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SAS® Enterprise Guide®, Best of Both Worlds: Is it Right for *You*?

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ABSTRACT

Whether you are new to SAS or a seasoned SAS Programmer, you still face the same dilemma. Does SAS Enterprise Guide represent the best of both worlds to make the transition to SAS easier with a point-n-click interface or enhance your productivity with over 90 tasks? Do you follow the same traditional path taken by millions who learned SAS many decades ago or do you take the yellow brick road to directly analyze your data? This presentation explores the vast differences between these two cultures and how they impact your programming environment. While there are numerous benefits to using SAS Enterprise Guide, there are also some caveats to keep in mind to make the transition smoother.

INTRODUCTION

Many organizations may find themselves lost by having SAS Enterprise Guide installed but not knowing how to get started because the new approach is drastically different from traditional SAS programming. In this presentation, I will explore the key differences as well as the similarities between the two different worlds.

## SAS DISPLAY MANAGER VS. SAS ENTERPRISE GUIDE

Traditional SAS programmers are very familiar with the SAS Display Manager which is similar to a simple, open village. In comparison, SAS Enterprise Guide offers more advanced tools that can be complex to develop. In making the transition to SAS Enterprise Guide, when the timing is right for you, there are many features to take advantage of including menu application, up to 90 tasks, querying multiple intermediate datasets and visual process flow.

SAS Display Manager World	SAS Enterprise Guide World
Technical	Non-Technical, Technical
Requires More Time for Programming	Requires Less Time for Programming using up to 90 Tasks
One Dataset/Program/Output File per window	Cross Reference/**Query Multiple Intermediate Datasets**/Programs/Output Files
Open Programmer's working environment (Interactive – DATA Step Debugger)	Controlled Analyst's working environment (Defaults, Batch Processing)
Non-Visual Programming	Visual Process Flow

Figure 1. SAS Display Manager vs. SAS Enterprise Guide

For those die-hard traditional SAS Programmers, you will be happy to know that you can change the display of SAS Enterprise Guide to resemble the SAS Display Manager.
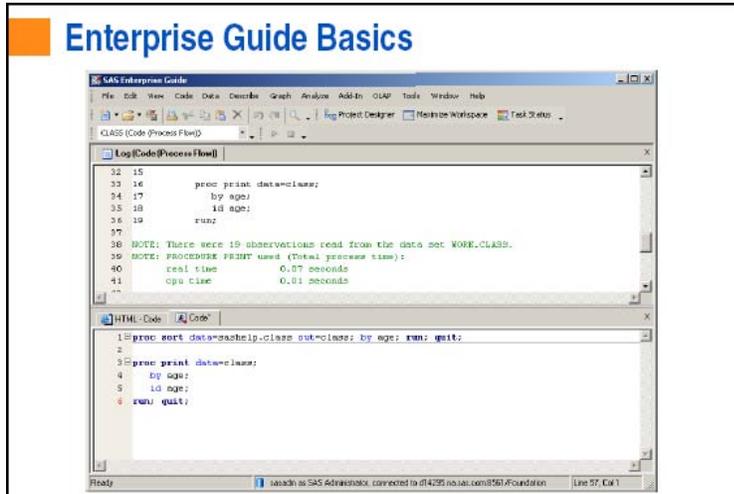
SAS Display Manager *Look*

Figure 2. SAS Enterprise Guide Basics I

SAS ENTERPRISE GUIDE PROCESS FLOW

As a SAS Programmer learning SAS Enterprise Guide, one of my first tasks was to understand the process flow. Some of the key questions I wanted answers to included how do I create and access SAS datasets, how do I write my own code or use tasks to create summary tables and how can I read the SAS log. By reviewing the process flow chart below, I realized that I was still able to access SAS datasets using a libname statement, submit my own SAS program or use a task to create summary tables and access the SAS log.

In addition, now, I could take advantage of new features to document my steps with notes as well as visualize *how* my summary table is produced by seeing the SAS dataset name, SAS program names as well as the output file types. This visual process flow chart not only helps to communicate how the program works, but also documents the SAS project and program.

Visualize **your SAS Programs**
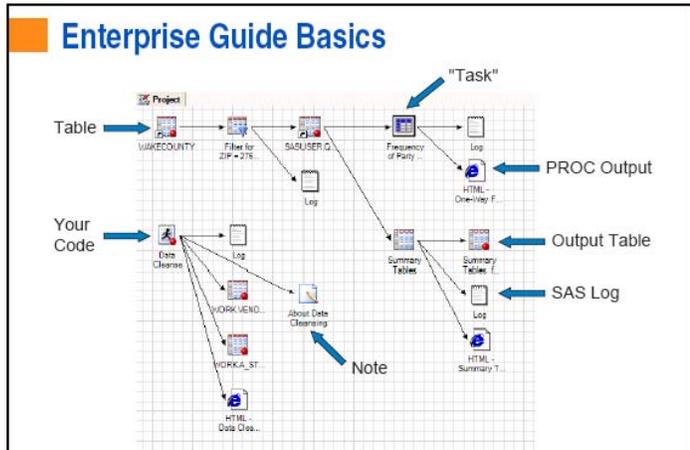
Figure 3. SAS Enterprise Guide Basics II

SAS Enterprise Guide has built-in tasks to make it easy to *build* SAS programs without having to type or remember SAS syntax! Through a sequence of logical point-n-click menu selections, both technical and non-technical professionals, including non-SAS programmers, can easily access, analyze and present data. When possible, SAS Enterprise Guide displays graph images for visual selection of the chart layout. For the summary table task, for example, you can drag and drop variables in the desired table layout structure.

2
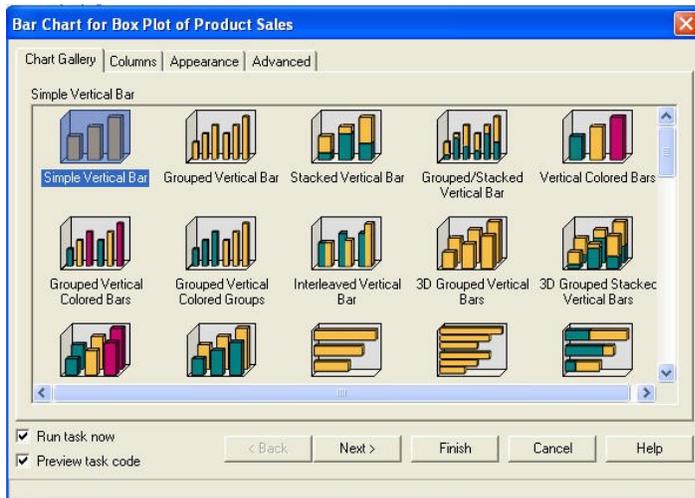
Figure 4. Graph Gallery

Menu Selection to *Build* SAS Program

PROGRAMMER'S GUIDE TO SAS ENTERPRISE GUIDE

As a die-hard SAS programmer, I am constantly searching for ways to help standardize and automate repetitive tasks as well as save my client programming time. While SAS Enterprise Guide is like working in a 'black-box' environment, there are at least four channels to insert custom SAS code.

Four Points of Custom Program Entry
1. Execute code when first opening project file such as setup.sas.
2. Execute code before or after running a task.
3. Insert custom code at predetermined points within a task to run with task. Examples include before or after DATA step or SAS Procedures and SAS Procedure statements or options.
4. Execute copied and customized generated code from task from a new program window.

With SAS Enterprise Guide, you can now more easily create prompts for user inputs. For example, after the user selects a product from the drop down selection, the query executes and returns the product's sales results. The end user does not need to be aware of the SAS code behind the menu prompt.
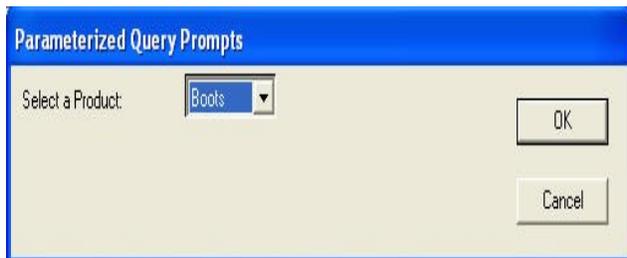

Figure 5. User Prompt Menu

User Input to *Build* Query Results

And yes, there is a special object called the Program Node where you can write your own code and submit it as if you were still working with SAS Display Manager. Below is an example of PROC REPORT. Note that any valid SAS syntax will still execute within SAS Enterprise Guide. Note that you have the option to embed your SAS program within SAS Enterprise Guide or execute the SAS program as an external file.

```
proc report data=mydatea.sales nowd split="*" headline;
 column product year,(quantity sales pct_prd)
          quantity=grd_tot sales=grd_pct;
 define product / group 'PRODUCT';
 define year / across 'Sales by Year' center;
 define quantity / sum 'N' center format=comma6.;
 define sales / sum 'Total' format=dollar8.;
 define pct_prd / computed '% Total' width=5 format=pctf.;
 define grd_tot / sum 'QNTY Total' format=comma6.;
 define grd_pct / sum 'SALES Total' width=5 format=dollar8.;
 compute before;
  gt1=_c3_; gt2 = _c6_; gt3 = _c8_;  endcomp;
```

3

```
compute pct_prd;
  _c4_ = (_c3_/gt1)*100;  _c7_ = (_c6_/gt2)*100;  endcomp;
rbreak after / summarize skip ol ul;
compute after;
  product = 'Total';  endcomp;
run;
```
Figure 6. PROC REPORT CODE

SAS ENTERPRISE GUIDE BEST PRACTICES

With any new software application, some level of training for *both* non-SAS programmers and SAS programmers is required. Once SAS programmers get to 'know their way around' SAS Enterprise Guide, they will be better able to fully take advantage of SAS Enterprise Guide features. Based on my experience working on client projects, I have listed 12 best practices below. I hope these tips will reduce your learning curve with SAS Enterprise Guide.

Best Practices Checklist
1. Some level of <u>training</u> is required.
2. Write to SAS programs instead of embedding the SAS programs to keep as <u>separate files</u>.
3. Take advantage of <u>Notes Task</u> to document steps.
4. Apply '<u>Save As</u>' instead of 'Save' to prevent accidental replacement of another project file.
5. Be careful when saving files when <u>multiple projects</u> are opened.
6. Take advantage of <u>process flow diagram</u> to visualize project code and tasks.
7. Take advantage of <u>split panel</u> to simultaneously view dataset and SAS program.
8. Take advantage of <u>order list</u> option to create batch jobs.
9. Take advantage of <u>viewing each HTML/RTF/PDF file</u>, for example, when creating multiple files.
10. For best debugging, keep all <u>unique intermediate</u> dataset names to view each data step sequence.
11. Put on your <u>data mining hat</u> to query explore most any intermediate dataset created to confirm assumptions.
12. Plan to follow a migration plan with your most open-minded SAS programmers <u>before</u> your closed-minded SAS programmers.

Ideally you and your manager will be asking specific questions such as 'What if SAS Enterprise Guide Could …'. This is exactly how my clients were able to optimize their investment in SAS Enterprise Guide. By going beyond 'just replacing the SAS Display Manager', my clients were able to save time with query exploration and management,

What If SAS Enterprise Guide Could?
1. Help with querying and validating?
    YES, with query exploration and management.
2. Help with documentation?
    YES, with more portable package formats such as notes, SAS Programs, Lists, Logs and Output files.
3. Enforce standards and automation?
     YES, with being fully compatible with SAS macros and menus.
4. Help with prototyping table layouts and performing complex statistical analysis?
     YES, with feature to create custom tasks.

Below is an example of how query exploration and management allowed me to rerun saved queries to confirm labtest results across several intermediate SAS datasets. Each SAS Enterprise Guide query allows you to select variables, apply subset conditions as well as sort the order of records. In addition, nested queries are also possible.
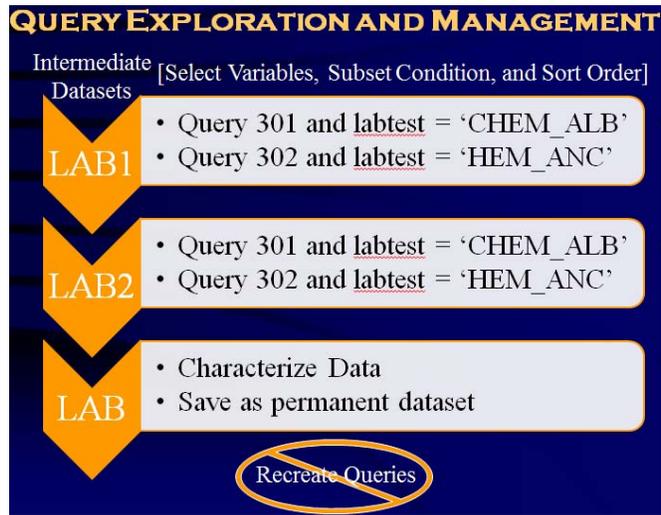
Figure 7. Query Exploration and Management

Below is an example of a checklist to enforce standards when creating SAS Enterprise Guide projects along with steps for creating SAS datasets and tables. This checklist was effective to better organize the development and validation tasks for a team of SAS programmers.

X	G	D/T	#	18 Point Development Checklist
	G		1	Point to central SETUP_EG.SAS file
	G		2	Point to and update corresponding <program>.SAS file
	G		3	Redirect SAS Log/List files to save in separate paths
		D	4	For analysis datasets, read attributes from Variable Definition Table (VDT) excel file
	G		5	For each dataset, apply PROC SQL – SELECT <required variables>
	G		6	Apply PROC SQL – LEFT/FULL JOIN to join all tables
		D	7	Apply macro variables from VDT file: &attribs, &formats, &keepvars
	G		8	Apply syntax when creating numeric variables: IF NMISS()=0 THEN NEW_VAR=SUM();
		D	9	Save as permanent dataset: PROC SORT – by key variables
		D	10	Confirm unique records: PROC SORT – unique key records
		D	11	QC of datasets: PROC COMPARE – Level I (Overall), II (Detail), III (Mismatch)
	G		12	Run QC check: Scan Source SAS Log and review process flow diagram
		T	13	ODS Path to Style Definitions and Table Templates
		T	14	Enterprise Guide Tasks to summarize data into dataset
		T	15	View/Save ODS Table/QC Result Listing in RTF File
	G		16	Create/Check each Intermediate Dataset
	G		17	Characterize Raw/Derived Datasets to view count of unique values and descriptive stats
	G		18	Utilize Options: Notes, Import Data from Excel, File New Ordered, Multiple Panels, User Parameters, Custom Tasks and Save As At the Project Level

Type: General (Datasets and Tables), Datasets, Tables

Standards: **Checklist for General, SAS Dataset or Table Generation**

Figure 8. Development Checklist

One of the gems I discovered was the Characterize Data task. By executing this one task against a SAS dataset, I was able to quickly review all unique values of both character and numeric variables as well as descriptive statistics for all numeric variables. Below is the PROC FREQ results of the NAME variable.

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Summary of Categorical Variables for WORK.CLASS

Limited to the 30 Most Frequent Distinct Values per Variable

Variable	Label	Value	Frequency Count	Percent of Total Frequency
Name		Alfred	1	5.2632
		Alice	1	5.2632
		Barbara	1	5.2632
		Carol	1	5.2632
		Henry	1	5.2632
		James	1	5.2632
		Jane	1	5.2632
		Janet	1	5.2632
		Jeffrey	1	5.2632

List of all unique values - Automatic for *both* character and numeric variables. Can specify number of unique values to display.

Figure 9. Summary of Categorical Variables

Below is the PROC MEANS results of the following numeric variables: AGE, HEIGHT, and WEIGHT.

Summary of Numeric Variables for WORK.CLASS

Descriptive Statistics - Automatic for *each* numeric variable.

Variable	Label	N	NMiss	Total	Min	Mean	Median	Max	StdMean
Age		19	0	253.0	11.0	13.316	13.0	16	0.34244
Height		19	0	1184.4	51.3	62.337	62.8	72	1.17623
Weight		19	0	1900.5	50.5	100.026	99.5	150	5.22470

Figure 10. Summary of Continuous Variables

Top Four Unknown Benefits

Are you familiar with these three powerful SAS Enterprise Guide features? Once I asked SAS tech support 'Could SAS Enterprise Guide …', and discovered that yes, SAS Enterprise Guide can, I started to apply the features daily. I hope you too can benefit from my discovery.

#1. The first feature is the ability to split the workspace screen to view multiple windows such as the SAS program and dataset or log files simultaneously. For me, cross-referencing SAS code with the SAS log and SAS dataset helps to provide a complete picture of my SAS program design. This benefit, combined with the second benefit, reinforces that SAS Enterprise Guide is not just for non-technical professionals, but also for the SAS programmer die-hards!

#2. The second feature is the power to save queries of multiple intermediate datasets such as sorts and filters for each data review step within a SAS program. For example, there could be missing values or patients with data issues that may cause unexpected results. SAS has a built-in system for us to trouble-shoot our SAS programs with step-by-step review of each intermediate dataset. What a concept! Without this great feature, you would have to 're-invent' the wheel for each condition, select variables and sort query datasets for the debugging purpose of each step. Who can remember all of these details or has the time to retype the SAS code?

#3. The third and final feature is the ability to run production SAS programs. Most organizations have a sequence of SAS programs they need to run on a regular basis. Who wants to manually submit each SAS program? This is a waste of time since you would not only need to monitor when the SAS program is done, but also need to track which SAS program to run next.

SAS SAVVY: FREE SAS RESOURCES

Recently, I launched my SAS blog, www.SASSavvy.com, to better organize my access to useful resources on www.support.sas as well as www.lexjansen.com. Instead of always drilling down to the best SAS papers and tips, I decided to categorize these links by SAS procedures and SAS topics as well as reference them in common SAS programming FAQ.

Below is a mind map I created to better identify best SAS papers for beginners, managers, SAS Display Manager and Right For You as well as links to videos, facts and options.
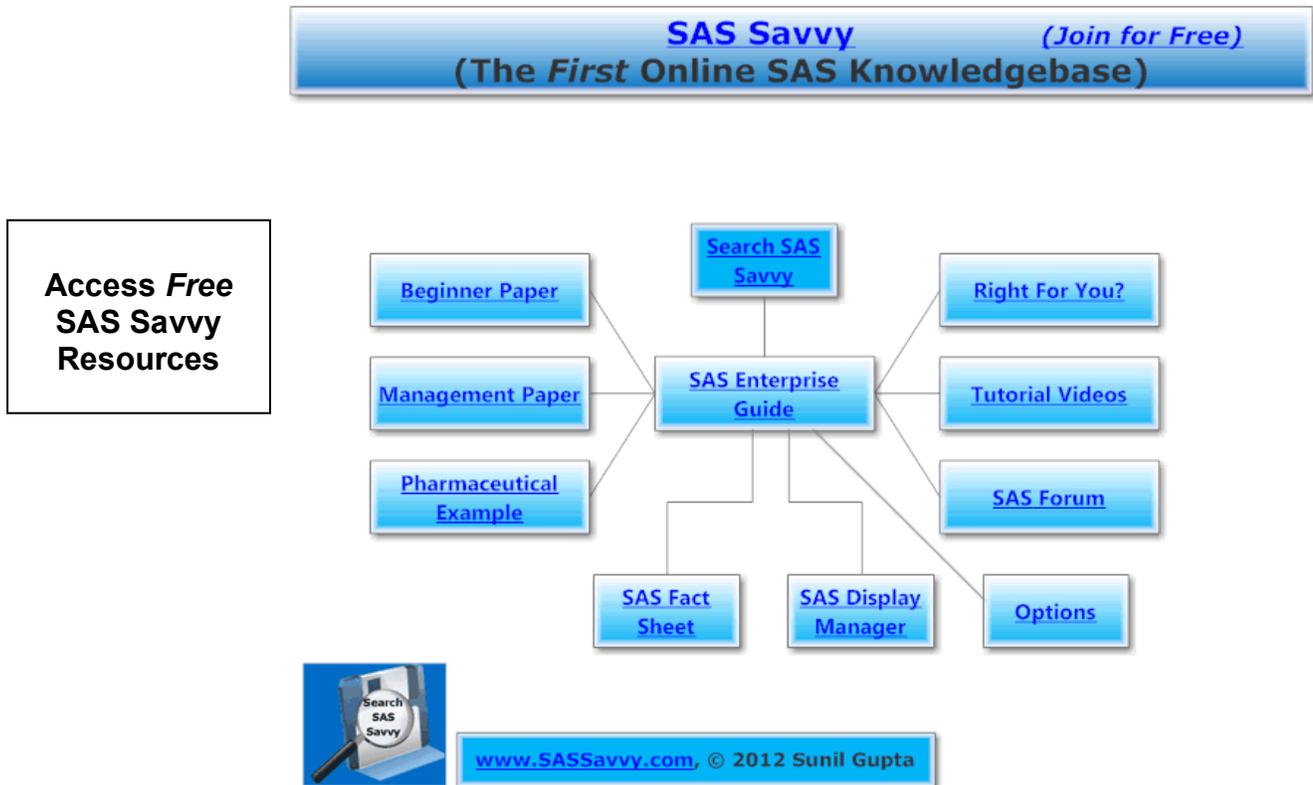
Figure 11. SAS Savvy: SAS Enterprise Guide Mind Map

Below is the link to free SAS Institute videos for learning SAS Enterprise Guide.

Figure 12. SAS Enterprise Guide Video

Below are the same best SAS papers referenced in the SAS Enterprise Guide mind map.

Beginner Paper Writing Code in SAS® Enterprise Guide®, Susan Slaughter, Lora D. Delwiche
Management Paper Enterprise Guide for Business Analysts, Sunil Gupta
SAS Enterprise Guide Pros/Cons Paper What you get and what you lose when you switch to SAS Enterprise Guide®, Andreas Mangold
SAS EG 4.3 One Page Summary Becoming a Better Programmer with 4.3
SAS EG 4.3 Paper New Goodies in SAS® Enterprise Guide® 4.3, Audimar Bangi, Chris Hemedinger, Stephen Slocum
Pharma Application Paper 1 SAS Enterprise Guide in Pharmaceutical Applications: Automated Analysis and Reporting, Alex Dmitrienko
Pharma Application Paper 2 Running Clinical Trials Programs with Enterprise Guide, Philip R Holland
Free SAS Tutorials SAS Enterprise Guide Video
Free SAS Video SAS Enterprise Guide 4.3 Demo Video
Free SAS Video New Goodies in SAS Enterprise Guide 4.3
Business Intelligence User Group for other SAS Enterprise Guide papers

SAS EG Automation Example

SAS Institute Hot Fixes

SUMMARY

As we get to the end of the discussion of the similarities and differences between SAS Display Manager and SAS Enterprise Guide, I hope you now have some insights into how and why you would consider migrating to SAS Enterprise Guide. Unless you have a strong reason *not* to utilize SAS Enterprise Guide, I suggest you take the big plunge and start taking small steps to use SAS Enterprise Guide. Both SAS Programmers and SAS Managers can easily use SAS Enterprise Guide to better document, organize and analyze data for better decisions.

Suggested Migration Steps
1. Export any or all SAS Enterprise Guide code as needed.
2. Enhance SAS Enterprise Guide code with ODS style options as needed.
3. Very useful to develop summary table prototype without writing SAS code.
4. For any task, select Preview Task Code to review generated SAS code.
5. Can create custom SAS code with Code Task, the Programmer's Task.
6. In SAS Enterprise Guide 4.3, can use fill-in editor and apply WHERE condition with new tab.

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Gupta, Sunil, "Analysis and Reporting Made Easier Using SAS Enterprise Guide", Los Angeles Basin SAS User Group, 2005, SAS Solutions, WUSS 2004

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Sunil Gupta is a best selling SAS author and global corporate trainer. Sunil is Principal Consultant at Gupta Programming since 1994. Most recently, Sunil launched www.SASSavvy.com and released five new SAS e-Guides on Quick Results with PROC SQL, Quick Results with PROC REPORT, A to Z Analysis and Validation using PROC TABULATE, Compare and Conquer SAS Programming Techniques and Automating Tasks using SAS Macro Programming. He has been using SAS® software for over 18 years and is a SAS Base Certified Professional. He is also the author of *Quick Results with the Output Delivery System*, and *Sharpening Your SAS Skills.*

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