

Enterprise Guide – Past and Future – A Case Study

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Abstract

Until now Enterprise Guide[®] software has been marketed as a separate product to be used as a thin-client front-end for the SAS[®] System. However, it is now being bundled with SAS v9 for Windows. This paper investigates the benefits gained by novice users of Enterprise Guide software, who are also unfamiliar with SAS v8, and looks forward to the newer versions of SAS software and the advantages these same users will have when they convert to SAS v9.

What is Enterprise Guide software?

Enterprise Guide software is a Windows-only thin-client application, which uses Microsoft .NET and Data Access Components to communicate with the SAS[®] Integration Technologies component. While access to SAS installations on remote Windows or UNIX platforms requires SAS Integration Technologies to be licensed on that system, Enterprise Guide software can act as a front-end to a locally installed SAS System, referred to as the Local Server, even if only Base SAS has been licensed.

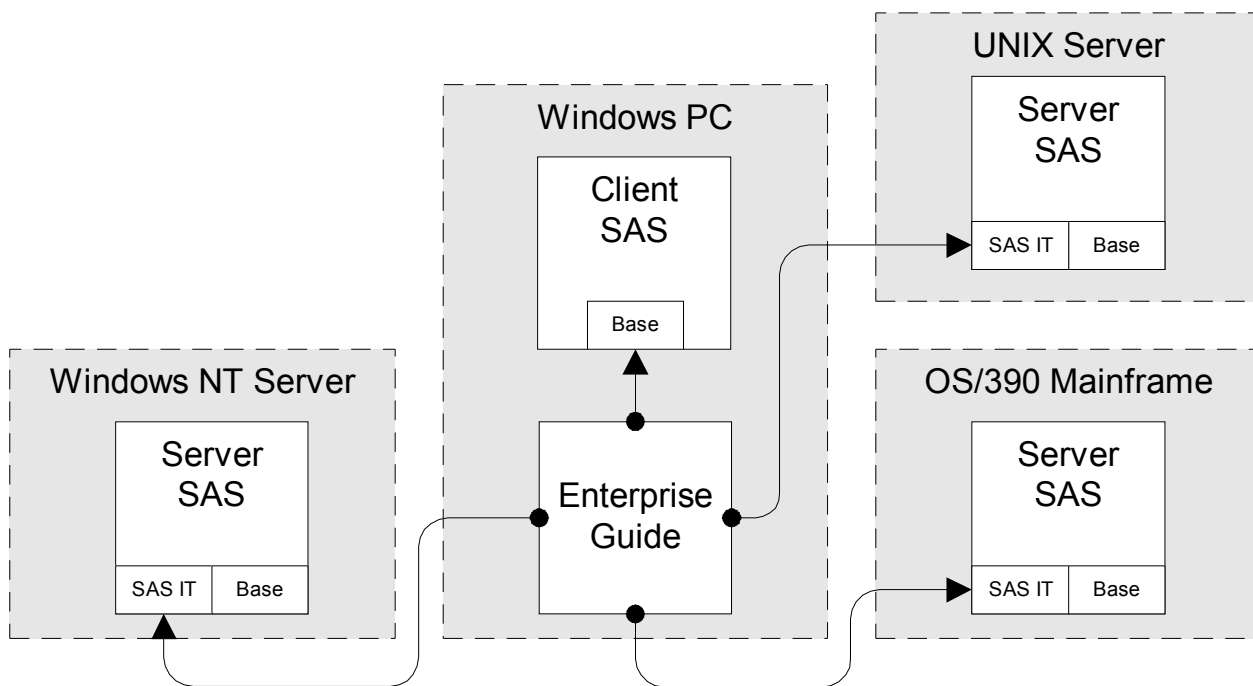


Illustration 1. Diagram of Enterprise Guide and SAS Integration Technologies dependencies

The thin-client architecture allows users to access data and run data process tasks on the server, but develop the tasks in a familiar local environment on the PC. Only the code and results are transmitted between the PC and server.

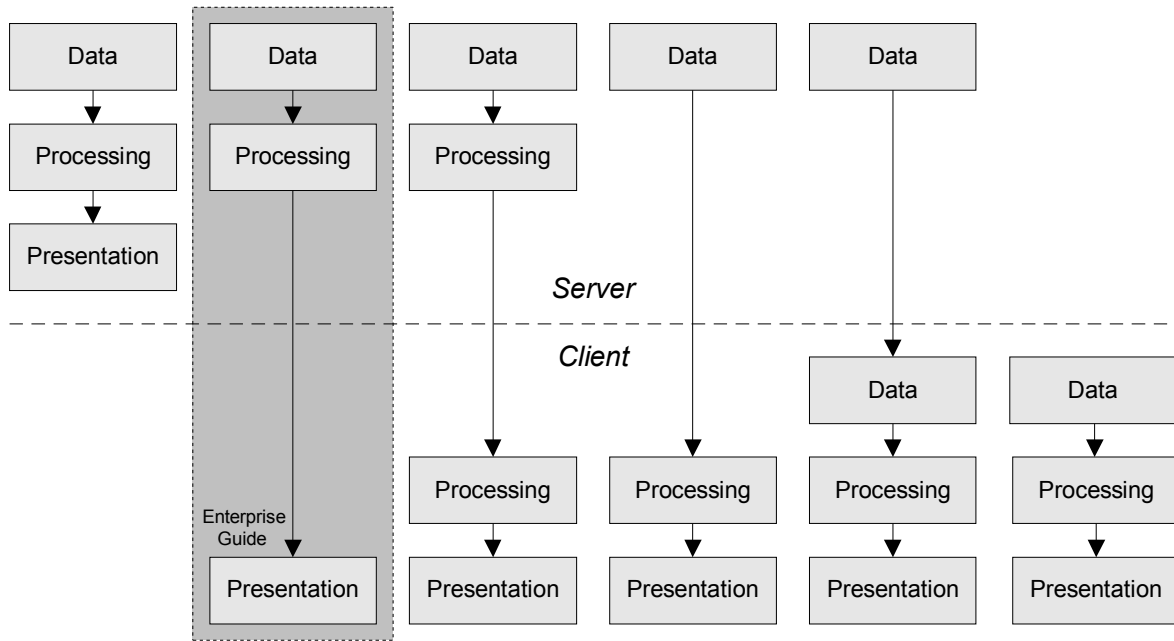


Illustration 2. Diagram of the Thin-Client Architecture for Enterprise Guide

User Interface

The GUI interface consists of an equivalent of the Results window (called the Project Window), a desktop for displaying the equivalents of the Log and Output windows, and a Task Status window.

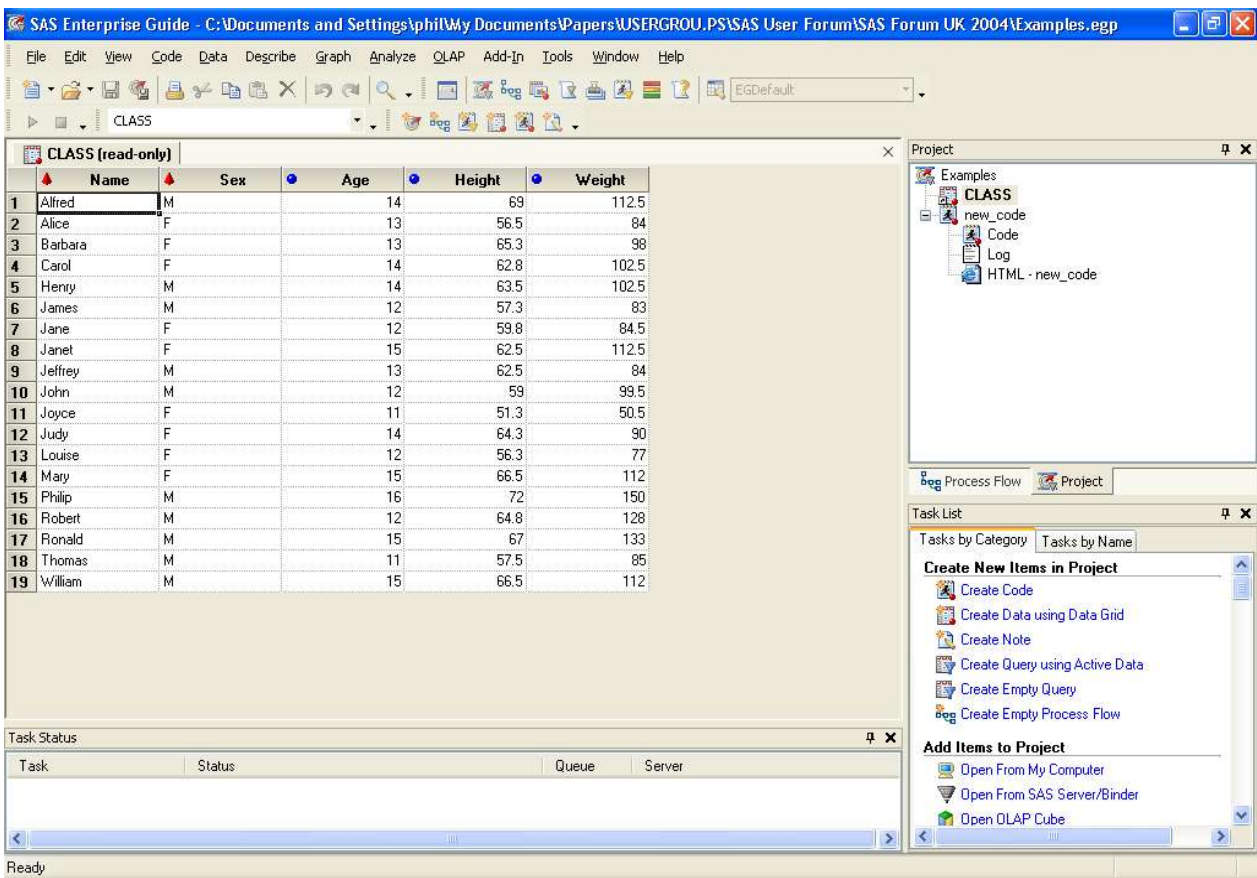


Illustration 3. Screenshot of a standard screen

There is also a Task List, which includes a list of facilities to generate SAS code for most of the commonly used procedures in Base SAS, SAS/STAT®, SAS/GRAPH®, SAS/ETS® and SAS/QC® software without any need to be able to write SAS code by hand.

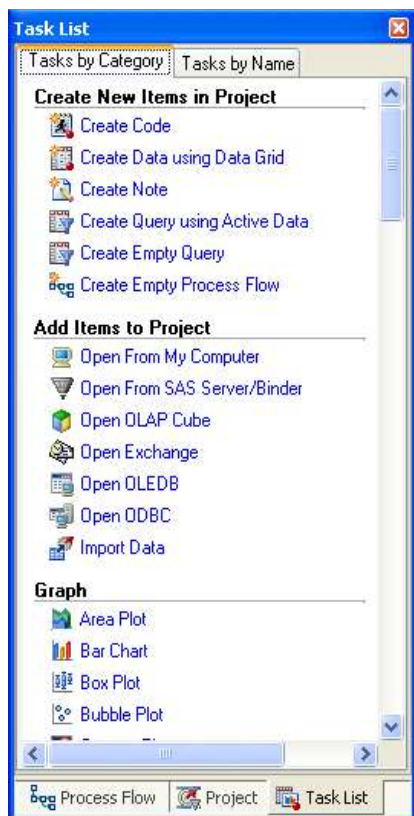


Illustration 4. Screenshot of the categorised Task List

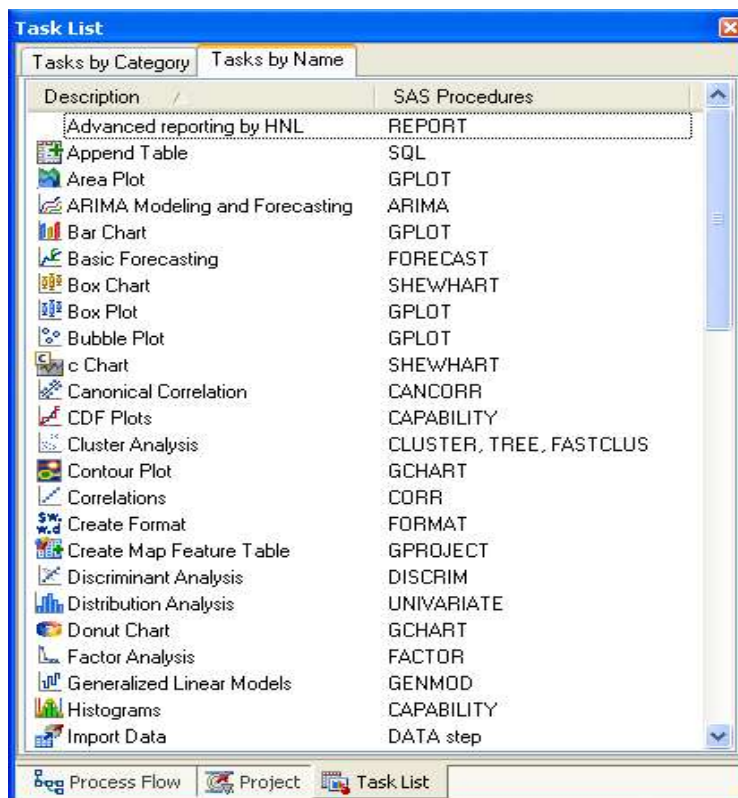


Illustration 5. Screenshot of the alphabetic Task List

However, if there is a need to write SAS code by hand, then the Code window is available, which uses the SAS Enhanced Editor add-in.



Illustration 6. Screenshot of the Code window

By default Task, Code and Data entries are grouped together in Projects, which can be saved to disk as *.egp files. These files can be saved on the local PC, a Network-connected disk, or on any SAS server connected via Enterprise Guide.

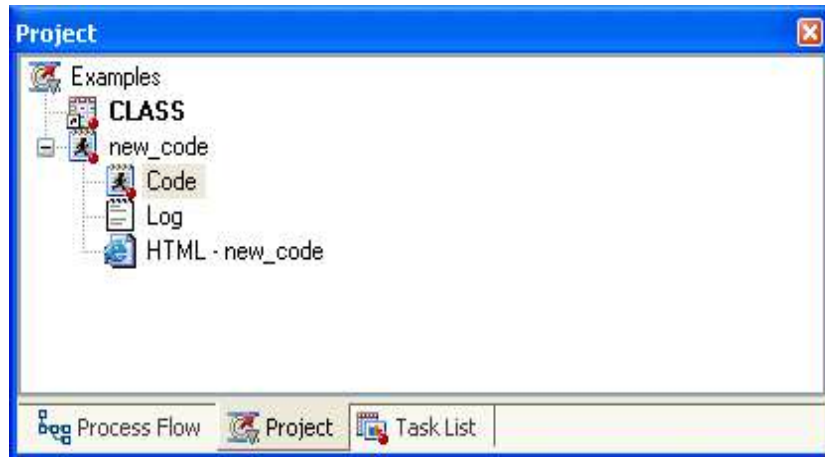


Illustration 7. Screenshot of the Project window

A Project can also be viewed as a Process Flow, where individual nodes can be connected together so that processes can be run in sequence.

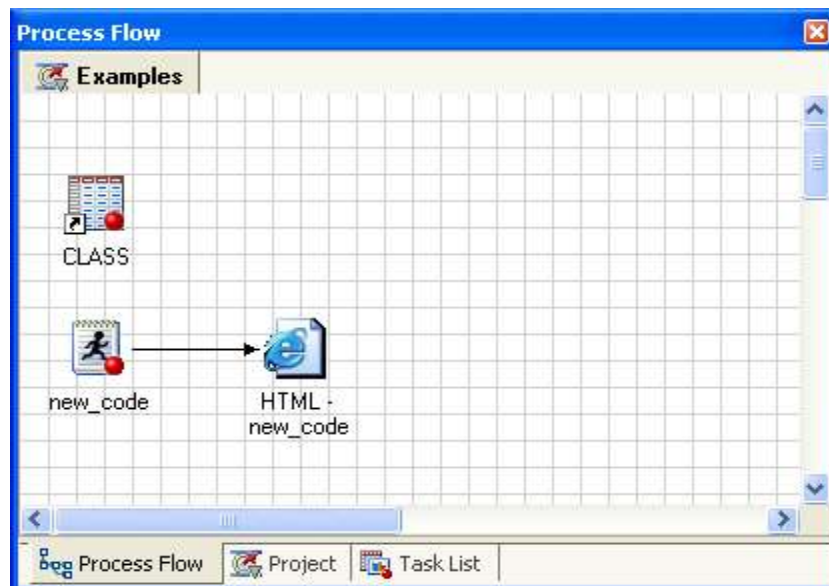


Illustration 8. Screenshot of the Process Flow window

SAS tables, or links to SAS tables, are stored in Data entries. A wide range of other file types can be converted to or from SAS tables, e.g. Excel spreadsheets, Access database tables, delimited and fixed-column flat text files.

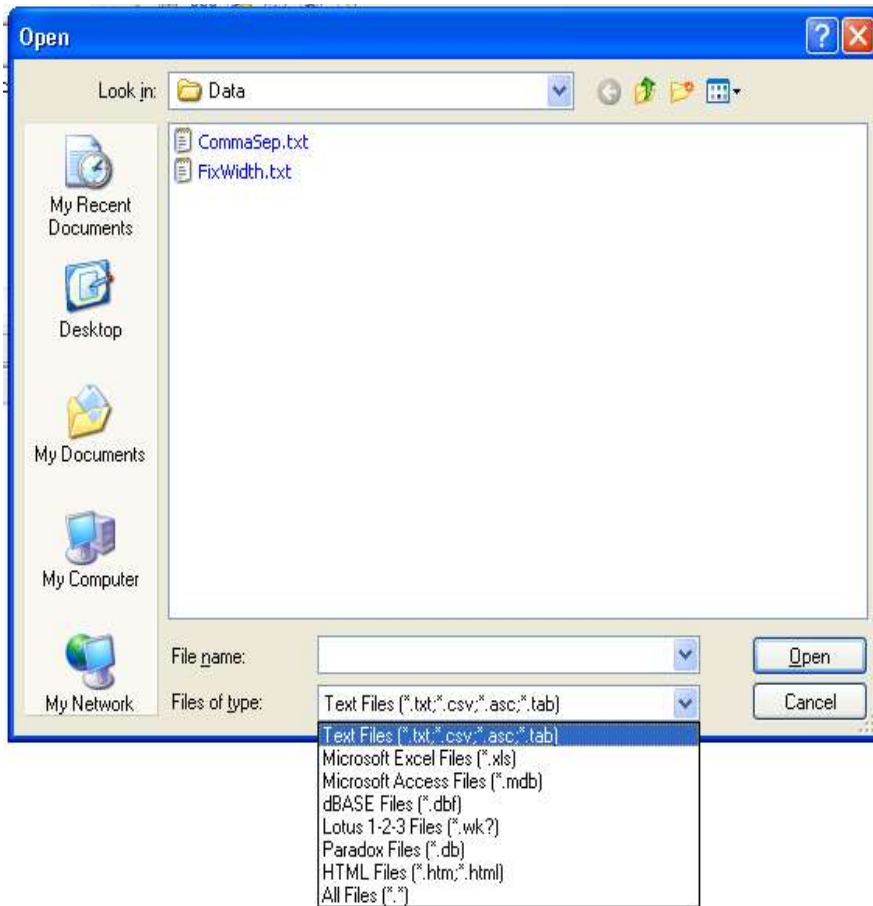


Illustration 9. Screenshot of the Import Data dialog

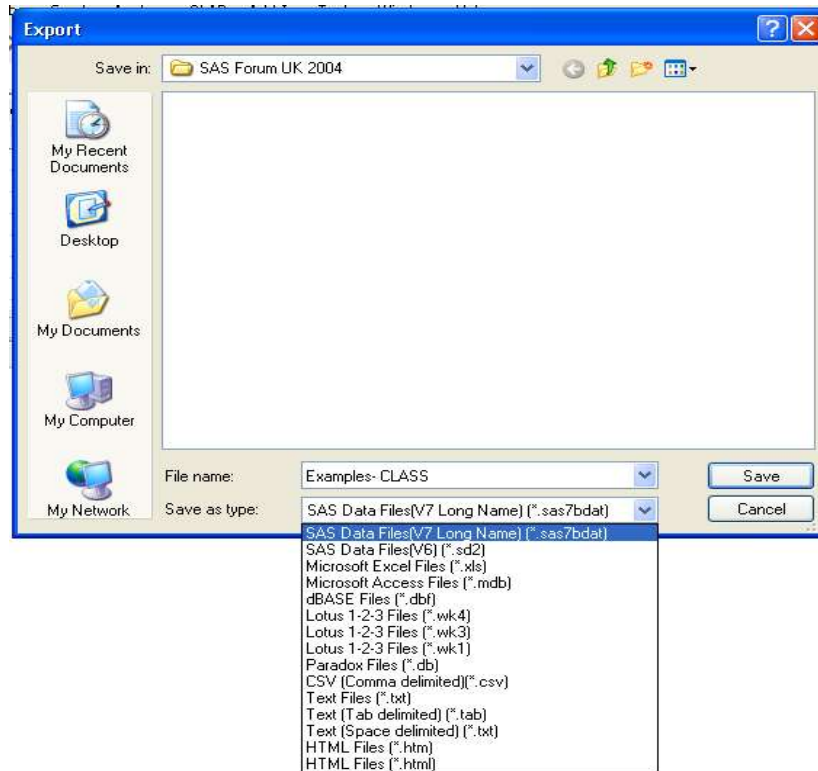


Illustration 10. Screenshot of the Save As/Export dialog

Tasks

The tasks, which provide facilities to generate SAS code for most of the commonly used procedures, are used via a point-and-click interface. Information about files, tables, data columns and options are shown, and can be set, in task-specific dialogues. Some of the tasks, e.g. Summary Tables, employ skeleton diagrams which the user can customize, using drag-and-drop actions, to build the required report layout.

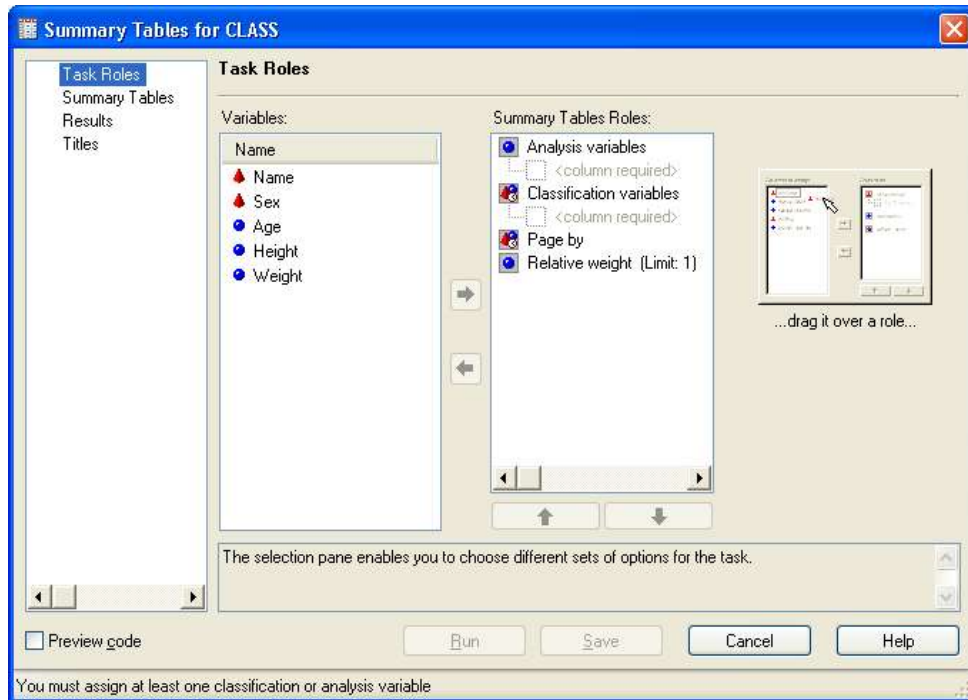


Illustration 11. Screenshot of the Summary Tables dialog - column selection

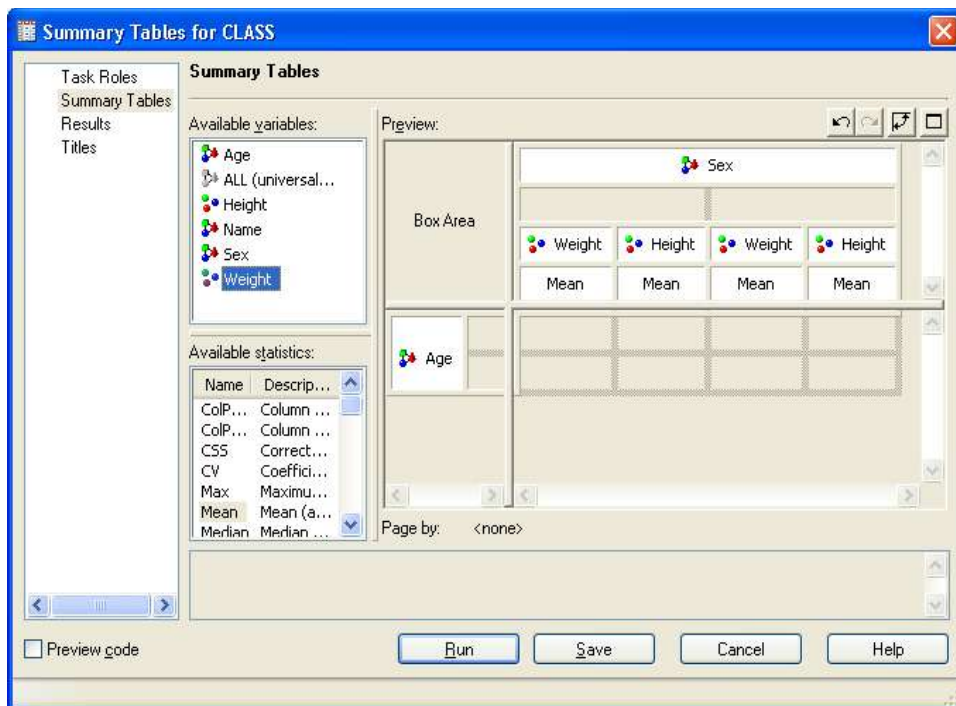


Illustration 12. Screenshot of the Summary Tables dialog - report design

	Sex			
	F		M	
	Weight	Height	Weight	Height
	Mean	Mean	Mean	Mean
Age				
11	50.50	51.30	85.00	57.50
12	80.75	58.05	103.50	60.37
13	91.00	60.90	84.00	62.50
14	96.25	63.55	107.50	66.25
15	112.25	64.50	122.50	66.75
16	.	.	150.00	72.00

Generated by the SAS System (Local, XP_PRO) on 17OCT2004 at 3:23 PM

Illustration 13. Screenshot of a Summary Tables report

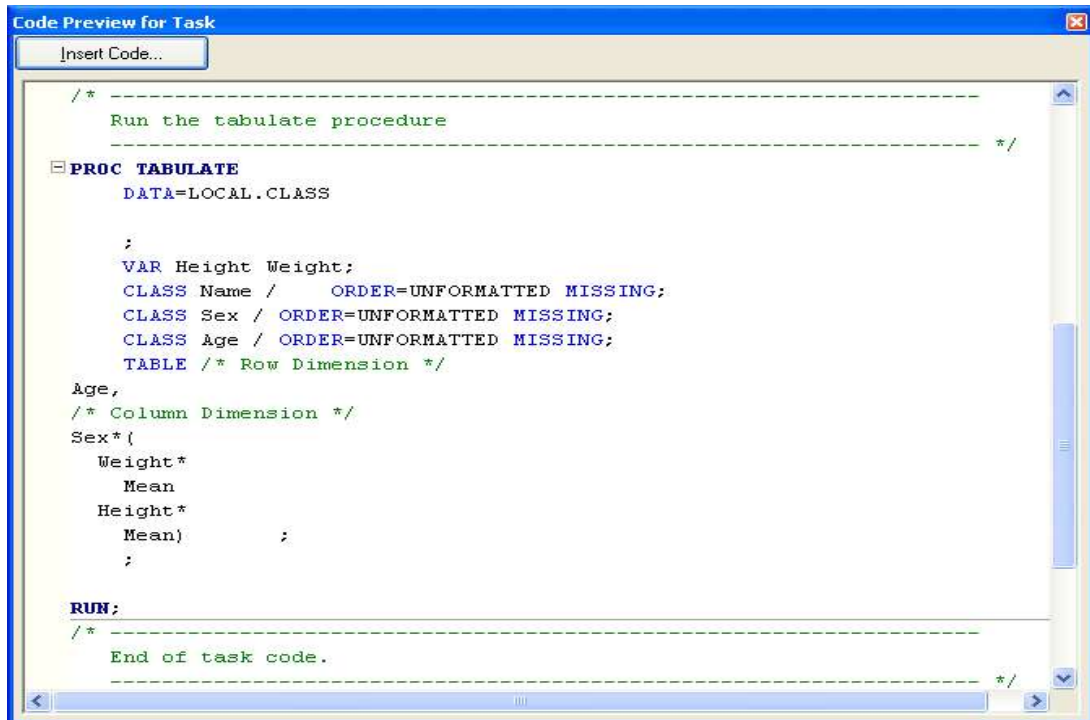
The tasks are not intended to cover 100% of the functionality of the corresponding SAS procedure, but will generate SAS code for the commonly used features.

It should be noted that, as the thin-client architecture has no direct access to the SAS System until the task is finally run, it is possible to generate SAS code for unlicensed SAS components, which will fail as a consequence. While the list of tasks can be customized to omit entries relating to unlicensed components, this may not be appropriate if several servers with differing licenses can be accessed.

Traditional Programming

Most generated SAS code can be previewed and copied into other programs, helping novice users develop their programming skills by example, and reminding more experienced programmers of relevant, but infrequently used, syntax.

The copied SAS code can then be manually edited in a Code window to include additional features not generated by the GUI interface. In particular, facilities for multi-threaded processing of SAS procedures in SAS v9 on certain platforms, e.g. PROC SQL and PROC SORT, may require manual editing of the generated SAS code to make use of these features. It may also be the case, as on OS/390 mainframe platforms, that the speed of host sorting routines automatically selected by the SAS System may make the use of PROC SORT and Data Step preferable to using PROC SQL.



The screenshot shows a window titled "Code Preview for Task" with a blue title bar and a standard Windows-style border. At the top left of the window is a button labeled "Insert Code...". The main area of the window contains SAS code for a PROC TABULATE procedure. The code is as follows:

```
/* -----  
Run the tabulate procedure  
----- */  
PROC TABULATE  
DATA=LOCAL.CLASS  
  
;  
VAR Height Weight;  
CLASS Name / ORDER=UNFORMATTED MISSING;  
CLASS Sex / ORDER=UNFORMATTED MISSING;  
CLASS Age / ORDER=UNFORMATTED MISSING;  
TABLE /* Row Dimension */  
Age,  
/* Column Dimension */  
Sex*(  
Weight*  
Mean  
Height*  
Mean) ;  
;  
  
RUN;  
/* -----  
End of task code.  
----- */
```

Illustration 14. Screenshot of the Preview window

Case Study

Environment

SAS software was introduced into risk management department in this finance company to process massive volume of historical customer records in flat files, which were copied to a UNIX server from the mainframe.

Existing analysis tools located on their PCs used a combination of a Visual Basic extraction application, SPSS data processing and Excel spreadsheets for reporting.

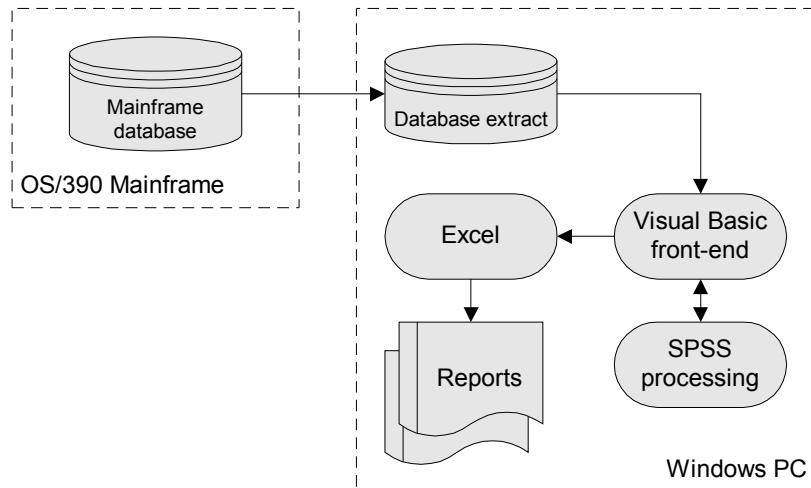


Illustration 15. Diagram of the old processing and reporting

The new SAS data warehouse processed the flat files into location-based data marts on the UNIX server, which could then be queried using SAS code submitted from Enterprise Guide software on their PCs.

The individual data marts varied in size up to around 10Gb for some specific locations, making the data transfer alone from server to PC impractical.

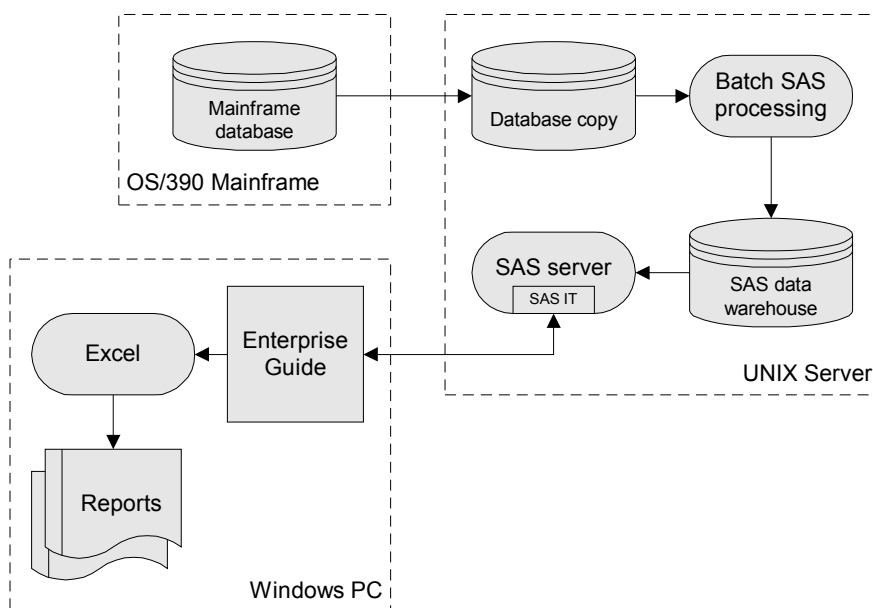


Illustration 16. Diagram of the new data processing and reporting

Enterprise Guide software provided the means to keep the data and the processing on the server, while still utilising the text editing and data viewing of the PC Windows environment.

User Training

At the beginning of the project the users had Enterprise Guide v1.1 and Enterprise Reporter v2.5 software installed on their PCs, and received SAS training in basic SAS programming and introductions to Enterprise Guide and Enterprise Reporter software. The SAS server had SAS Integration Technologies, SAS/STAT and SAS/ACCESS® for PC File Formats software installed.

Enterprise Reporter software was intended to provide the users with graphical reports, but it was almost universally disliked, as it lacked the charting capabilities they had been used to in Excel.

Enterprise Guide v1.1 software was not that popular either, as the Query task built SAS views, rather than SAS datasets, for each extract causing unnecessarily long response times when querying the larger data marts. Fortunately these issues were resolved in Enterprise Guide v1.3 software, which dramatically increased its usability.

In general the GUI screens were not used by the users to submit code, partly because of their experiences with Enterprise Guide v1.1 software. Instead the screens were used to generate code in the correct syntax, which was then copied from the preview window into the programs they were developing.

Although Enterprise Guide software generated reports by default as web pages, the users still continued to use Excel to publish them. It was discovered that HTML files renamed with a suffix of XLS were read automatically as spreadsheets by Excel, and tables copied from the Enterprise Guide-generated web pages could be pasted successfully into existing Excel files too. This meant that, if the table could be created in a fixed layout and copied into a specific location, Excel formulae and macros could still be used to finish the reports.

At about the same time Enterprise Guide v1.3 software was installed on the PCs, SAS/GRAPH software was installed on the server, so that the users could incorporate their graphical reports into their SAS reporting. Somewhat surprisingly little use has been made of SAS/GRAPH software by the users, mainly because of their continuing and extensive use of Excel charts.

User Perception

Users of the Enterprise Guide interface to the SAS data warehouse were asked the following questions approximately 18 months after its introduction. Their answers have only been altered to remove proprietary names.

Question 1: How would you compare SAS with the Visual Basic Application and SPSS for the processing and analysis of mainframe data?

User 1: SAS is much quicker and more flexible. Before in the Visual Basic Application, we had to output a lot of reports because we could only do cross tabulation with 2 variables.

User 2: SAS is far superior in terms of processing and analysis power. However, the 'point and click' of the Visual Basic Application is easier to learn.

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Question 2: How would you compare Enterprise Guide with Excel for analysing and presenting the data to management?

User 1: Generally SAS is better for analysing data although I use Excel for sorting smaller data sets as it is easier.

User 2: We still create all our reports and charts in Excel, we get the raw data from SAS and make it more presentable in Excel. For our standard reports/charts we have a consistent output from SAS which is linked in Excel to a more presentable output.

Question 3: Do you make use of the graphical parts of Enterprise Guide, or just use Excel for the production of charts?

User 1: No, Excel seems better (i.e. double axis graphs) and I am more familiar with it.

User 2: Excel only.

Question 4: Do the GUI screens in Enterprise Guide:

- (a) help you on a day-to-day basis,
- (b) help on when you forget the exact syntax of SAS procedures like PROC TABULATE, or
- (c) help you hardly at all now.

User 1: (c) No, tend to copy old code instead!

User 2: (c) Hardly use it at all now; most of our output is PROC TABULATE, we usually manipulate an existing piece of code.

Conclusions

- Enterprise Guide software can be used instead of a locally installed SAS System to replace existing applications, provided there are obvious benefits, e.g. reducing the amount of data required to be transferred to and from the user's PC.
- It is important to introduce SAS/GRAPH software with specific training as early as possible, otherwise existing software used for producing graphs will continue to be used.
- Enterprise Guide users do not need to use the GUI screens to find Enterprise Guide software valuable.

The Future

SAS Institute appears to be moving slowly towards the use of Enterprise Guide software as the preferred front-end for the development of SAS reports.

The SAS Learning Edition v1.0, a limited version of SAS software intended as an introductory training tool, employed Enterprise Guide v1.3 software as its default user interface. The new SAS Learning Edition v2.0 employs Enterprise Guide v2.1 software as its default user interface.

SAS v8 and v9

The release of Enterprise Guide v3.0 software, which will generate SAS code for SAS v9-specific procedure features, as well as existing procedure features in SAS v8.2, will permit a smooth transition from SAS v8 to SAS v9. It is also bundled with SAS v9 for Windows, which will introduce it to users previously unaware of its capabilities.

The minimal effort required to upgrade and re-license the SAS software will involve only the server installation, if Enterprise Guide software is in use as the default front-end for the SAS installation, yet all users will be able to make full use of the SAS environment without further changes to their PC setup.

Custom Tasks

Enterprise Guide v2.0 software introduced new facilities for the development and installation of custom tasks to augment the growing collection of GUI screens from SAS Institute, helping the user generate SAS code based on more SAS procedures and syntaxes. Custom tasks written for Enterprise Guide v2.0 are compatible with Enterprise Guide v3.0. This facility could also be used to generate specific SAS code to a set company standard.

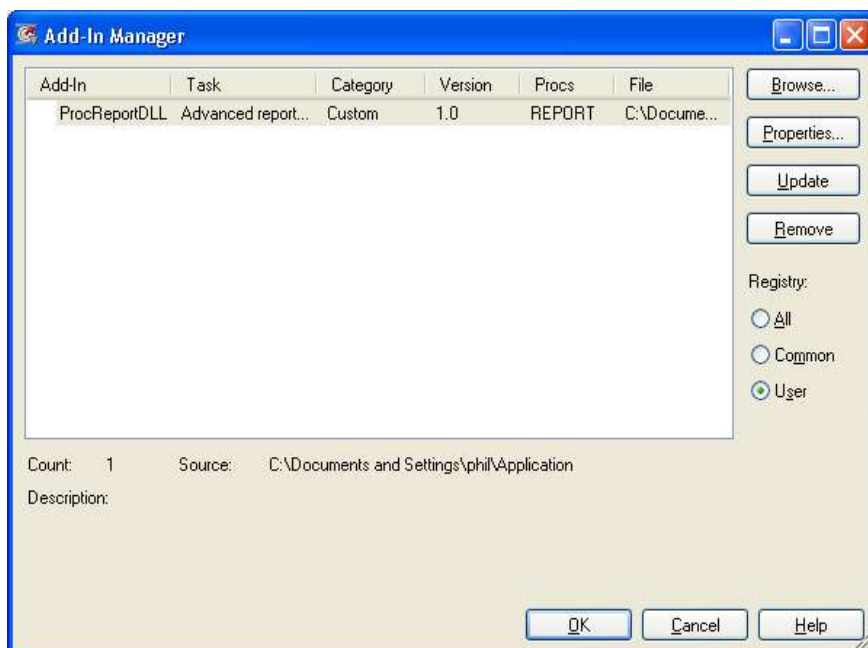


Illustration 17. Screenshot of the Add-in Manager menu

To add a COM custom task and view the list of available custom tasks

1. Register the custom task DLL (dynamic link library) with Windows using the regsvr32.exe utility from a command prompt or Run window, e.g.:
`regsvr32.exe "location-of-DLL\dll-name.dll"`
2. Open Enterprise Guide and select **Add-In** menu option.
3. Click the **Add-In Manager...** option in the drop-down list.
4. Select **User** from the **Registry** list.
5. In the **Add-In** list, select the custom task you wish to add
6. Click the **Update** button..
7. Click **OK** to close the **Add-In Manager** dialog box.

To remove a COM custom task

1. Open Enterprise Guide and select **Add-In** menu option.
2. Click the **Add-In Manager...** option in the drop-down list.
3. Select **User** from the **Registry** list.
4. In the **Add-In** list, select the custom task you wish to remove.
5. Click the **Remove** button.
6. Click **OK** to close the **Add-In Manager** dialog box.

The following screenshots were taken from an Enterprise Guide custom task which was written by the author to generate HTML-based reports using PROC REPORT. There are currently no built-in Enterprise Guide custom tasks that will generate SAS code for PROC REPORT.

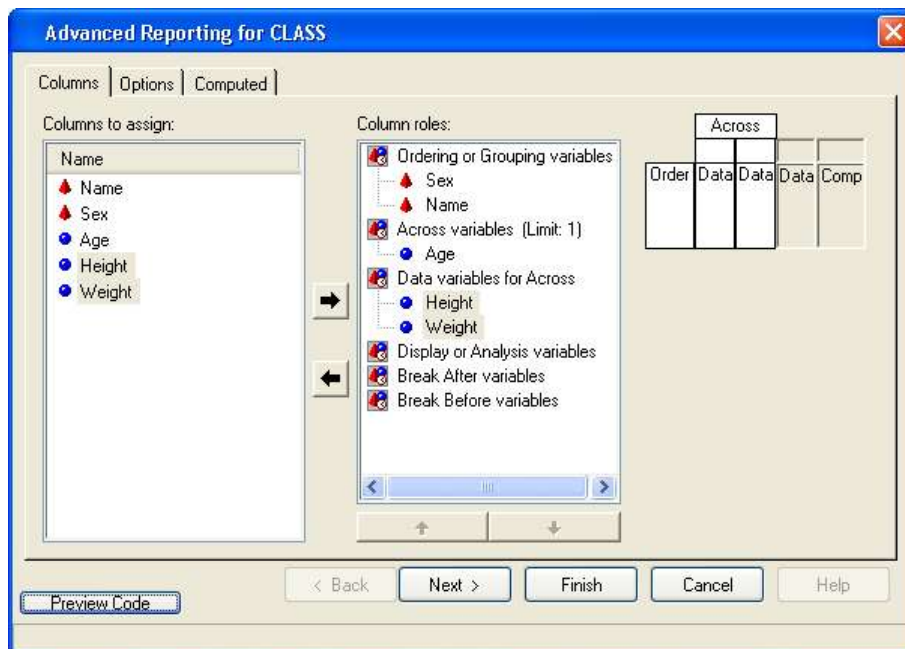


Illustration 18. Screenshot of Advance reporting by HNL - column selection

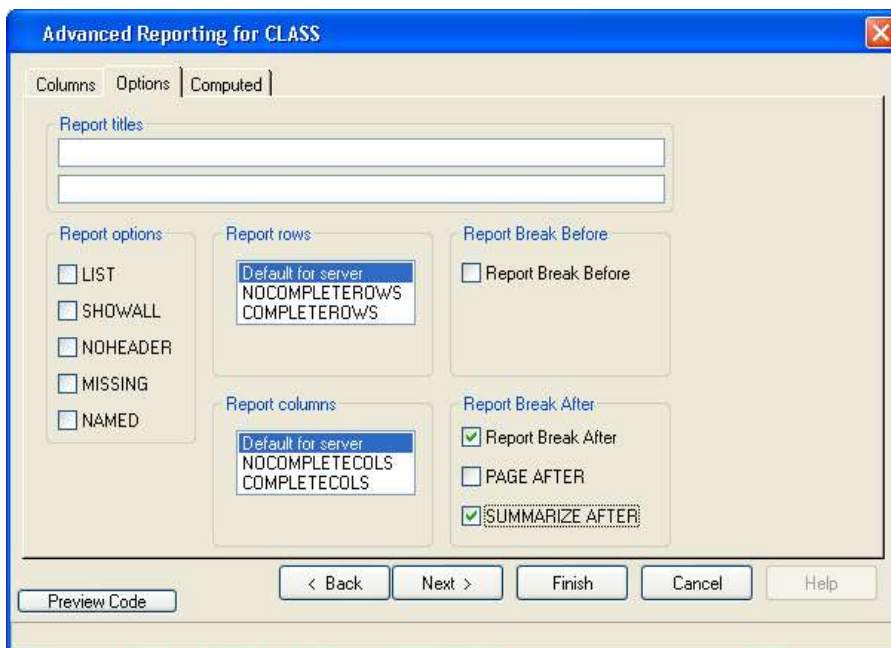


Illustration 19. Screenshot of Advanced reporting by HNL - report options

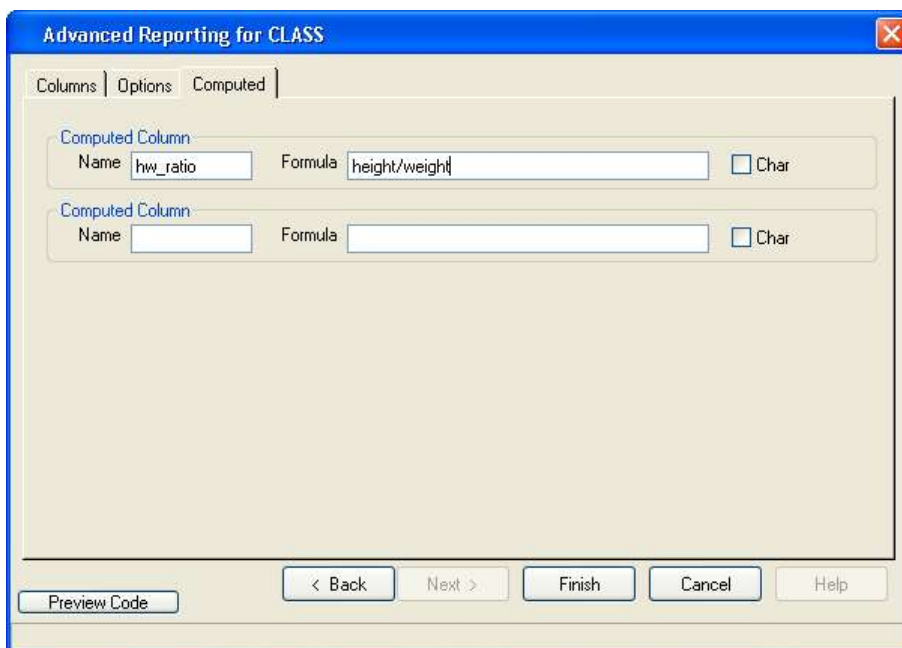


Illustration 20. Screenshot of Advanced reporting by HNL - computed columns

Sample code and information about developing your own Enterprise Guide custom tasks can be found on the SAS Institute web site.

Summary

- Enterprise Guide software is a thin-client application, which only runs on a Windows platform. It can access SAS installations on local clients and remote server platforms. The remote servers are not restricted to Windows platforms, but must have SAS Integration Technologies licensed. The local SAS installations only require Base SAS to be licensed and the optional SAS Integration Technologies software to be installed.

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- Enterprise Guide software is used to generate, edit and submit SAS code, which executes within the selected SAS system, returning the results and the SAS Log to Enterprise Guide.
- As Enterprise Guide software is independent of the SAS software installation, any changes made to the SAS software, e.g. maintenance, upgrades, licensing, etc., are immediately available to all Enterprise Guide users that can access that SAS System.
- Enterprise Guide v2.0 and v3.0 software increased the number of tasks available to the user to generate SAS code. They also provides an interface for users to develop their own custom tasks for SAS procedures not currently supported by the SAS-supplied Tasks, and also to provide standardised coding for SAS programs.

Further Reading

The following web sites are recommended for further reading about Enterprise Guide:

- www.sas.com - SAS Institute
- www.segus.org - SEGUS (SAS Enterprise Guide Users Group)
- www.hollandnumerics.com/sasfaq - Holland Numerics Ltd (FAQ)
- www.hollandnumerics.com/SASPAPER.HTM – Holland Numerics Ltd (papers)
- www.hollandnumerics.com/SOFTWARE.HTM – Holland Numerics Ltd (downloads)

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