ABSTRACT
Graphs are an effective means of communicating the important aspects of a large amount of information. This paper will center on how to best use the Graph Object to present information and will cover some of the newer enhancements to the Graph Object.

INTRODUCTION
The WestStar Bank is responsible for ensuring that all home loan applications and home improvement loan applications are processed without bias.

This portion of the application is used to graphically present loan data in an easy to use environment. It can also be used to assist in determining future loan activities. Management is particularly interested in trends which may be perceived as biased.

Racial data from the bank's loan applications is compared to census data from the bank's community to determine if the population is being served without bias.

This example could easily be modified to meet more specific and detailed requirements.

DETERMINING THE DATA
The demographic and banking data was provided by CLARITAS ®. The data which was summarized by county and tract, included:

1. Population
2. County
3. Tract
4. Number of persons representing each race

Loan Application Data
The loan application data was summarized by county and tract to provide loan information and included:

1. County
2. Tract
3. Approved
4. Denied
5. Race

CREATING A FRAME ENTRY

```sas
proc build c=sugi20.loan.action.frame;
run;
```

CREATING A REGION
Click anywhere inside the master region to display a pop-up menu. Select Make.

<table>
<thead>
<tr>
<th>Region attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make</td>
</tr>
<tr>
<td>Make transparent</td>
</tr>
<tr>
<td>Make group</td>
</tr>
<tr>
<td>Fill</td>
</tr>
<tr>
<td>Move</td>
</tr>
<tr>
<td>Reset</td>
</tr>
<tr>
<td>Copy</td>
</tr>
<tr>
<td>Empty</td>
</tr>
<tr>
<td>Remove</td>
</tr>
<tr>
<td>Move to group</td>
</tr>
<tr>
<td>Push</td>
</tr>
<tr>
<td>Pop</td>
</tr>
<tr>
<td>Align subregions</td>
</tr>
<tr>
<td>Define attachments</td>
</tr>
<tr>
<td>Save as Composite</td>
</tr>
<tr>
<td>General Attributes</td>
</tr>
</tbody>
</table>

Display 1 Pop-up menu

CREATING THE OBJECT
Select Graphics from the selection list.

Display 2 Selection List
THE GRAPHICS ATTRIBUTES WINDOW

This window is used to specify the graph's attributes.

Display 3  The Graphics Attributes Window

The attributes are:
- Name of Object
- Graph Type

ENHANCING THE APPEARANCE OF A GRAPH

Select Appearance in the Additional Attributes container box.

Colors

To change the color of the text on a graph, select the text button and then select a color in the Color Selector container box. The axis and highlight colors may also be modified in this manner. At this time the highlight button is grayed, since highlight is not active. The colors of the graph may be changed by selecting the numbered boxes and then selecting a color from the Color Selector container box. You can create custom colors by selecting the Edit button, select a square in the User Defined container box and change the colors in the Shading container box.

Display 5  Colors Window

Fonts

Fonts for a number of the graph elements can be modified by selecting the Fonts button and modifying the corresponding graph element.

Display 6  Fonts Window
ENHANCING THE APPEARANCE OF A GRAPH

Titles
Up to four titles can be added by selecting the Titles button. The font and justification can be set individually for each title in this window.

Footnotes
Two footnotes can be added by selecting the Footnotes button. The font and justification can be set for each footnote individually.

Reference Lines
Horizontal and vertical user-defined reference lines can be added in this window. Also the width, style, and reference line color can be individually specified.

Pie Options
JSTYLE may be toggled on and off. When JSTYLE is on the pie is drawn starting at 12 o'clock, in a clockwise direction, and the response data values are sorted in descending order. You can also change the location of the pie labels.

Footnotes Window

Reference Lines Window

Pie Options Window

Once all appearance attributes are set, return to the Graphics Attributes window by selecting OK. Then display the graph by selecting OK.

HIGHLIGHTING AND VIEWING DATA

The data info window which displays variable values associated with selected data points can be turned on and off by using the third mouse button to toggle the status. Highlight capabilities may also be toggled on in the same manner.

Object Attributes
Turn view data on
Turn highlight on
Region attributes
Make
Make transparent
Make group
Fill
Move
Resize
Copy
Empty
Remove
Remove group
Push
Pop
Align subregions
Refine attachments
Save as Composite
General Attributes

Third mouse button

Once the basic graph is created you can manipulate it in many ways to present the information in the best possible manner.
GRAPHICS METHODS

Additional methods have been supplied for the Graphics class and some existing methods have been enhanced as follows:

- **_GET_GROUP_VAR_**
  Returns the name of the GROUP variable used in a graph.

- **_GET_VALUE_**
  The ability to return the status of the value has been added.

- **_HIDE_LABELS_**
  Suppresses labels for 2d and 3d pies.

- **_HIDE_LEGEND_**
  Suppresses a graph’s legend.

- **_HIDE_MAJOR_REF_LINES_**
  Suppresses reference lines at a graph’s major tick marks.

- **_SAVE_AS_**
  Saves a Graphics Object as a SAS/GRAPH catalog entry.

- **_SET_COLOR_**
  Assigns a color to graph elements, including legend frame, legend background, all reference lines, text, legend labels, legend values, axis labels, axis values, pie slices, bars, axis lines, backplane and axis planes for 3d bar graphs.

- **_SET_DIRECTION_**
  Sets the direction the pie slices are drawn, either clockwise or counter clockwise.

- **_SET_FONT_LIST_**
  Sets the font used to display the graph’s text elements.

- **_SET_FOOTNOTE_**
  Assigns footnotes to a graph.

- **_SET Group_VAR_**
  Sets the name of the GROUP variable used in a graph.

- **_SET_INC_**
  Assigns the increment for a range of values on the specified axis.

- **_SET_JSTYLE_**
  Ability to set JSTYLE for pies. This consists of a starting angle at 90 degrees (12 o'clock), pies slices are drawn in a clockwise direction, response data values are sorted in descending order.

- **_SET_JUSTIFY_**
  Assigns a justification to a graph’s title and footnotes independently.

- **_SET_MAX_**
  Assigns the maximum value to an axis range.

- **_SET_MIN_**
  Assigns the minimum value to an axis range.

- **_SET_REF_LINES_**
  Assigns reference lines to a graph at points defined in an SCL list.

- **_SET_SIZE_**
  Assigns the size of a graph’s title, plot line, data point marker, axis frame, legend frame, and user-defined reference lines.

- **_SET_SOURCE_**
  Specifies the form of the source of data for the graph.

- **_SET_STYLE_**
  Assigns the style of lines in a graph, including line, major reference lines, and user-defined reference lines.

- **_SET_TYPE_**
  Assigns a graph’s type. 3D pies, 3D vertical bars, and 3D horizontal bars have been added.

- **_SHOW_LABELS_**
  Displays labels for 2d and 3d pies.

- **_SHOW_LEGEND_**
  Displays a graph’s legend.

- **_SHOW_MAJOR_REF_LINES_**
  Displays reference lines at a graph’s major tick marks.
BUILDING AN APPLICATION

The graph created can be integrated into an application for use in reviewing the loan application process. Several options can be added to subset the data by various variables, change plot types, or change data sources. The initial graph is shown.

CONCLUSION

The Graphics Object can be a valuable part of an application. It is a powerful tool that allows users to make interactive changes to the way data is presented without changing any source code.

ACKNOWLEDGEMENTS

I would like to thank CLARITAS and Geographic Data Technologies for providing data for this application and the other people at the Institute who spent time on this project. For working on the application: Bren Bailey, Mark Brown, Jack Bulkeley, Edie Jeffrey, Eleanor Johnson, Zhonggang Liu, and Tom Rooker. For working on the Graphics Object: Sheila Evans, Sam Johnson, Lina Land and Kathleen Miller.

SAS/GRAPH is a registered trademark of SAS Institute, Inc. in the USA and other countries. ® indicates USA registration.