Paper 060-2013

What's New in SAS® Enterprise Business Intelligence for SAS® 9.3

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ABSTRACT

SAS® Enterprise BI Server provides a comprehensive suite of BI tools that enables a broad set of business and IT users to produce and consume consistent, fact-based information. The latest revision contains enhancements to both SAS Web Report Studio and SAS BI Dashboard. Key capabilities are discussed and demonstrated by members of the product team. Designing reports and dashboards is now more flexible, and downstream consumers benefit from better performance, improved navigation and interactions, and better integration with Excel and your e-mail client. Plans for future releases are previewed, such as mobile delivery of SAS Web Report Studio reports, and how SAS Enterprise BI Server fits within the overall BI portfolio.

INTRODUCTION

SAS Enterprise BI Server has evolved over four major releases to include a broad set of query, reporting, analysis, and administrative capabilities. These capabilities are provided in a suite of integrated Web and desktop tools that share common metadata and infrastructure. There have been many key enhancements since the release of SAS 9.2, including dashboards, MS Outlook integration, and support for mobile delivery using a third party add-on, to name just a few. The latest release, SAS Enterprise Server 4.31_M2, runs on SAS 9.3 M2. Enhancements were made to the visualization and formatting of report results, integration between the SAS tools and with third party software, as well as dashboard indicator interactions. Going forward, the evolution continues with the upcoming release of SAS Enterprise BI Server 4.4 on SAS 9.4.

BRIEF OVERVIEW OF SAS ENTERPRISE BI SERVER

SAS Enterprise BI Server includes various tools to meet your organization's diverse Business Intelligence needs, including those of information consumers, content producers, and administrators.

SAS Enterprise BI Server capabilities include:

- Aggregation of SAS content and personalization.
- Dashboard building and viewing.
- Query and reporting.
- OLAP cube creation, tuning, and exploration.
- Microsoft Office integration.
- Metadata management.
- Server and security administration.

Users with varying technical skills and availability are able to quickly and easily obtain the information needed in support of better decisions.

There are a number of interfaces that have been designed specifically to meet the needs of the different types of users based on the tasks they need to perform in their roles. The following tools, listed alphabetically, are included in SAS Enterprise BI Server.

SAS® Add-In for Microsoft Office

> The SAS Add-In for Microsoft Office can leverage SAS for data access, reporting, and analytics directly from Microsoft Office via an integrated ribbon tab. Users can access SAS from Excel, PowerPoint, Word, and Outlook e-mail.

SAS® BI Dashboard

> Designers can create dashboards easily through a drag-and-drop interface, aggregating data from a variety of sources. SAS BI Dashboard enables indicator zooming, data brushing, and contextual filtering between multiple indicators. Dashboards can serve as a launch pad for BI, as indicators can be linked to other dashboards and reports. Commenting on individual dashboard indicators promotes collaboration leading to action.

SAS® Information Delivery Portal

Information created in SAS Business Intelligence products and SAS solutions, such as reports and dashboards, can be shared more broadly using the SAS Information Delivery Portal. The Web-based interface can be personalized and supplies sensitive content to authorized users with centralized role-based security.

SAS® Information Map Studio

SAS Information Map Studio creates and manages information maps, which is metadata that translates physical data structures and table joins into data items in terms that can be easily understood by your business users. By enabling business users to be self-sufficient in accessing your data, they can answer business questions on their own in a consistent manner.

SAS® Management Console

The SAS Management Console is a SAS environment management tool run from an administrator's desktop, yet it can manage the resources on all platforms supported by SAS as your single point of administration. This client application utilizes a plug-in architecture, enabling you to support a wide range of SAS administrative capabilities.

SAS® OLAP Cube Studio

SAS OLAP Cube Studio is a desktop tool that enables data modelers to design and build cubes, dimensions, hierarchies and measures using a point-and-click interface, as an alternative to the OLAP procedure.

SAS® Web Report Studio

SAS Web Report Studio is query and reporting application designed for general business users who want to view, author, and share reports on the Web. SAS Web Report Studio helps business users be self-sufficient answering their business questions while freeing IT staff to work on strategic technology initiatives.

The following are available as an optional add-on to SAS Enterprise BI Server.

SAS® Enterprise Guide®

SAS Enterprise Guide is a project-oriented Windows application that provides access to the analytic power of SAS. Business analysts, statisticians, and SAS programmers can gather and manage the data they need, and they can perform meaningful analyses quickly. The point-and-click interface guides users through the analytical process and makes it easy to create and publish reports, graphs, and charts.

SAS® Rapid Predictive Modeler

SAS Rapid Predictive Modeler enables all business analysts to generate predictive models without having to rely on a limited number of analytic professionals. The SAS Rapid Predictive Modeler task is available from either SAS Enterprise Guide or the SAS Add-In for Microsoft (Microsoft Excel Only). It automatically transforms the data, selects variables, selects the best model from a variety of algorithms, and delivers the results in simple charts. If needed, modelers or statisticians can use SAS Enterprise Miner to further refine SAS Rapid Predictive Modeler-generated models. Note that SAS Rapid Predictive Modeler requires SAS® Enterprise Miner 6.2 running behind the scenes to generate predictive models.

Roambi ES for SAS®

In partnership with MeLLmo, Roambi ES for SAS provides an adapter for publishing SAS Web Report Studio reports via native applications for iPhone or iPad.

KEY ENHANCEMENTS SINCE 9.2

There have been many enhancements to SAS Enterprise BI Server since its initial release in 2005. Most SAS Enterprise BI Server customers have deployments in either SAS 9.2 or 9.3. These enhancements have been based on feedback primarily from existing customers. Just a few of the key enhancements added, since the release of SAS 9.2, are:

- Interactive dashboards
- Improved prompting
- Role based capability control
- Discussion threads
- Outlook integration
- SAS BI Web Parts for SharePoint
- Mobile delivery via Roambi ES for SAS

For more details about all of the enhancements made to the SAS Enterprise BI Server tools or optional add-ons, please refer to the "What's New in SAS" page on the SAS Support site by pointing your browser to http://support.sas.com/documentation/whatsnew/index.html.

SAS ENTERPRISE BI SERVER 4.31_M2

SAS Enterprise BI Server 4.31_M2 was released in August 2012. SAS Product Management and Technical Support have heard a great deal of feedback when engaging existing customers about various ways the capabilities they used most could be even better. Therefore, the primary objective for the 4.31_M2 release is to improve upon several existing capabilities, rather than introducing entirely new functionality. Release themes for 4.31_M2 include:

- Improved visualization and formatting.
- Improved integration.
- Improved interactivity.

Specific tools enhanced for the 4.31_M2 release include SAS Web Report Studio and SAS BI Dashboard. SAS Enterprise BI Server 4.31_M2 requires SAS 9.3 M2, which was also released in August 2012.

SAS WEB REPORT STUDIO 4.31_M2

Web reports are easy to share with a broad community of business users, so it is important that the information is well formatted for quick interpretation. Many of the improvements made to SAS Web Report Studio 4.31_M2 enhance the report consumer's ability to spot what information is most important and enable them to share the results easily. The following sections take a closer look at each of the latest enhancements to SAS Web Report Studio with examples.

Improved Conditional Highlighting

When used moderately, conditional highlighting in SAS Web Report Studio helps you focus your attention on the most important information. In the 4.31_M2 release, conditional highlighting has been improved for tables so that you can define formatting rules based on category values. You can create multiple rules for a single category data item, so that you can emphasize multiple category values. For example, if a data item called catalog equals Gardening, color the entire row green or if catalog equals Sports, then color the entire row blue. In addition, you can now choose to highlight an entire row or column based on a category or measure for list tables. Crosstabs highlight rows or columns for categories and individual cells for measures. Prior releases were limited to highlighting individual cells for measures only.

If you have multiple conditional highlighting rules for a table, you might have cells where multiple rules conflict. This is because rules that apply to entire rows or columns can intersect each other, and they can overlap with rules that apply to individual cells as well. The styles that you specify for colors and fonts are not merged among conditional highlighting rules that intersect. For example, you are not able to get a cell that has a bold font on a green background when one rule that only changes the background color to green and a second rule that only changes the text font to bold both apply to that cell. SAS Web Report Studio only applies all of the font and color attributes for a single rule to a cell. Therefore, the following precedence logic determines which conditional highlighting rule is applied for each cell in a table.

- Measure highlighting rules override category highlighting rules.
- Highlighting rules applied to an entire row override highlighting rules applied to an entire column.
- Inner category highlighting rules override outer category highlighting rules.
- Rules that apply to a cell override rules that apply to a row or column.

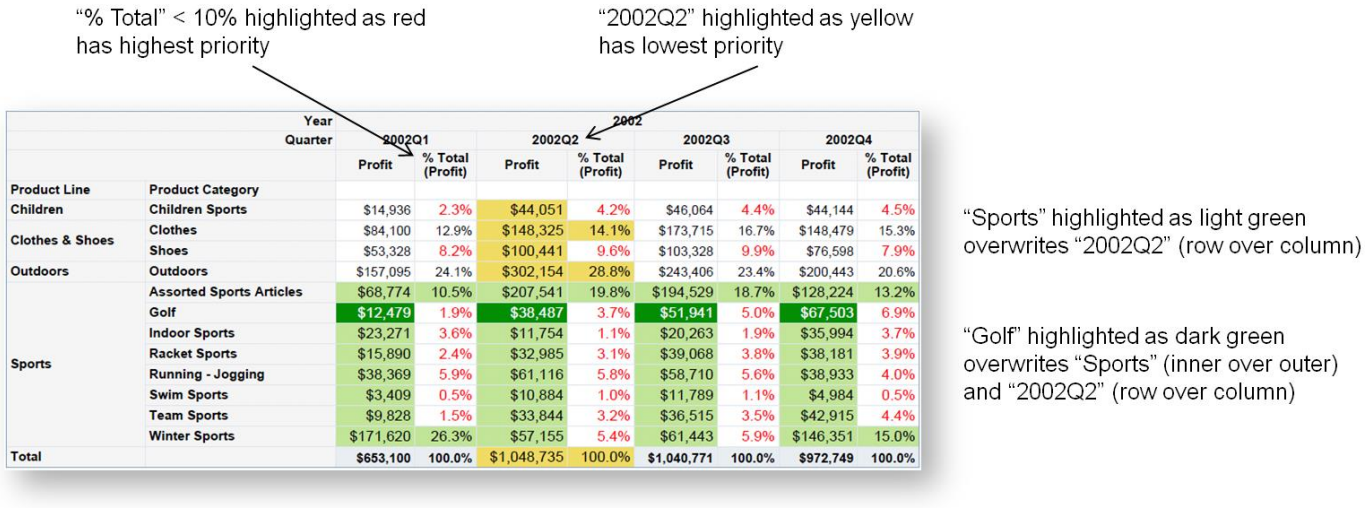


Figure 1: Precedence of Multiple Highlighting Rules

Note that hot fixes I84001 and I86001 (http://ftp.sas.com/techsup/download/hotfix/HF2/I84.html) include corrections to a precedence order issue found with the initial 4.31_M2 release.

There are a few constraints to conditional highlighting in SAS Web Report Studio 4.31_M2. You cannot create a rule for one data item based on a condition for another data item. For example, even though you can define a rule that colors the text of revenue green when revenue is greater than expenses, you cannot define a rule that colors the text of revenue green when profit is greater than zero. Similarly, you cannot create a rule that highlights a row or column based on a data item that is not displayed in a table. Totals and subtotals cannot be conditionally highlighted based on a measure data item.

Better Format Control for Measures

You can now modify measure data item formats while in view mode, starting with SAS Web Report Studio 4.31_M2. For prior releases, report consumers could add new measures to a table in view mode by turning on percent of totals or subtotals from the right-click context menu, but they could not control the formatting of the new measure. Moreover, a percent of total or subtotal always displayed a precision of two places to the right of the decimal. Even report authors could not change the format of a percent of total while in edit mode. Several customers asked SAS for the ability to control the number of decimal places displayed when turning on percent of total or subtotal. If your data is highly summarized, it might not be relevant to show a value between whole percentages to break ties. However, if there are many rows contributing to a total, you might need to show one or two decimal places to avoid seeing 0% for rows having a small contribution and to distinguish between values that would appear to have the same contribution if no decimal places are displayed. With this new capability you and report consumers have the choice, as illustrated in Figure 2 that follows.

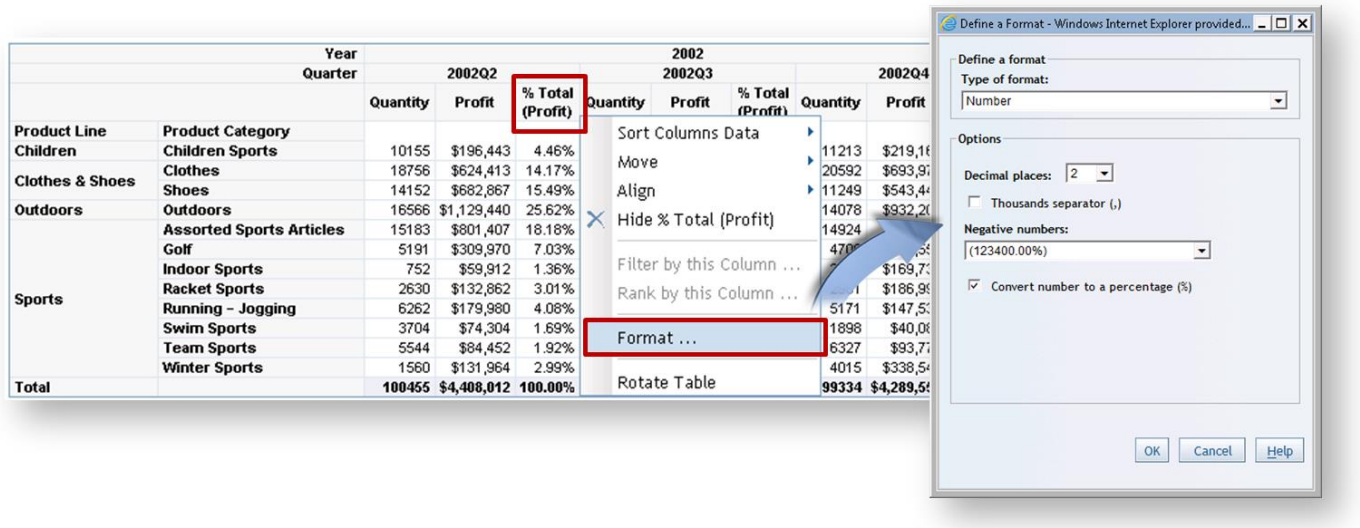


Figure 2: Change Measure Formats in View Mode

Member Alignment

When your data source for a crosstab is an OLAP cube, all members at the same level in a hierarchy are now aligned when a member does not have child members. In Figure 3 below, the table on the left shows a member, Indoor Sports, at the product category level that does not have descendants. It is not indented with other members at the same level because of the missing expand and drilldown icons. This could lead report consumers to misinterpret results concluding that Indoor Sports is a parent of the indented members below it, for example Racket Sports. In SAS Web Report Studio 4.31_M2, members without children are aligned even though the drill and expand icons are absent.

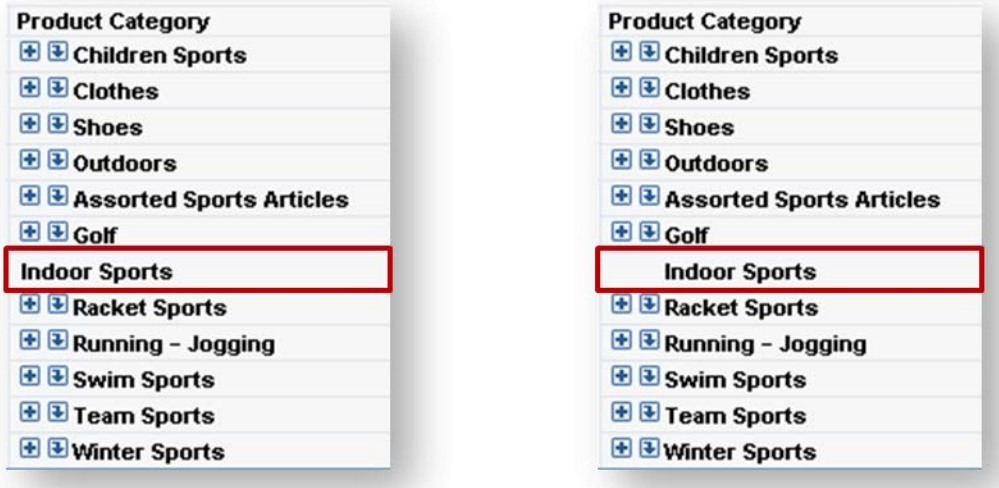


Figure 3 Members without Children are Aligned with all Siblings

Header and Footer Enhancements

Add Links to Headers and Footers

SAS Web Report Studio 4.31_M2 enables you to associate a link with images and text in the report header and footer. You can do this prior to 4.31_M2 only in the report body using text objects, but you need this capability in the header or footer if you want a link to appear at the top or bottom of your report and if you need the link to repeat on each page of a report PDF. An example of a common link in the report header might be a company logo at the top

that links to the corporate intranet. Information consumers accustomed to seeing this logo at the top of intranet pages or dashboards, might expect that this logo to always link to the intranet home page. A link in the report header and footer can be defined to reference an existing report, a SAS Stored Process, or a URL that you provide. With either destination type, you can provide a tooltip text popup for report viewers when they move their mouse over the link, and you can decide if the link replaces the content in the current browser or opens a new browser window. If the link references a Web page via URL and you expect the user might need to return to the report to continue their analysis, opening the link in a separate window enables them to return to the report. Users cannot use the browser's back button to return to the report if the link destination replaces the report contents.

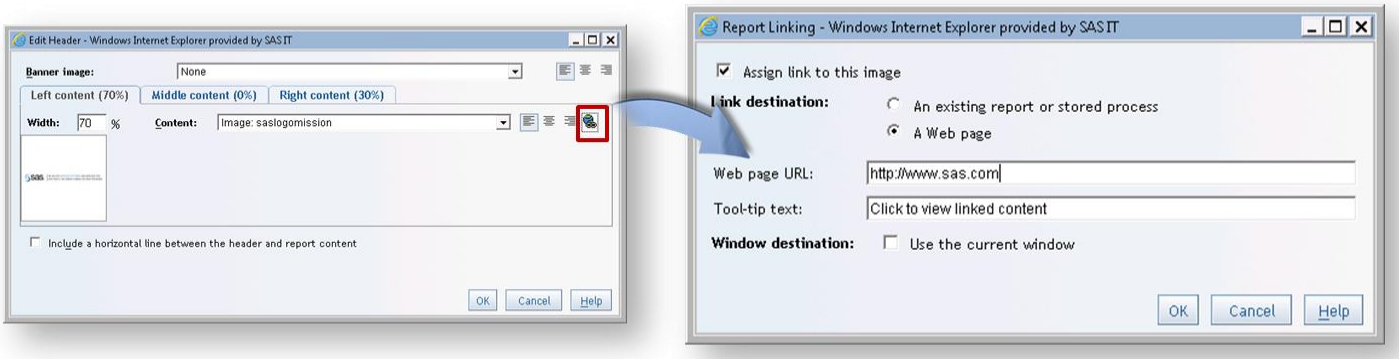


Figure 4: Add Links to the Report Header and Footer

Note that you cannot associate a link with the banner image at the top of the left screen image in Figure 4. You can associate a link with images added to the left, middle, or right content areas of the header or footer.

Add Prompt Values to the Header and Footer

It is common for the title of a report to display the time period and other criteria associated with the information in the body of the report. With SAS Web Report Studio 4.31_M2, you can display as text in the report header and footer the prompt values selected by report consumers when opening reports. This enables your report titles and footers to be dynamic, and provides anyone reviewing the report results a clearer understanding of how the information is filtered. Figure 5 that follows displays the continents at the top of the report, on the right, that a report viewer chooses from a multi-select control on the prompt page. When defining the report header, on the left, you can place the prompt values where you need them to appear among other static and dynamic text.

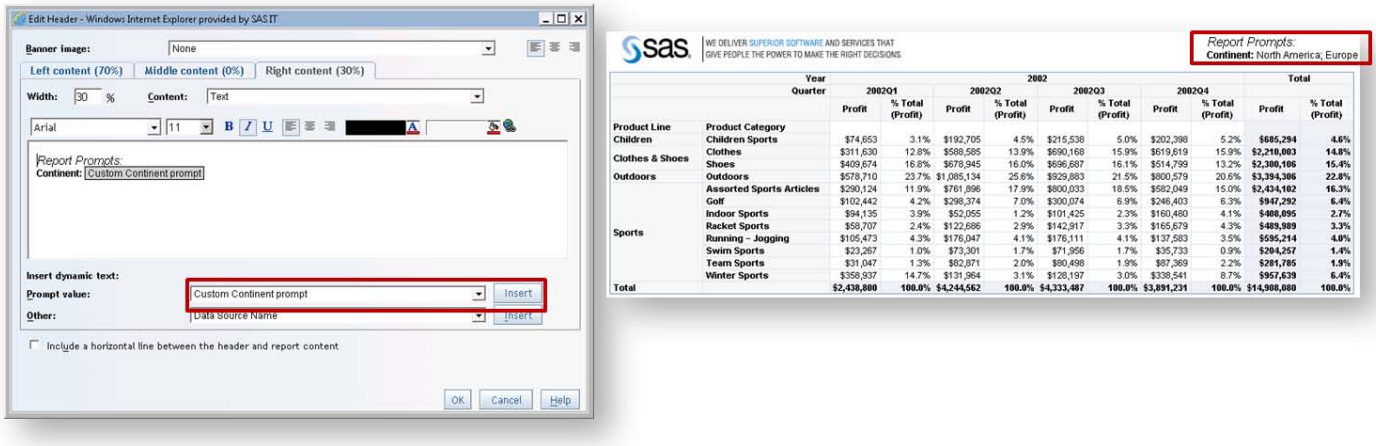


Figure 5: Insert Prompt Values in Report Header and Footer

Custom Colors

Anywhere you can change color, SAS Web Report Studio 4.31_M2 enables you to provide a custom color. Prior to 4.31_M2, colors were limited to the 72 standard colors. Many organizations have style and color standards for their corporate brand. If you create reports for external customers and partners, it is likely important that your organization's brand is reflected in the reports you share with them. SAS Web Report Studio enables you to change colors in various places, such as the text color used on tables, graphs, and text objects, or the pallet of colors used on a grouped bar chart, for example. Now you can enter a hex code in the color selector. There are several standard color models (RGB, HSL, HSV, and CMYK), and you can easily find color code converters on the Web to generate the hex code for one of these color model codes. Once you have the hex code for a color, you then type or paste this 6 digit number preceded by number sign (#) in the color value box, as in Figure 6 below. Note that you cannot use this feature to assign a specific color to a category value displayed on a graph, such as a bar or pie wedge. However, you can use a custom color on a table when creating a conditional highlighting rule for a category value. For graphs, you can specify the color of the nth position in a sequence, for example the 4th bar in a bar chart regardless of which category value is in the 4th position.

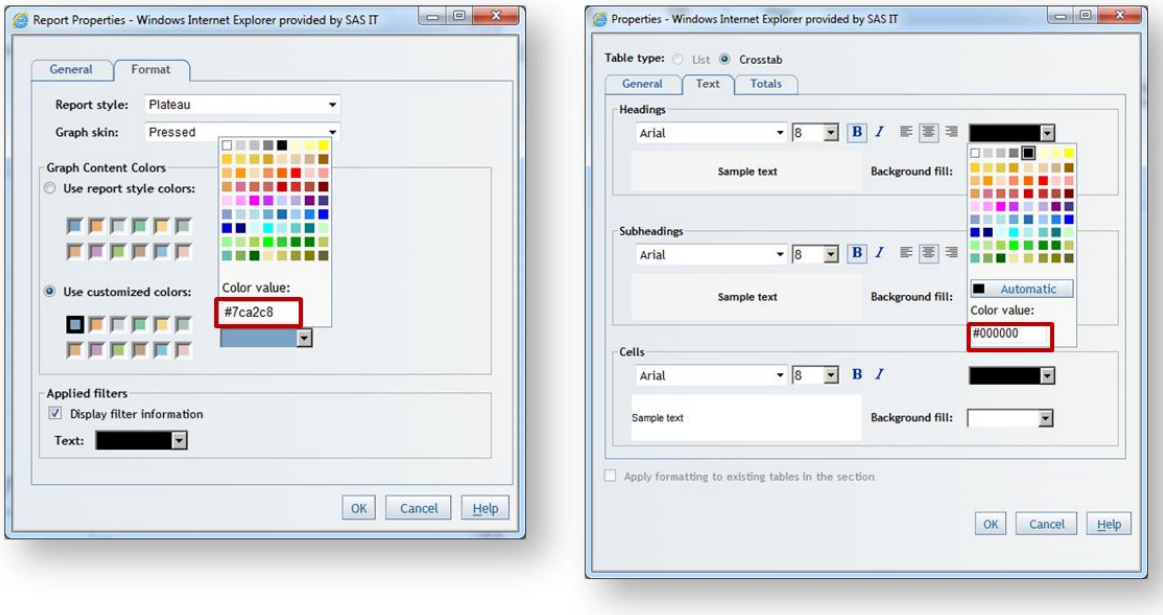


Figure 6: Custom Hexadecimal Color Codes

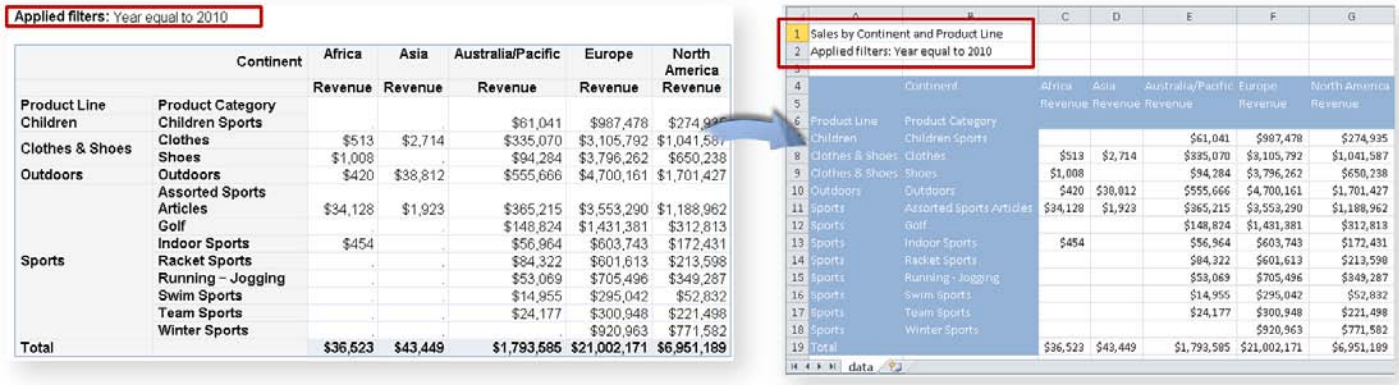
Dual Y-axis with 3 or More Measures

With SAS Web Report Studio 4.31_M2 you can assign more than 2 measures to a line chart when you have both a left and right Y-axis. Prior to this release, you could add more than two measures to a line graph with a single Y-axis only. If you had a second Y-axis on the right, you were restricted to only two measures. You might need to display multiple data items having different units of measure, such as quantity sold, revenue, and costs on the same line graph in order to understand how the these dependent variables move in relation to one another over time. Figure 7, that follows, illustrates this example. Measures with different formats, such as currency and percentage, also often require a second Y-axis. Removing the restriction of two measures for a dual Y-axis makes the line graph more flexible and valuable in SAS Web Report Studio 4.31_M2.

Figure 7: 3 or More Measures with 2 Y-Axes

Improved Export to Excel

You can now include the name of your report and the applied filters information in the output when exporting an individual report object to Excel. Figure 8, below, illustrates this with a red rectangle around the additional information above the crosstab that you can include when exporting to Excel from SAS Web Report Studio 4.31_M2. In addition, you can export data from individual report objects to the native XLSX output format for Microsoft Excel. Exporting the report name requires a change to a new system property, **`wrs.addReportNameToExport`**, which by default is set to false. You can find this property from the SAS Management Console under Application Management / SAS Application Infrastructure / Configuration Manager / Web Report Studio 4.3, and you need to restart the mid-tier application for a change to this property to take effect. To include filter information in the exported content, you need to select File ► Properties, while the report is open in SAS Web Report Studio, click the Formats tab, and then select the Display filter information option. For additional detail on how to configure these export options, please refer to the SAS Usage Note 46243, at http://support.sas.com/kb/46/243.html.



Applied filters: Year equal to 2010

	Continent	Africa	Asia	Australia/Pacific	Europe	North America
		Revenue	Revenue	Revenue	Revenue	Revenue
Product Line	Product Category					
Children	Children Sports			$61,041	$987,478	$274,935
Clothes & Shoes	Clothes	$513	$2,714	$335,070	$3,105,792	$1,041,587
	Shoes	$1,008		$94,284	$3,796,262	$650,238
Outdoors	Outdoors	$420	$38,812	$555,666	$4,700,161	$1,701,427
Sports	Assorted Sports Articles	$34,128	$1,923	$365,215	$3,553,290	$1,188,962
	Golf			$148,824	$1,431,381	$312,813
	Indoor Sports	$454		$56,964	$603,743	$172,431
	Racket Sports			$84,322	$601,613	$213,598
	Running - Jogging			$53,069	$705,496	$349,287
	Swim Sports			$14,955	$295,042	$52,832
	Team Sports			$24,177	$300,948	$221,498
	Winter Sports				$920,963	$771,582
Total		$36,523	$43,449	$1,793,585	$21,002,171	$6,951,189

Figure 8: Export to Excel with Report Name and Applied Filters

E-mail Report Enhancements

SAS Web Report Studio 4.31_M2 includes multiple enhancements that improve your ability to share reports via e-mail. A SAS Web Report Studio customer once shared that when SAS added the ability to e-mail links to reports, usage of the reports increased significantly. You can find more details for each of these enhancements by referring to the section "Sharing Reports" in the *SAS Web Report Studio User's Guide* at

http://support.sas.com/documentation/cdl/en/citug/65339/HTML/default/viewer.htm#n1savmd7p6imyjn1mwffxs34zmkx.htm. The following sections provide an overview for each of the enhancements that make sharing SAS Web Report Studio 4.31_M2 reports via e-mail significantly more valuable to your organization.

Preserve View State when E-Mailing a Report

Until SAS Web Report Studio 4.31_M2, e-mailing a link to a SAS Web Report Studio report while you were viewing the report sent a link to the original report definition. Therefore, if you had made changes to the report while viewing it, such as sorting, filtering, drill navigations, and so on, the recipient of the e-mail with the link would not have seen the same view that you were viewing when you sent the link. Now, SAS Web Report Studio 4.31_M2 automatically creates a snapshot of the report's current state while you are viewing it to send as a link to the e-mail recipients. This means your changes made while viewing, as well as any prompted filter selections made upon opening the report, are preserved so that recipients of the e-mail see the same information you were viewing at the time you send the link. You no longer need to type extra navigation instructions in the e-mail message for recipients to see the same information as you. Note that the report link URL is now shorter if your report contains prompts, because the prompt values selected are saved within the report snapshot instead of being added to the report URL. When the e-mail recipients open the report from the link in the message body, the report is opened to the section that was active when you e-mailed the report. Likewise, if your report contains group breaks, the report opens initially navigated to the place on the table of contents (group break values and levels) in the left pane where you were when you emailed the report. This improvement enables e-mail recipients to see the information you intended much faster to facilitate better collaboration.

A report definition snapshot is associated with the original report, and does not appear as another report in the list of reports. Although the snapshot does not add clutter to the list of reports in the file open dialog, you can access and manage these snapshots from the **File Management** page in SAS Web Report Studio 4.31_M2, invoked by clicking the **File ► Manage Files**… menu option. Both senders and recipients see the snapshot appear in their recent reports list on the **File** menu and **Getting Started** page. Note that the name of the report is the same as the original with "/Emailed/" plus a timestamp in the YYMMDD_HHMMSS format added to the end. Figure 9 below displays an example snapshot name at the top of the recent reports list.

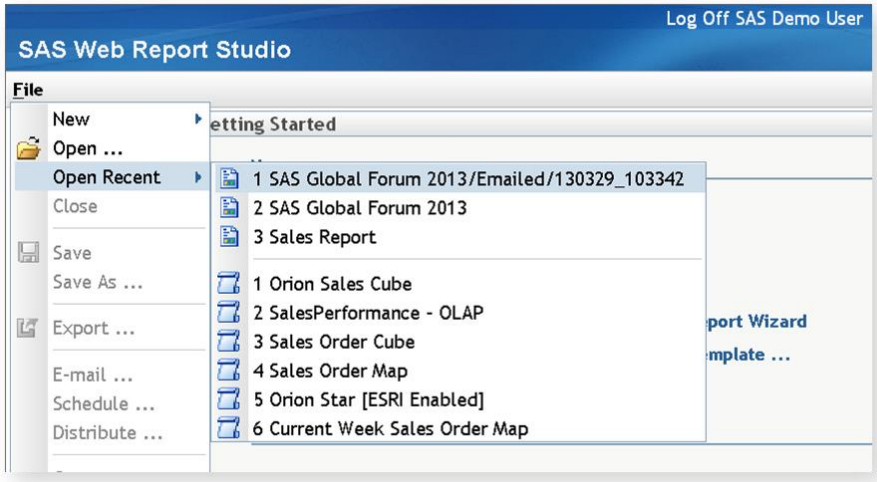


Figure 9: E-Mailed Report in Recent List

System Option to Include Standard Text in E-Mail Body with Link to a Report

The preservation of view state when e-mailing a report link, covered in the previous section, reduces the need to type report navigation instructions in your e-mail message to ensure the recipient sees the same view as you, but infrequent or first-time recipients might need basic SAS Web Report Studio instructions, to keep your phone from ringing, and you might be required to include a legal disclaimer. If you require this type of text in the message body, it should be consistent and it would be repetitive for you to type this text for each report e-mailed prior to SAS Web Report Studio 4.31_M2. With the 4.31_M2 release, you can optionally create a text file on the mid-tier server for custom text to be automatically inserted before and after the report link when SAS Web Report Studio users e-mail a link to a report.

To enable this standard text for all users when e-mailing reports, your need to do the following. First, create a text file containing the standard text that all users see in the message body when e-mailing a link to a report from within SAS

Web Report Studio. Figure 10 below is an example of the text file content, and an example filename for this file is **`email_standard_text.txt`**. You should save this new text file in the folder *SAS-configuration-directory*`\Lev1\Web\Applications\SASWebReportStudio4.3\`*customer* on the mid-tier server machine. Be certain to save the file as a UTF-8 file if your text contains international characters. Then, set the **`wrs.email.report.standard.text.file.name`** property in Configuration Manager within SAS Management Console to reference this new text file.

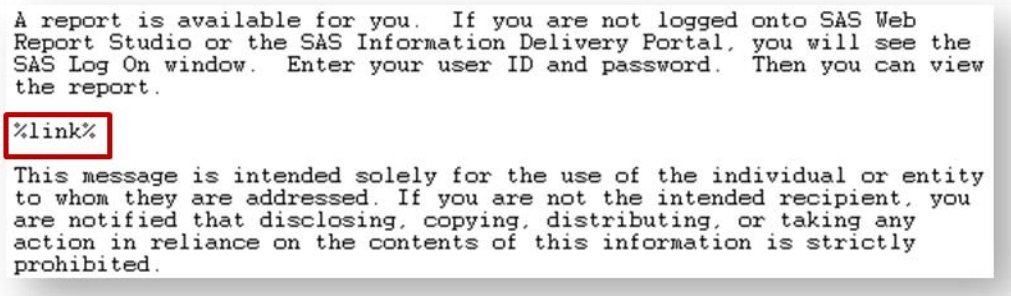


Figure 10: Example of Standard Text to Include in E-Mail Message Automatically

Group break values in distributed e-mail subject

Automated report distribution, which enables you to push specific pages of a scheduled report to multiple e-mail recipients, is improved. SAS Web Report Studio uses the group break values to break the report into multiple pages, and you can specify one or multiple e-mail addresses to receive the pages for each unique combination of group break values, such as a specific store id in the southeast region. If you are a regional manager, you might receive multiple e-mails for different pages of the same report, for example one e-mail for each store in your region. Prior to the 4.31_M2 release, each of these e-mails for different pages of the same report also have the same e-mail subject. In 4.31_M2, you have a new option to include the group break values in the subject line of the e-mail. With this improvement, you can find specific reports that are pushed to you inbox faster.

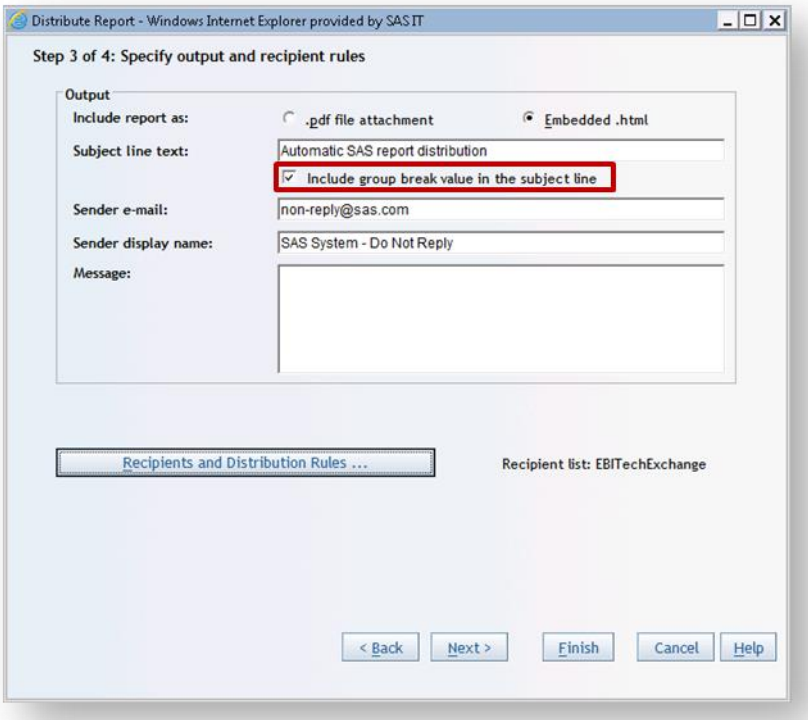


Figure 11: Option to Include Group Break Values

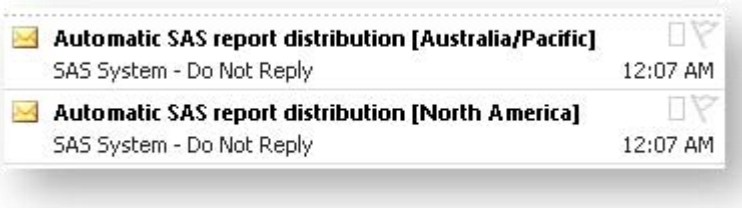


Figure 12: Inbox with a Group Break Value in the Subject Line

Feature: Switch Hierarchies

In SAS Web Report Studio 4.31_M2, you can now change which of the alternate hierarchies for a dimension you want to display on a repot object while viewing a report. It is common to have multiple hierarchies for an OLAP cube time dimension, and you might use multiple hierarchies for other dimensions, such as a customer dimension. Prior to the 4.31_M2 release, you had to be in edit mode and you had to modify the data selection, because the ability to switch hierarchies was limited to report authors. Note that you are still only allowed to have one hierarchy per dimension assigned to the table or graph at a time. Figure 13 that follows shows the right mouse click context menu that enables you to change to another hierarchy for the same dimension for a crosstab.

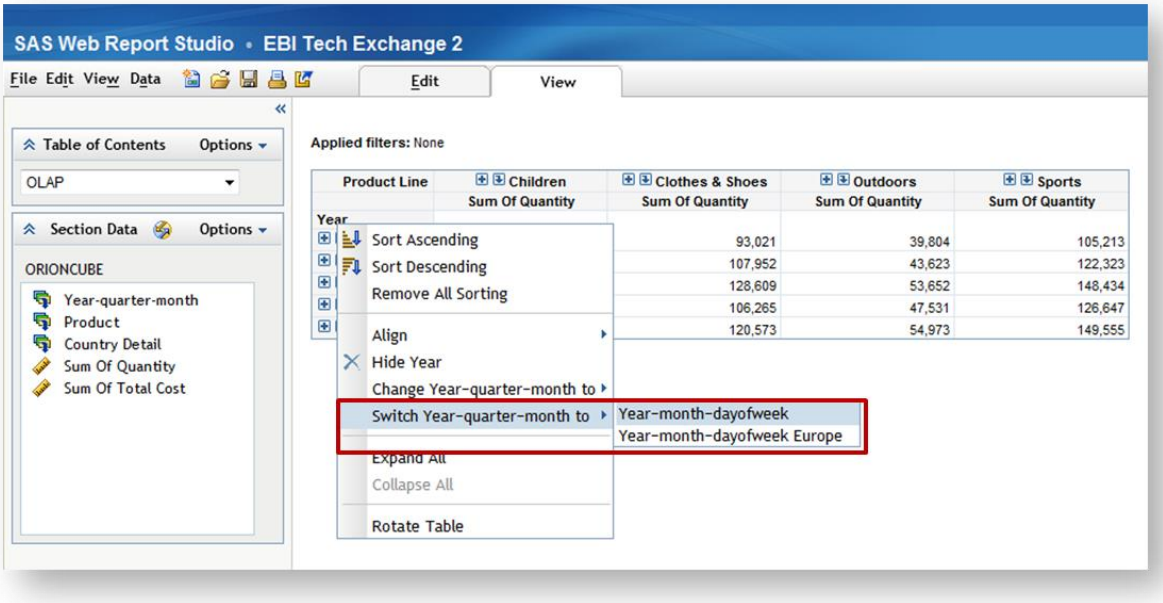


Figure 13: Switch Hierarchy Context Menu

Feature: Saving Reports

If your organization has a large deployment of SAS Web Report Studio report consumers, you might be restricting the ability to save changes to standard reports in specific shared folders. When saving an existing report, if you do not have permission to write the report file, nor permission to write in the same folder as the report file, then you are redirected to the "Save As" window when clicking the save menu item or toolbar icon, and you are relocated to your preferred save folder. You have always been able to manually select the save as option, however now the process is more efficient providing a better user experience.

A related enhancement gives your administrators an option to set a company preferred folder for saving reports. Note that the setting applies to all users. As mentioned in the previous paragraph, administrators might prefer to protect standard reports and the shared folders they belong to from being overwritten. The company preferred folder, if set, provides a different shared folder for saving modifications as a copy. Even if the administrator has set a company preferred folder for saving, you can overwrite this default "Save As" location in your preferences. Figure 14 illustrates this new preference. For example, you might have a personal folder or department folder that you use frequently and wish to be your default save location.

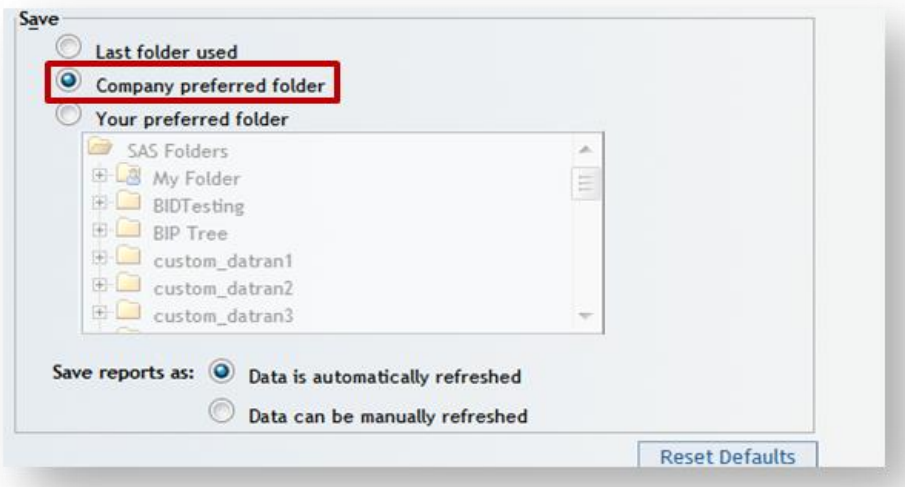


Figure 14: Default Save Location in Preferences

SAS BI DASHBOARD 4.31_M2

Information dashboards continue to grow in popularity, and SAS has provided a number of enhancements with the second maintenance release of SAS BI Dashboard 4.31. These dashboard enhancements either contribute to improving navigation within and between dashboards, the design of dashboards, or dashboard performance. The sections that follow describe and illustrate each of the enhancements to SAS BI Dashboard 4.31_M2.

Passing Parameters between Dashboards

You can specify parameters that can be passed to a dashboard when it is opened. These parameters are used to set the initial value of the prompts in the dashboard. Several SAS customers have shared that they often create a series of dashboards linked together, where one dashboard serves as the primary starting point. Ultimately, one of the secondary dashboards might link to a SAS Web Report Studio report or SAS Stored Process for deeper analysis. When linking from a dashboard to another dashboard, it became important to be able to pass the existing filter context to the target dashboard. Otherwise, dashboard consumers have to select the same prompt values again. With SAS BI Dashboard 4.31_M2 you can have the same or similar filter prompts in multiple dashboards where selections in one are passed to the next dashboard.

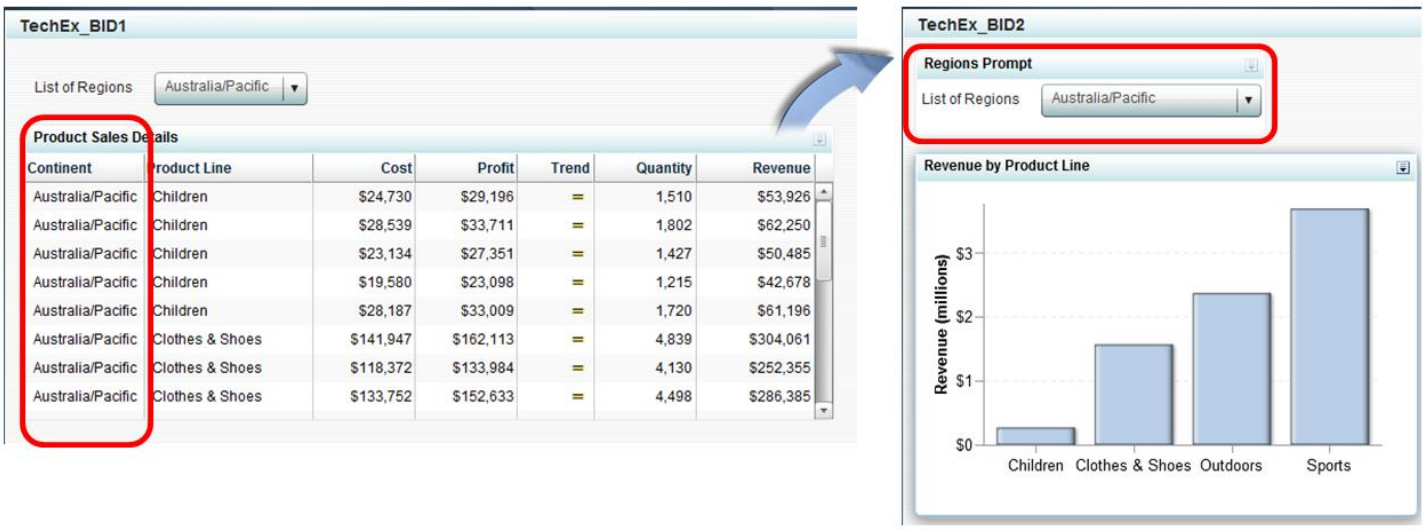


Figure 15: Pass Values to Target Dashboard

Save Filter Values with a Favorite Dashboard

When you set a **Favorite** for a dashboard with prompts, SAS BI Dashboard 4.31_M2 saves the current prompt values that you are using to filter the view of information in the dashboard. Figure 16 shows two favorite dashboards with two saved filters each.

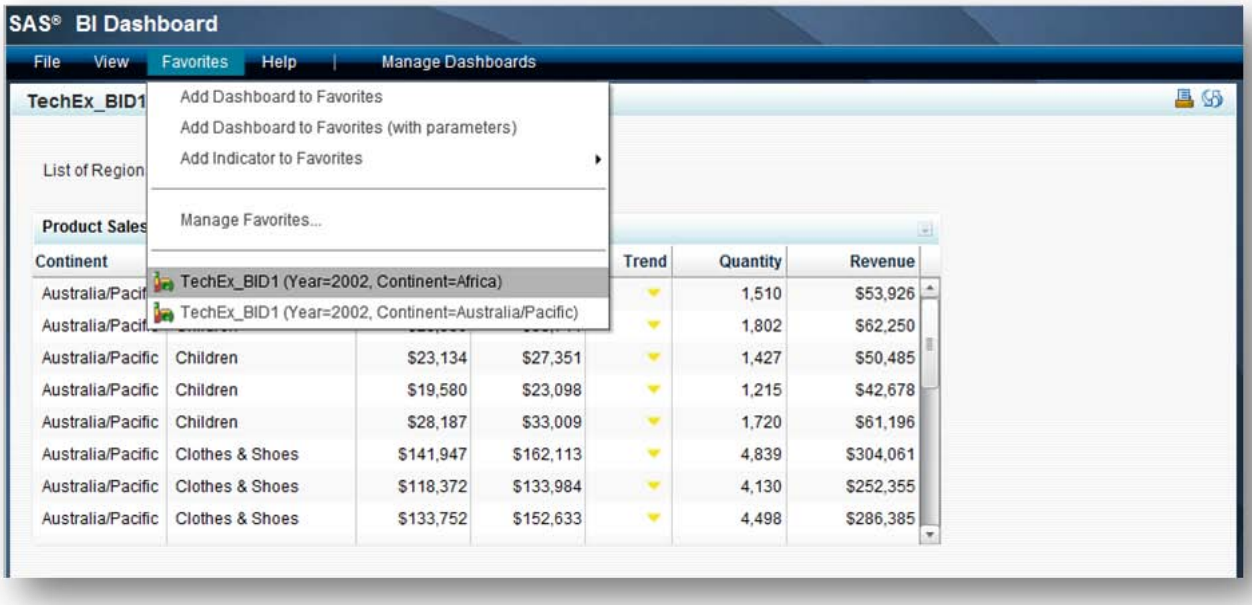


Figure 16: Favorite Dashboards with Saved Filters

Maintain the State of the Dashboard Portlet when Returning

If you use the SAS Information Delivery Portal to host BI Dashboard portlets, SAS BI Dashboard 4.31_M2 improves the navigation experience when returning to your dashboard in the portal. Prior to this latest release, you might have noticed that when the dashboard links to a SAS Web Report Studio report or SAS Stored Process and you navigate back to your dashboard in the portal, the dashboard portlet might not contain the same information that it did when you left the dashboard to view the report. For example, if you selected prompt values in the drop-down list to filter the dashboard information, those selections and the information would have been reset to the initial state of the dashboard, the default view. Likewise, if the initial dashboard displayed in the portlet has a link to a second dashboard and that second dashboard has a link to a SAS Web Report Studio Report, you would have seen the first dashboard in your portlet, rather than the second dashboard that invoked the link to the Web report, when returning to the portal from viewing the Web report. Since the release of SAS BI Dashboard 4.31_M2, when you return to the portal from a linked destination, you see the same dashboard displayed in the portlet with the same filter state as it was when you navigated to the linked report or stored process.

Multiple Value Selection for Interaction

SAS BI Dashboard enables you to create relationships between two or more indicator objects, so that selecting a portion of one indicator either filters or selects related information in the dependent indicators. With the 4.31_M2 release, you can select multiple rows on a table or items on a graph at once to affect how information is displayed in a related indicator. To obtain the result shown in Figure 17 below, you simply hold down the control key and click additional bars. Note how the list table on the right only displays rows for the Outdoors and Sports product lines because the interaction type between these two indicators is set to filter.

Figure 17: Multiple Selection for Indicator Interactions

All Option for Dashboard Prompts

SAS BI Dashboard 4.31_M2 provides a new option to include (all) as a selection choice in drop-down filter prompts on your dashboards. Note that even if you sort the values in the list, the (all) item always appears at the bottom of the drop-down list. See Figure 18 below for an example. This option might be appropriate when a single default value does not apply to all users of the dashboard. However, you might consider continuing to use a single default value if (all) would return too many distinct values to fit on your dashboard.

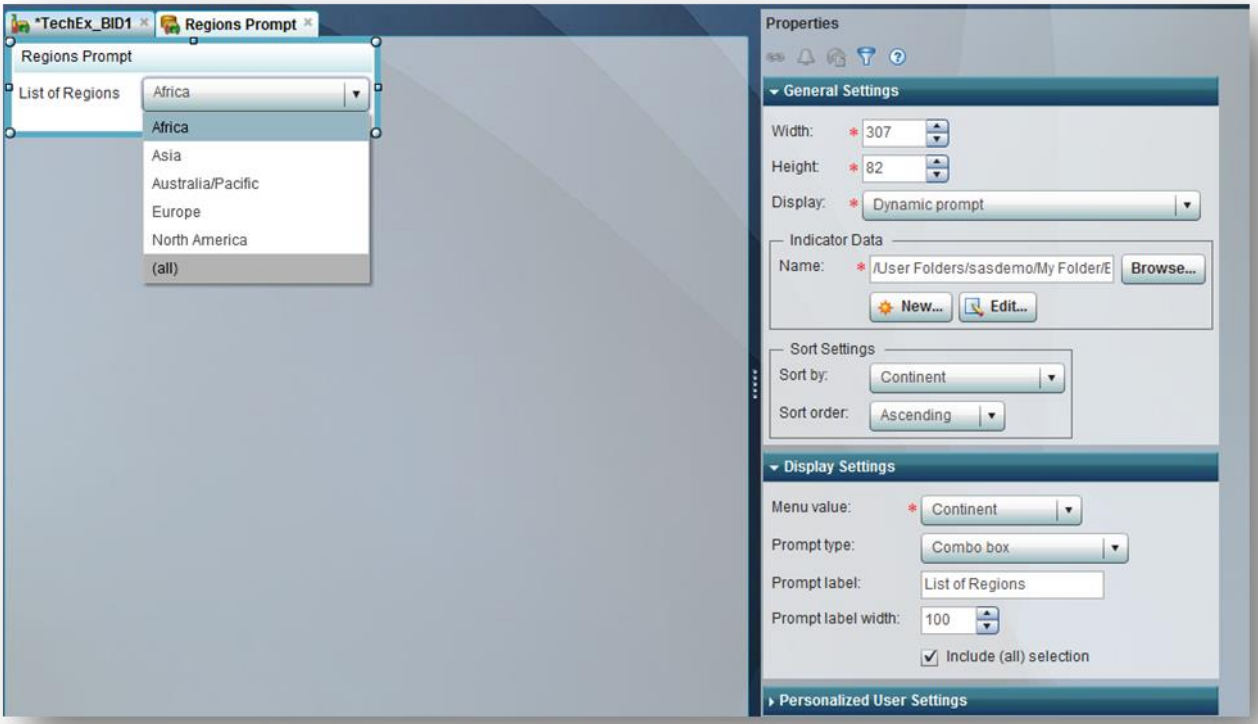


Figure 18: All Option for Drop-down Prompts

New Chart Type – Multi-Line Chart

The multi-line chart, new for SAS BI Dashboard 4.31_M2, enables you to display multiple lines, one for each value of a category data item, along an interval scale. In addition to the required measure for the Y-axis and a category for the X-axis, the multi-line chart requires a category be assigned to the line group as well. In the following Figure 19, product line is assigned to this line group role. It is recommended that you assign a date data item to the X-axis or a numeric category that represents a logical order, such as age ranges.

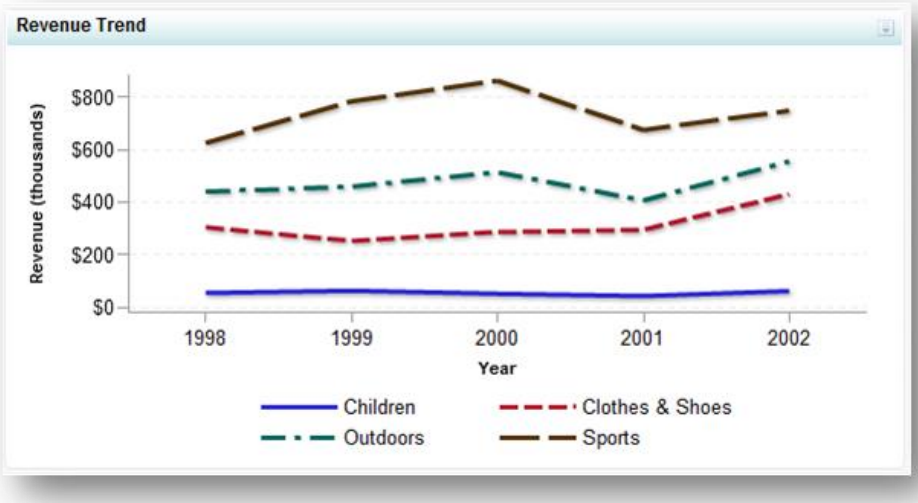


Figure 19: Multi-Line Chart

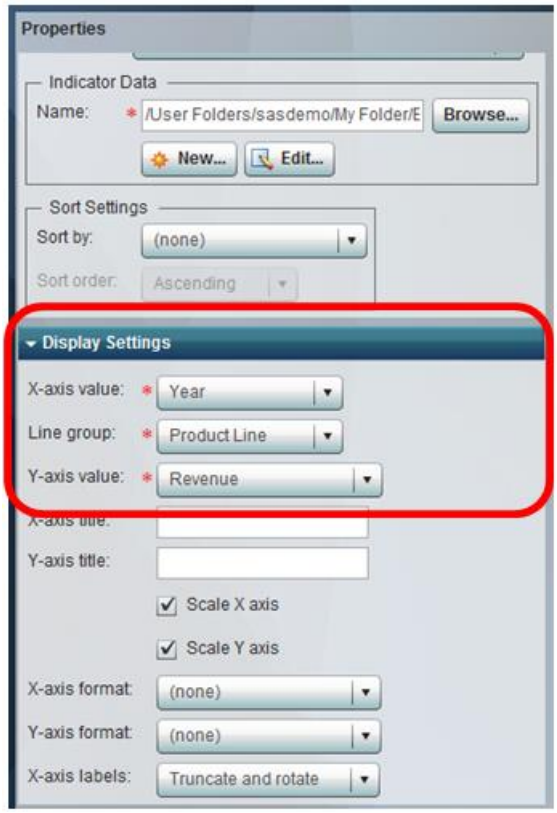


Figure 20: Multi-Line Chart Properties

Spark Table Enhancements

You now have the option to include or exclude the actual measure value with a gauge in a spark table. If your dashboard only needs to show the qualitative status for a metric, you can conserve space in your table by hiding the gauge label, which is the actual formatted value. Figure 21 below shows an example table on the right after you choose to hide the gauge label.

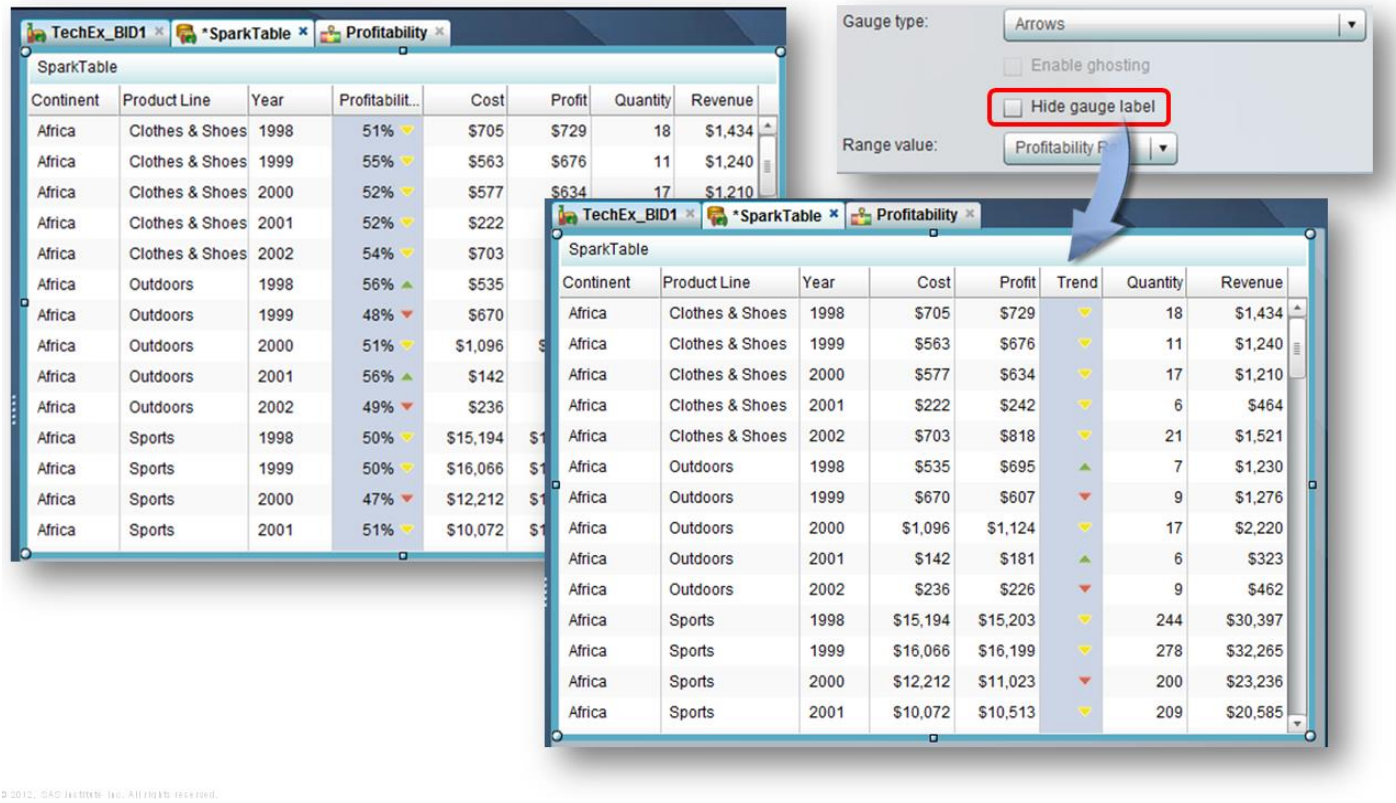


Figure 21: Hide a Gauge Label in a Table

Specify Default Parameter Values for an Indicator

If your indicator data supports parameters, you can specify default parameter values for the indicator. The types of indicator data that support parameters include SAS Information Maps that have a filter defined and SAS Stored Processes that are defined with parameters. If your indicator data supports parameters, is available at the top of the Properties pane. Otherwise, the funnel icon is grayed out. When you click the funnel icon, you see the window in Figure 22 below with a table for the parameters. The parameter names appear in the left column, and you enter parameter values in the right column. When you click the ok button, the indicator refreshes with the parameters applied. The parameter values you provide are saved with the indicator and applied whenever you reference the indictor in a dashboard. Note that you can save multiple copies of the indicator with different parameter values to show different information with a consistent display.

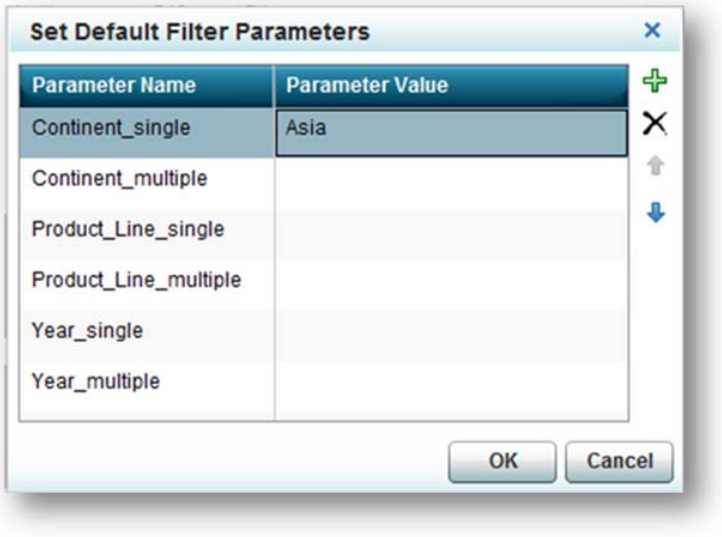


Figure 22: Window to Set Indicator Parameter Values

Custom Color for Static Gauges

You can now change the color of static gauges that display a single color, for example an up or down arrow, based on the colors you define for your range intervals. Prior to the 4.31_M2 release, SAS BI Dashboard rendered an image of a static gauge with one of the three fixed colors that shipped with the software. The specific colored image displayed for the gauge was determined by the range interval that the actual value equated to, but the color you specified for that range interval was not applied. Therefore, you were limited to the single shade of yellow, green, and red colors that came with the software. As a result, your static gauges might not have matched the colors on your dynamic gauges displayed within the same dashboard, and your static gauges could not you have a color other than green, yellow or red, such as gray. SAS BI Dashboard 4.31_M2 removes this color limitation for certain static gauge types, so that the resulting graphic is filled with the proper range color you define.

Even with custom colors in 4.31_M2, static gauges still render faster than dynamic gauges because they require less processing for SAS BI Dashboard to generate. Prior to the 4.31_M2 release, you could have used a dynamic gauge in order to use specific colors on your gauges, but your dashboard might have taken longer to render than you expected, depending on the size of your underlying data and the number of gauges. For example, one SAS BI Dashboard customer used a spark table on one of their important dashboards that contained 4 or 5 embedded dynamic gauges, and they wanted this dashboard to open and render within a few seconds. Their dashboard consumers need to see at a glance, the general health of a particular metric, but they do not need to see a precise value. Likewise, they do not need to see precise boundaries for the multiple range intervals on the gauge. A single color was sufficient and preferred in this dashboard. In addition, they want the gauge to appear gray if the metric value is zero. In their case, an actual value of zero for this measure is not considered poor performance, so red is not inappropriate. A static gauge would meet their needs if a different color could be specified for a metric equal to zero. Now, with SAS BI Dashboard 4.31_M2, this customer is able to replace the embedded dynamic gauges with faster static gauges with data driven custom colors based on ranges. If you need to embed small gauges within a spark table, consider using static gauges, improved in SAS BI Dashboard 4.31_M2, in order for your dashboard to render as quickly as possible.

The following KPI indicator gauge types support custom range color settings:

- Arrow
- Arrow (small)
- Button
- Cylinder
- Fancy arrow
- Pointer
- Simple arrow
- Traffic Light (small)
- Slider
- Solid Tachometer

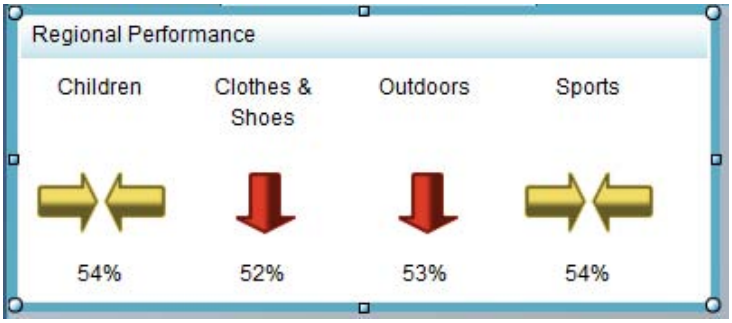


Figure 23: Static Gauges with Custom Colors

Dynamic Prompts without Range Dependency

A dynamic prompt is a drop-down list of category values that you can use to select a single value in order to dynamically filter or highlight one or multiple indicators, as well as other prompts, based on the category value that is selected. You can choose to display an indicator to the right of each selection choice in the drop down selection list, as you can see below in Figure 24 in the prompt on the right.

Figure 24: Dynamic Prompts without a Gauge (left) and with a Gauge (right)

However, if you chose not to include an indicator in your prompt's list of values, you were still required to specify a range on the **Create an Indicator** window when defining a new dynamic prompt. As of SAS BI Dashboard 4.31_M2, a range is no longer required when you create a dynamic prompt indicator, as illustrated below in Figure 25.

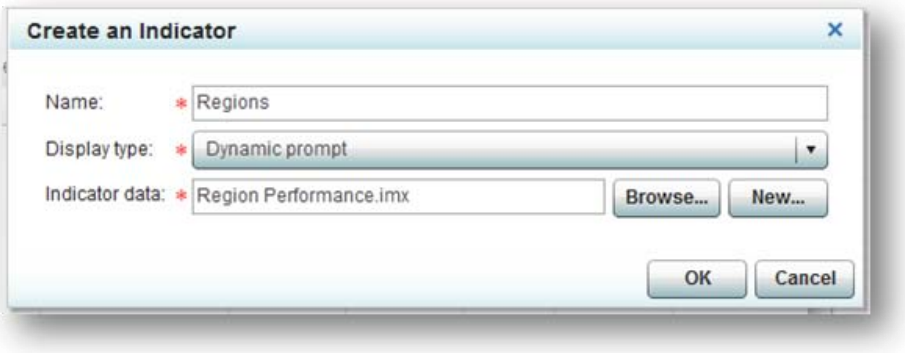


Figure 25: Create Dynamic Prompt without a Range

Add More Information to the Indicator Tooltip

Since the release of SAS BI Dashboard 4.31_M2, all data items from the indicator data appear in the data tooltip that displays when you hoover your mouse pointer over an indicator. Prior to this release, only the data items assigned to data roles on the indicator, such as the X and Y axes, or data items used to filter the indicator interactively were displayed in the data tooltip. The additional data displayed in the data tooltip in 4.31_M2 for the hidden data items appear below the primary data items visible on the indictor and with less emphasis. The primary data items display with a black font and the order is determined by the type of indicator, usually category data items, measures, then range values. The secondary data items, those not assigned to an indicator role, display with a gray font, and the order of these data items is based on the order they appear in the underlying indicator data selection. If you have too many data items appearing in your data tooltip, consider removing some of the unnecessary columns from your indicator data. You can do this by unchecking the leftmost checkbox in the **Data Mapping** column when editing your indicator data. Note that if your indicator data is shared with other indicators, be sure that the data items that you uncheck are not primary data items assigned to a data role in one of the other indicators. With this recent enhancement, you can easily include additional information to display in the tooltip by adding a new column to the indicator data.

Design Time Bring to Front and Send to Back

Many SAS customers have expressed that they often create dashboards that include background images. Background images are behind the charts, tables, and Key Performance Indicators on their dashboards. In many of these cases, customers have used a large image as the background for the entire dashboard as part of the branding of the display. If you wanted the image to appear behind a dashboard indicator in the previous release of SAS BI Dashboard, you had to add the image as the first object because the layers of objects on the dashboard canvas was determined by the order that the objects were added. Otherwise, you had to remove any existing objects, add the image, and then add the original indicators back to your dashboard. In 4.31_M2, you now can control the layer arrangement of dashboard objects using **bring to front** and **sent to back** menu controls. As a result, you can add background images, for example, after a dashboard has initially been designed by sending the image to the back.

Improved Dashboard Performance

Rendering performance

Although static gauges render more quickly than dynamic gauges, improvements have been made for SAS BI Dashboard 4.31_M2 in order to render multiple instances of the same dynamic gauge faster. Multiple instances of the same gauge occurs when you have sparklines or dynamic gauges embedded in a table where the gauge displayed in a column repeats for each row of the table. In the same way, dynamic prompts that include dynamic gauges in the drop-down list box display multiple occurrences of the same gauge type for each row of the list. SAS BI Dashboard 4.31_M2 creates a single gauge object for each column, and it reuses this object to create multiple image snapshots with different values for each row of the table or drop-down list. This approach uses less memory on the server. As a result, dynamic gauges embedded in tables and prompt lists are significantly faster to render.

Query performance

In addition, query performance has been improved. Each graph, gauge, table and prompt issues a query to populate the object with data, and SAS BI Dashboard processed each query one at a time. As of SAS BI Dashboard 4.31_M2, the queries behind all objects are processed concurrently. As a result, dashboards that have many objects can see significant performance improvement once you upgrade to the 4.31_M2 release.

SAS ENTERPRISE BI SERVER 4.4(SUMMER 2013)

SAS Enterprise BI Server 4.4, which requires SAS 9.4, is scheduled to be available summer 2013 at the time this paper was written (schedule subject to change). The primary purpose for this release is to enable SAS Enterprise BI Server applications to run on the SAS 9.4 platform and to leverage SAS 9.4 platform enhancements. In addition, SAS Mobile BI, available at no charge from the Apple App Store, enables you to view SAS Web Report Studio reports, having tabular data sources only, on your tablet. This is the same tablet application you can use to view SAS Visual Analytics reports. Finally, there are minor enhancements to SAS Web Report Studio and SAS BI Dashboard for the summer 2013 release.

The following is a list of the main enhancements planned for SAS Enterprise BI Server 4.4.

General

- Improved browser support (adds support for Chrome and Safari).
- Embedded Web server and application server.
- Improved backup and restore of metadata, content, and services repositories.

SAS Web Report Studio 4.4

- Reports from tabular sources can be viewed on SAS Mobile BI (available on Apple App Store)
- Improved totals and subtotals

  You can choose which measure data items you want to include totals and subtotals. Prior to this release, either all measures had totals or subtotals or no measures had totals or subtotals.

- Improved language support

  You can create a report that dynamically changes the language of text labels, metadata, and categorical data based on the user's preferred locale.

SAS BI Dashboard 4.4

- Users can link to and set up filter or brush interactions with custom graphs generated by a SAS Stored Process and pass it parameters
- The tile chart, also known as a tree map, has a new Use Flow Layout option. By default, tile charts arrange the rectangles by size. In general the largest rectangle starts in the lower left corner and the smallest is usually displayed in the top right. Flow layout of the tile chart enables you to control the sorting of the tiles, making it easier to find a specific category value. Please refer to Figure 26 below to see an example.
- The pie chart has a new option to show or hide the response label (measure value) on the graph.
- New **Multi Area Chart** display type (stacked line chart).
- Improved application theme support, via user preferences.
- Remembers your last location when opening and saving content or objects.

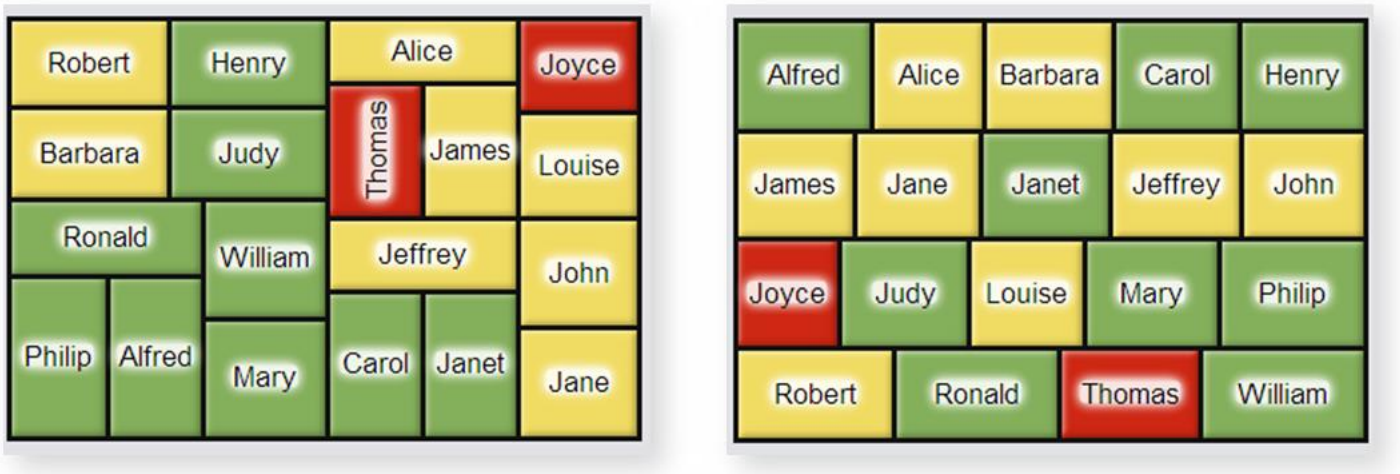


Figure 26: BI Dashboard 4.4 Tile Chart - Default versus Flow Layout

CONCLUSION

SAS Enterprise BI Server continues to evolve. SAS Enterprise BI Server 4.31_M2, which runs on SAS 9.3 M2, is the most recent release, and the release includes a number of useful enhancements to existing capabilities. SAS Web Report Studio 4.31_M2 provides additional ways to format reports and share your results via e-mail. SAS BI Dashboard 4.31_M2 interactions have been improved, and you can now pass filter context when linking to other dashboards. With the upcoming release of SAS Enterprise BI Server 4.4 on SAS 9.4, you have additional options and flexibility presenting information in tables and graphs, along with support for new popular browsers. The SAS 9.4 platform, underlying SAS Enterprise BI Server 4.4, delivers improved backup and restore capabilities and server clustering, which enables a new level of manageability and scalability. Now that you understand the enhancements and benefits to the recent and planned releases of SAS Enterprise BI Server, you are prepared to help others in your organization understand the value and best time to modernize your SAS BI deployment.

REFERENCES

SAS Institute Inc. 2012. *SAS® Web Report Studio 4.31: User's Guide.* Cary, NC: SAS Institute. http://support.sas.com/documentation/onlinedoc/wrs/index.html

SAS Institute Inc. 2012. *SAS® BI Dashboard 4.31: User's Guide, Second Edition.* Cary, NC: SAS Institute. http://support.sas.com/documentation/onlinedoc/bidashboard/index.html

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RECOMMENDED READING

- Paper 062-2013 Popular Tips and Tricks to Help You Use SAS® Web Report Studio More Efficiently. Keith Myers, SAS
- Paper 061-2013 SAS® BI Dashboard: Interactive, Data-Driven Dashboard Applications Made Easy. Scott Sams, SAS
- Paper 053-2013 How Mobile Changes the BI Experience. Murali Nori, SAS
- Paper 043-2013 Stop your 'Wine"-ing: Use a Stored Process! Angela Hall, SAS; Tricia Aanderud, And Data Inc
- Usage Note 45624: Where to find documentation about how to set commonly used SAS® Web Report Studio properties (http://support.sas.com/kb/45/624.html)

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