

SAS[®] Tile Charts: Thousands of Business Tips with One Click

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ABSTRACT

The ever-growing complexity, increasing size, and increasing availability of business information make getting to the critical issues a major challenge. As such, you can either add 100 or so “executive dashboard” links using your Web browser or, maybe you want to consider a well-organized SAS tile chart to grab and focus attention on those issues that require immediate action.

This paper outlines the capabilities and business uses of the SAS tile chart. The SAS tile chart looks like the landscape of Kansas when viewed from a window seat on your favorite airline, but its effective use of the color, size, and data tips in a hierarchical grid communicates important business intelligence information. This mass of drillable tiles that are organized into a hierarchical structure makes large volumes of data available for quick analysis.

WHAT IS A SAS TILE CHART?

A tile chart is technically known as a rectangular tree map, and was originally developed at the University of Maryland. One version created by SmartMoney.com is used to visualize the stock market. To view this chart, open <http://www.smartmoney.com>. Select the **Tools** menu, and then select **Map of the Market**. This chart is designed to view a large quantity of hierarchical data in a limited space. At the lowest level, each tile represents one stock. The color of the tile indicates the percent change in market price, and the size of the tile represents the total market value of that stock (also known as market capitalization). These tiles are placed in a hierarchical arrangement by industry, sector, and company. There are over 500 stocks included in the map, so it gives a quick view of how the market is doing.

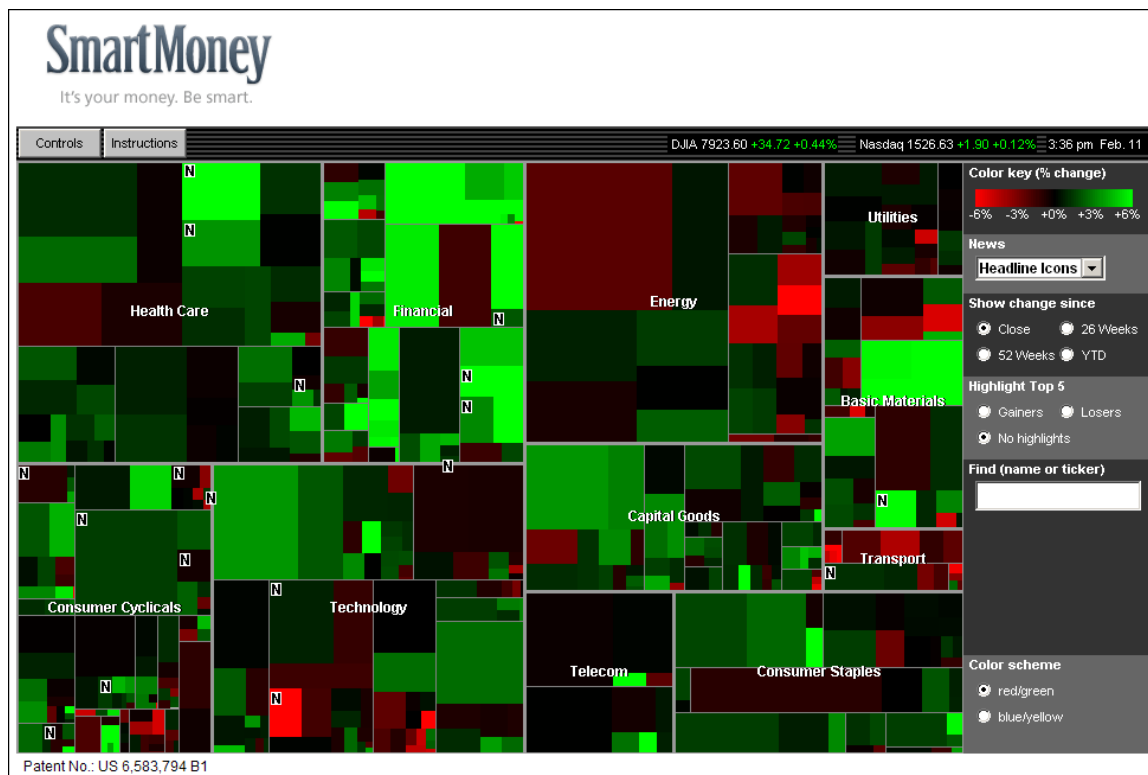


Figure 1. SmartMoney.com

Figure 2 has another example of the tile chart. It shows a large number of computers arranged in a hierarchy by the **Function** they perform, **Machine** and **Hour**. The size of the rectangle represents the relative size (in number of processes) of each function, machine and hour, and the color represents the hourly utilization for the computers that support that Function.

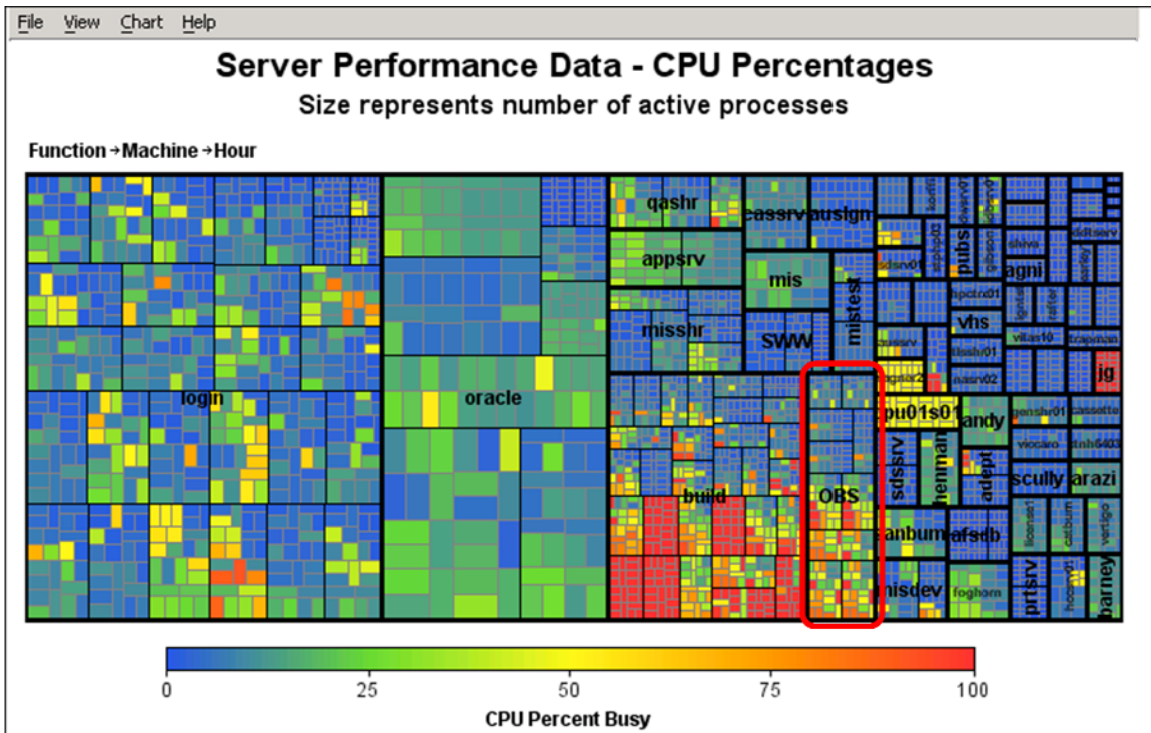


Figure 2. Sample IT Tile Chart

The tree-based nature of the tile chart makes it especially useful in an interactive environment. By clicking on areas of the tile chart, you can zoom into and out of the hierarchy. In the previous example, the Online Banking Service (OBS) function is selected. By drilling down into this tile, you can view the computers and the utilization of those computers that host this service. If you further drill down into each tile that represents a computer, the individual hours of the day are displayed so that the busiest time of day for each computer is readily identifiable.

Interaction

The status bar is in the upper-left area of the tile chart. (See Figure 2.) It shows all available levels of the hierarchy, from the most general to the most specific. The levels in the hierarchy are set when the tile chart is created. This status bar is an indicator for the following tile chart interactions:

- Current visible levels appear in **bold** text.
- Current zoomed levels are underlined, indicating that they can be clicked to zoom back to that level.
- State information is shown in parentheses beside the variables that you have zoomed into.
- Depending on detail level, some levels might appear in plain text to the right of the visible levels. (These levels can be seen by increasing the detail level or zooming into the data.)

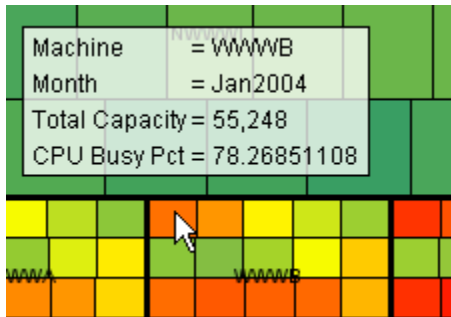


Figure 3. Data Tip

Data tips are displayed when the mouse pointer passes over a particular tile. Left-clicking on a tile zooms in one level of detail (as indicated in the status bar) for the selected tile. To zoom back up (or out) of any level, click an underlined level in the status bar. Right-clicking on a tile opens a pop-up menu with options to zoom in, to zoom out, or to navigate Web links. Depending on the detail level of the tile chart, zooming in can make new tiles visible.

A color-gradient legend provides a key to the value of the colors plotted on the chart. The legend provides the name of the variable used to color the tiles. The legend displays the variable's minimum value, the maximum value, and the midpoint value. These colors and midpoint value can be changed in the chart data options.

Using several chart functions, the viewer can change the colors of the legend or the layout of the chart. At any point in the drill-down hierarchy, the data tip displays the detail information from the underlying data. (See Figure 3.)

BUILDING A TILE CHART

The SAS tile chart functionality is supported in SAS[®] 9.2 using the new GTILE procedure in SAS/GRAPH[®] software. The SAS tile chart can also be created using SAS[®] Enterprise Guide[®] 4.2 and SAS[®] Web Report Studio 4.2. Either Java or ActiveX must be specified to create interactive charts, and the SAS Output Delivery System (ODS) is used to open and close the output destination. This paper discusses the new SAS procedure and how to create the SAS tile chart in SAS Enterprise Guide.

Required Specifications

The SAS tile chart procedure, GTILE, requires a CHART variable to specify a numeric variable from the input data set whose values are used to determine the size of each tile. If the COLORVAR= option is not specified, the CHART variable is used to assign a color to each tile.

The TILEBY parameter specifies the variable, or list of variables, that defines the tile segments and the chart levels. The variables can be character or numeric and are used to define the hierarchy of the tile chart.

Tile Chart Placement Options

The tile chart supports different ways of displaying data as tiles in the available space. The STANDARD (also known as TILE or SQUARE), FLOW, and TOGGLE statements specify the type of layout, the variables that define the chart levels, the tile categories, and the tile sizes used to display the data. These layouts lend themselves to customizing the way a tile chart is displayed to best accommodate the type of data being shown. For example, date or time values for the TYLEBY variable look better when ordered sequentially. All layouts are performed recursively, for each level of the TYLEBY variable specified. Illustrations of the different tile layouts are provided.

The STANDARD layout displays data as close to square as possible. It creates a chart that orders data by tile size, generally placing tiles from largest to smallest from bottom-left to top-right. This is the classic rectangular tree map, where tile position is not significant. (See Figure 4.)

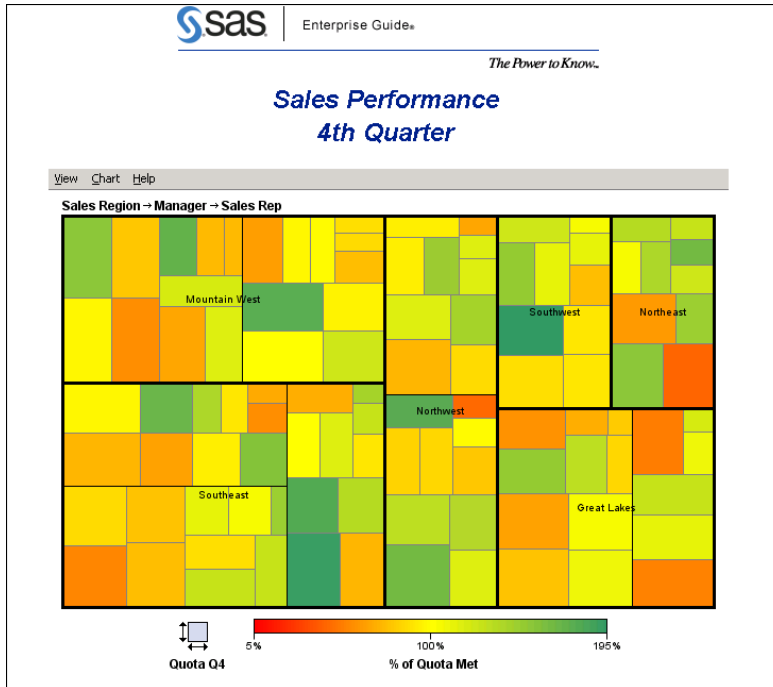


Figure 4. STANDARD Tile Layout

The FLOW layout creates a tile chart that honors sort order and is read from left to right and top to bottom. This layout is most useful for TYLEBY variables that have a sequential or date order. (See Figure 5.)

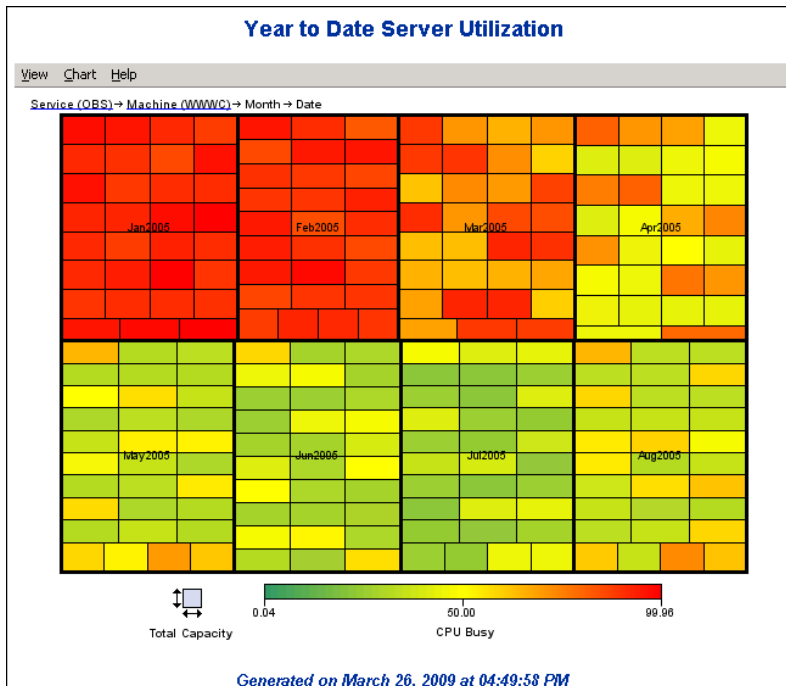


Figure 5. FLOW Layout

The TOGGLE layout creates a chart that honors sort order and is read horizontally or vertically. When changing levels, TOGGLE switches direction for each level of TYLEBY variable and the display toggles from one row to one column. Therefore, the data can be displayed in sorted order along a single axis. (See Figure 6.)

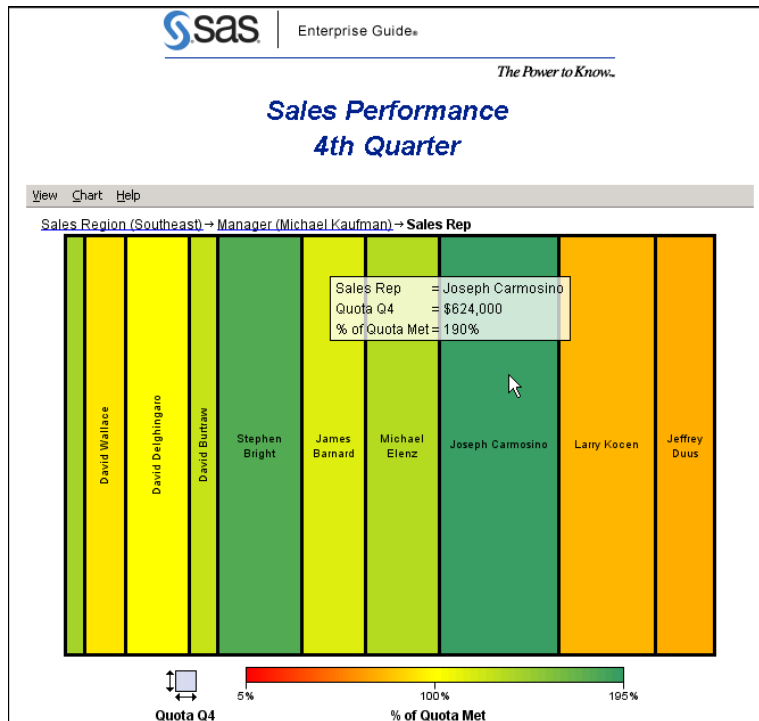


Figure 6. TOGGLE Layout

Options

The options in a GTILE procedure affect all chart levels that are produced.

- **BASELINE** specifies the midpoint color value for the tiles.
- **CMISSING** specifies the color to be assigned to tiles when the COLORVAR value is missing. The color used to identify missing values is represented by a missing color indicator that is displayed to the right of the legend.
- **COLORRAMP** specifies the colors to be distributed continuously across the range of data values. Two colors are required to create a color ramp. However, the number of colors that can be provided is not limited. These values specify the minimum and maximum values of the color ramp. If only two colors are specified, the legend midpoint is not labeled. All of the color-naming schemes supported by SAS/GRAPH are valid.
- **COLORVAR** specifies a numeric variable whose values determine the color of the tiles. The smallest value of this variable is assigned to the first color in the color ramp. The largest value of this variable is assigned the last color in the color ramp. Each value is assigned a color from the gradient list of colors between the first and the last colors in the color ramp.
- **DETAILLEVEL** specifies the number of levels of detail to display. The valid values for the **DETAILLEVEL=** option are from 1 to the number of variables listed in the **TILEBY** levels list. Each level has a unique outline. As you drill-down through the levels, the lines get thinner in weight, then lighter in color, then both. The levels are listed in the status bar on the left. The **DETAILLEVEL=** option does not affect the drill functionality.

The following sample code creates a tile chart called "Sales Performance."

```
TITLE1 "Sales Performance";
TITLE2 "4th Quarter";
FOOTNOTE1 "Generated on %TRIM(%QSYSFUNC(DATE()), NLDATE20.) at
%TRIM(%SYSFUNC(TIME()), NLTIMAP20.)";

proc gtile data=WORK.SALESDATA;
  TITLE 'Quota Q4'n
  tileby=( 'Sales Region'n, Manager, 'Sales Rep'n)
  /
  BASELINE=1
  COLORRAMP=(RED YELLOW CX339966)
  COLORVAR='% of Quota Met'n
  DETAILLEVEL=2
  ;
run;
quit;
```

USING SAS ENTERPRISE GUIDE

Tile charts are also supported in an interactive client application. SAS Enterprise Guide provides the user with a point-and-click interface for selecting the parameters and options necessary to create the tile chart.

Step 1:

- Determine the hierarchy by assigning classification variables (TILEBY).
- Select the metric for color analysis.
- Select the metric for the size of the tiles.

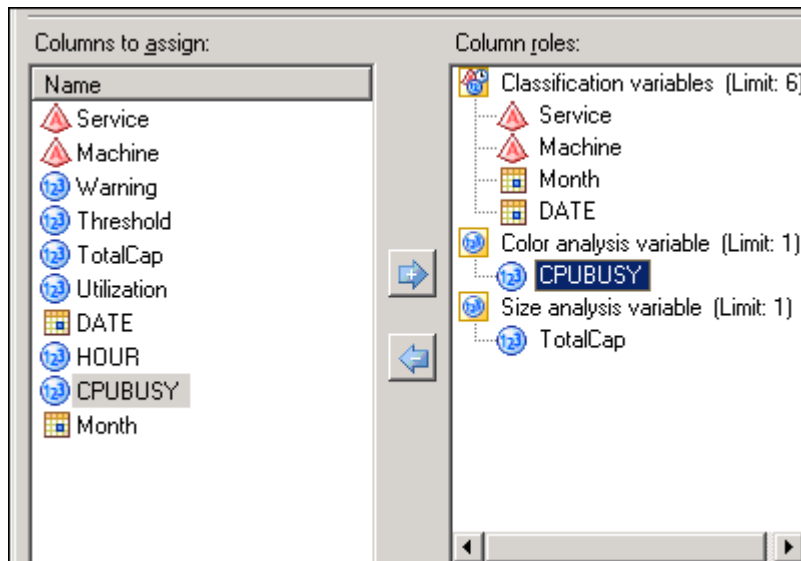


Figure 7. Data Window in the SAS Enterprise Guide Task

Step 2:

- Select the tile layout.
- Select the classification level of detail.
- Select the colors.

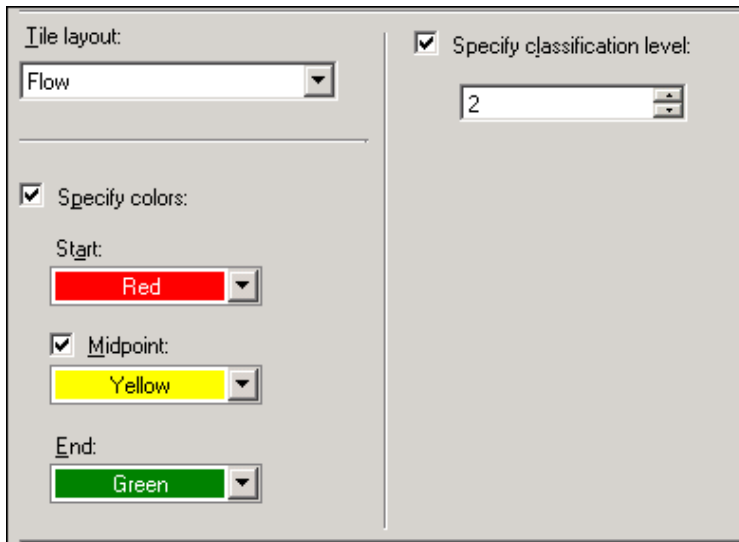


Figure 8. Appearance Window in the SAS Enterprise Guide Task

A Web links facility can be used to extend the drill down to other reports. This facility allows a specific tile to be linked to any Web address and is typically used to display a graph, to display a Web site, or to execute a SAS stored process. The Web link can contain the values of one or more of the classification variables in the name of the graph (see Figure 9) or as parameters to a stored process.

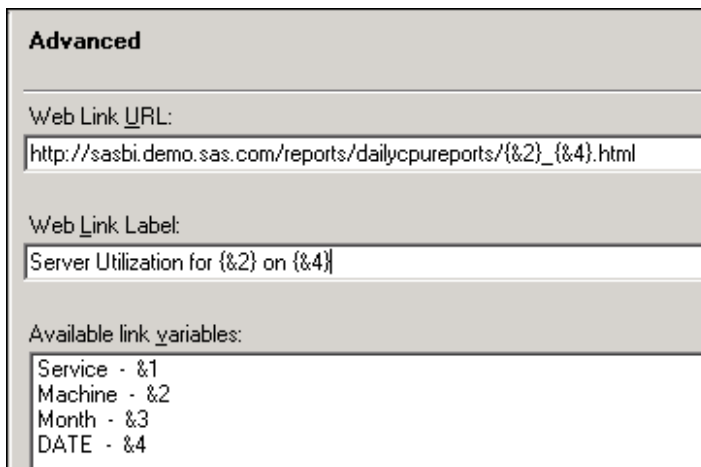


Figure 9. Advanced Window in the SAS Enterprise Guide Task

An example of linking to a stored process with parameters looks like this:

```
http://sasbi.demo.sas.com:8080/SASStoredProcess/do?_program=/BIP%20Tree/Daily_C  
PU&Machine={&2}&date={&4}&_odsstyle=Sasweb
```

BENEFITS

The technology behind SAS tile charts enables the creation of an interactive graphic specifically designed to grab and focus the report consumer's attention on those issues that require their action.

Key Benefits and Advantages

- Extend the value of your SAS® Business Analytics platform—View the wealth of data already in your SAS data marts in a new way.
- Quickly visualize actionable items embedded in masses of data—The tile chart displays vast amounts of information that can be consumed in a glance.
- Pinpoint exceptions and anomalies—Through the use of size, color, and interactivity, tile charts focus attention to those items requiring it.

In conclusion, the tile chart is used in this paper for stock performance, computer resource usage, and sales representative performance. Other uses of the tile chart are limited only by your imagination and the business data available to you, so, by all means, crack open this new chart type available from SAS and use it to your best advantage!

The SAS Advantage

Access to the information you need to make quick and accurate business decisions is key to your organization's success. SAS Business Analytics and the SAS tile chart provide you with access to actionable intelligence to optimize business resources, services, and financial investments.

CONTACT INFORMATION

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