Paper 193-2009

Graphs in Flash Using the Graph Template Language

Himesh Patel, SAS Institute Inc., Cary, NC
David Kelley, SAS Institute Inc., Cary, NC
Dan Heath, SAS Institute Inc., Cary, NC

ABSTRACT

The Graph Template Language (GTL) offers many opportunities for application developers to package simple or complex custom-designed graphs into stand-alone template libraries. In SAS® 9.2, users can generate static output only through Java rendering. Let's take a peek into future rendering through the use of Adobe® Flash. You will be able to use your current GTL code to generate interactive graphs using Flash technology. Once data is visually analyzed, you will be able to publish the graphs in presentations or reports.

INTRODUCTION

This video poster assumes that users are familiar with the SAS® Output Delivery System (ODS) and SAS/GRAPH® software. Because most of the work involves Adobe Flash and Adobe® Flex®, it is critical to understand the technology on the surface. Adobe Flash Player is a run-time application that is written in ActionScript, or in the Flex markup language MXML, using Flex SDK. Flex is a collection of technologies that allow developers to develop cross-platform, rich Internet content. Running a Flash application requires a one-time Flash Player download. The Player can be downloaded for free from the Adobe Web site at www.adobe.com. You can define the required content as MXML, which is similar to XML, by creating a new ODS destination using a tagset. One caveat for using this method is that MXML must be compiled into an SWF file before it can be executed by Flash Player.

THE ODS TAGSET FACILITY

Languages such as HTML, XML, and MXML are called tag-based languages. Tags are nothing more than keywords that provide instructions. ODS has a facility called a tagset that enables users to create tag-based output from events generated from within SAS. These tagsets might extend existing tagsets that are shipped with SAS, or you can create a tagset that is completely stand-alone. Figure 1 shows the HTMLPANEL tagset, which is an example of a tagset extension that is shipped with SAS. This tagset extends the HTML4 tagset to enable users to create layouts in their HTML output. For more information about creating or extending tagsets, see the documentation on the SAS Web site.

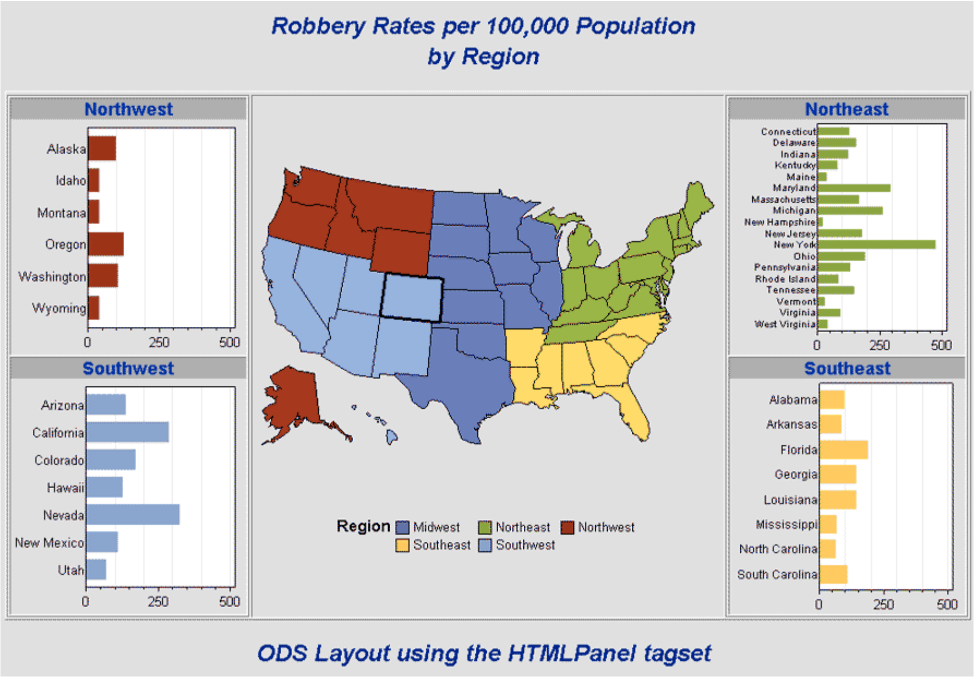


Figure 1. Layout Using the HTMLPANEL Tagset

Tagsets are used just like other ODS destinations. For example, if you were creating RTF output, you would open an RTF destination such as the following:

```
ods rtf file="output.rtf";
```

If you were creating output using the HTMLPANEL tagset, the statement would be similar to that of the RTF destination:

```
ods tagsets.htmlpanel file="output.html";
```

The tagset-based ODS destinations are closed in the same way as other destinations—either by using the destination name or by using the _ALL_ directive:

```
ods tagsets.htmlpanel close;
```

Tagsets are stored in the same repository as table templates, graph templates, and ODS style templates.

See Figure 2. To invoke the repository, type **`odstemplate`** (**`odst`** for short) into the command box of your DMS session. Expand the SASHELP.TMPLMST folder to see the template directories in Sashelp. One of these directories is named TAGSETS. If you click on that folder, you will see the tagsets that were shipped with SAS. If you double-click on any of these entries, the source for that tagset is displayed in a window.

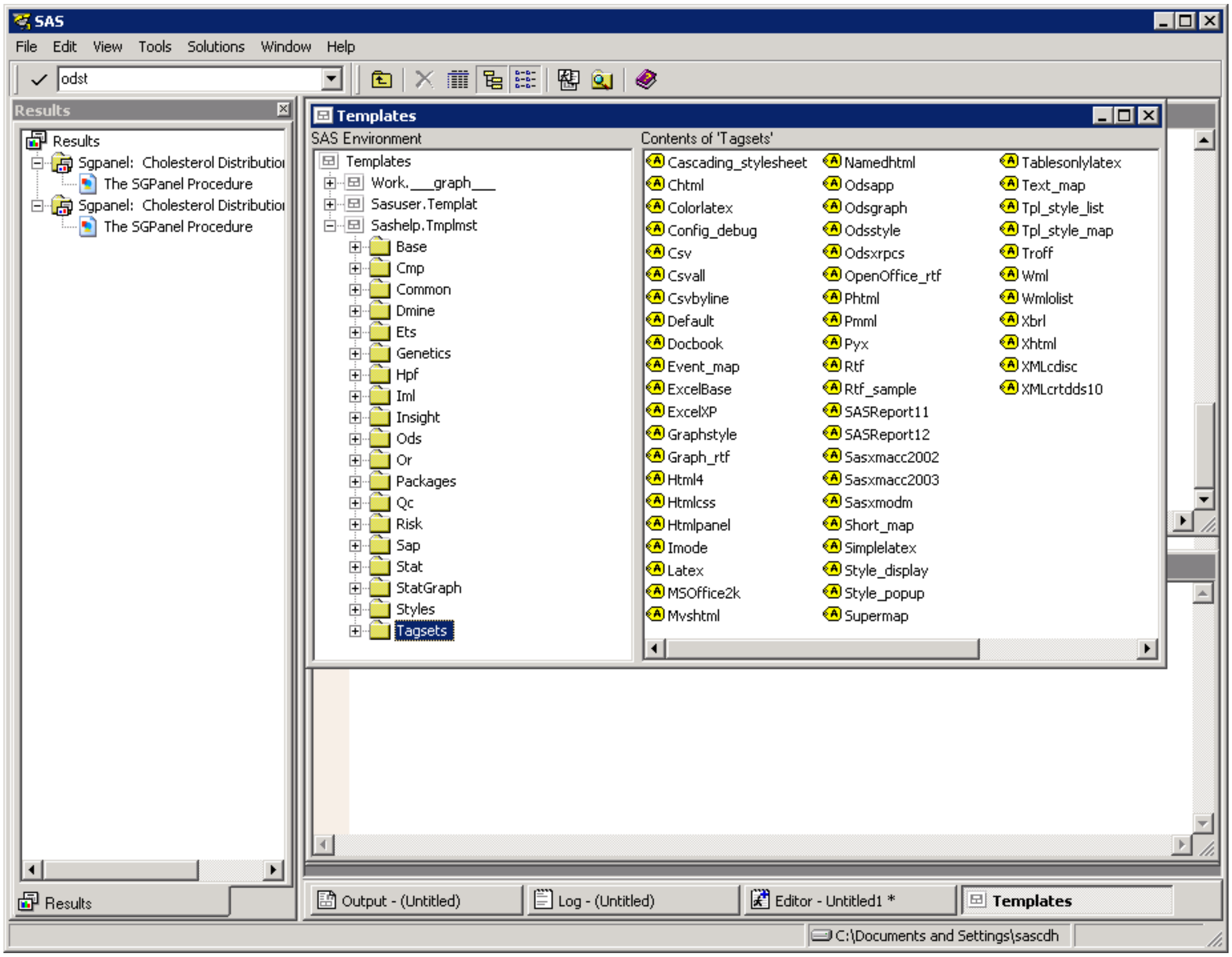


Figure 2. The Templates Window

Using the tagset concept, you can create a tagset to generate MXML output that can be compiled into SWF files that can be for displayed by Flash Player. These SWF files can then be embedded into an Internet browser window to provide rich content.

Figure 3 shows an overview of how the user can generate Flash content from ODS. Once you define the tagsets, you can compile them using the TEMPLATE procedure. Your ODS program uses the defined tagset name to access the tags and to generate the MXML file. This MXML file looks similar to an XML file, but it contains specific tags that are understood by the Flex compiler. You must use the Flex compiler to compile the MXML file and to produce an SWF file, which contains the byte code to execute the program. The SWF file can be viewed using Flash Player, or the SWF file can be embedded in an HTML page.

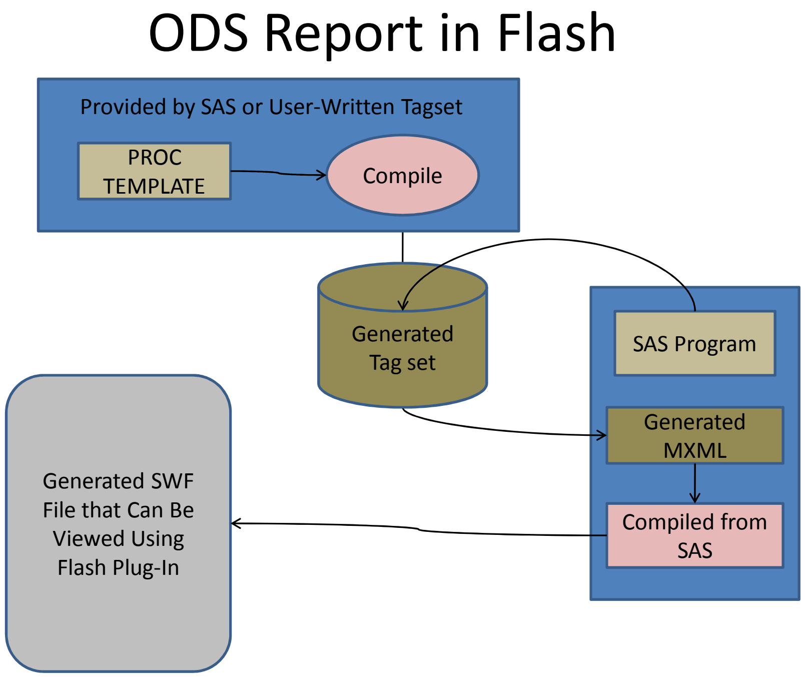
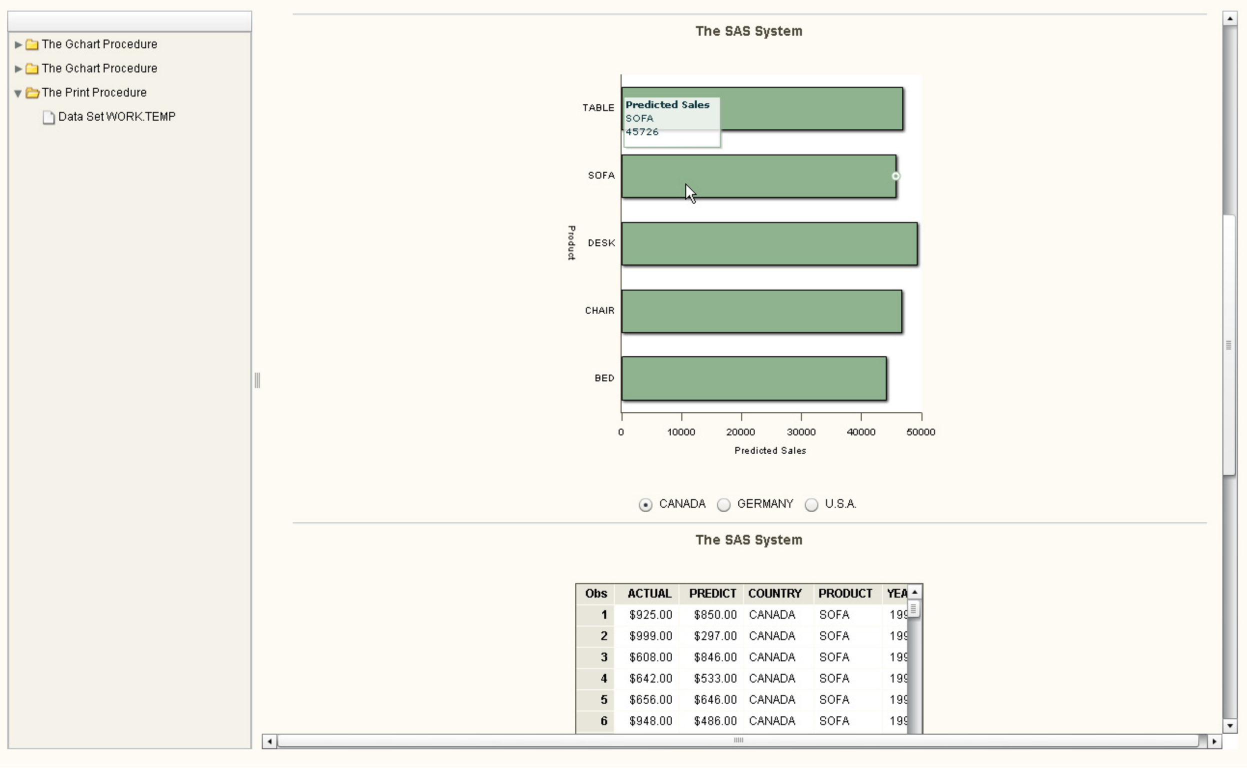


Figure 3. Overview Diagram

Basic Graphs and Tables Using Flex Graphs

SAS has generated a rendering library for graphs that are defined using GTL. For research purposes, SAS has developed an internal tagset to generate MXML code for Flash output. To view the output in Flash, you must compile the MXML code into byte code. Internally, code was added to invoke the Flash compiler to compile the MXML code into an SWF file. Tables are rendered using Flex components, and graphs are rendered using the SAS Flex rendering library.

Figure 4 shows a charting package that is bundled with Adobe Flex SDK. ODS is generating the MXML tagset to represent the graph and the table.



Obs	ACTUAL	PREDICT	COUNTRY	PRODUCT	YEA
1	$925.00	$850.00	CANADA	SOFA	199
2	$999.00	$297.00	CANADA	SOFA	199
3	$608.00	$846.00	CANADA	SOFA	199
4	$642.00	$533.00	CANADA	SOFA	199
5	$656.00	$646.00	CANADA	SOFA	199
6	$948.00	$486.00	CANADA	SOFA	199

Figure 4. Output Using Flex Graphing Package

Generated MXML must be compiled into an SWF file, which is the binary format that can then be embedded into the HTML file as Flash content. The charting package that is shipped with Adobe Professional is not ideal for SAS customers because it doesn't have all the features and functionality that is in Graph Template Language (GTL). An Adobe table is used to show the output from the PRINT procedure. To support all GTL functionality, SAS has developed a Flex graphing package that contains default interactive features, such as zoom, scroll, and data tips.

ODS Tagset Using Flex Graphing Package

GTL is very feature-rich. The current package that is shipped with Flex does not support all of the possible graphs that users can generate. To support future renderings of graphs that are generated by GTL, SAS is developing a Flex charting library that can understand MXML that is based on GTL to render graphs. To make use of SAS graphing library, we will need to produce mxml that is GTL based. Because the graphs are provided by SAS, certain interactions with graphs are set by default. Interactions such as zoom, scroll, data tips, and interactions with the user interface are provided as default settings.

Figure 5 shows the use of the SAS Flex Graphing package to generate output from the HPF procedure.

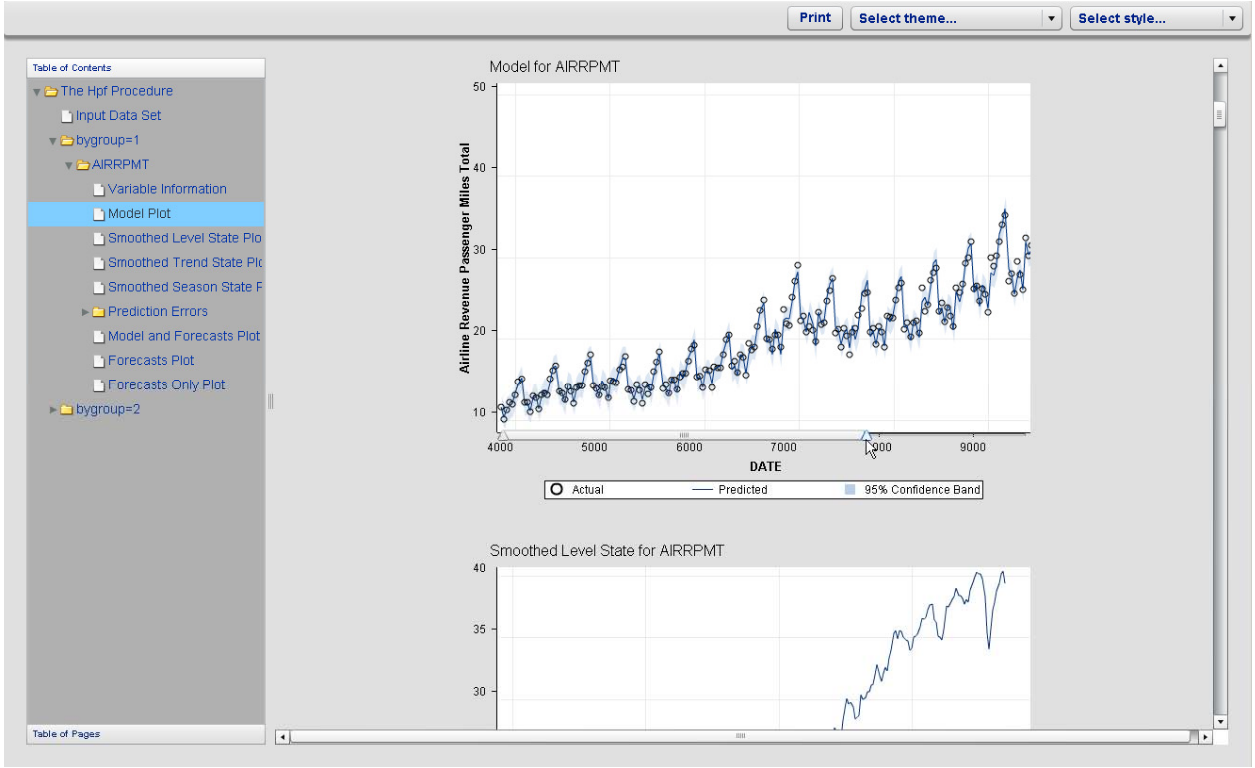


Figure 5. HPF Procedure Output Using Flex Graphing Package

Note the zoom scroll slider at the bottom of the graph. This type of interaction is provided by default. Flex has rich table functionality, and the Flex data grid table displays the output.

Data Brushing

Brushing is another feature that is being used between the graph and the table. To use brushing between graphs or between a graph and a table, you must ensure that the data sources are the same. Currently, to ensure that the data sources are the same and for prototyping purposes, we have added an option that enables the brushing feature.

CONCLUSION

Generating MXML tags to render graphs and tables in Flash has advantages and disadvantages. Because MXML must be compiled into an SWF file, users must have access to the Flex compiler. This requirement might not be ideal for all users. It would be ideal if SAS could provide a rich content that is similar to that of ActiveX, with a simple switch, such as DEVICE=FLEX. SAS continues to develop optimal solutions for users so they can easily generate Flex content that takes advantage of rich features that Flex provides, such as brushing across multiple graphs or tables.

RECOMMENDED READING

For information about Adobe and Flash downloads, visit http://www.adobe.com/.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Himesh Patel
SAS Institute Inc.
SAS Campus Dr.
Cary, NC 27513
E-mail: Himesh.Patel@sas.com