SAS in Style: Customizing Solutions and Reports with SAS® Theme Designer

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ABSTRACT

SAS® Theme Designer enables users to create their own custom application and report themes and to tailor the visual look of the applications they run and the reports they generate. Colors, fonts and images can be specified and the visual changes are presented within an embedded preview application, or within an actual application when editing a theme within application context. Users can customize their applications and reports to use a unique organizational theme, or can customize their applications and reports based on an individual business requirement. This visual customization helps to provide for the customers' desire for colors, general branding, and logo integration. This paper explores the process of using SAS Theme Designer in conjunction with other application such as SAS Environment Manager and highlights the following features of SAS Theme Designer: creating and modifying application themes, previewing application color, font and image changes within SAS Environment Manager.

INTRODUCTION

Building upon the solid base features of SAS® Theme Designer 3.0, SAS® Theme Designer 3.1 provides you with the ability to fully customize the appearance of their SAS® Viya based applications as well as the reports created within SAS Visual Analytics 8.1. SAS Theme Designer empowers you to create visually appealing *themes* which can be deployed and then shared among individual users, departments or even company-wide. Default themes currently exist for all SAS applications and reports. But SAS Theme Designer provides the means by which your SAS applications can be customized according to your individual tastes or to portray your corporate brand. New features available in SAS Theme Designer 3.1 such as the ability to select custom fonts, change banner colors and logo image, initial loading and transitions screen animations and a much richer set of property settings for Table and Crosstab displays are all included with this release of SAS Theme Designer.

The purpose of this paper is to acquaint the reader with the method of creating custom application themes and then utilizing those themes to change the appearance of any available SAS applications and reports. The reader should become familiar with how custom themes are created within SAS Theme Designer 3.1 and how these themes can then be used within available SAS applications and reports.

WHAT IS SAS THEME DESIGNER?

SAS Theme Designer was developed to provide an easy and approachable way to alter the visual look of their SAS applications and reports. In the next section, we will touch on several key features within SAS Theme Designer and explain their use.

KEY FEATURES

- A simple graphical user interface (GUI) provides point-and-click functionality to create, edit and publish a theme and to make it available to all users of all SAS-based applications.

- Creating and deploying a custom theme is a relatively simple task, as no redeployment of applications or restarting of web application servers is required in order to make the custom theme available to all users.

- A customer site can create as many custom themes as they deem necessary, and the default theme is configurable. When an administrator changes the default theme setting, the specified theme becomes the default theme for all users, except when an individual user has previously specified that a different default theme is desired.

- The **Manage Themes** page of SAS Theme Designer provides all of the expected theme management capabilities, while also offering a thumbnail of theme colors per theme to help identify each available theme.

- Creation of new themes can start from a default theme, or may begin with one of several starter themes available on the right sidebar of the Manage Themes page.

- When editing a theme, selectors are provided to alter a number of general theme properties such as **Brand** color, **Neutral** color, **Font family** and **Font size**. These types of generalized properties affect multiple aspects of an application or report, thus allowing you to get up and running very quickly in creating your custom themes.

- Individual override selectors are also accessible that allow you to set individual theme properties which then affect only specific regions within an application or report. As a result, you are afforded the granularity to set only the specific colors and properties that you desire to change.

- A live **Preview** application is available when editing a custom theme and the preview application provides instant visual feedback to you when a theme color or similar property is altered.

- A very powerful ability within SAS Theme Designer 3.1 is editing custom application themes from within the context of another SAS application. For example, you can launch any installed SAS application such as SAS Home or SAS Environment Manager from within SAS Theme Designer. After doing so, changes to the currently edited theme are instantly reflected in the selected application.

GETTING STARTED WITH SAS THEME DESIGNER

Note that in order to access SAS Theme Designer, you must be a member of the **Application Administrators** custom group. With the proper authority granted, you can then access SAS Theme Designer directly via a URL, from the main Show Applications menu, or from a tile found within the SAS Home application.

Manage Themes is the starting point in creating either application or report themes. A tabular list of themes is presented here which includes all of the built-in system themes, as well as any custom themes that you may have previously created. Each row of the table represents an available theme, with a tri-colored tile anchoring the row. The colors found within the tile are representative of the **primary**, **neutral**, and first **graph data** colors which were selected when building the specific theme.

A special icon follows the tri-colored tile if the theme is a built-in *system* theme provided within SAS Theme Designer. The theme name and a theme type of **Application** or **Report** follow. An indicator of whether the theme is in **Draft** or **Published** state and the last modified date of the theme are then included. Lastly, a *check* icon is present to signify which of the listed themes are the default application and report themes. Please see **Figure 1. Manage Themes** below for more information.
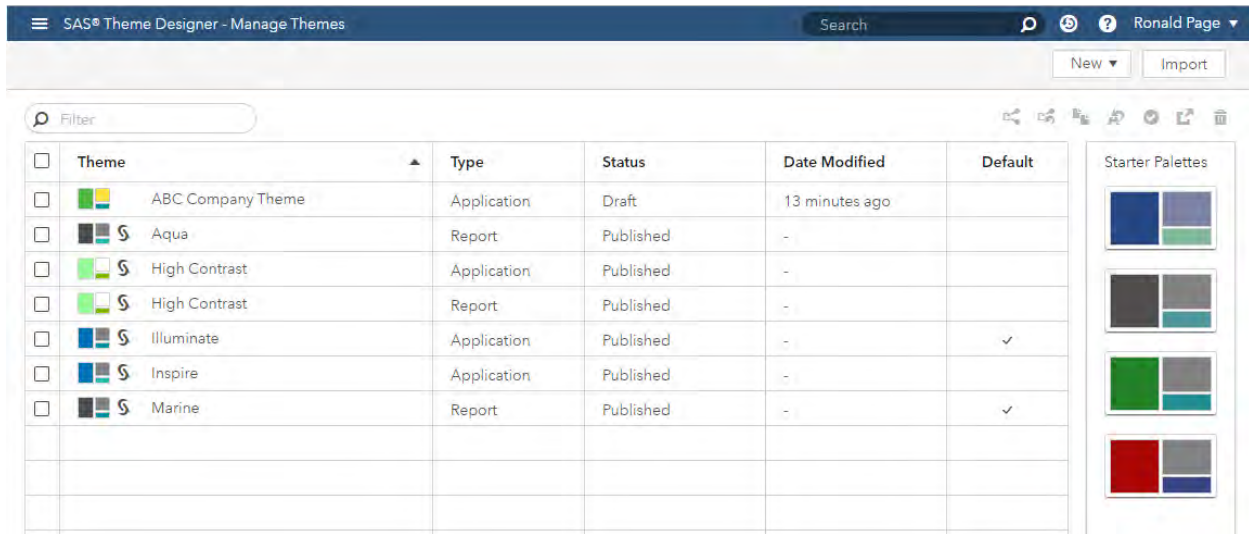
Figure 1. Manage Themes

Note that the right sidebar of the **Manage Themes** page contains a selection of **Starter Palettes**, each represented by larger tri-colored tiles. These starter palettes provide an easy way to begin the process of creating a custom report or application theme and they each provide a set of complementary colors defined by the SAS visual design team.

Design tip: Hovering over any of the tri-colored tile sections will provide the RGB values of the particular color selection. For example: #274884 is the medium blue found within the largest section of the first tile in the **Starter Palettes** section.

The checkbox found to the left of each theme in the tabular display allows for the selection of one or more themes to perform theme management tasks such as **Publish**, **Unpublish**, **Duplicate**, **Rename**, **Export** or **Delete**. Another icon selection also allows the theme administrator to set the default Application and Report themes to be used when creating new custom themes. The icons in the upper right task bar of the themes table are representative of the above-mentioned theme tasks and are enabled and disabled according to whether the particular theme management task is applicable to the selected theme(s). For example, you cannot Unpublish a theme which is currently in Draft state. Please se*e* **Figure 2. Manage Themes with one theme selected** below for more information.
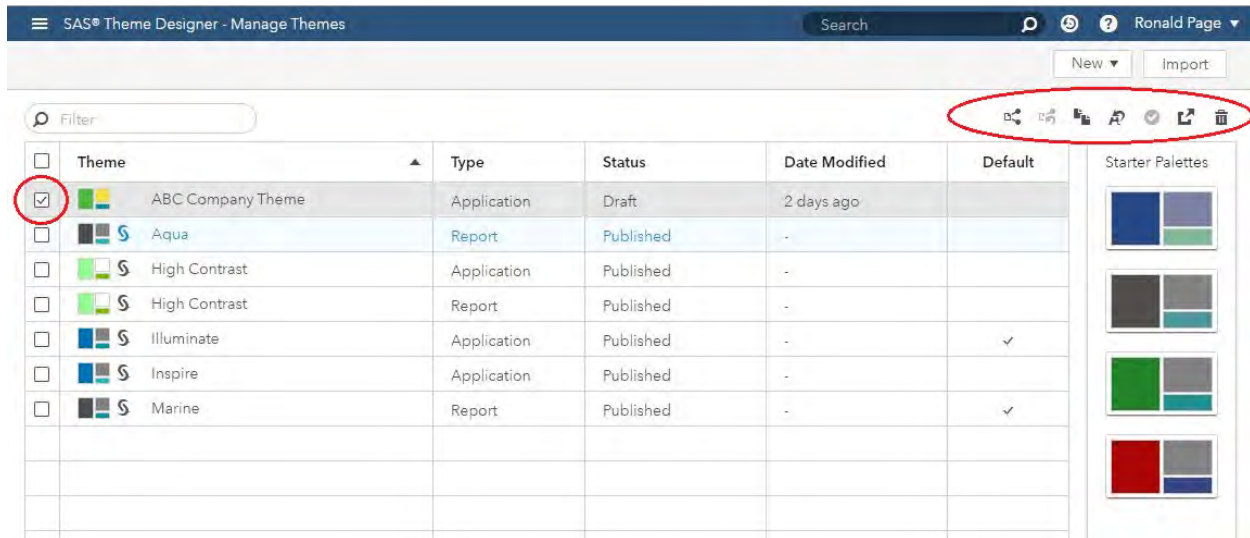
Figure 2. Manage Themes with one theme selected

CREATING A NEW APPLICATION THEME

To begin creating a new custom application theme, simply select the New > Application Theme on the right toolbar in SAS Theme Designer. Please see **Figure 3. Creating a new default application theme** below.
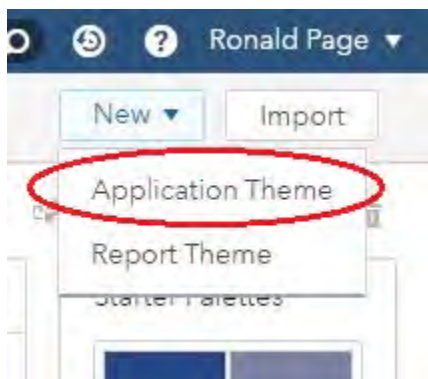

Figure 3. Creating a new default application theme

Immediately following the above selection, you are then presented with a view of a new custom theme based upon properties from the current default theme selection. The **Preview** area is evident in the lower left portion of the window. Any changes made to the current theme are immediately reflected in the Preview area -- provided that the **Live Preview** checkbox is enabled. Please see **Figure 4. Creating an application theme with Preview shown**.
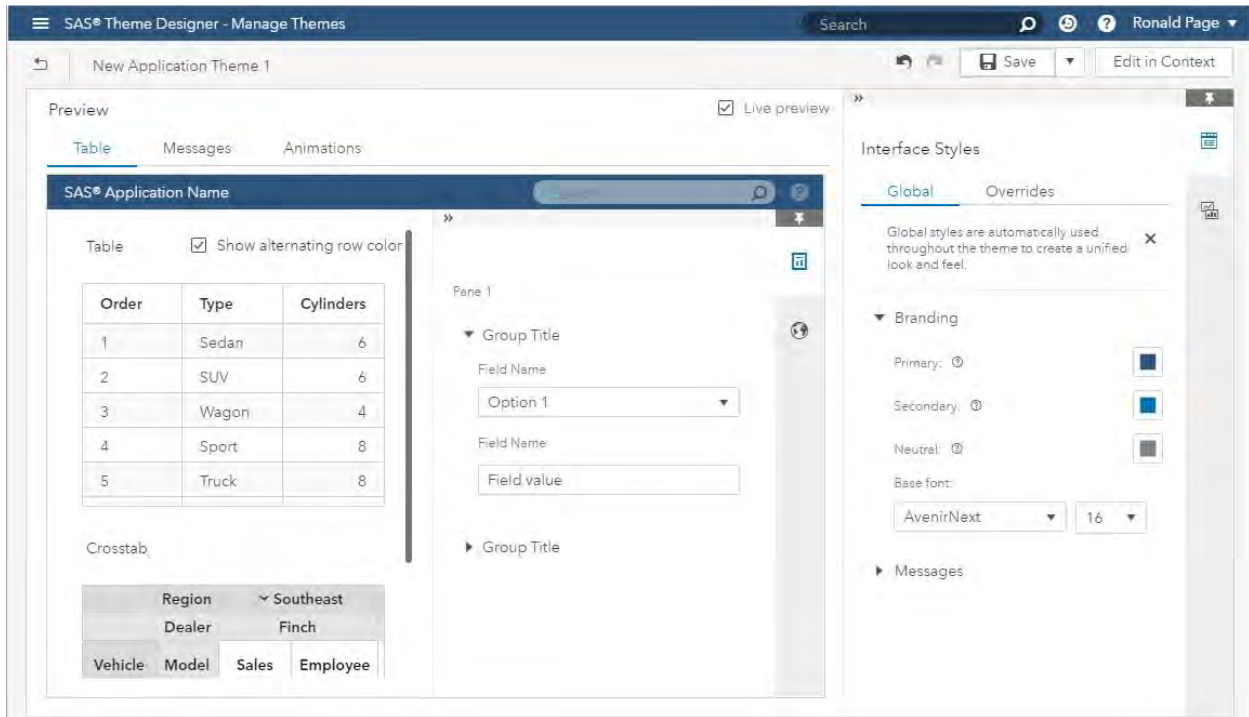
Figure 4. Creating an application theme with Preview shown

CHOOSING THE SPECIFICS OF YOUR NEW APPLICATION THEME

With a visual idea in mind, you'll find that creating a custom theme can be a fun and easy task. An example of this follows.

Perhaps because SAS Global Forum is being held in Colorado this year, creating an application theme based upon the colors in the Colorado state flag would be appropriate! A quick internet search reveals what the Colorado flag looks like. From this image, it can be determined that the approximate hex code RGB colors included in the CO flag are as follows:

- #102F82 (dark blue)
- #BF2C34 (red)
- #F6D047 (yellow)

Figure 5. Colorado state flag

GLOBAL SETTINGS IN YOUR NEW APPLICATION THEME

Returning to the default theme being edited above, first choose an appropriate theme name, for example: *Colorado State Flag Theme*. Next, clicking on the **Primary** color selector under the **Branding** section, then clicking the **Custom** selector at the top of the color dialog, you may then key in the hex code RGB values noted above, minus the #. As stated above, the red color is #BF2C34. Please see **Figure 6. Selecting a custom color** below.
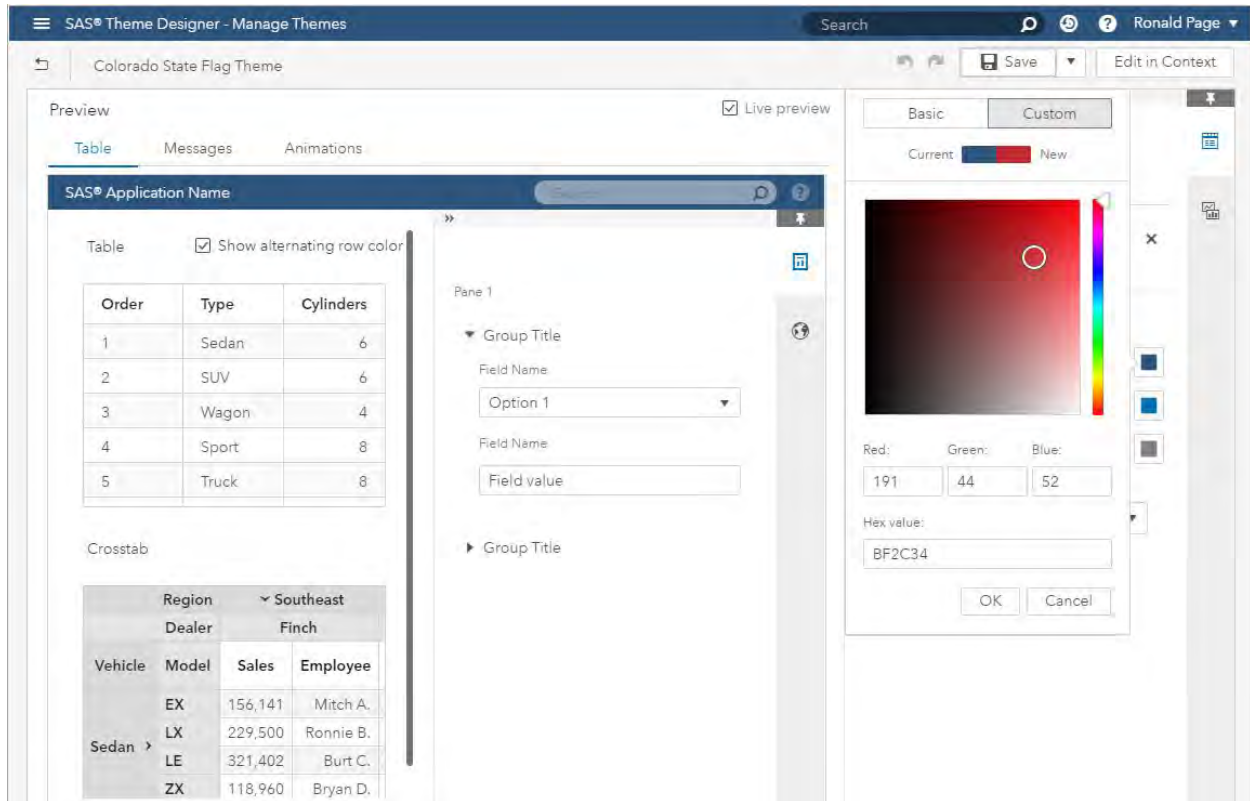

Figure 6. Selecting a custom color

Repeating the above process and adding in the additional custom colors of #F6D047 and #102F82 for **Secondary** and **Neutral** colors respectively, the preview now begins to show some changes in the desired color scheme. Note that when **Live preview** is enabled, the changes are displayed in the Preview immediately after each color selection is made. If several selections are to be made without interruption, you may want to first disable the **Live preview** selector and manually refresh the display only when changes are complete.

Please refer to **Figure 7. Global color selections visible in the preview** for further example of these particular settings.
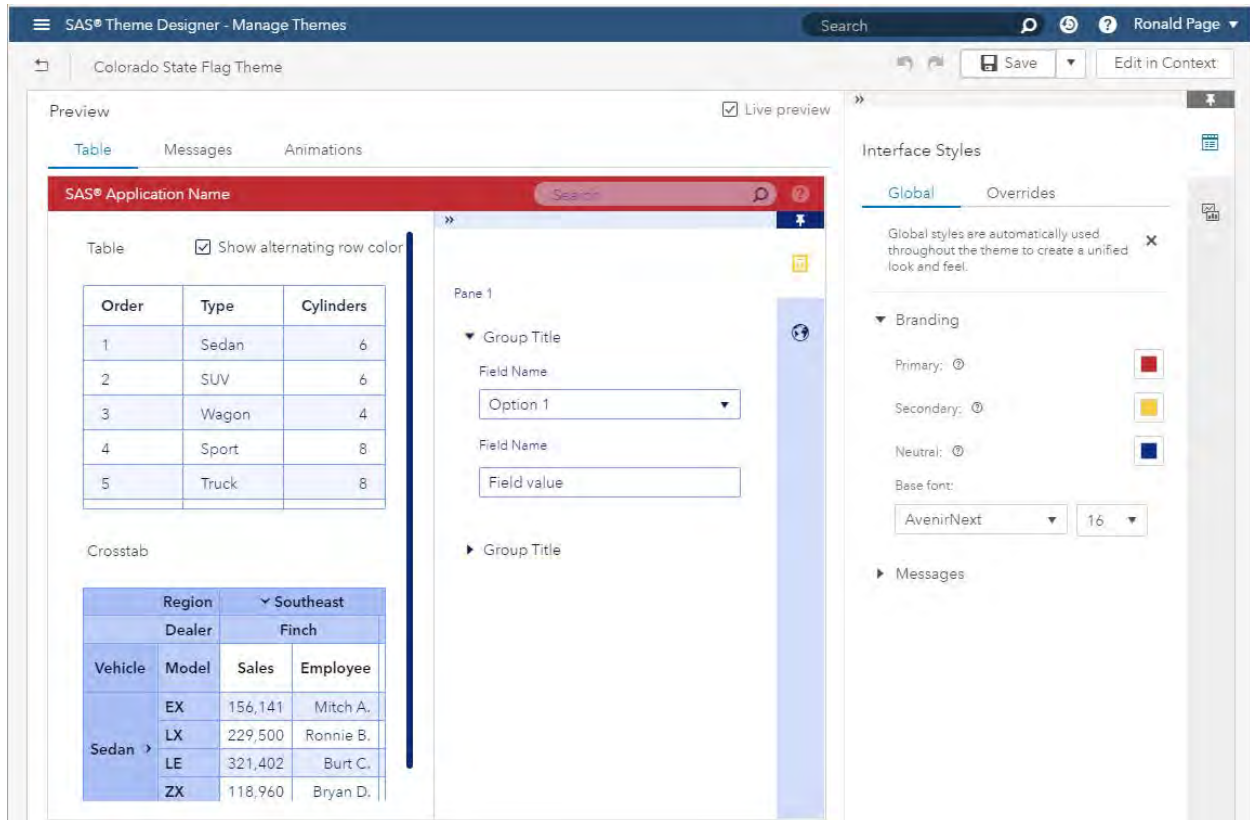
Figure 7. Global color selections visible in the preview

The following is a sampling of the global **Branding** changes that are now showing within the preview area above:

1. The red color (#BF2C34) which was introduced as the **Primary** color now shows in the application banner.

2. The yellow color (#F6D047) which was selected for the **Secondary** color is now present in the pane selector tool on the right edge of the preview. Likewise, this yellow color is now used as the *selected item* color as you hover over the items in the Table section, or if you engage the selector widgets on the right side pane of the preview area.

3. The dark blue (#102F82) selected as the **Neutral** color is now present in the scrollbar as well as the Pin selector on the top right edge of the preview.

4. Also notable is the fact that a lighter complementary shade of the **Neutral** color is used throughout the application -- for example within the outlines, header backgrounds, and alternating row background color selections. Often, a lighter or darker version of the chosen Neutral color is used by the components in order to preserve a desired contrast between the shaded areas and the text that overlays the background.

OVERRIDE SETTINGS IN YOUR NEW APPLICATION THEME

The **Overrides** property panel can be accessed by clicking on the **Overrides** tab on the right side properties panel. Unlike global properties, override properties are often specific to a certain component within an application. Note that sometimes, properties found within the overrides panel are *derived* properties. For example, when the red color (#BF2C34) was previously chosen as the **Primary** color in

the **Branding** section, the background color selection of the **Banner** section automatically defaults to be the same red color. Please see **Figure 8. Overrides colors may be derived** below.
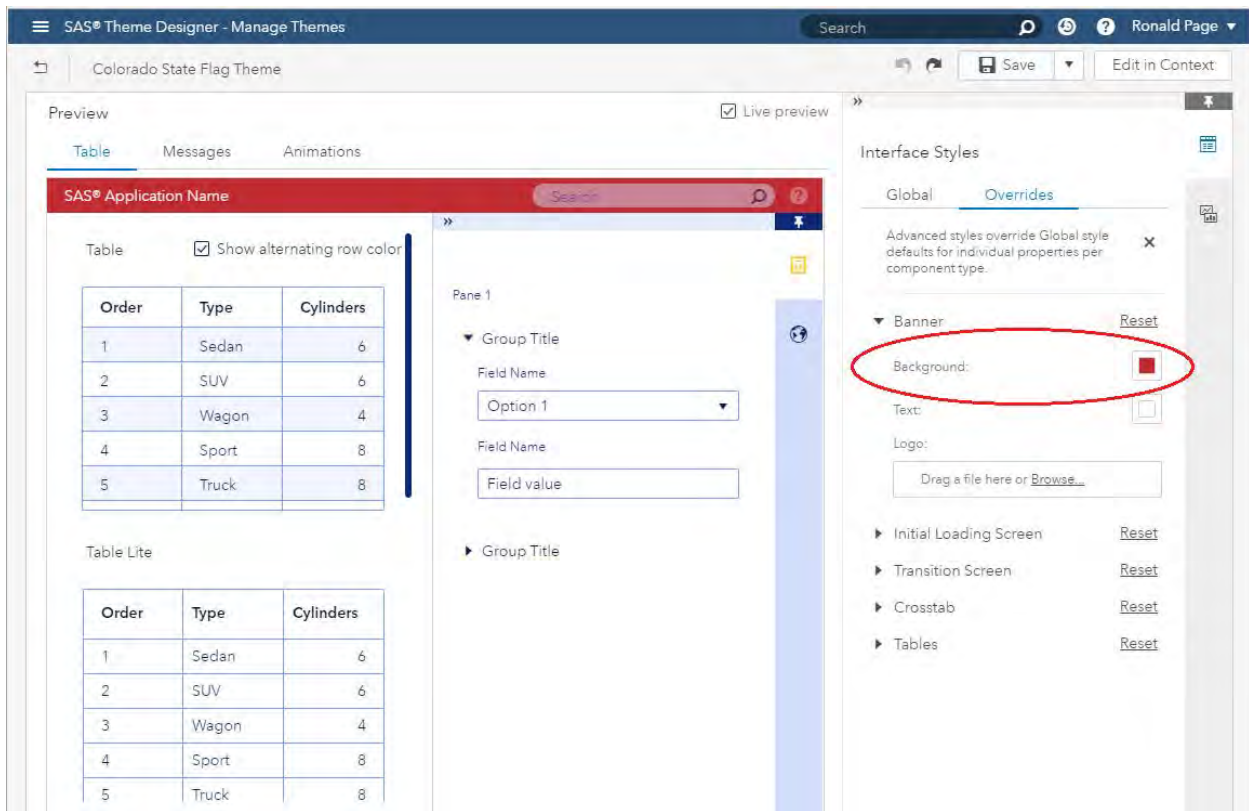

Figure 8. Overrides colors may be derived

Until you specifically change the banner background color, the banner background color will always be dictated by the primary **Branding** color selection.

Design tip: If you wish to remove all of your edits within an override section, choose the appropriate **Reset** link in that property grouping. Doing so will remove all of the user-specified values in that grouping and those values will be returned to their derived values.

To further customize the new Colorado State Flag theme, other overrides can be added as follows:

- Banner > Text (#F6D047)
- Table > Header > Text (#F6D047)
- Table > Header > Background (#102F82)
- Crosstab > Column Headers > Text (#F6D047)
- Crosstab > Column Headers > Background (#102F82)
- Crosstab > Row Headers > Text (#F6D047)
- Crosstab > Row Headers > Background (#102F82)

These additional settings further complete the design scheme. See **Figure 9. Specific override colors set**.
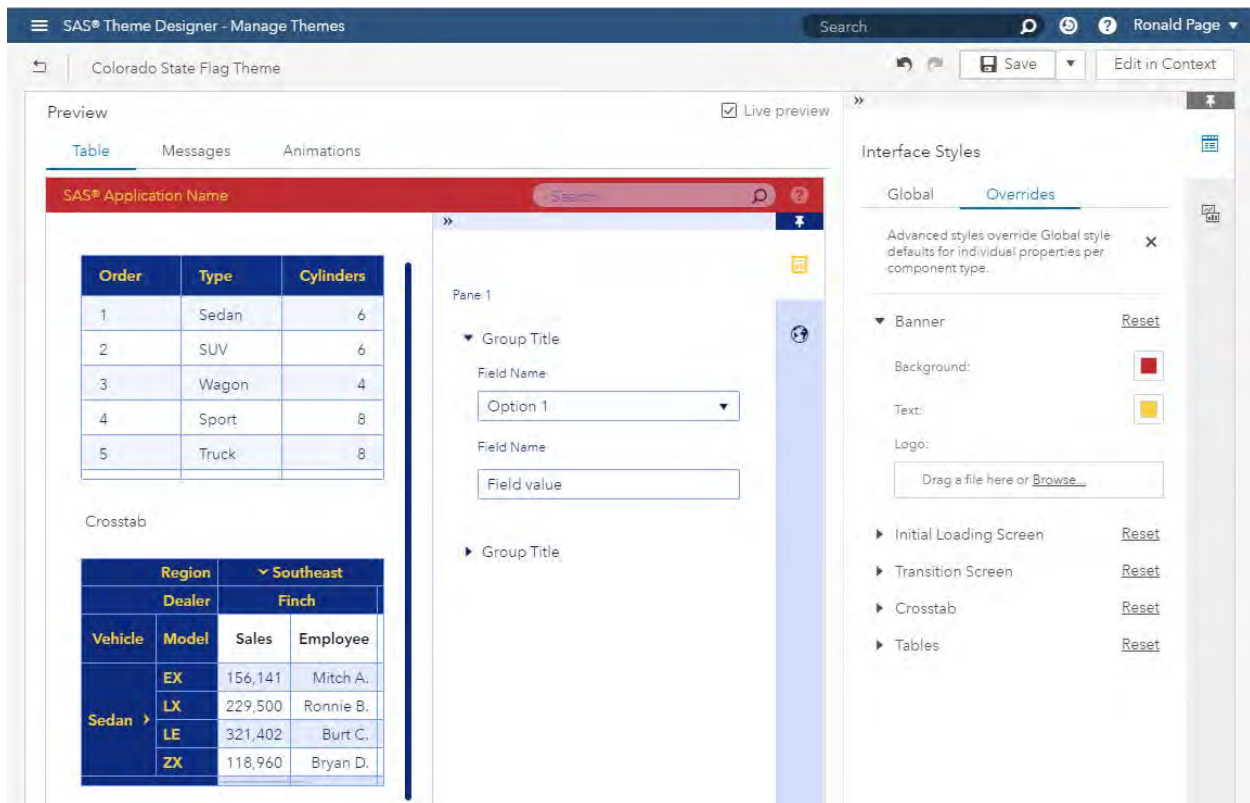
Figure 9. Specific override colors set

Also, within the **Banner** section a drop zone area is provided for including a custom logo to be presented on the right side of the application banner. Most common image types are supported -- for example: **.jpg, .gif, .png, .bmp, .img, .svg, .tiff** are all valid types. An image file can be dragged from another window and dropped into the drop zone, or an available **Browse** link provides file selection access to the location of the desired logo file to be imported.

For the purposes of this example, an image of the Colorado state flag is now included in the Logo section. Please see **Figure 10. Override colors with logo**.
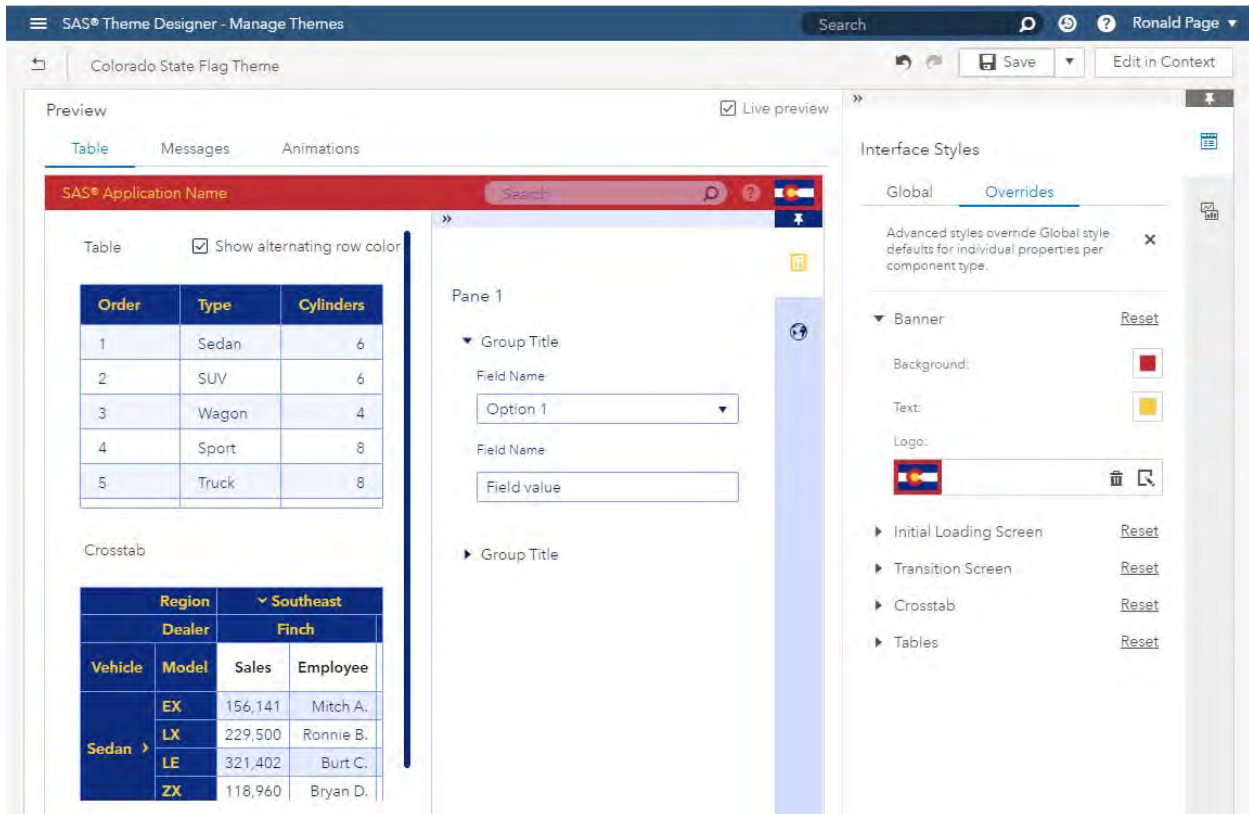
Figure 10. Override colors with logo

UNDO AND REDO SUPPORT

Currently you have created a number of theme changes, but perhaps one of these changes isn't visually appealing or is altogether incorrect. Note that in the center of the upper toolbar, SAS Theme Designer 3.1 offers **Undo** and **Redo** buttons which will remove or replay any changes that may have been made to the custom theme since the editing session began. See **Figure 11. Undo and redo buttons provided**.

Design tip: Performing a long press or clicking the right mouse button while hovering over either the **Undo** or **Redo** buttons causes an informational dialog to appear. This dialog lists the changes which have been made in the current editing session, along with the individual variable names and color selection hex values. Hovering over each of these items displays a tooltip with the full informational text, in the event an ellipsis is displayed after the item.
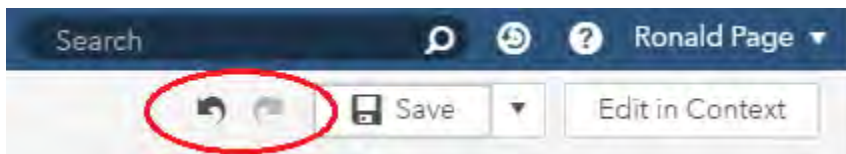

Figure 11. Undo and redo buttons

GRAPH STYLE SETTINGS IN YOUR NEW APPLICATION THEME

Another theme customization available is the selection of specific graph colors. Clicking the **Graph Styles** icon on the upper portion of the right sidebar, the **Preview** area then displays a number of graphs and the current color list order is evident in the bars, lines and nodes presented. In keeping with the custom theme based upon the Colorado flag, it's again easy to set the first three graph colors to be the custom colors previously defined as:

- Red (#BF2C34)
- Dark blue (#102F82)
- Yellow (#F6D047)

After the above changes are complete, all graphs being displayed use these three custom colors first. See **Figure 12. Graph style changes made**.
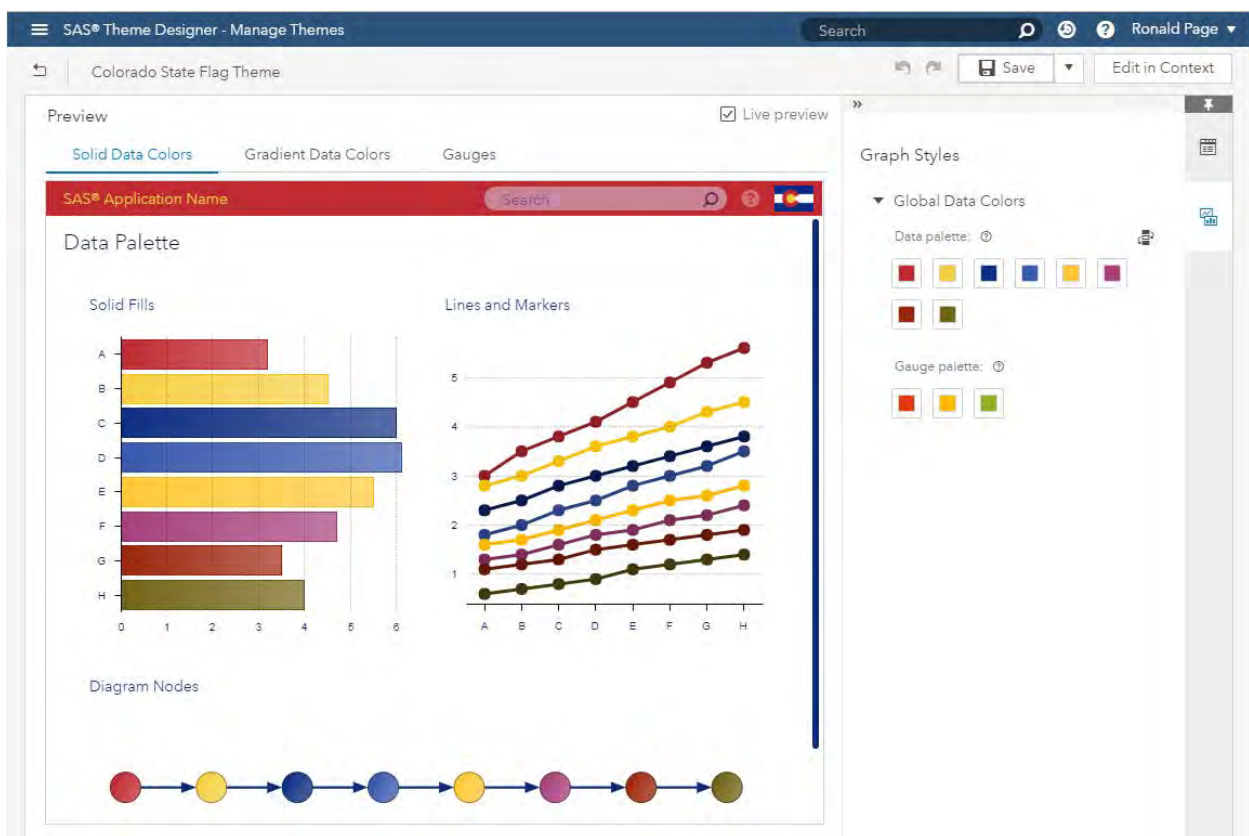

Figure 12. Graph style changes made

CUSTOM THEME EDITING IN ANOTHER APPLICATION

As previously mentioned, one of the key features of SAS Theme Designer is the ability to edit a custom theme while the theme is being displayed in another SAS application. While editing a custom theme in SAS Theme Designer, you can temporarily switch to another SAS application and display the currently edited theme properties. This is a powerful tool for creating a custom theme, as you can see instantly how the theme settings will be applied in other SAS applications.

VIEWING CUSTOM APPLICATION THEME CHANGES IN ANOTHER APPLICATION

While editing a custom theme, you can select the **Edit in Context** button on the right side upper toolbar. In the resulting dialog, select the SAS application that you'd like to display the custom theme within. For example, within **Figure 13. Edit in Context application selection**, SAS Environment Manager is the chosen application.
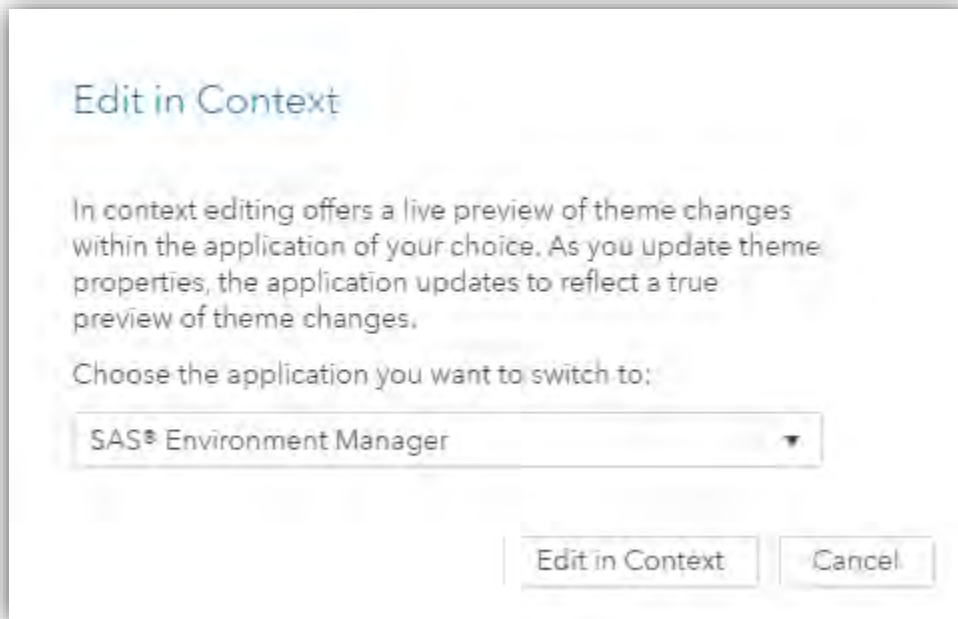

Figure 13. Edit in Context application selection

After selecting the **Edit in Context** button above, the selected SAS application is launched and the settings of the edited custom theme are automatically applied within the chosen application. Along the right side of SAS Environment Manager, a dialog now overlays the screen containing the SAS Theme Designer properties panel with each user selection visible. See **Figure 14. Viewing SAS Environment Manager in Context**.
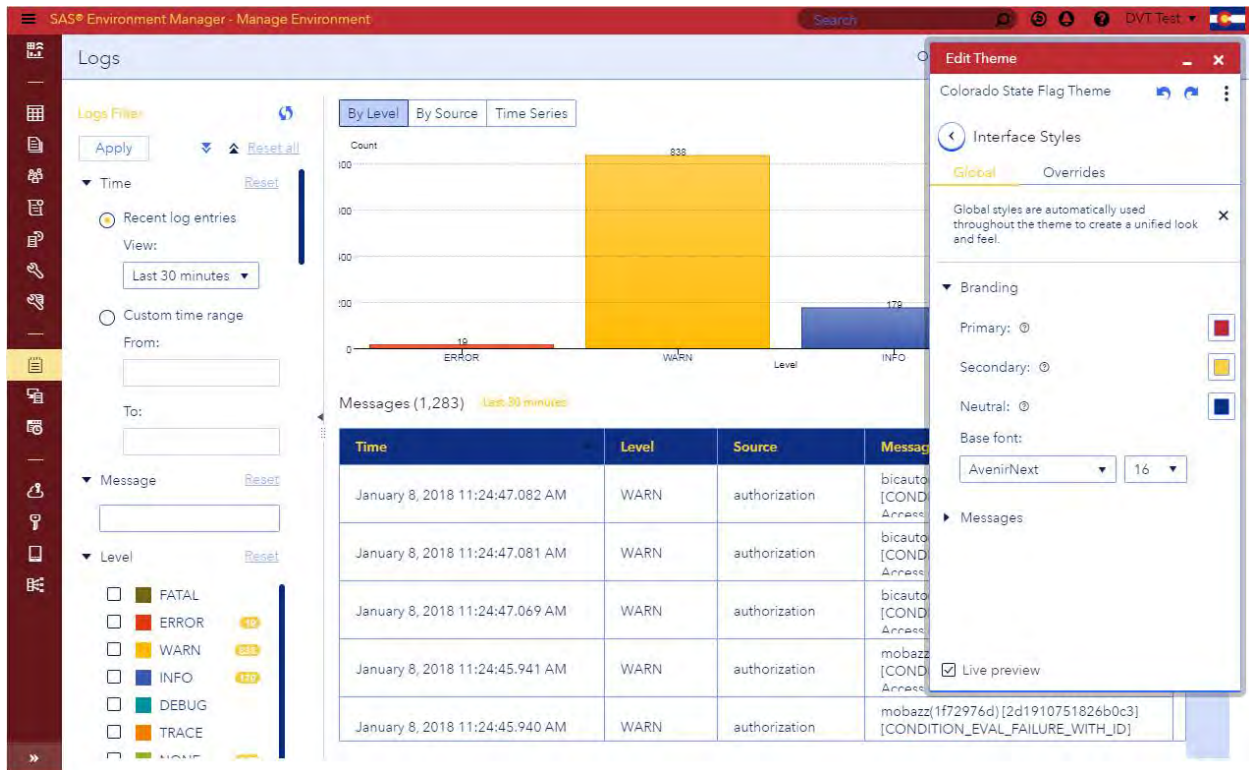
Figure 14. Viewing SAS Environment Manager in Context

After the SAS Environment Manager application is displayed, observe that the Edit Theme dialog is visible on the right side of the screen. The same custom theme colors and properties that were selected from within SAS Theme Designer are now displayed in the dialog. Also, note that the color and logo selections previously made during theme creation are now integrated into the SAS Environment Manager application. A few of the observed changes include:

1. The banner of SAS Environment Manager contains the custom red color (#BF2C34) and the banner text uses the custom yellow color previously selected (#F6D047).

2. The banner logo of the Colorado state flag which was selected in previous steps is displayed on the right side of the upper banner.

3. The table in the bottom shows with the custom blue color (#102F82) as the table header and the custom yellow color previously selected (F6D047) as the header text color.

4. The *selected* versions of the radio buttons and dropdowns are now shown in the custom yellow color noted above.

5. The inner header background and many of the buttons, icons and borders in the left side inner panel are using a complementary shade of the custom blue color (#102F82).

6. The bar chart across the top of the application is using the three custom colors in the order that you specified in the previous step.

These are just a sample of the changes that are present within SAS Visual Analytics, based upon the relatively few color and property changes which were previously made during this theme editing session.

ADDITIONAL THEME SELECTIONS MADE IN ANOTHER APPLICATION

As before when color selections were made evident in the **Preview** area of SAS Theme Designer, now any additional changes to colors and other custom theme properties made while editing an application theme in context become instantly reflected within the SAS application. For example, perhaps the usage of the custom yellow color (#F6D047) in the banner text is no longer appealing. Changing the banner text color back to white might be desirable. Within **Interface Styles**, click the **Overrides** tab and expand the **Banner** section to reveal the banner text color. Selecting the custom yellow color, the banner text color can then be changed to white (#FFFFFF). After the selection of white is made, the SAS Environment Manager application is instantly refreshed with the desired changes displayed. See **Figure 15. Editing SAS Environment Manager in Context**.

Design tip: While editing a custom theme within the context of another application, the **Undo** and **Redo** buttons are again present at the top of the dialog and function exactly as they do while editing the custom theme from within SAS Theme Designer. Also as before, unchecking the **Live preview** checkbox at the bottom of the Edit Theme dialog allows for multiple changes to be made without the interruption of screen refreshes.
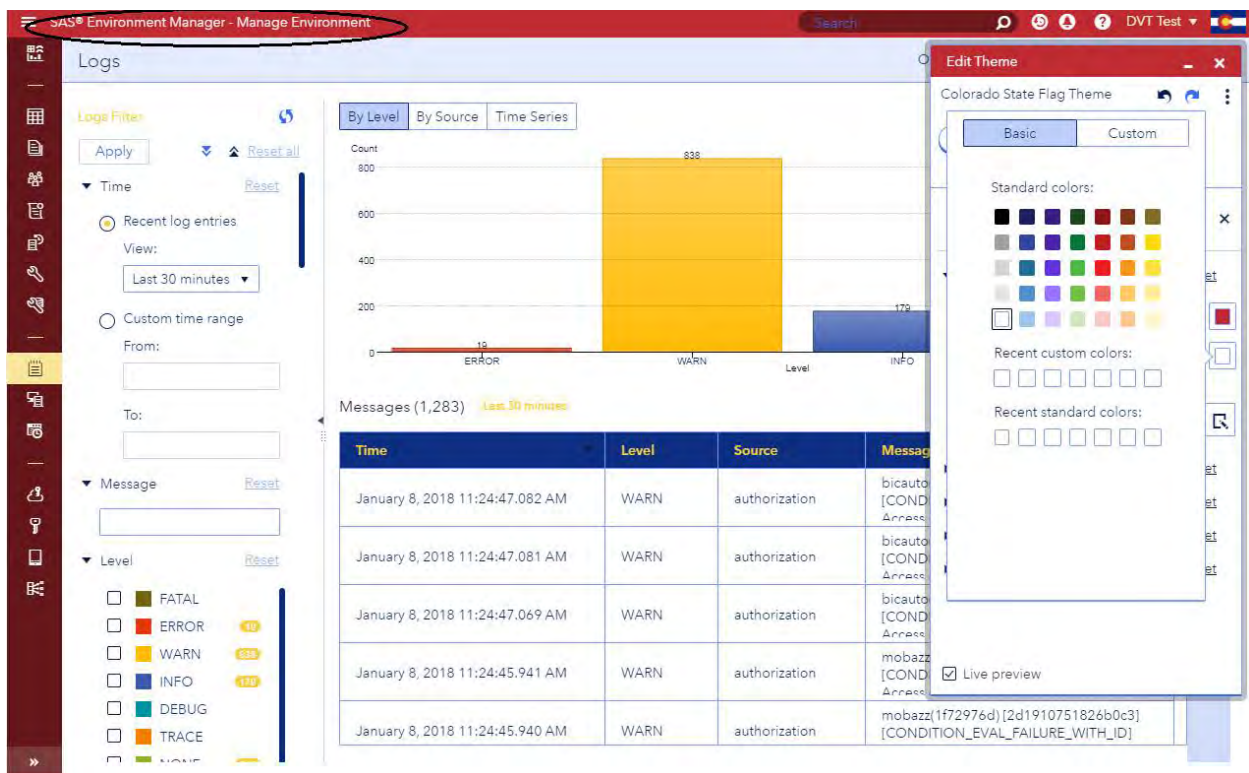

Figure 15. Editing SAS Environment Manager in Context

RETURNING FROM AN APPLICATION TO SAS THEME DESIGNER

When editing a custom theme within the context of another SAS application is complete, select the **(X)** in the upper right corner of the Edit Theme dialog, or select the **Edit in SAS Theme Designer** menu item from the dialog overflow menu to return to SAS Theme Designer where your editing session originated. All previous selections and any editing changes made while in another application context are preserved.

SAVING A CUSTOM APPLICATION THEME

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When all desired edits are in place, clicking the Save button on the toolbar preserves the custom theme settings along with the chosen name. After the theme is saved, clicking the **View All Items** return arrow at the top left of the editing session window returns you to the **Manage Themes** window and the new custom theme **Colorado State Flag Theme** is now visible there in **Draft** status. See **Figure 16. New custom theme is saved**.
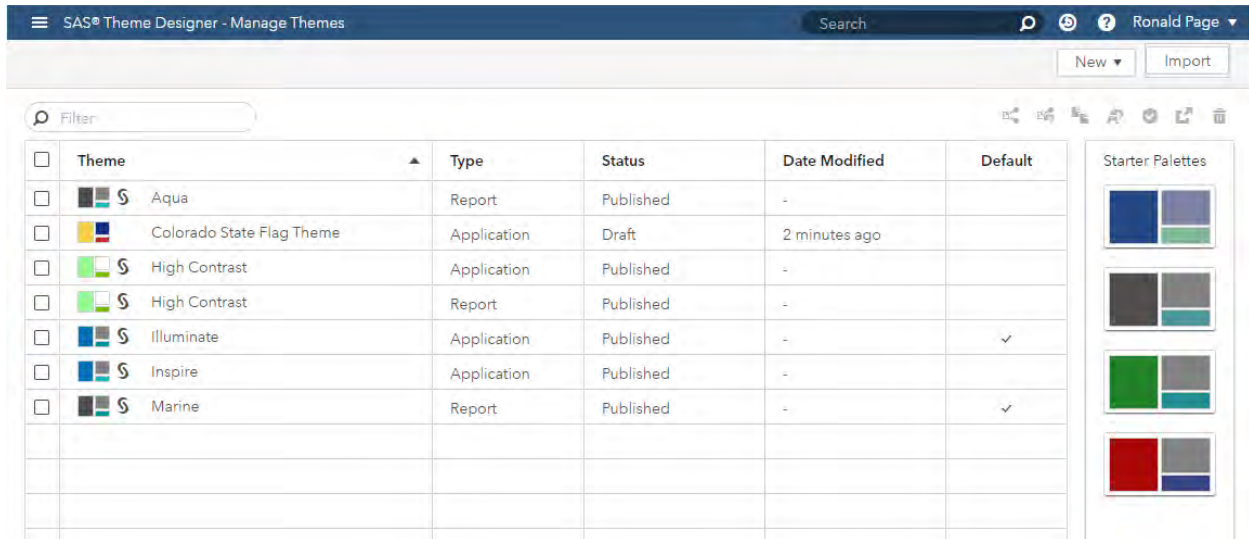

Figure 16. New custom theme is saved

MAKING A CUSTOM APPLICATION THEME AVAILABLE FOR USE

Currently, specific theme colors and other properties have been selected and saved into a custom theme. *Publishing* the custom theme is now desirable, so as to prepare the theme for permanent usage and to make it available to other SAS users.

PUBLISHING A CUSTOM APPLICATION THEME

In order to publish a custom theme, simply select the checkbox to the left of the custom theme you would like to publish, then select the **Publish** icon in the toolbar. Please see **Figure 17. Publishing a custom theme**.
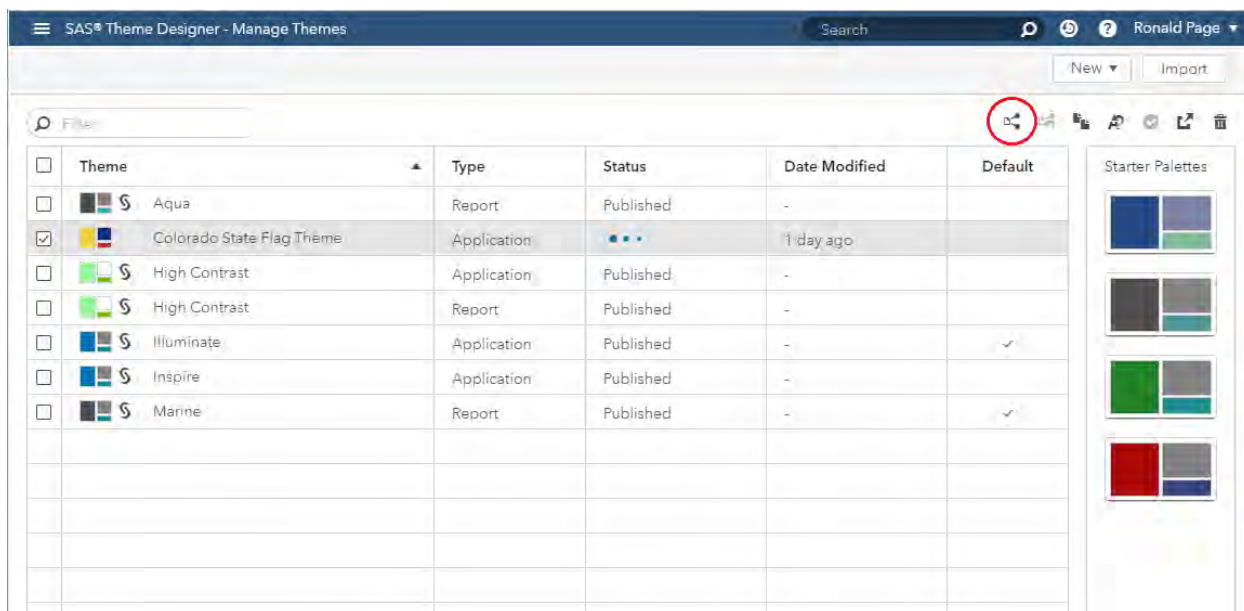
Figure 17. Publishing a custom theme

Please note that publishing can take some time to complete, as the theme is being compiled and prepared for use. The actual publish time can vary from several seconds up to a few minutes, depending on your processing speed and available memory. When publishing a custom theme is complete, the **Status** field of the custom theme will be updated to **Published**.

SWITCHING TO USE A PUBLISHED THEME

The process of publishing a custom theme makes it available for general usage. By default, all users of SAS applications use one of the built-in system themes. Currently, the default theme for all users is the **Illuminate** theme. For example, after launching SAS Environment Manager you might desire to switch to use the newly created custom theme **Colorado State Flag Theme**. The **Settings** dialog provides the mechanism for selecting a custom theme for display.

In order to access the **Settings** dialog, click the **user name** at the top right corner of display and select the **Settings** menu item. The settings dialog is then displayed. In the **Global** > **General** section, simply click the **Choose a theme** category and a selector is then enabled that lists all of the published themes available for use. The new custom theme **Colorado State Flag Theme** is now listed there. See **Figure 18. New custom theme is selectable**.
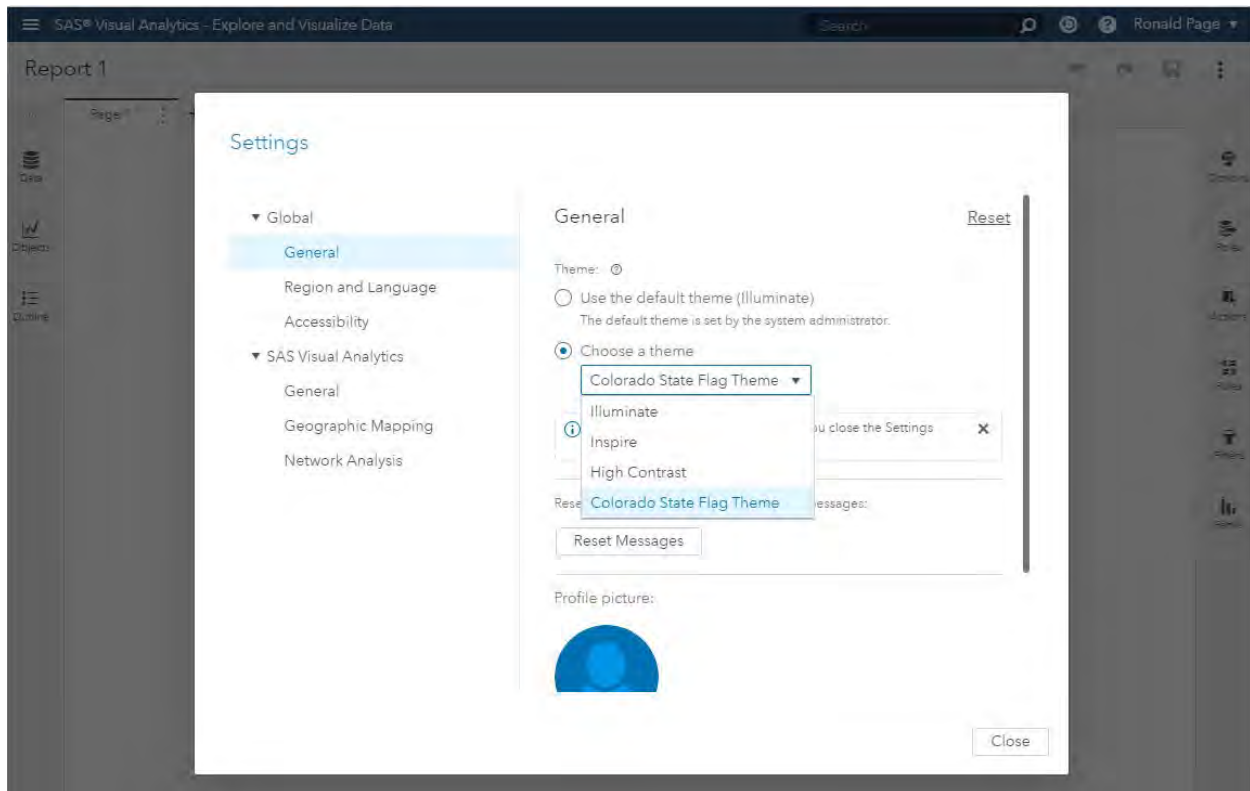
Figure 18. New custom theme is selectable

Selecting the **Colorado State Flag Theme** and closing the Settings dialog causes the new custom theme to become the current user selection. Now, the SAS Visual Analytics application will display just as it did earlier when editing the custom theme within the context of that application. Instantly notable changes are the red banner, dark blue icons, a complementary blue background and a banner logo depicting an image of the Colorado state flag. See **Figure 19. SAS Environment Manager with Colorado State Flag Theme Applied**.
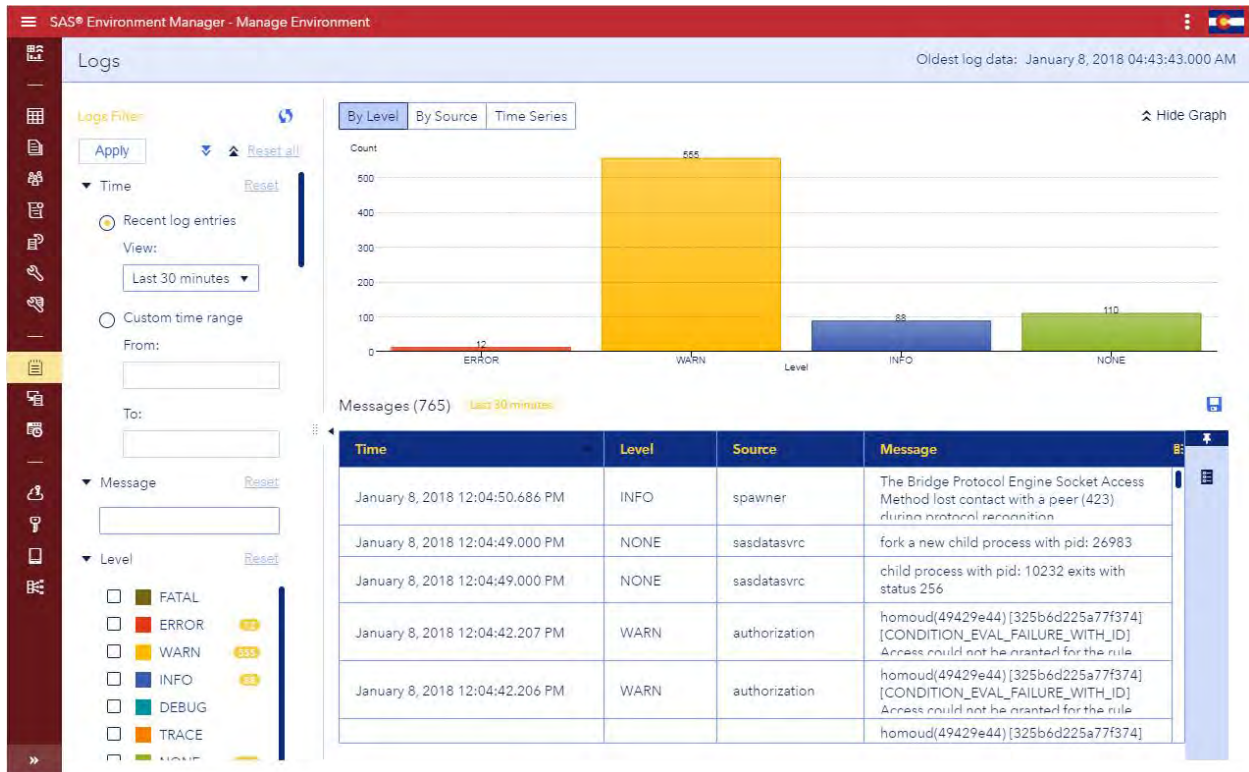
Figure 19. SAS Environment Manager with Colorado State Flag Theme applied

CREATING AND USING CUSTOM REPORT THEMES

SAS Theme Designer 3.1 also provides the ability to create custom report themes. These themes are utilized to style reports created within SAS Visual Analytics. The process for creating a custom report theme is very similar to that of custom application themes.

To begin creating a new custom report theme, simply select the New > Report Theme on the right toolbar in SAS Theme Designer. Please see **Figure 20. Creating a new default report theme** below.
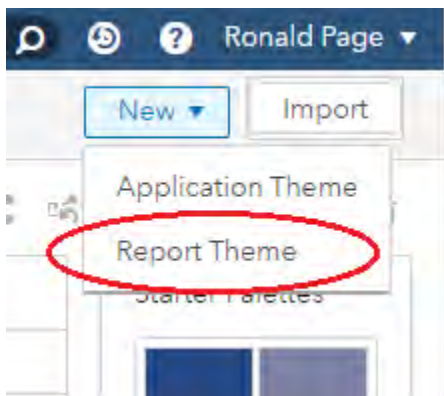

Figure 19. Creating a new default report **theme**

After the editing session is launch, you can click the **Choose Report** button to select the desired Visual Analytics report to style.

CHOOSING THE SPECIFICS OF YOUR NEW CUSTOM REPORT THEME

The process of selecting colors and other properties for custom report themes are essentially the same as previously discussed. And just as with custom application themes, any changes made during the editing session of a custom report theme are immediately rendered within the selected SAS Visual Analytics report.

PUBLISHING AND USING YOUR NEW CUSTOM REPORT THEME

Once the custom report theme is finalized, it can be *Published* using the above mentioned mechanism we used for custom application themes. Then when editing a report within SAS Visual Analytics, a selector is provided in the report properties that allows you to select the custom report theme as the desired theme to be associated with the report.

For a further in depth explanation of how custom report themes are created and utilized, please refer to the paper SAS597-2017 presented at the 2017 SAS Global Forum entitled *Visualizing Reports with SAS® Theme Designer in SAS® Visual Analytics* by Aniket Shirish Vanarase.

CONCLUSION

SAS Theme Designer 3.1 provides the means by which your SAS applications and reports can be styled and customized according to your individual tastes or to portray a corporate brand. With only a few clicks, custom themes can be created, edited and deployed. These themes can then be made available to others at your organization to provide the desired style for all SAS applications and reports.

REFERENCES

Visualizing Reports with SAS® Theme Designer in SAS® Visual Analytics

SAS support site (http://support.sas.com/documentation)

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