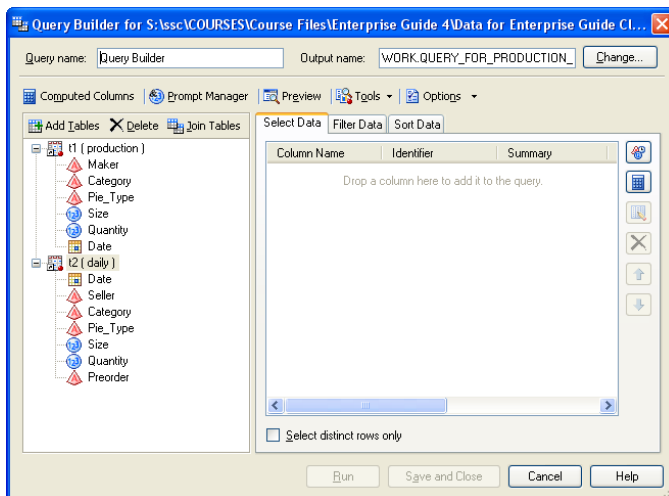

Figure 10: Example of the Query Builder

REPORTING, GRAPHING, AND TEMPLATES FOR ANALYSTS

Enterprise Guide also allows end users to create and modify custom reports, including the use of graphs and custom templates. In many organizations, analysts are dependent on others to create simple reports and graphs. Then if they want any changes, even to something as simple as the color of graphs, they need further assistance. Enterprise Guide empowers users to leverage all the power of SAS reporting capabilities in easy point-and-click interfaces.

ANALYSTS CAN TRANSITION INTO PROGRAMMING

In a fast paced business world, very few people have the time to learn a new programming language and learn how to integrate it with their business applications. When using Enterprise Guide, analysts can use point-and-click interfaces for the majority of what they are doing. When they do not find the functionality they are licking for in these ready made interfaces, they can generate shell code and learn how to program as the situation necessitates.

So, for example, a user may generate a PROC TABULATE report using a wizard but find that the results are not quite what they are looking for. When seeking SAS assistance, they realize they could get their required results with a PROC TABULATE option. So, they can use the shell code, manually code the option and get exactly what they want. But through that process, they better understand what is going on behind the scenes, and next time they don't get their exact desired results, they will delve into the coding world again. It can also make it easier for an analyst to debug their SAS process. So, analysts can gain better understanding of what is going on behind the scenes, but they can do so as needed and maintain their maximum efficiency.

ANALYSIS TASKS

Summary Statistics is just one of the analysis tasks available in EG. Within this wizard, one can assign analysis and classification variables, select which statistics to include, create a plot, change the results format, and add titles/footnotes. Behind the scenes, Enterprise Guide is creating PROC MEANS code. The output that EG creates looks the same as if it were coded from scratch.

Figure 11: Example of Summary Statistics Output

Figure 12: The Table Analysis Task creates two- and three-way Frequency Tables.

REPORTING FOR ANALYSTS

Analysts may depend on others to create simple reports or for simple changes. Analysts can leverage SAS reporting capabilities in an easy GUI, creating custom reports and templates, using Enterprise Guide.

One example of a reporting wizard is Summary Reports (PROC TABULATE). This wizard includes a Preview Area which allows the user to manipulate the dimensions, concatenation and crossing, analysis and classification variables, and statistics.
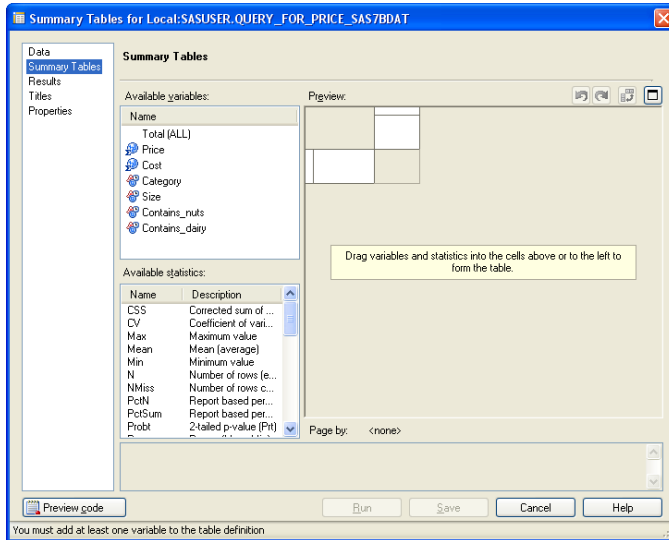

Figure 13: Summary Tables Preview Area

		Category								All			
		Chocolate Pies				Fruit Pies							
		Size				Size							
		8				8							
		Price		Cost		Price		Cost		Price		Cost	
Contains Dairy	Contains Nuts	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
No	No	.	.	.	.	4.99	6.99	2.60	3.70	4.99	6.99	2.60	3.70
Yes	No	6.99	10.99	3.20	5.25	7.99	8.99	4.20	4.55	6.99	10.99	3.20	5.25
	Yes	9.99	9.99	5.00	5.00	.	.	.	.	9.99	9.99	5.00	5.00

Figure 14: Summary Tables Output

CONTINUED ROLE OF IT

Of course IT's support of analysts will still be important. Analysts may still need to rely on IT staff for programming expertise for complex data manipulations, specialized reports, production processes, and other complex issues. However, with a good majority of day to day tasks, analysts can be rather self sufficient.

INCREASE EFFICIENCY OF YOUR PROGRAMMING STAFF

Experienced SAS programmers can also greatly benefit from the use of SAS Enterprise Guide. One way to leverage Enterprise Guide is to use it to do the heavy lifting. Programmers can use wizards in Enterprise Guide to complete tasks such as joining many tables, creating reports, filtering and querying data. Programmers can complete many of the tasks through wizards quicker than if they were to code it from scratch. The processes also are less error prone.

For example, it can be cumbersome to join several tables (Enterprise Guide can do up to 32 tables at once!). It is easy to misspell a variable name, miss a comma, or incorrectly spell a SAS key word. A programmer can join tables within a wizard in a fraction of the time. Enterprise Guide will attempt to find which variable to join the tables by or the programmer can manually tell Enterprise Guide how to join the tables. You can specify what type of join you want and other options as well.
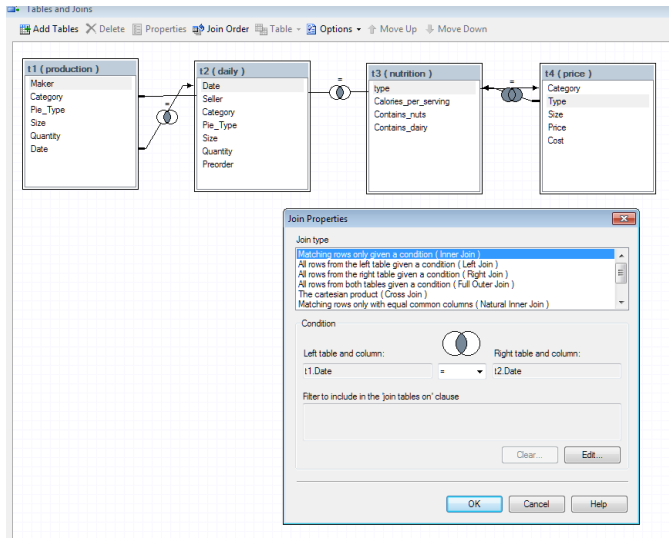

Figure 15: Joining Tables in Enterprise Guide's Query Builder
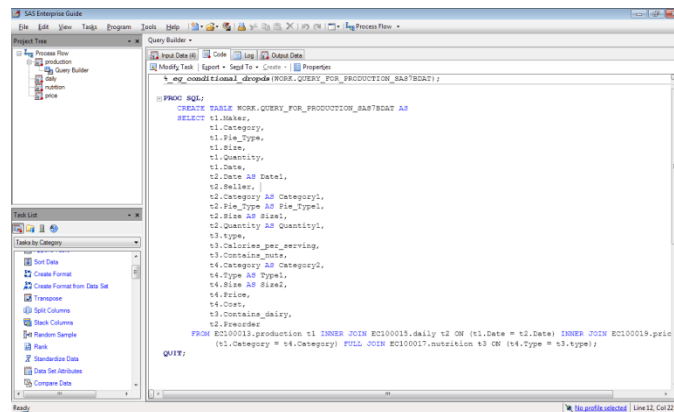

Figure 16: The Query Builder generates SQL Code which can be used or modified.

NEW PROGRAMMER FEATURES IN ENTERPRISE GUIDE 4.3

With the new release of Enterprise Guide 4.3, the software has truly become a programmer's tool. One of the best enhancements in Enterprise Guide 4.3 is the new Syntax Suggestion. With this new feature, as one is typing a SAS keyword, SAS will display a list of potential keywords that one can click on to use in code. Another exciting addition to the new software is the Integrated Syntax Help. This feature is available simply by mouse-over or clicking F1 over a SAS keyword. A box appears which offers the syntax for the keyword, as well as a brief description of the keyword. Both of these features mean that users can continue to improve my SAS coding abilities and take advantage of new options, functions, etc., all without needing to remember the syntax for every keyword. This new feature is sure to change the programming experience of every programmer, from novice to expert. Enterprise Guide 4.3 has many more exciting new features as well, including displaying libraries and data members, parentheses matching, program formatting, and more.

Integrated Syntax Help
Using mouse-over or clicking F1 over a SAS keyword will display syntax for the keyword, as well as a description

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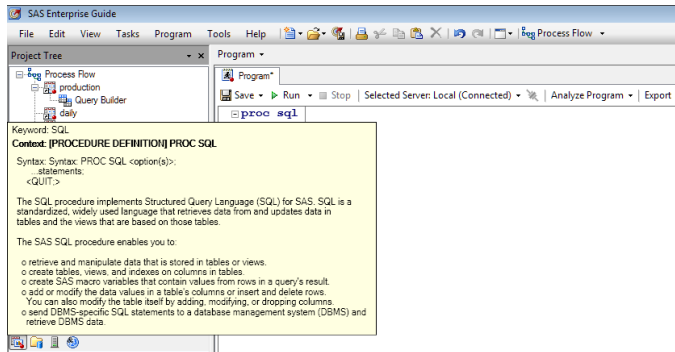
Figure 17: Example of Integrated Syntax Help in Enterprise Guide 4.3

Syntax Suggestion
When typing a SAS keyword, SAS will display a list of potential keywords to use in code.

More Exciting New Features
Displaying libraries and data members, parentheses matching, program formatting, and more!

These new features will change the programming experience of every programmer, from novice to expert.

SAS PROCESS ORGANIZATION

SAS Enterprise Guide provides a comprehensive interface for organizing an entire SAS process. A SAS user can organize all of their programs, data, reports, logs, and documentation for a particular business process into one flowchart like file, called a "Project." "Sticky notes" can be used to further document the overall process. This organization simplifies process comprehension, updates and standards across the organization. SAS processes created in Base SAS can be imported in an Enterprise Guide "Project" and displayed as a "Process Flow." Users can created Ordered Lists which will specify which order processes will run in, and the processes can be scheduled.

EASILY CREATE USEFUL, BEAUTIFUL GRAPHS

Creating graphs in Enterprise Guide is simple. The user does not need to remember SAS/GRAPH syntax, and graphs can be completed in a fraction of the time. Users can create graphs with a point-and-click interface that constructs a variety of graph formats, including: bar charts, pie charts, line plots, scatter plots, area plots, donut charts, bubble plots, contour plots, box plots, and more. Many users who had previously exported data to Excel to graph can now easily create great looking graphs right within SAS.
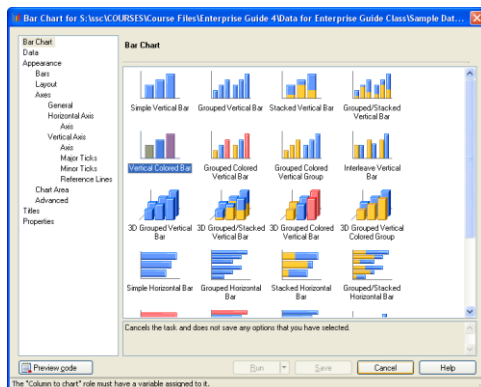

Figure 18: Example of a bar chart interface in Enterprise Guide
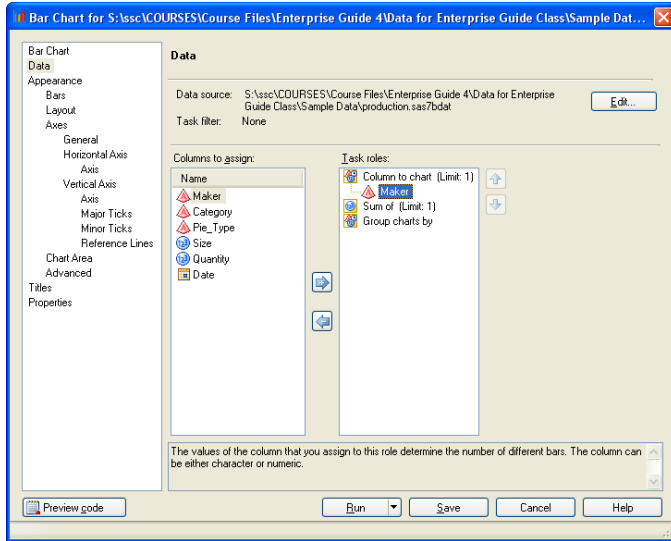
Figure 19: Example of assigning data roles for graphing SAS Enterprise Guide

Output formats for graphs include: ActiveX, Java, GIF, JPEG, ActiveX image, Java image, and SAS EMF. ActiveX and Java, generate interactive graphs. Interactive graphs can change the graph type or properties, without re-running the SAS process.
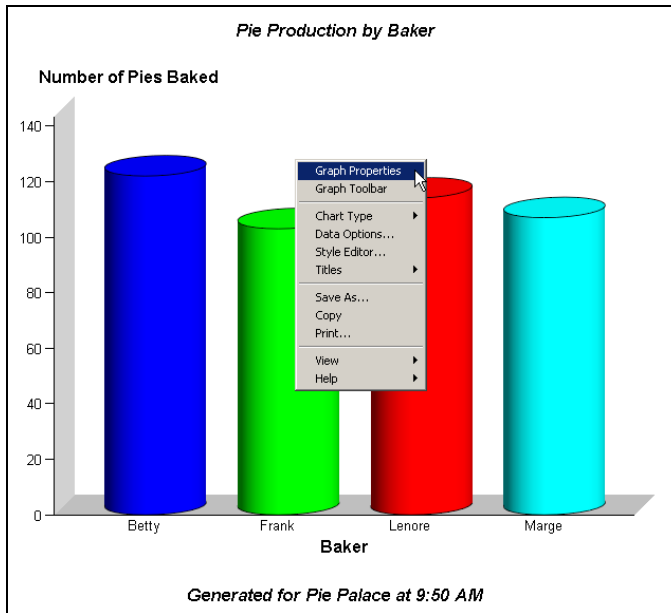
Figure 20: A graph created in SAS Enterprise Guide

SIMPLE, COMPLETE REPORTING PACKAGES

Task results can be generated in the following formats: HTML, PDF, RTF, SAS Report, and Text. For many organizations, it is easy to create sharp looking, standardized reports. Enterprise Guide users can easily create and apply cascading style sheets that define styles, fonts, color, and include logos or other pictures. Each of these elements is easy to manipulate on a very specific level, so it easy to get reports that look just exactly how a user wants. These templates can be stored and reused. With this functionality, it is easy to create attractive, consistent reports across an enterprise.

Reports are also easy to package in SAS Enterprise Guide. With a few clicks, a user can package multiple reports for easy distribution to important decision makers. Reports can include charts, titles, text, images, and more. Reports can easily be emailed or scheduled distribution.
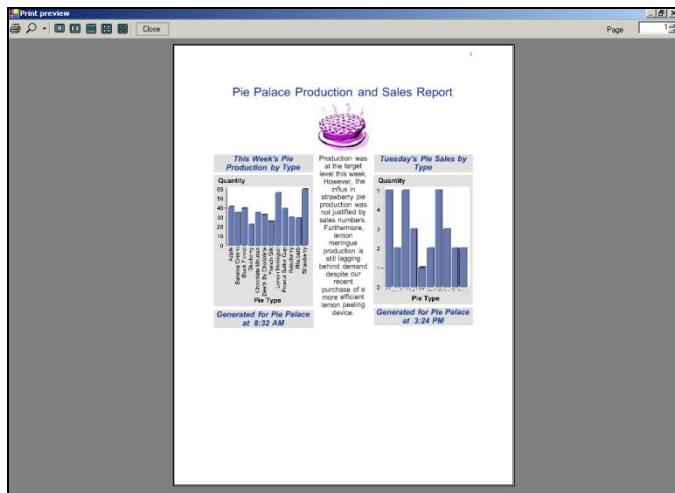

Figure 21: Example of a packaged report in Enterprise Guide

SOME THINGS TO CONSIDER

MISSING FUNCTIONALITY

There is some functionality that is not available or is limited in Enterprise Guide, including the following. However the internet abounds with documentation and ideas about how to address these items:

- DDE

- X STATEMENT AND SYSTASK (need special permission that may be difficult to get from administrator)

- SAS/AF Applications

- %WINDOW

- Statements, PROMPT options on LIBNAME statements, and interactive environments such as the Report window

- DATA step debugger

- SAS statements that require user interaction and that do not work well in a SAS batch program

- THE ENDSAS STATEMENT

INTERNAL RESISTANCE

You may encounter some internal resistance at your organization. Many experienced users have processes that work, and if it's not broke, why fix it? Non-programmers may have fear that the software will be technical or that they will not be able to understand or use it. The best way to deal with both of these situations is to simply allow these users some hands-on time. Once programmers see how easy they can use their current processes and how it will streamline future development, they will fall in love. And once analysts see the results they can achieve with ease, they will be ecstatic.

LOGISTICS OF IMPLEMENTATION

SAS Enterprise Guide is packaged as part of Base SAS, so there is no additional software investment. Enterprise Guide is a PC product. Many users have Enterprise Guide and aren't even aware of its existence. Depending on the complexity of an enterprise's environment, they may require IT assistance to install and support it. You may need additional products to access different data types and platforms. Users may also require IT assistance to set up their servers, metadata servers, and define workspace.

CONCLUSION

Enterprise Guide really has something for everyone. It allows users to streamline and standardize process, increase efficiency and capabilities. There may be some resistance at first to using a new interface for SAS, however once users get some hands-on time with the software, they will never so back. Enterprise Guide is truly an enterprise wide software for the future.

REFERENCES

Bangi, Audimar. 2010. "SAS® Programmer's Paradise: New Goodies in SAS® Enterprise Guide® 4." Proceedings of the SAS Global 2010 Conference. Cary, NC: SAS. Available at http://support.sas.com/resources/papers/proceedings10/137-2010.pdf.

ACKNOWLEDGMENTS

We would like to acknowledge Benjamin First, a fellow SAS Enterprise Guide user. He brings his programming background to Enterprise Guide, and is always finding ways to "think outside the box." He has served as a mentor for us with SAS Enterprise Guide, and is always eager to help with questions and ideas.

RECOMMENDED READING

The Little SAS Book: SAS® Enterprise Guide

SAS® For Dummies®

CONTACT INFORMATION

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