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Visualizing Key Performance Indicators using the GKPI Procedure

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ABSTRACT

The GKPI procedure is new in SAS 9.2 SAS/Graph®. This new procedure can be used to create graphical key performance indicator (KPI) charts which include sliders, bullet graphs, dials, speedometers, and traffic lights. This paper is intended to serve as an introduction to the GKPI procedure by discussing the syntax and demonstrating examples. In addition, this paper will discuss how results from the GKPI procedure can be integrated into existing SAS environments.

INTRODUCTION

This paper is intended to act as an introductory guide to the GKPI procedure which is new in SAS 9.2 SAS/Graph. Methods used for generating dashboards previous to SAS 9.2 will also be briefly discussed. This paper assumes a basic level of SAS/Base and SAS/Graph knowledge.

DEFINITIONS

KEY PERFORMANCE INDICATORS

A KPI is a measure or metric that helps a business monitor its performance and measure its progress towards specific goals. Typically, a KPI will be displayed graphically as shown in Figure 1 below.

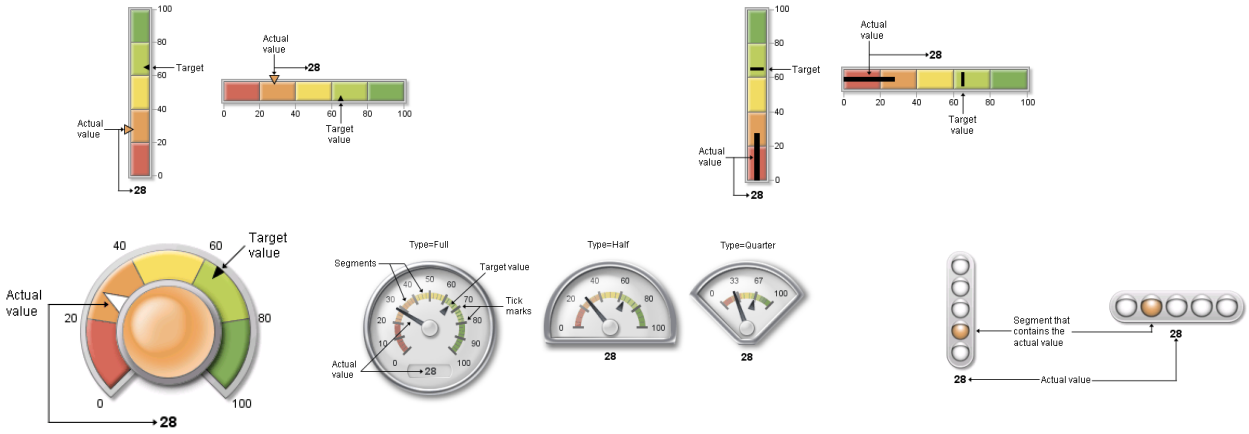

Figure 1. Graphical KPI Examples from PROC GKPI

DASHBOARD

A series of graphs, charts, gauges or other visual indicators that a user has chosen to monitor. Even though some measures may be strategic, there is no overall objective tied to the strategy for the organization.

BALANCED SCORECARD

One or more dashboards with an overall strategy directly tied to the organization's objectives and strategies.

The terms dashboard and scorecard are often used interchangeably but for the purpose of our discussion; all we need to know is that both typically contain key performance indicators.

TRADITIONAL METHODS TO PRODUCE GRAPHICAL KPIS IN SAS

SAS/GRAPH

SAS/Graph has had the capability to produce graphs that can communicate a KPI using the GCHART, GPLOT and/or GREPLAY procedures for quite some time. http://support.sas.com/rnd/datavisualization/dashboards/ contains a lot of information and examples on how to produce dashboards containing key performance indicators.

For example, one can download programs from the SAS web site to produce graphs as figure 2 shows below using GCHART and annotate.

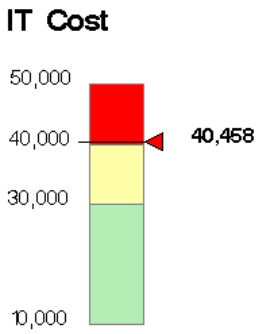

Figure 2. Example of graphical KPI generated with GCHART and annotate

CRITICAL SUCCESS FACTOR MACROS / RANGEVIEW HTML GENERATOR

This macro (DS2CSF) can create html pages with critical success factor widgets leveraging the rvapplet jar file and a web application server. See http://support.sas.com/kb/25/642.html for more details. Figure 3 below shows a few examples of output from the DS2CSF macro.

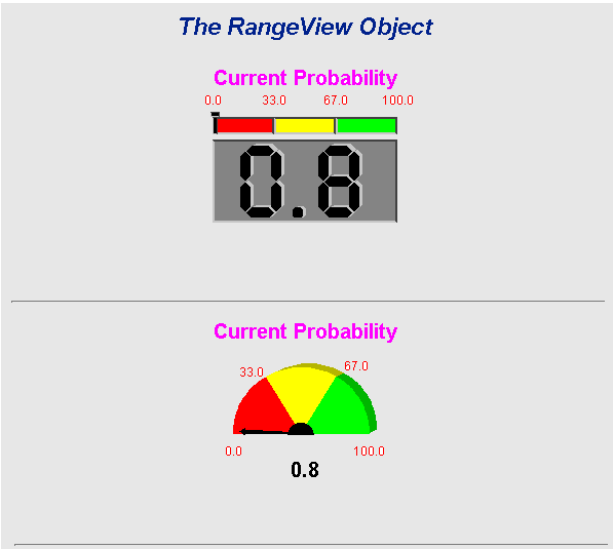

Figure 3. Output from DS2CSF Macro

SAS BUSINESS INTELLIGENCE DASHBOARD

The SAS BI Dashboard is accessed from within the SAS Information Delivery Portal. The SAS Information Delivery Portal is part of the SAS Enterprise Business Intelligence Platform. SAS BI Dashboards are implemented into the portal as a type of Portlet as shown below. For more information on the SAS BI Dashboard, see http://support.sas.com/documentation/onlinedoc/bidashboard/index.html.

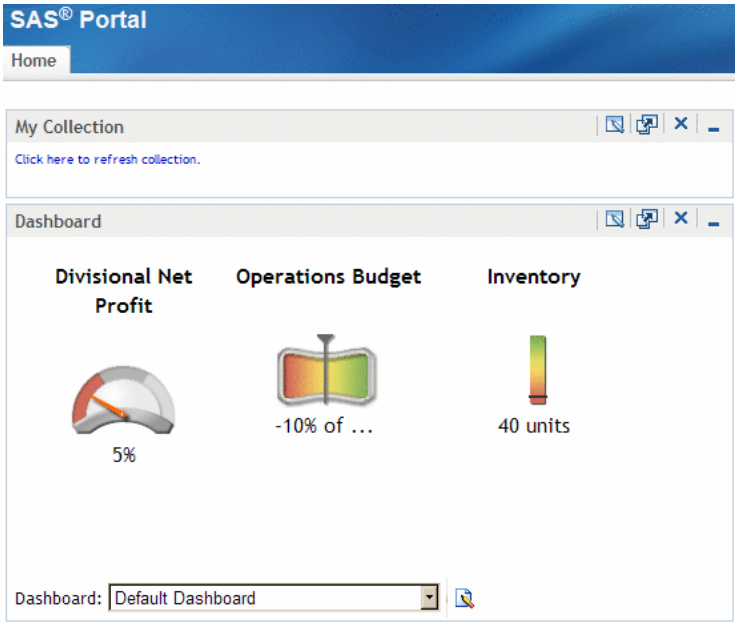

Figure 4. The SAS Business Intelligence Dashboard Portlet

STRATEGIC PERFORMANCE MANAGEMENT

SAS Strategic Performance Management helps organizations manage their strategy and supporting measures. It is a web based solution to design, build and manage scorecards, dashboards and diagrams such as strategy maps.

THE GKPI PROCEDURE OUTPUT

The GKPI procedure creates graphical key performance indicator charts. This procedure can create 5 different chart types at this time. These chart types are shown in figures 5 through 9 below:

SLIDER CHART (VERTICAL OR HORIZONTAL)

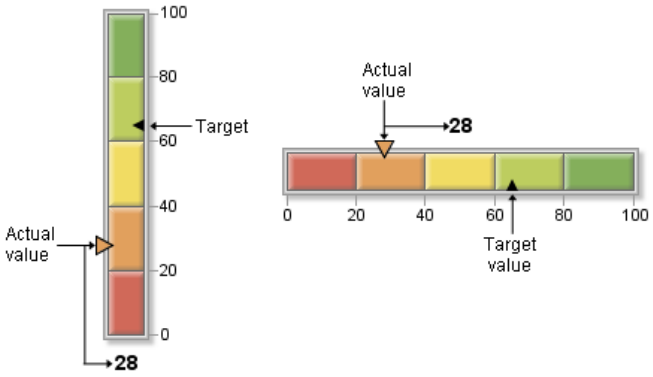

Figure 5. VSLIDER and HSLIDER

BULLET CHART (VERTICAL OR HORIZONTAL)

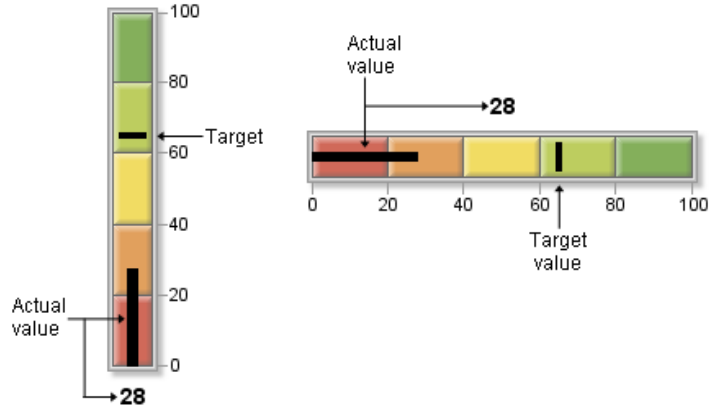

Figure 6. VBULLET and HBULLET

DIAL CHART

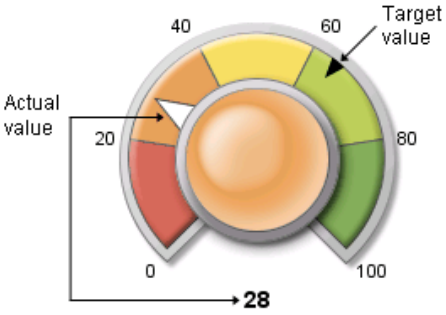

Figure 7. DIAL

SPEEDOMETER CHART

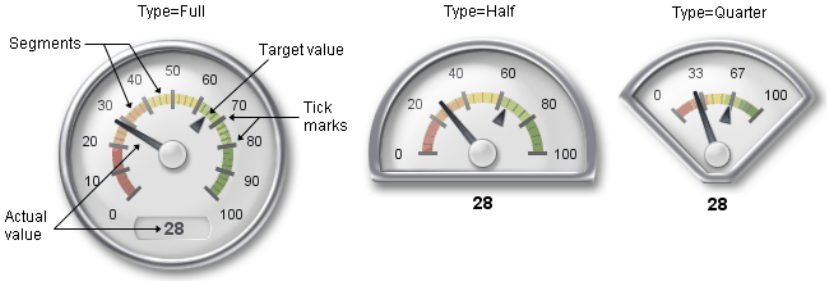

Figure 8. SPEEDOMETER

TRAFFIC LIGHT CHART (VERTICAL OR HORIZONTAL)

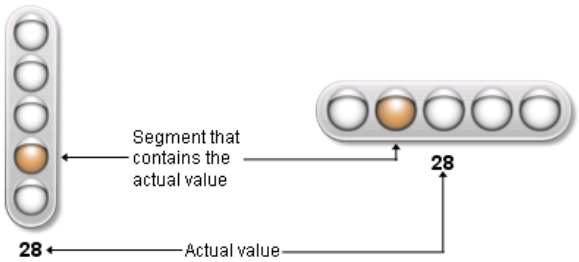

Figure 9. VTRAFFIC and HTRAFFIC

DECISIONS WHEN BUILDING A GKPI

GRAPHICS DEVICE

This decision will be easy because the GKPI procedure only supports the JAVAIMG device.

```
goptions reset=all device=javaimg;
```

BASIC OR RAISED MODE

Each KPI generated with this procedure can be displayed in basic or raised mode. The basic mode has a flat two dimensional appearance while the raised mode appears to be more three dimensional. This is controlled by the MODE= option on the PROC GKPI statement.

```
proc gkpi mode=raised;
```

TYPE OF INDICATOR

The type of indicator displayed is controlled by the statement that is specified. The possible indicator statements are as follows:

- vslider or hslider
- vbullet or hbullet
- dial
- speedometer
- htrafficlight or htrafficlight

SEGMENT BOUNDARIES

The segment boundaries are defined by a list of numbers in ascending or descending order using the BOUNDS= option on the <kpi> statement. The BOUNDS= list must contain at least 2 numbers and be specified either in ascending or descending order. The number of resulting segments is equal to the number of values in the bounds list minus 1.

```
proc gkpi;
   hslider actual=6 bounds=(-8 -5 0 3 5 10);
run;
quit;
```

MAKING THE ACTUAL KPI VALUE AVAILABLE TO THE PROCEDURE

The actual KPI value represents the metric or measurement of interest that you want to display graphically. The ACTUAL= option allows the user to specify the value by just supplying the measurement or metric value.

```
proc gkpi;
   hslider actual=6 bounds=(-8 -5 0 3 5 10);
run;
quit;
```

Of course, in practice, we would most likely calculate the value or read it from a table of KPI values and pass it in through a macro variable. An example follows of how this may look.

```
proc sql;
   select percent_gross_revenue into :percent_gross_revenue
   from <table of KPI values>
   where <time_period>=2009;
quit;

proc gkpi;
   hslider actual=&percent_gross_revenue. bounds=(0 25 50 75 100);
run;
quit;
```

SPECIFYING ACTIVE AND INACTIVE COLOR LISTS

The active segment is the segment that contains the actual value. The inactive segments are the segments that do not contain the actual value. If you define only one or more than five segments, the GKPI procedure uses a gray scale default for all segments as shown below.

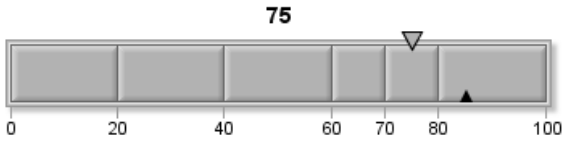

Figure 10. Gray Scale Default Color Scheme

If you define between two and five segments, there are default color lists as shown below.

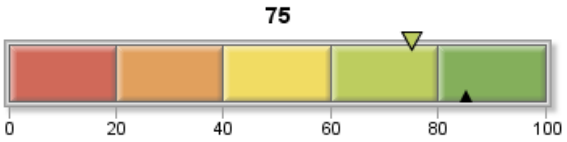

Figure 11. Five Segment Default Color Scheme

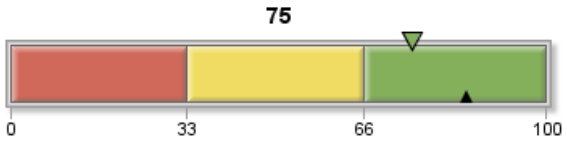

Figure 12. Three Segment Default Color Scheme

These colors can be controlled by using the COLORS= option for the inactive colors and the ACTIVECOLORS= option for the active colors.

```
ods html;
proc gkpi mode=raised;
   hslider actual=0.45
   bounds=(0 .22 .35 .50) /
   colors=(red yellow green)
   activecolors=(red yellow purple);
run;
quit;
ods html close;
```

SPECIFYING FONTS

The GKPI procedure has options to control the boundary and tick mark values (BFONT=), the actual values (AFONT=) and the labels (LFONT=). With each of these font options, you can also control the color, height, and in the case of the label (LFONT), the justification.

To determine what fonts are available in your SAS environment, one can look in the SAS registry. There are directions provided on the following web page.
http://support.sas.com/documentation/cdl/en/graphref/61884/HTML/default/a003259919.htm

OTHER REQUIREMENTS

- You must specify an ODS HTML or ODS RTF statement
- This procedure only works with the JAVAIMG device.
- OPTIONS available to use with GKPI
  - TITLE, FOOTNOTE
- GOPTIONS available to use with GKPI
  - BORDER, VSIZE, HSIZE, XPIXEL, YPIXEL, IBACK, CBACK, CTEXT, HTEXT, FTEXT

BUILDING A GRAPHICAL KPI VIA ENTERPRISE GUIDE 4.2

Enterprise Guide 4.2 has the capability to leverage the GKPI procedure by using a custom add-in task. The link http://support.sas.com/kb/36/180.html has the detail for how to download and import the custom add-in into EG 4.2.

The figure below shows the interface when using the custom add-in task in EG 4.2.

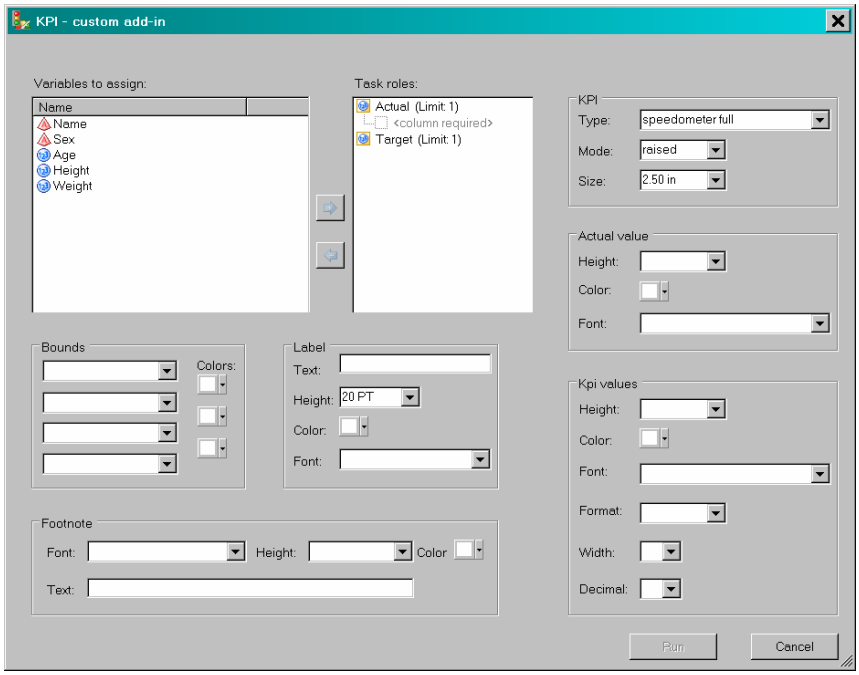

Figure 13. Enterprise Guide GKPI Custom Add-In Task

EXAMPLES

Extensive examples will be provided at the presentation.

CONCLUSION

The GKPI procedure is yet another method for generating presentation quality widgets for use in dashboards, scorecards or just normal reports. The procedure is fairly easy to understand and use. I would recommend learning about this procedure so that when you need to use graphical KPIs in your reporting or application portal, this procedure will be in your arsenal of tools available.

REFERENCES

GKPI Procedure Online Documentation
http://support.sas.com/documentation/cdl/en/graphref/61884/HTML/default/a003163556.htm

RECOMMENDED READING

- "The Balanced Scorecard" by Robert S. Kaplan and David P. Norton
- "Show me the Numbers" by Stephen Few

CONTACT INFORMATION

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