Enterprise Guide®: Tips for Programmers

John D. Chapman, PhD, Markcelian Analytics, Cohasset, MA
Mark S. Chapman, Markcelian Analytics, Cohasset, MA

ABSTRACT

SAS® Enterprise Guide is a Microsoft Windows client application that provides a guided mechanism to exploit the power of SAS. Enterprise Guide, also known as EG, integrates an array of SAS analytics into a friendly interface that allows business analysts to produce reports they need. Though SAS marketing has emphasized this accessibility to users who are not programmers, Enterprise Guide also provides an improved work environment for programmers. That is the focus of this paper, which introduces SAS Enterprise Guide to programmers. It describes and explains features that make Enterprise Guide an attractive alternative to the conventional Windows interface for programming, whether using SAS on a PC or on a server. The primary objective is to motivate SAS programmers not yet using Enterprise Guide to give it a try. There are also several tips that programmers with some Enterprise Guide experience could find useful.

GETTING STARTED

On the one hand, Enterprise Guide is a graphical interface that combines the power of SAS with an easy to use point-and-click interface and a variety of analytical tools that can be used out-of-the-box. This is how SAS has marketed it: a GUI for analysts.

But that is not the only group of users for whom Enterprise Guide has something to offer. Enterprise Guide is also an environment for you, the SAS programmer, an intuitive and efficient way to structure and organize your projects, manage flows, and customize their output.

At its core, Enterprise Guide offers you the same capabilities as Display Manager. But it also does much more. With Enterprise Guide, many routine functions become easier. Tasks such as importing data and building reports in HTML can now be done using Enterprise Guide's GUI interface. If you don't like the results, Enterprise Guide lets you access its generated code to make adjustments.

Enterprise Guide is a client application distinct from SAS. It is licensed and installed separately, thought it is dependent on Base SAS and, for some functionality, on other SAS components. If the installation of SAS that you are using is on a server, Enterprise Guide is installed on your client computer and configuration is required for connection to the server(s) and metadata repository.

ENTERPRISE GUIDE – A BRIEF TOUR

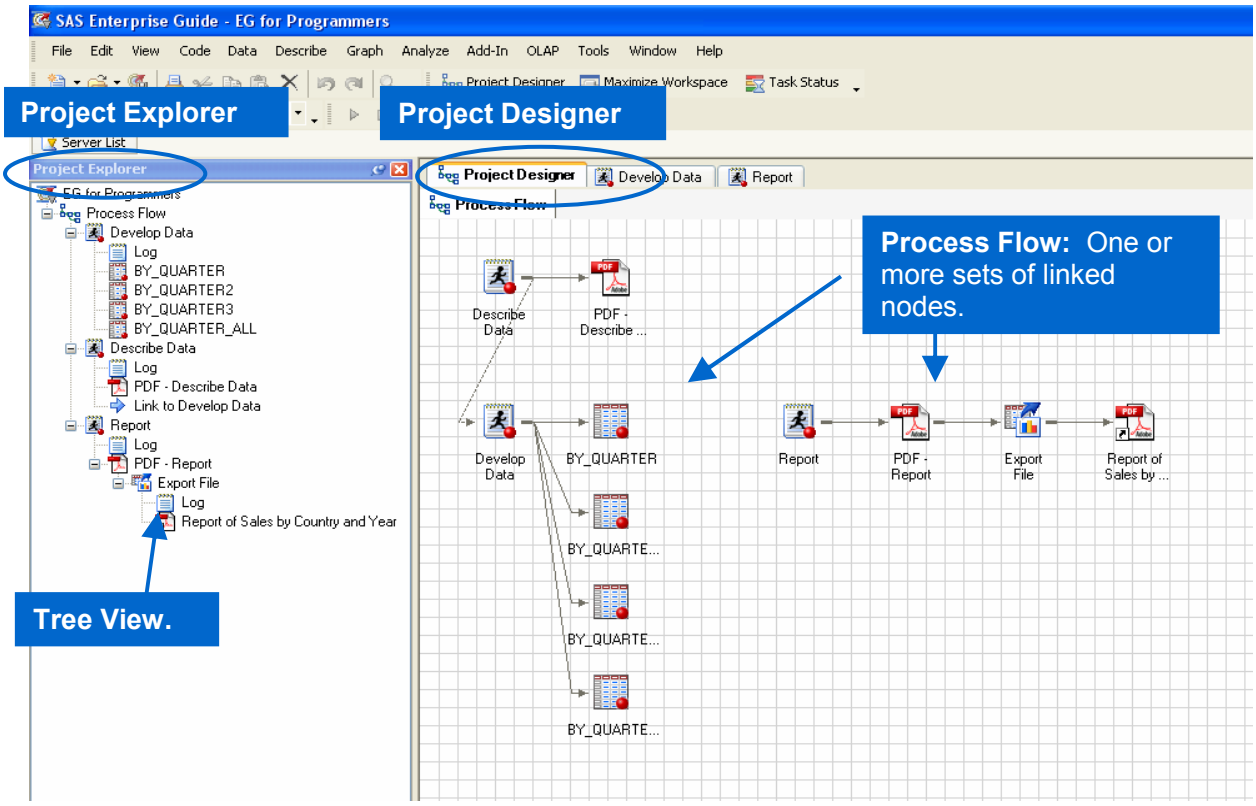
Enterprise Guide offers programmers a new way to structure work and manage its flows and its products. While its features can make work easier and more efficient, you must adjust how you think and how you work. The more fully you adjust, the more you will profit. In this section, we will take a look at what makes Enterprise Guide new and useful to you. But always remember, you are (if you choose) still just a SAS programmer who can write code just as you always have.

THE PROJECT

The central organizing concept in Enterprise Guide is the project. A project is an organized collection of code, data sets, logs, and output. Each of these objects may be embedded in a project, or stored in a distinct file with a shortcut referencing it in the project. This enables you to keep all the pieces of your project organized and accessible from a single location. Physically, the project is a single file, which allows it to be shared easily within a team.

There are two different ways to view a project in Enterprise Guide – the Project Explorer and the Project Designer. Each is a type of window, which may be positioned and sized as you see fit and viewed either by itself or in conjunction with other windows. The Project Explorer displays the components of your project in a familiar tree view. The Project Designer arranges the same components in "process flows." Figure 1 shows a simple project, with both Project Explorer and Project Designer windows.

Figure 1: Two Views of a Project

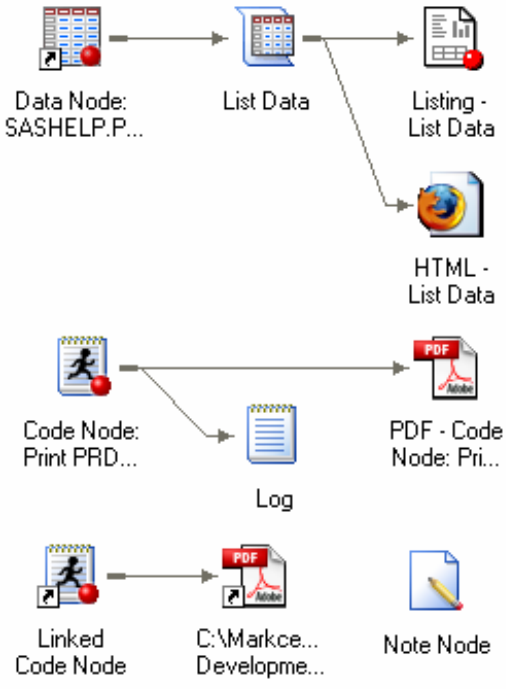


NODES

The distinct elements that make up a project are called nodes. Each type of node holds or links to a different type of content:

1. Code – SAS code that you write.
2. Tasks and Wizards – EG point-and-click interface used to specify a specific data manipulation or analytic activity, for which EG then generates SAS code that you may modify.
3. Log – SAS log, which may be associated with code, tasks or wizards.
4. Data – SAS datasets or data in other formats (Excel, MS Access, text files), which may appear as input for code or task, and/or as a result.
5. Results – Output other than datasets, with many format choices, including list output, HTML, RTF, PDF and Excel.
6. Notes – Free text used for documentation.
7. External Files – Embedded files from other applications (e.g., Word).

Figure 2: Some Node Types



Nodes are displayed as an icon in the Project Explorer and Project Designer windows, and are arranged within those windows in ways the communicate the relationship(s) among the nodes. Like any icon in Windows, you can double click to open, or right click to display menu of available actions, which varies depending on the type of node.

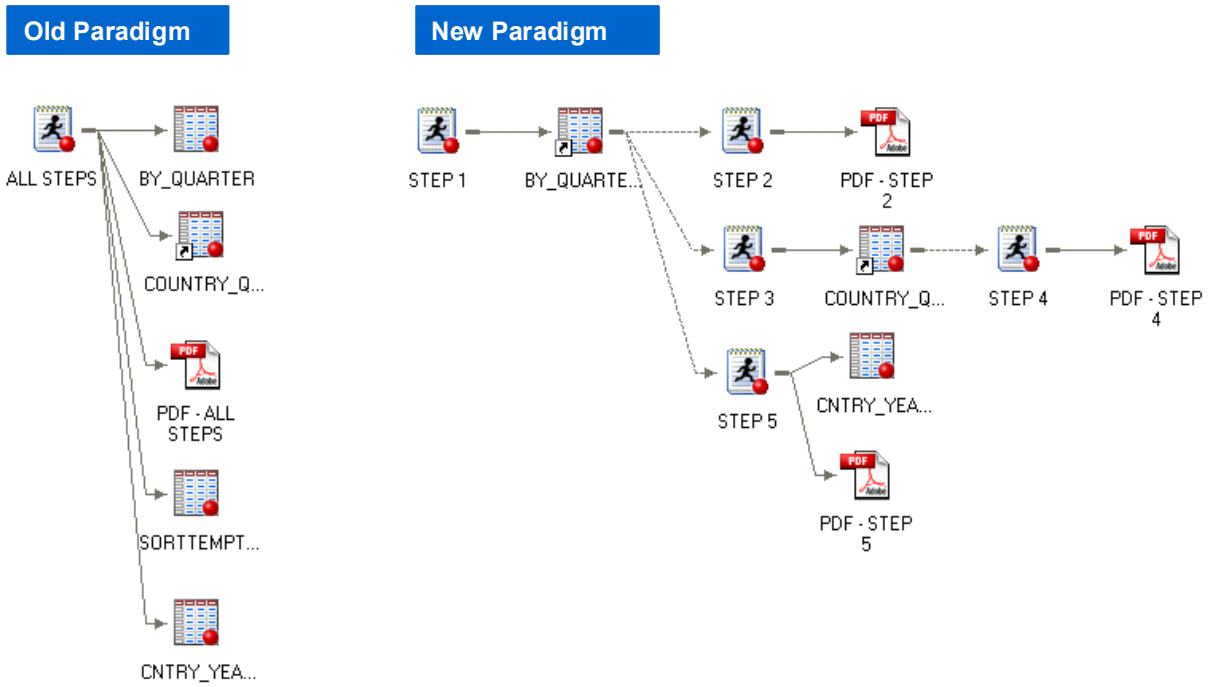
Nodes may be embedded or linked. The content of an embedded node is part of the project file, while clicking on a linked node opens

up content which is stored in a separate file. Some nodes, such as data nodes, are always linked to external files. Task and note nodes, on the other hand, are always embedded. The icon of a linked node has the familiar arrow of a shortcut, while an embedded node does not.

GIVING A ROJECT STRUCTURE

Using the Project Designer to organize nodes is one way you can choose to think and work differently with Enterprise Guide. Figure 3 shows two ways to approach the same work. In the version labeled Old Paradigm all code is in one file, with its structure managed with conventional comments. Results flow from it sequentially, but otherwise undifferentiated. In the New Paradigm nodes are used to manage the components of the process, resulting in a clear visual representation of the process.

Figure 3: Representing a Process Visually



ENTERPRISE GUIDE VIEWS

Every person has their own preferences for how they like to view and navigate their work. Enterprise Guide offers myriad ways to arrange the content of your project. Windows can be fixed in place, pinned open, or hidden when not in use. In addition to Project Designer and Project Explorer, windows you may choose to use include:

1. **Server List**: A list of all available servers, with the data sets and other files available on each, arranged in a tree structure by library and/or file folder.
2. **Task List**: Point-and-click interfaces to analytic code generation. They are designed for the non-programming analyst, but are also a new tool for the programmer, and will be explored below.
3. **Task Status**: This bar shows the status and queue position of each task that is currently running, allowing you to monitor the progress of jobs while continuing to do other work and to see when tasks have stalled or frozen and need to be stopped or rerun.
4. **Project Log:** An aggregate log of all code and tasks run from the project since the project log was last cleared.

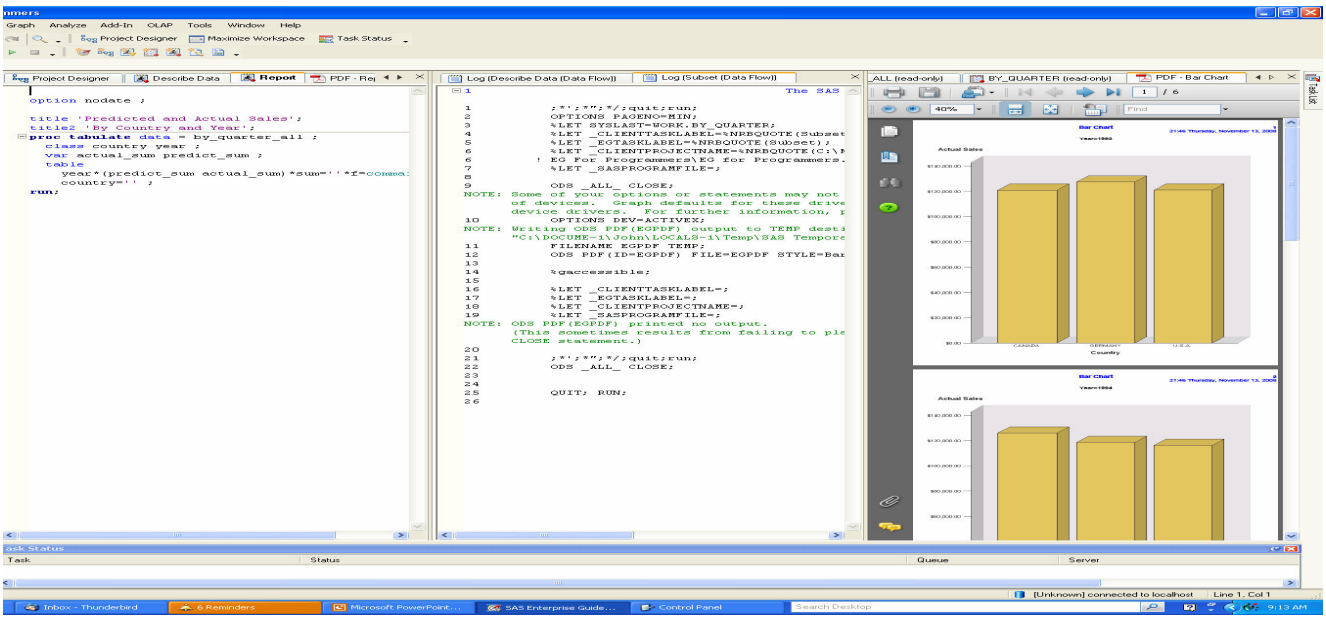
A BAKER'S DOZEN – THIRTEEN FEATURES OF ENTERPRISE GUIDE AS A PROGRAMMING ENVIRONMENT

As you use Enterprise Guide you will develop your own favorite features. We've picked a baker's dozen of features that we miss the most when forced by circumstance to use SAS without Enterprise Guide.

#1 - TABBED VIEWING

Open files may now be arranged in a tabbed format. Conventional windows remain an option, but with many windows open, tabbed viewing is a nice alternative. Not only do tabs aid navigation among open nodes, but you may split the screen to view more than one tab at a time, as illustrated in Figure 4.

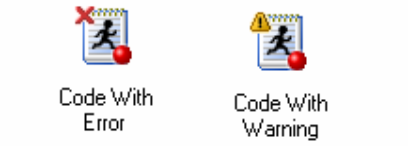
Figure 4: Tabbed Viewing – Code, Log and Results Viewed Side-by-Side



#2 – TROUBLE INDICATORS

You may configure Enterprise Guide to give you visual trouble indicators on code or task icons. If the process has an error, a red 'x' will appear on the icon. If it has a warning, a yellow warning triangle will appear. You can also set the log to open automatically upon encountering an error.

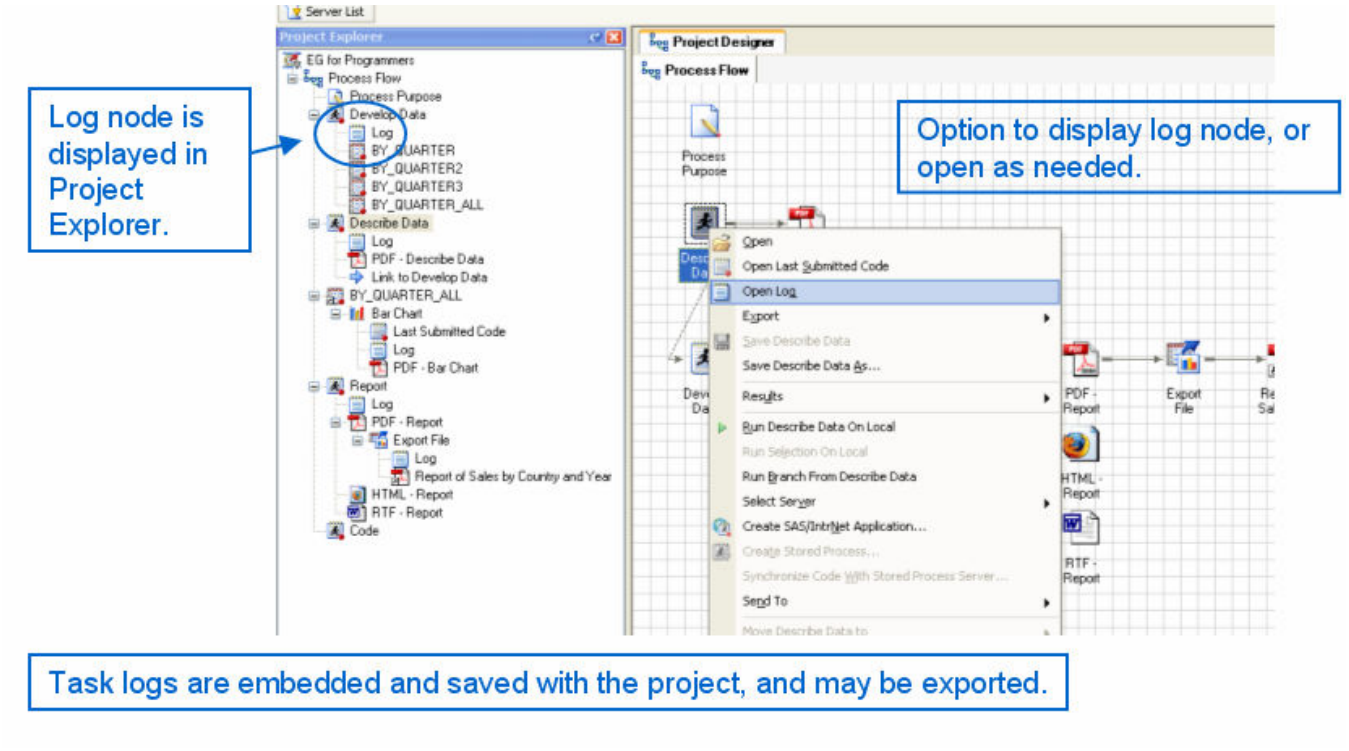
Figure 5: Code Nodes With Trouble Indicator



#3 – TASK LOG FEATURES

Each code or task node has a log node associated with it. This log is refreshed each time the code (or portion thereof) or task is executed. You have several options for when and where the task log icon is displayed and when the log is opened. Regardless of display options selected, the task log is always saved with the project. You may also choose to include a task that will export the log to a file.

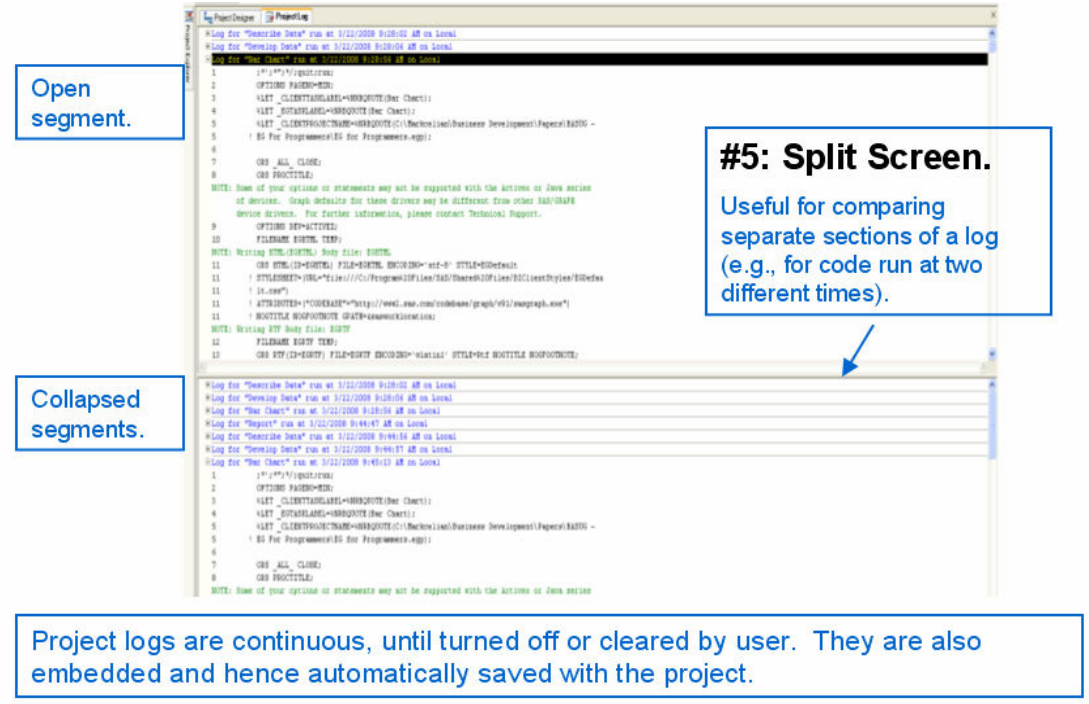
Figure 6: Task Log



#4 – PROJECT LOGS

In addition to the task logs, you may choose to maintain a project log. Project logs are continuous until turned off or cleared. Work done in different sessions is all recorded in a single, aggregate log, unless you choose to clear it. Each time code or a task is run a new section is created in the log; sections may be collapsed. Project logs are embedded and automatically saved with the project, but can also be exported if desired.

Figure 7: Project Log Segments With Split Screen



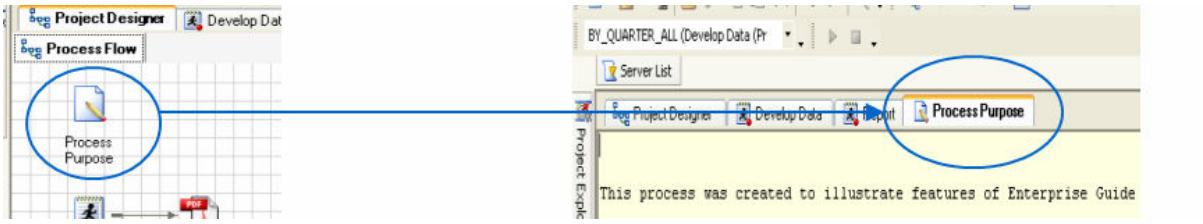
#5 – SPLIT SCREENS

Enterprise Guide allows you to view two parts of code or log nodes in a split screen mode, which is useful for doing things like comparing separate sections of a project log (e.g., for code run at two different times).

#6 – NOTES

We all know there is more to programming than simply writing code. Projects need to be constructed in a clear and concise way so others can look at the code and data, and understand what we are doing. Embedding notes in a project helps you communicate to others looking at your code. In Enterprise Guide, notes are basically embedded text files you can use to describe what you are doing alongside your code.

Figure 8: Notes



#7 – LINKING TO EXTERNAL DOCUMENTS

Enterprise Guide also lets you link to any external documents, Word documents, PDFs, Excel files, etc. This feature makes it easy to view all of the information relevant to the project in one place. To insert a link to any of these file types choose *File – Open - Other* from the menu.

#8 – CREATING MULTIPLE OUTPUT TYPES WITHOUT WRITING ODS

Enterprise Guide makes it easy to produce reports in various output types without writing ODS. In the Options section, simply choose what output types you want (e.g. HTML, PDF, or SAS Report) and Enterprise Guide will produce them automatically. You can export the result to a file using a wizard, either on a one-time basis or as part of a process. But of course, you can still write custom ODS if you want. Enterprise Guide never denies you the option of coding the way you always have. It only expands your options and automates tasks if desired.

#9 – RESULTS IN CONTEXT

The process flow illustrates how nodes within a project are related to one another. Where Display Manager placed results in a sequential list, Enterprise Guide's process flow places results in context, making them easier to interpret. Not only is the result clearly associated with the code or task that generates it, but all results including datasets are in the same structure. This can be seen in Figure 3. Even using the old paradigm, each result is associated with the code that generated it.

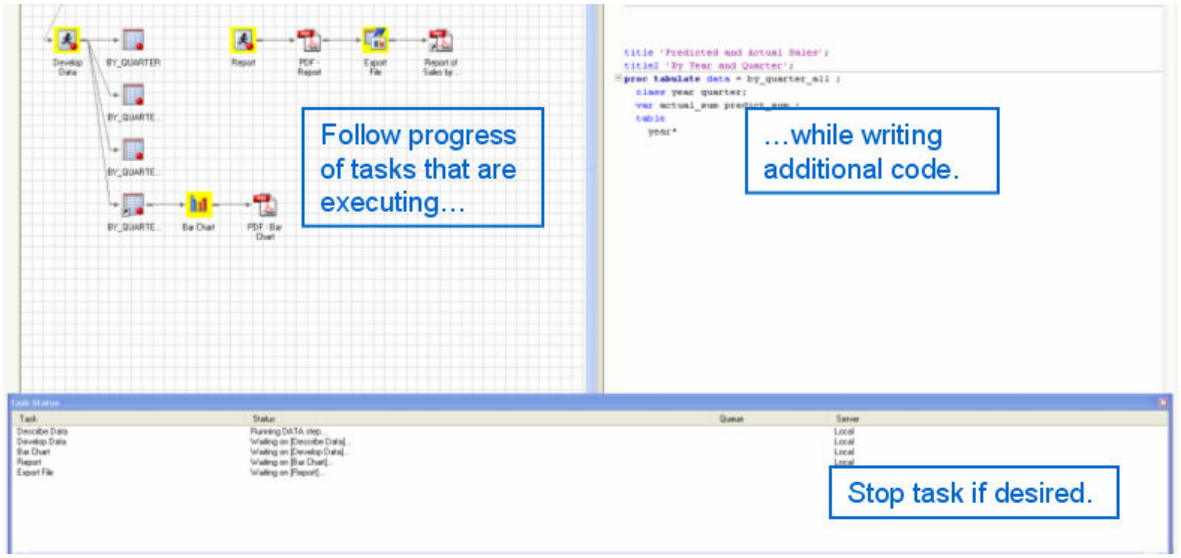
#10 – ADDITIONAL PROCESS FLOWS KEEP THINGS ORGANIZED

Process flows also provide an easy way to keep multi-dimensional projects organized. If one process flow becomes overcrowded, individual nodes or groups of nodes can be moved to a new process flow. In this way, related nodes can be grouped together in a logical way and you can prevent your workspace from becoming cluttered.

#11 – MONITOR TASK STATUS WHILE WORKING IN PROJECT

With Enterprise Guide, you can follow the progress of tasks as they execute and write additional code at the same time. The icon of a task that is running is highlighted in green; a task in queue is yellow. You may also watch the progress of execution in the task status bar, and use it to stop tasks during their execution if desired. These features are illustrated in Figure 9. While monitoring your tasks, you can continue to write code in a separate tab.

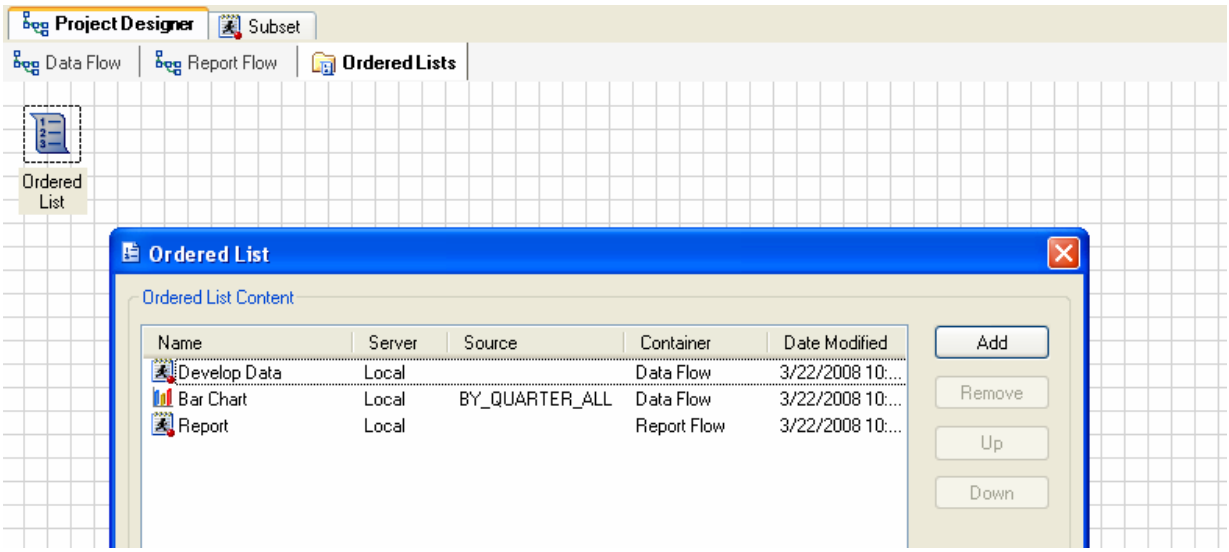
Figure 9: Task Status



#12 – CONTROL SEQUENCE OF EXECUTION

Enterprise Guide offers two ways to control the sequence tasks are executed. The first way is through a branch, a sequence of linked nodes. Appropriate links are inserted automatically when tasks and wizards are used. Code and data nodes may be linked manually. Tasks can also be executed using an ordered list, which is a set of code nodes and tasks to be run in sequence. They do not need to be linked, or even be in the same process flow.

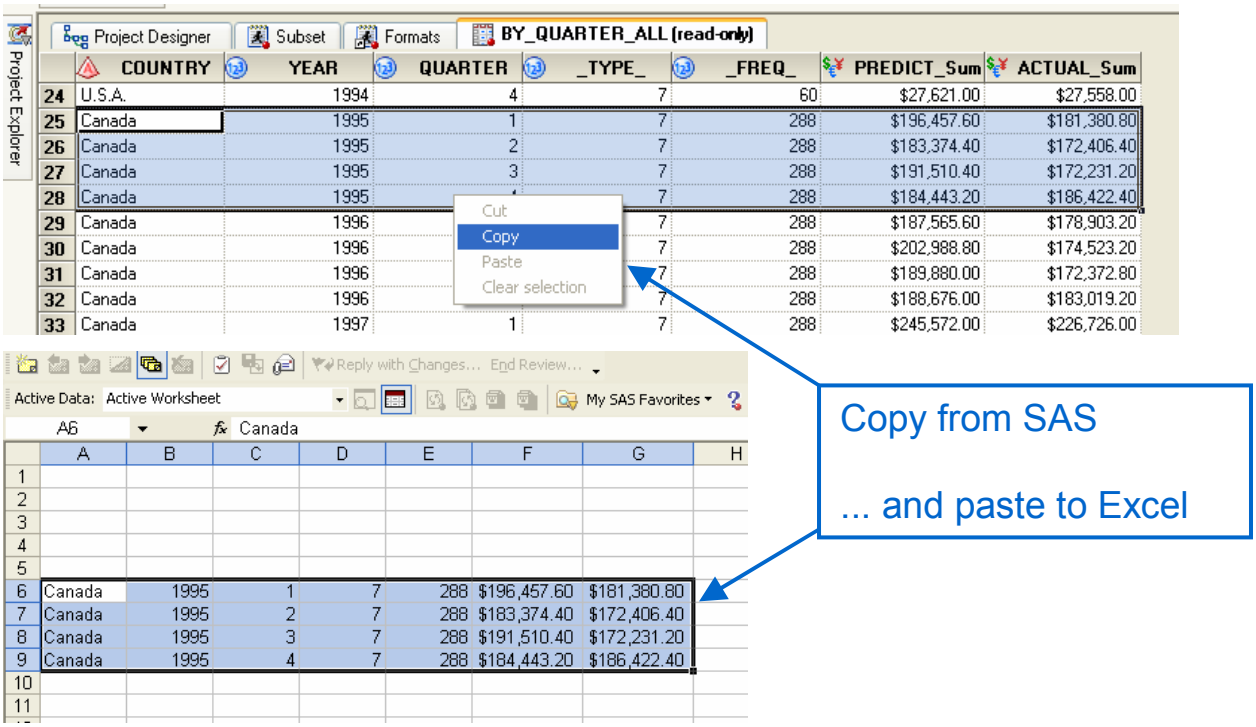
Figure 11: Ordered Lists



#13 – DATA FEATURES

To get good results, you need clean data. This often entails manual modification of data. Enterprise Guide makes that job a little easier by allowing you direct access to the data you are working with. Tables may now be manually changed. You can insert columns or rows, modify column properties, or cut and paste specific portions of data.

Figure 12: Copy and Paste a Block of Data



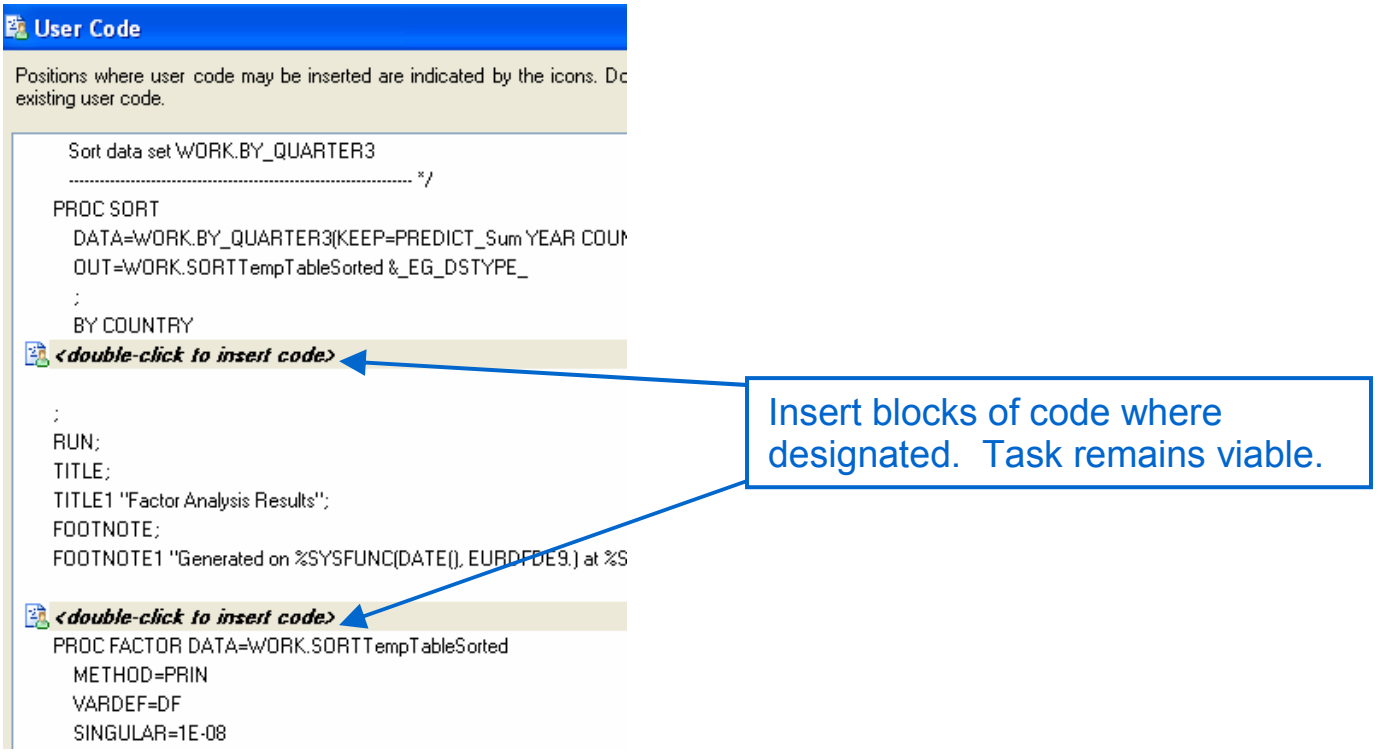
At least as important as editing data is the ability to move it from one format or application to another. Enterprise Guide offers many tools to supplement or support using SAS code for this purpose, including wizards for importing and exporting data to and from a variety of file types and for creating entirely new data sets from scratch. These become part of the project and can be re-run at any time. You may never need to write INFILE again, though you may if you wish. There are also options for *ad* hoc movement of data; you can even copy and paste a selected block of data, not just one cell at a time.

GUI CODE GENERATORS – NOT JUST FOR ANALYSTS

Enterprise Guide offers you three new, flexible ways to help you produce and manage your code – Tasks, Wizards, and the Query Builder. These GUI code generators – they write SAS code using specifications and parameters entered using a visual point-and-click interface -- are intended primarily for business analysts (i.e., users who are not SAS programmers), but they are useful tools for the programmer as well. Perhaps most importantly for the programmer, the SAS code written by these applications may be modified from within the GUI dialog as illustrated in Figure 13, in which case you may continue to use the point-and-click interface, or the generated code may be used as a template and saved with any desired revisions as a free-standing code node. This functionality may be convenient at times, and is also a good way to learn procedures with which you are not familiar.

It is your choice whether you use these tools, and if so, how. If you want to keep doing things the way you have always done them, just ignore these GUI options; they won't bother you.

Figure 13: Modifying Task and Wizard Code In Place



NEW FIELDS FOR PROGRAMMING

Finally, Enterprise Guide offers several new fields that make programming easier.

1. **Stored Processes** – A way to disseminate SAS® code for (controlled) reuse by non-programming users.
2. **Metadata --** Enterprise Guide is designed to leverage metadata server and exploits new integration technologies. These new abilities execute in the background, as Enterprise Guide shields the user from the more technical aspects.
3. **Custom Tasks** – Component Object Model (COM) add-ins. Extend existing tasks, or create your own.
4. **OLAP** – Integrated viewer/MDX editor.

CAVEATS

Of course, nothing is perfect. If you're a whiz at SAS AF, you'll be disappointed: it is not supported by Enterprise Guide. Instead that functionality is provided by the ability to write custom tasks using VB.NET or C#. Other SAS products not supported by Enterprise Guide include FSP, Insight and SCL. There are also some useful features of Display Manger that are missing from Enterprise Guide. Our pet peeve is that indexes are not included in the dataset properties window.

CONCLUSION

But these are minor shortcomings in light of all that Enterprise Guide does that can make your life as a programmer easier. So give Enterprise Guide a try as your SAS programming environment. You won't go back.

REFERENCES

SAS® Overview: http://www.sas.com/technologies/bi/query_reporting/guide/

Getting Started with SAS® Enterprise Guide® – free learning tutorial available from

http://www.sas.com/apps/elearning/elearning_details.jsp?pubcode=59271

Hemedinger, Chris (2005), "Boost Your Programming Productivity with SAS® Enterprise Guide®", Proceedings of the Thirtieth Annual SAS® Users Group International Conference

Hemedinger, Chris and McDaniel, Stephen (2005), "The New World of SAS®: Programming with SAS® Enterprise Guide®", Proceedings of the Thirtieth Annual SAS® Users Group International Conference

Fecht, Marje and Dhillon, Rupinder (2007) "A SAS® Programmer's Guide to SAS® Enterprise Guide®", Proceedings of the SAS® Global Forum 2007

CONTACT INFORMATION

John D. Chapman, PhD
Markcelian Analytics, Inc.
25 Virginia Ln.
Cohasset, MA 02025
Phone: 781-383-9793
E-Mail: jchapman@markcelian.com