Cognos Analytics: AI Infused Data Discovery with Dashboards

Lab Exercise Guide

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Think 2021

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1 Introduction

IBM Cognos Analytics provides users with data discovery capabilities to visually explore and interact with their data to identify the key insights for improving data driven decisions. Users can perform data discovery and then quickly assemble that information, which is most relevant to them into interactive, visually appealing dashboards; all without the need for IT assistance or formal training and without leaving a single User Interface.

1.1 Lab Overview

In this lab, you will experience the following capabilities in IBM Cognos Analytics:

- Cognos Analytics User Interface
- Uploading Personal Data Sourcesf
- Using the AI Assistant
- Visualizations and Geospatial Mapping
- Forecasting
- Pattern and Relationship Analysis

1.2 Prerequisites

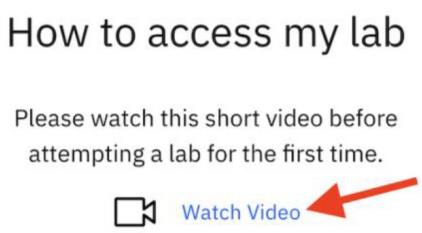
Everything you need in order to complete the lab is available in your lab environment. All you need is your computer and an internet connection.

2 Get Started with your Cognos Analytics Lab

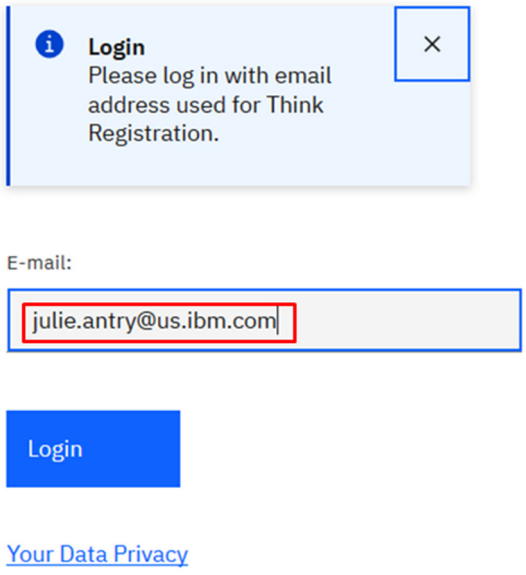
2.1 Accessing your lab environment

You will be provided with a link to access your THINK 2021 lab from your instructor. This link will lead you to IBM SOLEIL platform that we are using to host the lab environments.

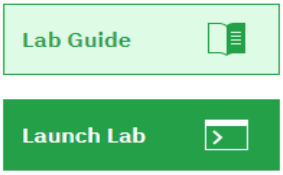
__1. There's a useful "How to access my lab" video on the even page that we recommend you watch before staring your lab.



__2. After watching the video, log in using your email that you used to register for THINK 2021.



__3. This will take you to the lab landing page where you can access this lab document using the Lab Guide button and access your individual lab environment using the Launch Lab button.

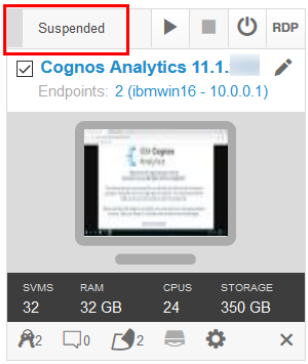


__4. Click on the **Launch Lab** button to open your lab environment dashboard page.

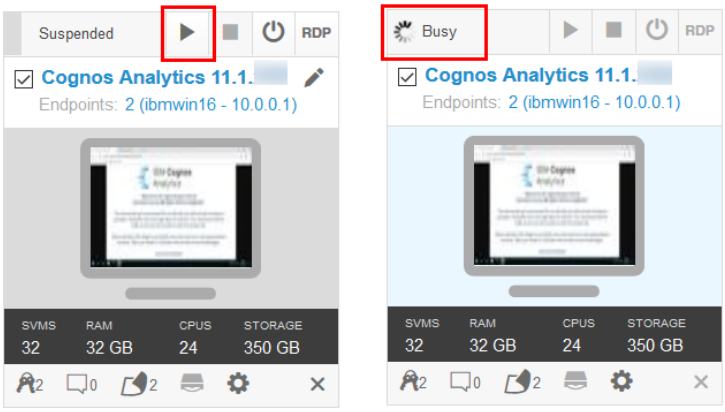
2.2 Start the Virtual Machine (VM) for your lab

Your lab environment has only one (1) virtual machine (VM) that should have already been started up for your convenience (green background, status "Running"). If it is not running, you can start your VM using the steps below to start.

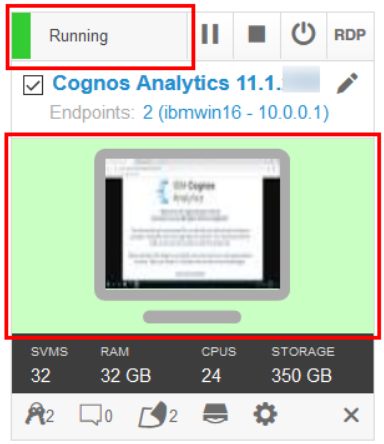
__1. Check the status of your image that is indicated. It may be Powered off, Suspended, or Running.



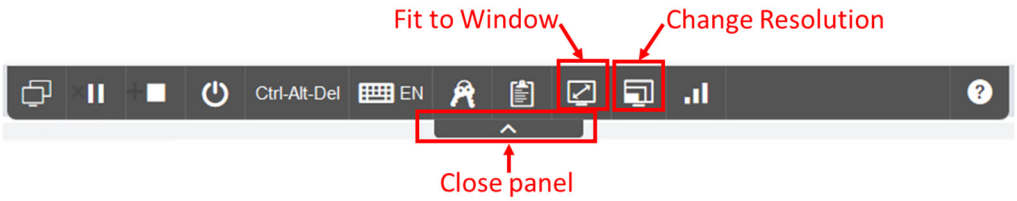
__2. If your image is already running (green background, status "Running"), skip this step. If it's Suspended or Powered off, click the **Play** button to start the VM and wait until the VM has booted (you can see the spinning gear).



__3. Once the VM is ready the computer monitor thumbnail will have a light green background. Click the **monitor** to start the VM.

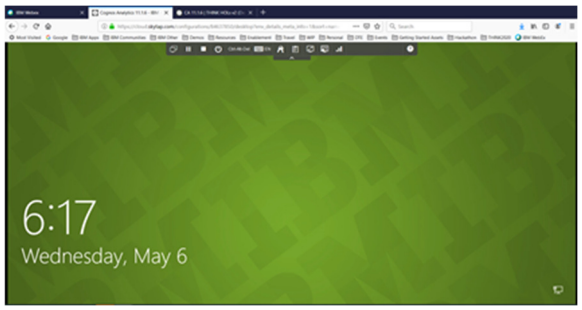


__4. The VM opens in a new browser tab. You can use the controls toolbar at the top of the screen to adjust the resolution. Click the **Fit to Window** button to fit the screen to the size of the browser. Also, it is recommended to set the window size of the browser to full screen using the **Change Resolution** setting. Once done, you may close the panel.

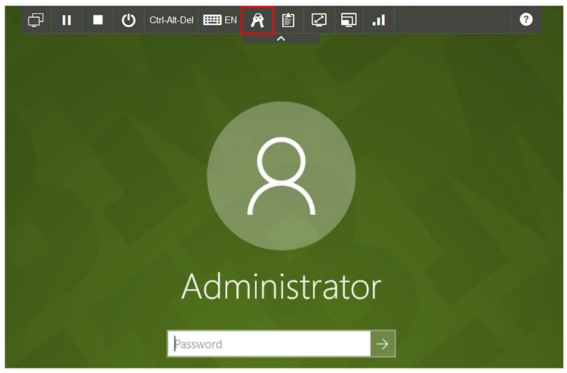


As your environment comes online, it may power up to a login screen for the VM. Some images, which have already been activated, may open from a suspend state and directly to the desktop. Instructions for signing in for both states are listed next.

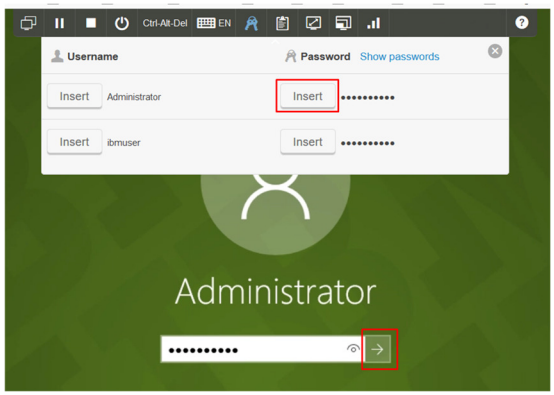
__5. If your VM opens to screen similar to the one below, it is just powering up and you will need to sign in to access the desktop of the machine. (NOTE: If you do not come to this screen, but rather to the desktop or a browser window, skip to step 8.)



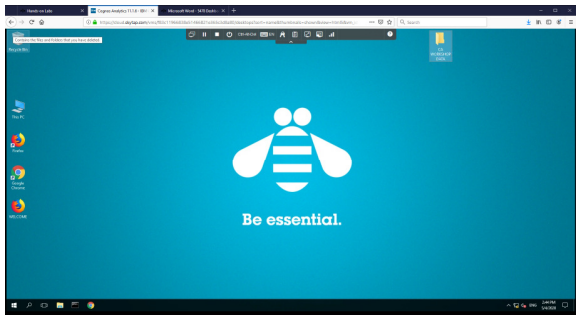
__6. Click the **screen** to open the sign-on dialog box. Click the "**keys**" icon from the VM controls toolbar to open credentials window.



__7. Click the **Insert button** for the Administrator Password. This will auto populate the password into the dialog box. Click the **arrow** or press Enter to proceed to the desktop of your VM, where you will begin your lab.



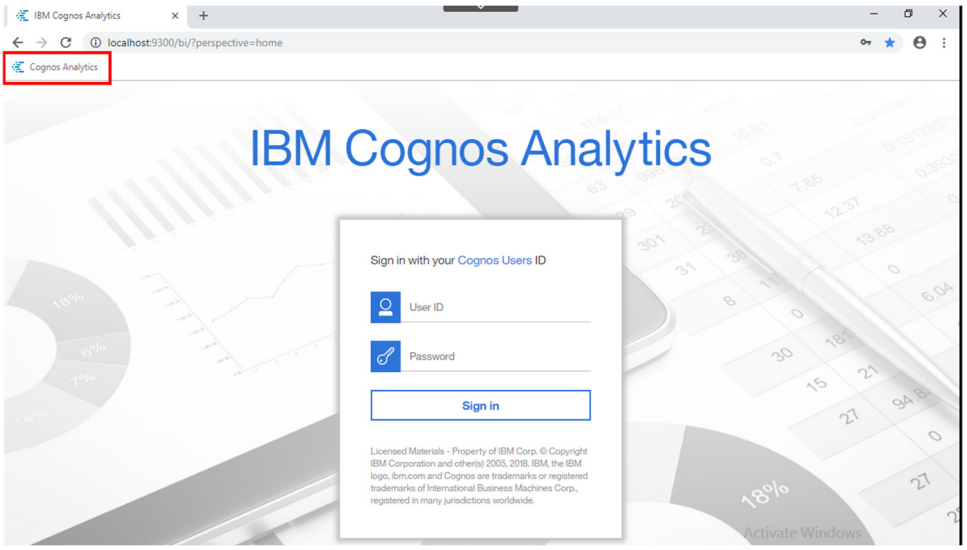
__8. Once you are signed in to the VM, you will see the desktop of the VM. Some VMs may already have a browser open where you will see a welcome screen.



__9. It may take a few minutes for the VM to complete startup of all services. Your environment is ready to use once you are able to open a browser window from the desktop, or to close the browser tab of the welcome page using the **X** on the browser tab.

2.3 Start Cognos Analytics for your Lab

__1. From the desktop, open **Chrome**. From the **Bookmarks Toolbar**, open the **Cognos Analytics bookmark** to launch IBM Cognos Analytics and open the login page.



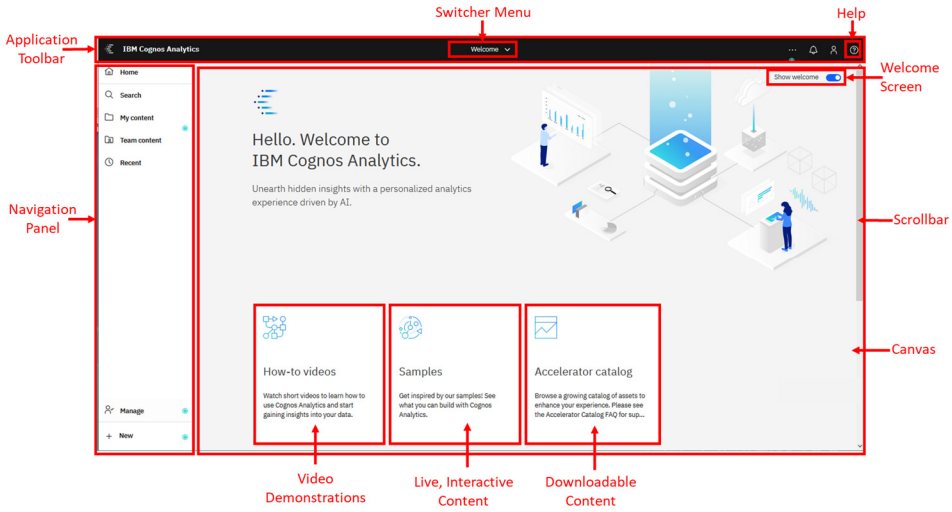
__2. Enter the sign-in credentials as follows:

- User ID: **cogadmin**
- Password: **IBMDem0s!**

2.4 Cognos Analytics User Interface

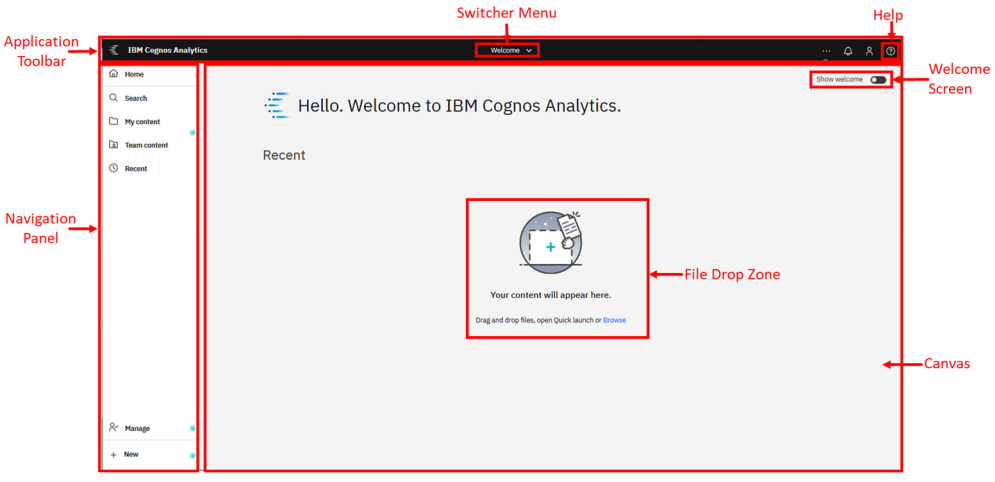
The goal of the User Interface (UI) is to provide users with a streamlined way to get started using Cognos Analytics and view content and activities pertinent to them.

__1. The User Experience brings you directly into and expanded landing page for the Cognos Analytics User Interface (UI). All Cognos Analytics Users begin their navigation here.



TECH TIP: *NOT ALL WELCOME SCREEN GETTING STARTED TILES MAY BE AVAILABLE IN YOUR LAB INSTANCE. THE WELCOME SCREEN GETTING STARTED TILES PRESENTED ARE BASED ON WHICH HAVE BEEN CONFIGURED TO RUN IN THE ENVIRONMENT.*

__2. Click the **Welcome Screen toggle button** on the upper right of the canvas to collapse the Welcome Screen's Getting Started content. The canvas now shows the Recently used files in the **Recent** section, if any, along with **the File drop zone** where Users can easily upload their data files.



__3. Once you begin working with content, the canvas updates with your recently used items. In your Cognos Analytics instance, you may see recent content on the canvas.

TECH TIP: *DETAILED INFORMATION REGARDING THE UI CAPABILITIES ARE SHOWN IN APPENDIX A FOR YOUR REFERENCE.*

2.5 Business Use Case for this lab

For the purposes of this lab, you play the role of a retail marketer.

You have received the following email from one of the Product Managers asking for assistance:

Julie,

Based on the recent pandemic, we are looking for additional insights into how customer buying patterns have changed with the shift to more online buying and store-pickup only. We need to be able to identify these shifts so that we may adjust our inventory plans to meet customer demands. We also need to understand how our coupon programs and loyalty programs are performing. I've tried to capture this information in a spreadsheet, but its just not scalable in this format. And what I really need is a dashboard to share with the organization.

Could you take a look at the attached file I've started and investigate this further?

Thanks,
Matt

Using the dashboarding capabilities in Cognos Analytics help you understand what's happening in your business. You begin by uploading this file and building a Cognos Analytics dashboard to analyze department sales. Using a dashboard template, you quickly assemble content for your analysis. Once your content is assembled, you move on to formatting each of your widgets to polish it up and really make it shine so you can share your findings with others in your organization.

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3 Building a Dashboard

3.1 Uploading External Data

The ability for Business Users to use their personal and external data for discovery dramatically broadens the landscape of Users who can make new data available for analysis. Users can upload an external data file and immediately begin self-service data discovery, ad hoc analysis and building dashboards.

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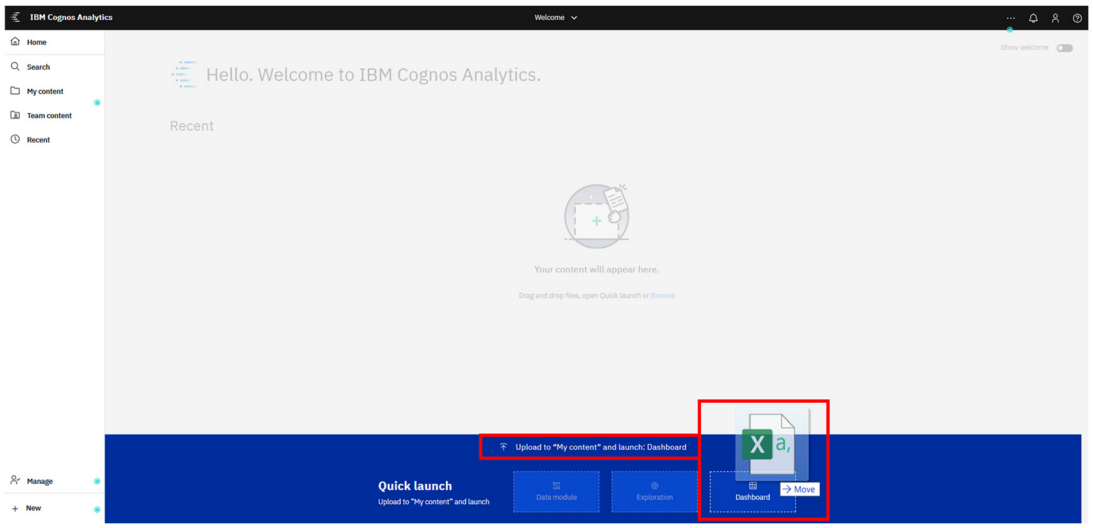
*For the first exercise, use the file "**CustomerLoyaltyProgram.csv**". This file is located in a folder on the desktop of your Cognos Analytics instance:*

Desktop>CA Workshop Data.

__1. To upload a file, you can either drag and drop this file into the **drop zone**, or you can click **browse** in the drop zone to navigate to where the file is saved.

__2. For this lab, use the drag and drop option. Drag the file to the **Drop zone** button on the canvas until the blue **Quick Launch** menu appears at the bottom of the screen. The Quick Launch section allows you to select your intent on how you wish to interact with the data you are uploading. Drop the file over the **Dashboard** option.



***TECH TIP:** THE DROP ZONE APPEARS WITHOUT THE NOTEBOOK OPTION IN ENVIRONMENTS WHICH HAVE NOT BEEN SET UP TO RUN JUPYTER NOTEBOOKS.*

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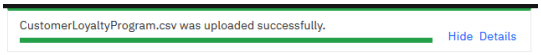
*Using this method, Cognos Analytics automatically uploads the file to your **My Content** folder and open Dashboard capabilities to begin working with your data.*

__3. As the file uploads, notice that under the Switcher Menu, a series of **status bars** are visible as the upload process reads and analyzes the data being brought in.

__4. Once it completes, the status bar will update to show the successful completion before closing.



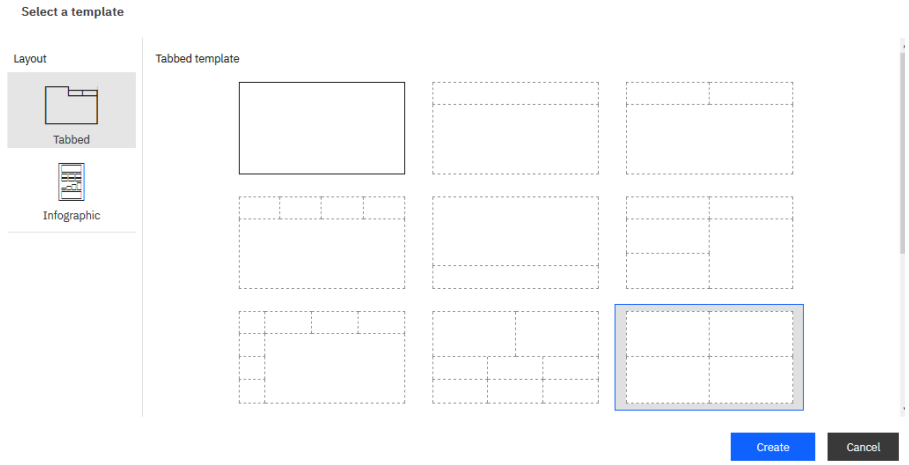
Since you selected to upload the data and launch a Dashboard, the Dashboard User Interface will immediately open after the upload is complete. You're now ready to start to build your first dashboard from this data.

3.2 Using Templates

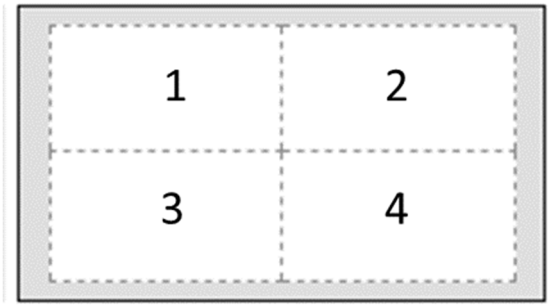
Dashboard templates provide many easy to use, predefined layout styles for to assist Users in the layout of content. Templates contain one or more panels where Users quickly assemble various content items, known as "widgets", onto a dashboard. Widgets can be a visualization, a list or crosstab, a single value, an image, a text box and so on. For this lab, we will focus on building visualization widgets.

Dashboards provide a line of sight into your business allowing you to easily monitor KPIs and metrics at a glance. As a starting point, you would like to use the uploaded data file to analyze product performance. You'll use a dashboard template to assist in the layout of the data.

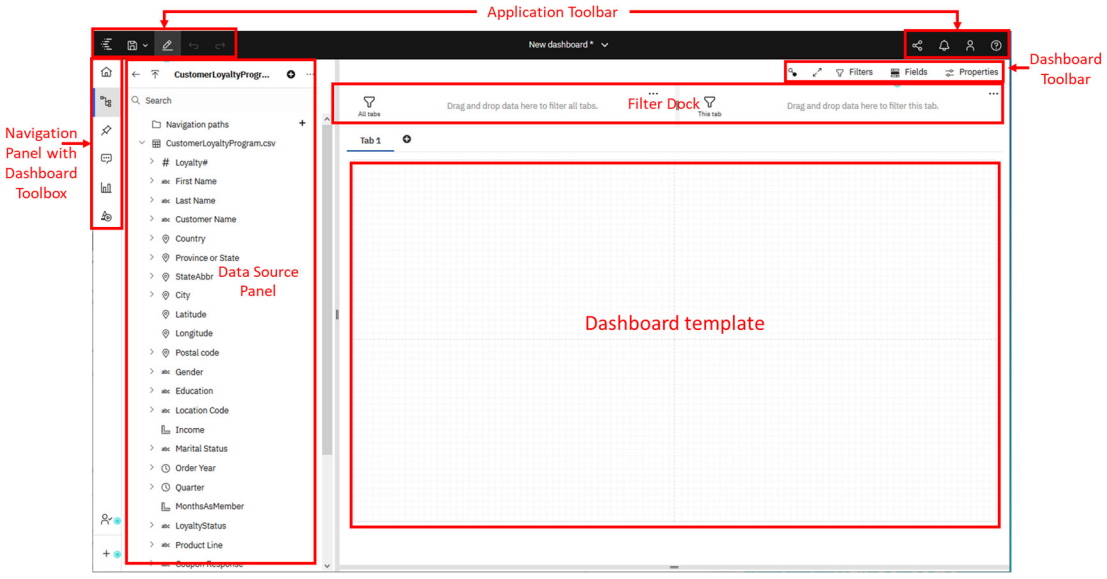
__1. The Template window will display allowing you to select the type of dashboard and the template style. Select the **tabbed dashboard style**. This will allow you to have multiple pages for your dashboards. Select the **four-panel template with 2x2 configuration.** Click **Create**.



__2. As you build the dashboard, this lab references the location placement for **Widgets** in the dashboard template using the following **Panel** numbers



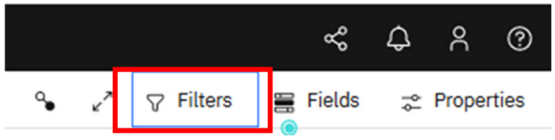
__3. The **dashboard template** opens in the **Canvas** along with the data source open in the **Data Source Panel**. Notice that the **Navigation Panel buttons** on the upper left have now updated to show the dashboard toolbox capabilities available for assembling a dashboard. The main toolbar has also updated exposing the dashboard editing and sharing functions available.



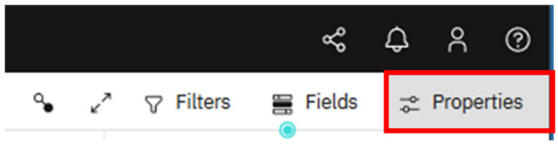
For ease of dashboard design, the default view presents a convenient grid to assist in dashboard layout. This grid, and other layout settings may be set by the User.

__4. Click the **dashboard template** to bring it into focus.

__5. Above the dashboard template is the **Filters** dock. The Filters dock is used to place filters on multiple objects on a single tab, or all tabs, simultaneously. This lab will not use the Filters dock during this exercise. It may be closed to remove it from view. Click the **Filters button** on the **Dashboard toolbar**.



__6. To open the dashboard template properties, click the **Properties** button on the **Dashboard toolbar**.



__7. The **Properties panel** opens. This is where you define the **General** settings for your dashboard template. Under **Canvas**, you can set many properties for working with the template including layout positioning, page sizing and using grids and snapping to assist with dashboard design and layout.

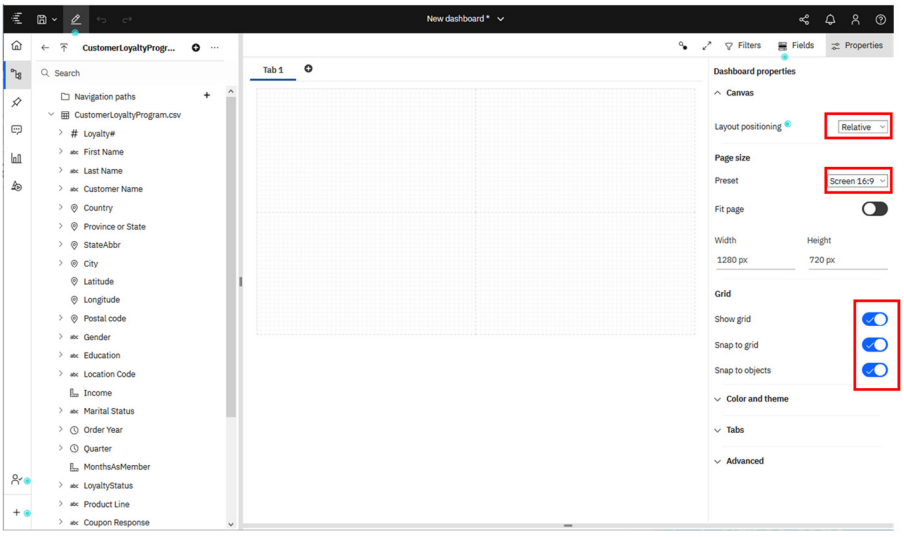
- **Canvas layout positioning** - In the properties for a dashboard or story, you can set whether the layout positioning is relative or absolute. In a relative layout, the size and position of widgets adjust to fit into the screen. Widgets in an absolute layout appear exactly as you size and place them in the view, regardless of the screen size. For this exercise, the **layout positioning** should be set to **Relative**.

- **Page size** - You can choose a pre-set page size for a dashboard such as letter or legal. You can also set the height and width of a dashboard. This feature gives you control of the display of your dashboard or story to accommodate the various devices with different screen sizes your users may use to consume this information. Leave the default **Preset** to **Screen 16:9**.

- **Show grid, snap to grid, and snap to objects** - You can display a grid on the canvas that provides a guide for you to snap objects to as well as snap objects to other objects. You can enable and disable these features in the dashboard or story properties.

TECH TIP: *THE PROPERTIES IN THE PROPERTIES PANEL ARE GROUPED BY CATEGORIES SUCH AS CANVAS, COLOR AND THEMES, AND TABS. THESE GROUPS ARE COLLAPSIBLE AND EXPANDABLE TO IMPROVE ORGANIZATION AND USABILITY OF THE PROPERTIES PANEL.*

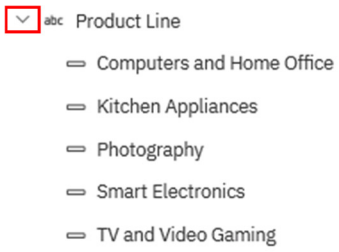
__8. For this lab, your template's **Properties settings** should appear as follows:



__9. Click on the **Properties** button to close the **Properties panel**.

__10. From the **Navigation panel**, select **Sources** to open the data source panel, if it is not already open. The **Data Source panel** displays the uploaded file "**CustomerLoyaltyProgram.csv**" as the **Selected Source**.

__11. Notice the arrows next to various data items. Users can easily expand and collapse the fields in their metadata tree to see individual values or members. Click on the **Expand arrow** next to **Product Line** to see the members in the tree. Click the **Collapse arrow** to collapse the member view.



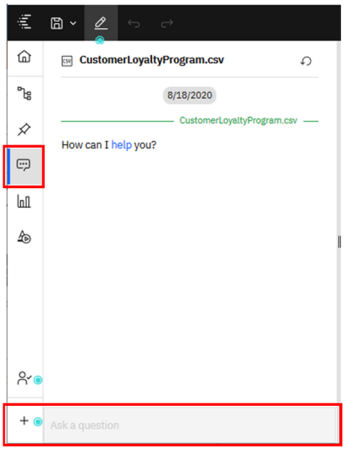
3.3 AI Assistant

The Cognos Analytics Assistant provides recommendations to help answer questions and provide the User with quick insights into their data. Many times, Users will have specific questions they are looking to answer but may not be familiar with the dataset or exact data items they need to uncover the insight or answer they are seeking.

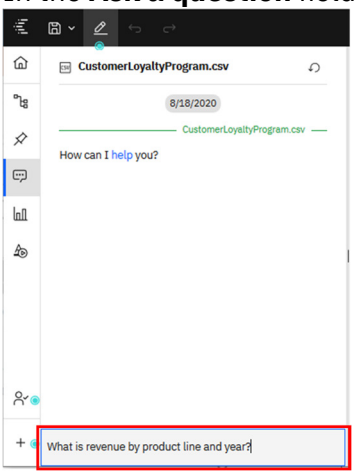
From within a Dashboard or Exploration, the User can type in natural language text to uncover meaningful insight in the data, as well as generate visualizations that can be added to an existing or new dashboard, exploration or story. Simply enter text related to the Users analytical intentions and an AI conversational agent responds with visualizations and other information to satisfy the request.

The AI Assistant allows users an easy starting point to begin working with their data. In this case, the first question the User may have is how Product Line sales have historically trended over time. To get started, the User can use the AI Assistant to ask questions.

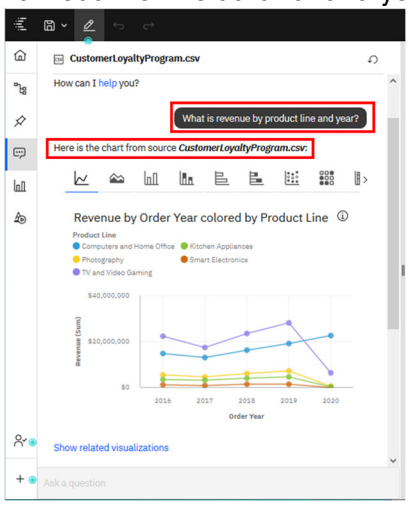
__1. Click the **Assistant icon** from the **Navigation panel**. The Assistant panel opens.



__2. In the **Ask a question** field, type "***What is revenue by product line by year?***" and click **Enter**.

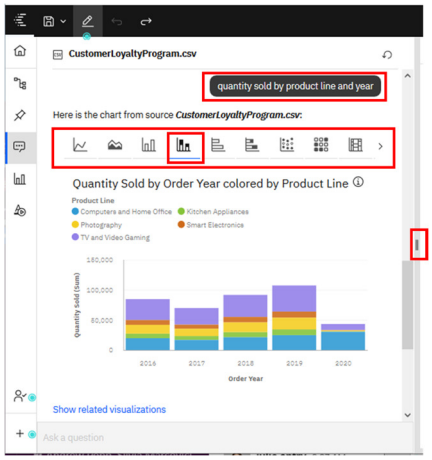


__3. Cognos Analytics identified Product Line, Revenue and Year in the **CustomerLoyaltyProgram.csv** file uploaded earlier and provides recommendations for ways to visualize this data for analysis.



TECH TIP: *IF THE DATA ITEMS FROM YOUR INQUIRY EXIST IN ANY OTHER DATA SOURCES, THOSE MAY BE LISTED AS ADDITIONAL MATCHING SOURCES. YOUR LAB ENVIRONMENT MAY HAVE MORE, FEWER, OR NO OTHER MATCHING SOURCES. THIS WILL NOT IMPACT THE EXERCISE IN THIS LAB.*

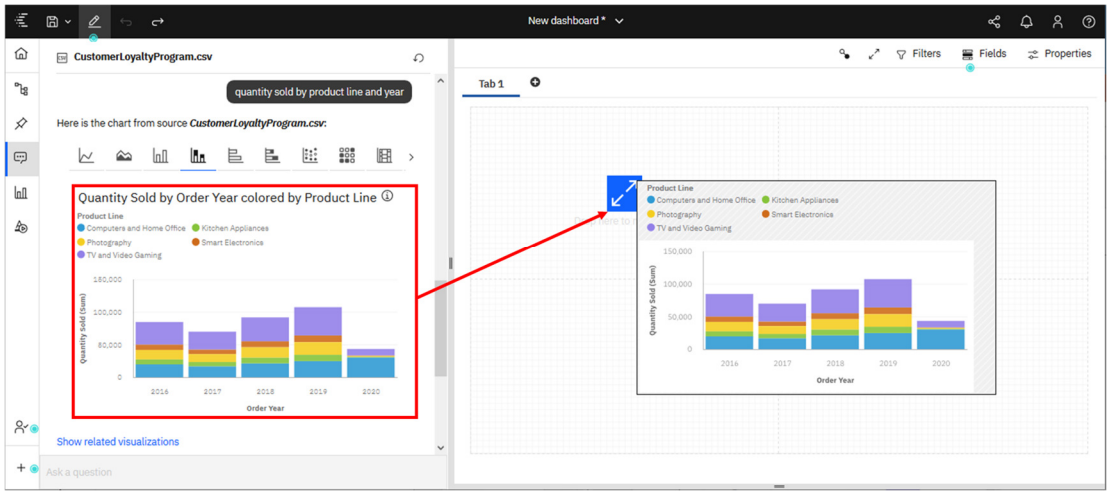
__4. Questions made to the AI assistant do not need to be in full context or use proper sentence case and capitalization. In the **Ask a question field**, type "***quantity sold by product line by year***" and click **Enter**. Based on the data items in the inquiry, Cognos Analytics also provides a series of additional visualizations related to the question. Click through the **visualization bar** to view the various visualization recommendations. Click the **Stacked Column** to bring up a visualization that looks similar following:



TECH TIP: *YOU CAN INCREASE OR DECREASE THE WIDTH OF THE ASSISTANT PANEL AS PREFERRED BY USING THE* ***PANEL SIZING TOOL*** *ON THE RIGHT EDGE OF THE PANEL.*

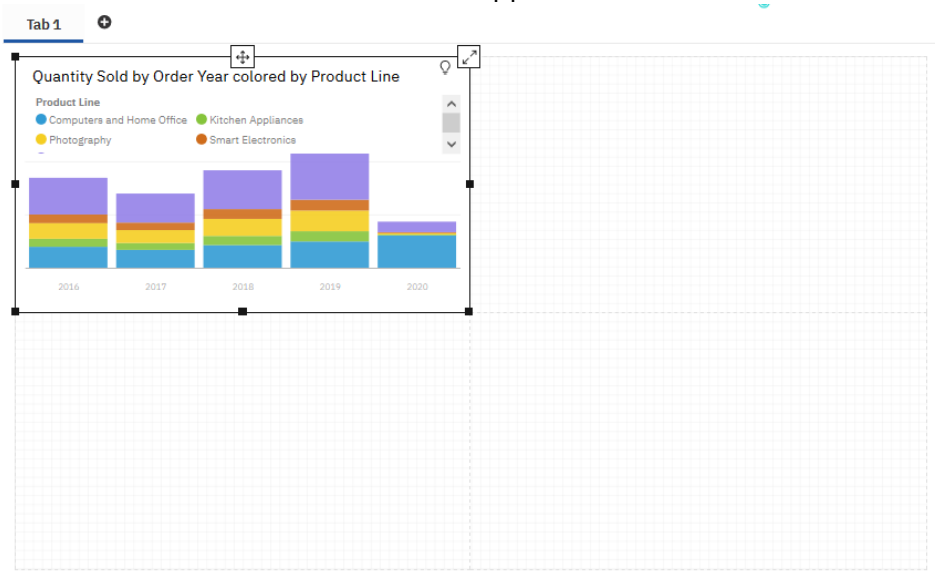
The visualizations the AI Assistant provides you with widgets including descriptive titles that you can bring into your dashboard.

__5. Click the **Stacked Column visualization** and drag it over to the **canvas** into **panel 1**, dropping it when the **drop zone** turns blue.

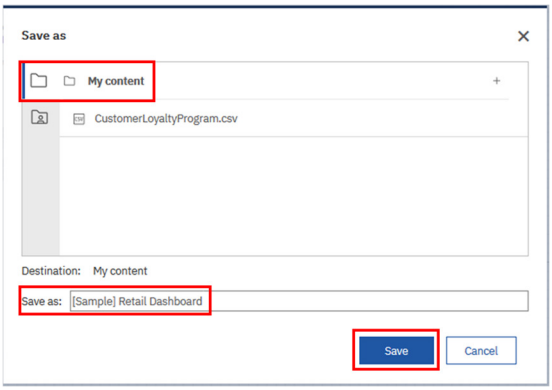


TECH TIP: *BY DROPPING THE DATA ITEMS ON TO THE **DROP ZONE**, THE WIDGET WILL AUTOMATICALLY SIZE TO FILL THE ENTIRE PANEL. USERS CAN MODIFY THE SIZING, PLACEMENT AND LAYOUT AT ANY TIME.*

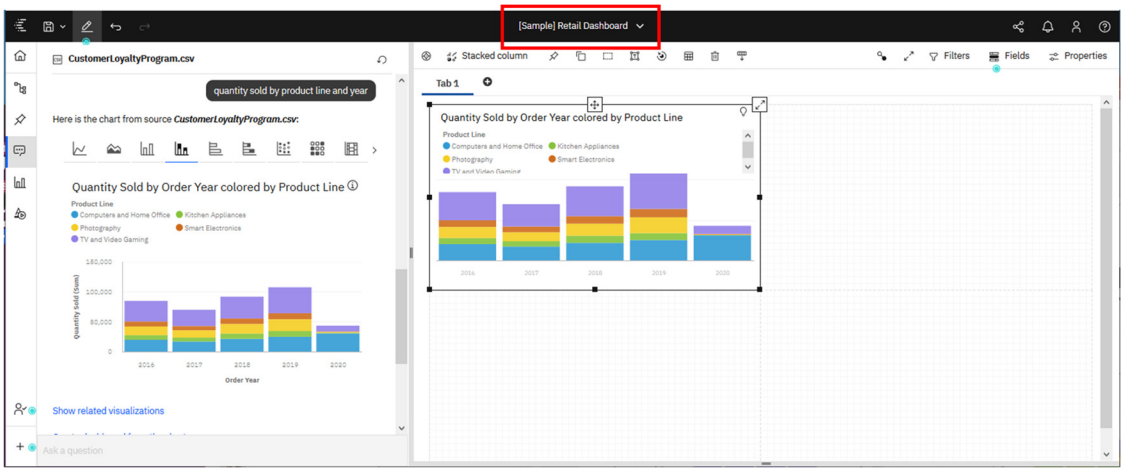
__6. Your dashboard canvas should now appear as follows:



__7. Click the **down arrow** next to the **Save icon** on the dashboard toolbar. Click **“Save As”**. Navigate to **My Content**. Save as **“[YourName] Retail Dashboard.**



__8. Notice that the name of the dashboard now appears in the **Switcher menu**.



This visualization shows how each of the product lines contribution of quantity sold to the total has trended over the last few years. You can see that after a dip in sales in 2017, sales have been steadily recovering, having regular growth overall over the last two years.

Since the current year 2020 is only a partial year, you will add in quarterly detail to better understand current year performance as well as see if there appears to be seasonal trends in the data.

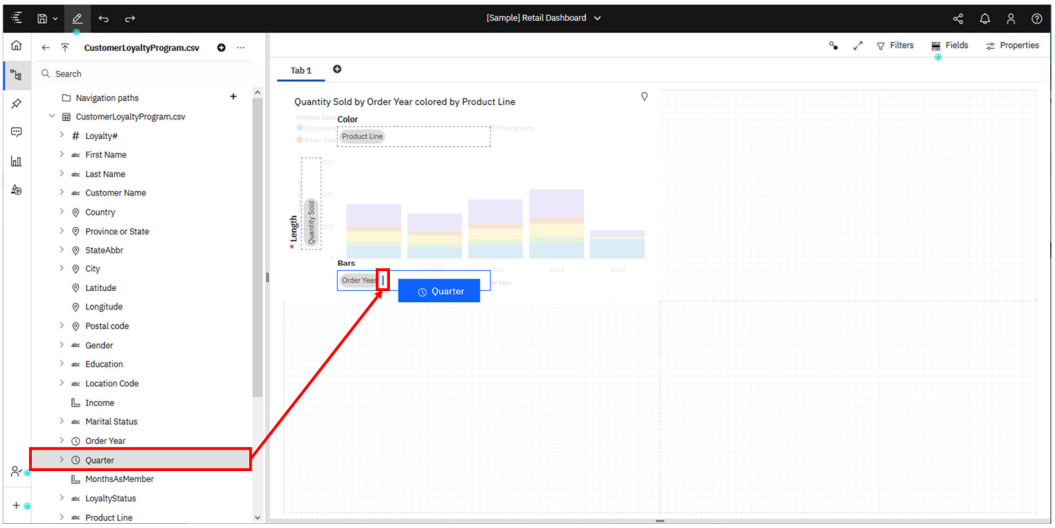
3.4 Nesting Data

Cognos Analytics allows you to use multiple data items per data slot. With the year already charted out, you can nest in quarterly data to create a more detailed visualization in the same amount of space.

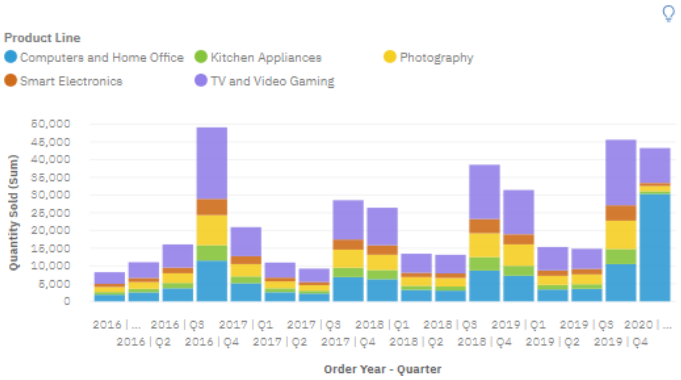
In order to see a more granular view of how product sales have trended over time, you will add in quarterly data so show a more detailed sales history.

__1. From the **navigation panel**, click the **Sources** icon to open the data source panel. Use the **Panel sizing tool** to adjust the width of the data sources panel as preferred.

__2. From the **Data Source panel,** drag **Quarter** over to the **Order year Axis**. The **Bars data slot** window opens. Drop **Quarter** to the right of Order Year. A **vertical blue bar** renders when you've hit the correct location for the **drop zone**.

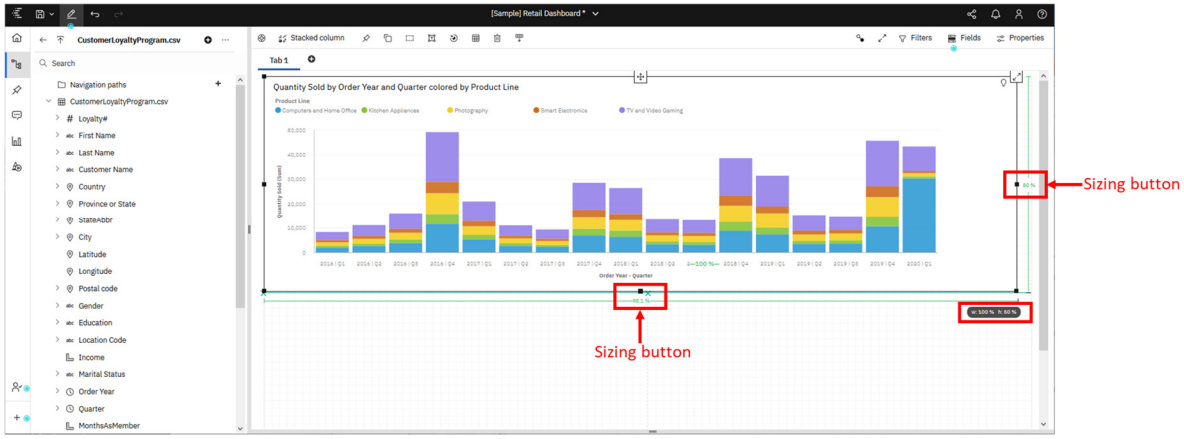


__3. Quarter is now nested under Order Year providing a much more detailed view of the historical sales trends. Your widget should appear as follows:



As you assemble your dashboard, you may want to resize a visualization to optimize its presentation. You can easily use the sizing buttons on the edges of the widgets to resize it while using the Grid to assist you with alignment. As you resize your widget, size guidelines render to show you relative size of the widget to the overall template.

__4. Using the right **Resizing button**, drag the edge of the widget all the way to the right so it **covers both panels 1 and 2**. Notice that as you drag the edge, the sizing ratios render on the screen.



With the widget resized, we can easily see the quarterly axis titles under the columns. This allows us to quickly identify a distinct seasonality to the data showing the highest sales quantities have traditionally been in Q4. Yet we also see a large spike in sales for Q1 of 2020 of which the majority of this increase is from the Computers and Home Office product line. This is very interesting as this aligns with the beginning of the pandemic.

__5. **Save** the dashboard.

Tech Tip: *If you are looking for exact "pixel perfect" formatting and sizing, you can set the exact sizing definitions in the properties Panel for both the Dashboard and the individual widgets. From the visualization properties, you can also align widgets relative to one another, precisely position, and adjust the height and width of widgets.*

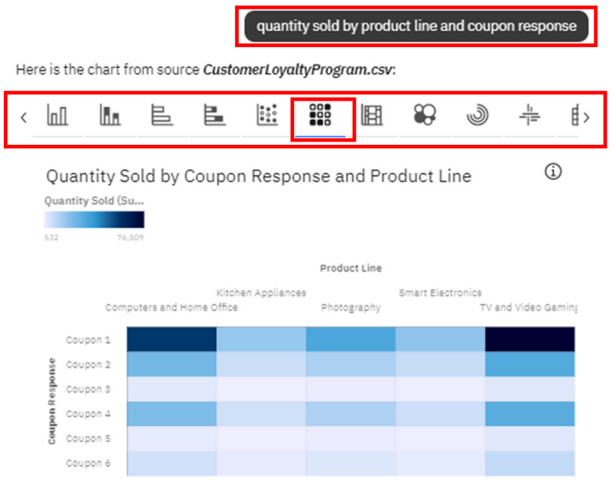
3.5 Working with Visualizations

Dashboards provide Users with a line of sight into their business that allows them to easily monitor KPIs and metrics. With Cognos Analytics, Users have flexibility to create and assemble very attractive and engaging dashboards with meaningful visualizations that are automatically generated with little authoring experience needed. Users can also easily create a customized look and feel as well as set up Corporate color palette standards.

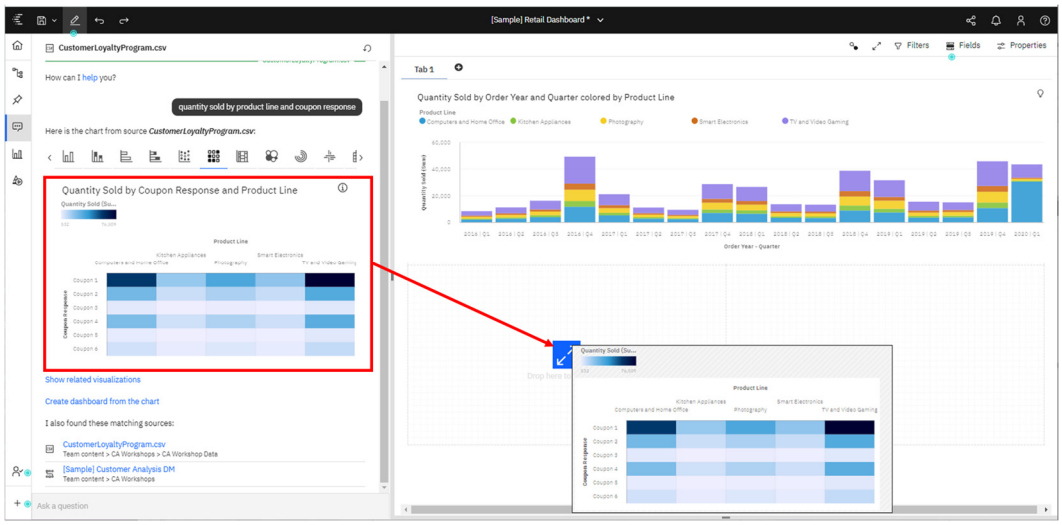
Using the AI Assistant, you easily created a widget that illustrates Sales history over the past few years. Next, you would like to do more data discovery and build additional visualizations that allow you to easily monitor sales performance from the dashboard. You can continue working with the AI Assistant as well as manually build out visualizations for your analysis, or even use a combination of both.

You would like to understand the performance of Coupon programs in place from Marketing for each of the Product Lines. You'll use the AI Assistant to get started, then modify the visualization for your analysis.

__1. From the **AI Assistant panel**, type "***quantity sold by product line and coupon response***" in the **Ask a question** field and click **Enter**. Use the scrollbar to select the **Heat Map** . You should see a visualization similar to the following.

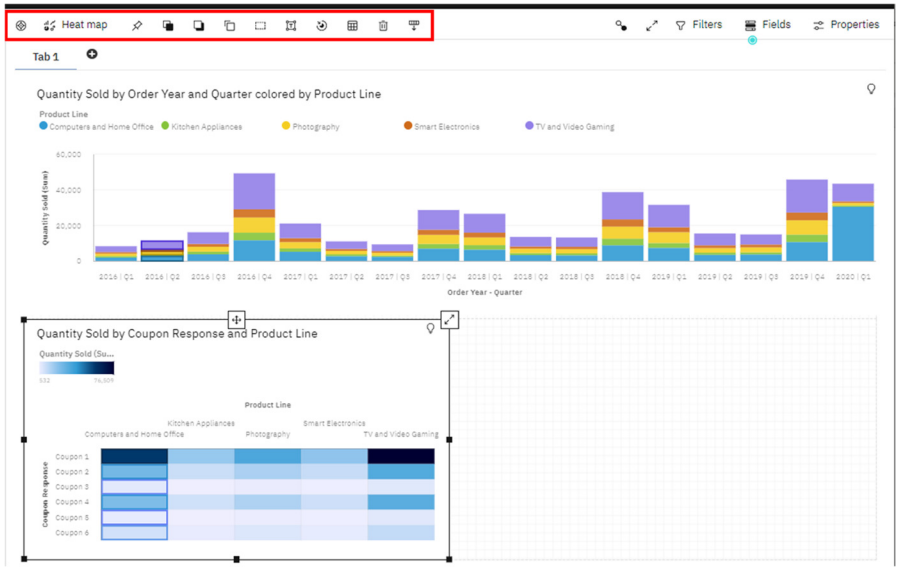


__2. Click the **Heat Map visualization** and drag it over to the **canvas** into **panel 3**, dropping it when the **drop zone** turns blue.

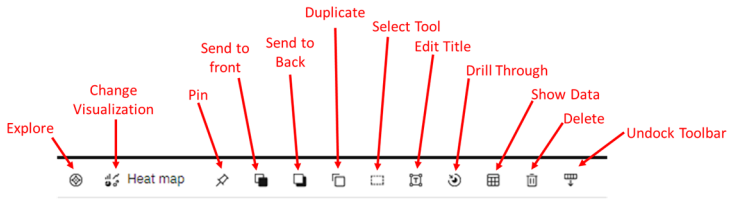


Heatmaps use color intensity in a matrix, which provides the viewer with an immediate visual summary of information. From the heatmap, you can immediately see that the highest quantities sold are under Coupon 1. Two product lines, 'Computers and Home Office' and 'TV and Video Gaming' have the highest quantities sold for all the coupon programs across all Product Lines.

__3. Users can easily select other visualization options from the Visualization library. Click the **Heat Map in panel 3** to view the on-demand toolbar for the widget. The on-demand toolbar is docked above the dashboard template.

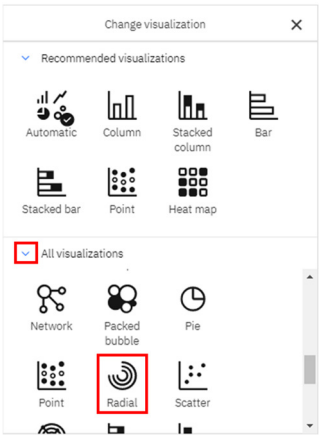


__4. The widget's on-demand toolbar renders tools in context based on the User's selection within the widget. Hover over the **on-demand toolbar** to view the capabilities available. You will work with many of these as you go through the exercises.



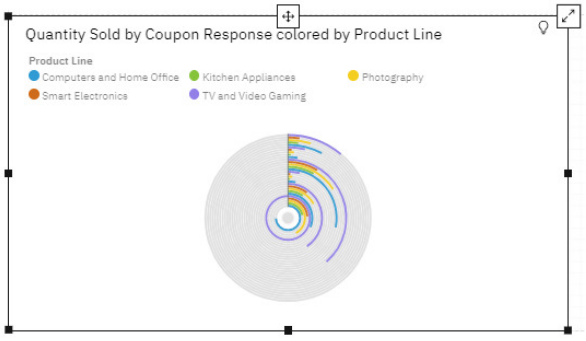
__5. Click the **Change Visualization icon** on the on-demand toolbar to view the Visualization library.

__6. A list of recommended visualizations render. Additional visualizations are also available in the visualization library. Use the **arrow** to expand **All Visualizations** to review the numerous styles available. For this exercise, select **Radial** chart from the **visualizations** list.



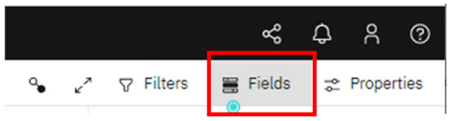
__7. Click the "**X**", or anywhere outside the window, to close the **Change visualization** panel. The visualization updates to a Radial chart.

__8. The visualization updates to a Radial chart.



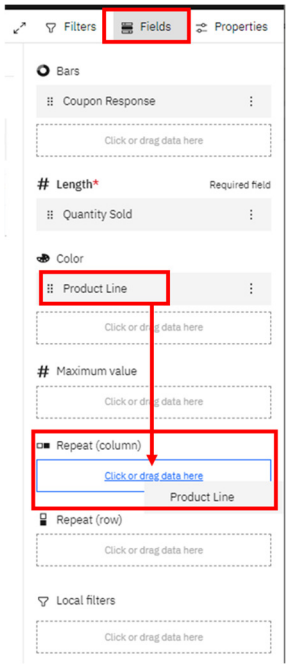
The new radial chart shows all data rendered in a single radial. For your analysis, you would like to have each product line have its own radial visualization, so you will customize the visualization to suit your analysis.

__9. Click the radial chart to bring it into focus. Click the **Fields button** on the **Dashboard toolbar** to open the **Fields Panel**.

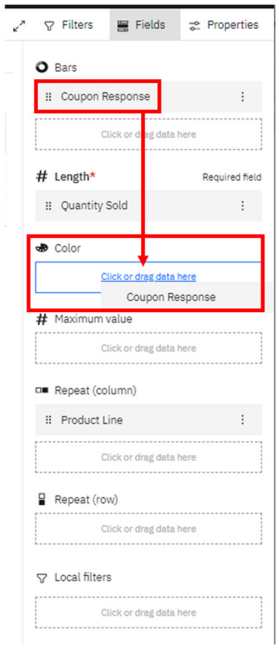


Once the Fields Panel window opens, you are in design mode and will see the data slots available for the widget. The Data slots are used to set the definitions for how you want the data items to be defined for visualization rendering. You would like to see the Coupon Promotions on individual radial charts repeated for each of the Product Lines. To do so, you'll move the data items around into the data slots to define and render your preferred visualization.

__10. Drag **Product Line** to the **Repeat (column)** slot.

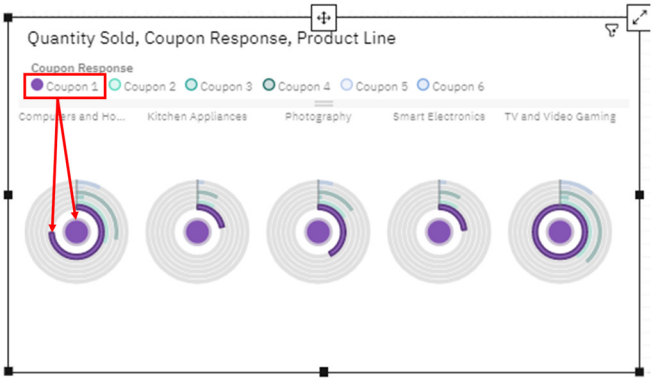


__11. Next, move the **Coupon Response** to the **Color** field.



__12. Click the **Fields** button to close the fields panel.

__13. The visualization updates to show radial charts for each Product Line. Hover over each of the **Coupon Response codes in the legend**. The visualization highlights the Coupon Response legend color and the corresponding radial bar.



The individual radial charts make it easy to see the coupon response by Product Line Departments. Coupon 1 response is the highest overall, followed by Coupon 4. Of the five product lines, Kitchen Appliances and Smart Electronics appear to have the lowest coupon redemptions overall. This information is helpful when looking at the success of coupon promotions as it uncovers insights into potential opportunities to drive sales of lower volume product lines. For instance, the company could run a coupon campaign targeting customers purchasing Computers and Home Office and/or TV and Video Gaming products with additional coupons for Smart Electronics as a "bundled" promotion.

__14. Notice that the name of the dashboard appears in the **Switcher menu**.

> **TECH TIP:** AS YOU MAKE ADDITIONAL CHANGES TO THE DASHBOARD, AN ASTERISK (*) WILL APPEAR TO THE RIGHT OF THE DASHBOARD NAME. THIS INDICATES THERE ARE UNSAVED CHANGES IN YOUR DASHBOARD.

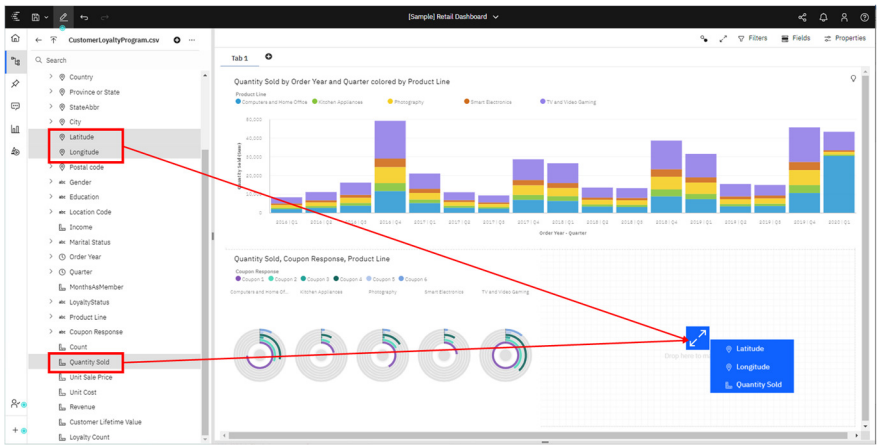
__15. Save the **dashboard**.

3.6 Working with Geospatial Mapping

Your corporate data has locations stored by latitude and longitude, so you can select those fields and drop them onto the canvas to map out the store locations.

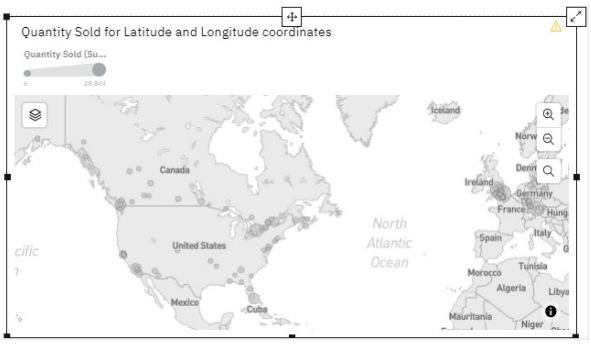
__1. From the **Data Sources** panel, **Expand CustomerLoyaltyProgram.csv,** if needed.

__2. **Multi-select** the **Latitude**, **Longitude** and **Quantity sold** items and drag them to the dashboard canvas to the **drop zone** of **Panel 4**.



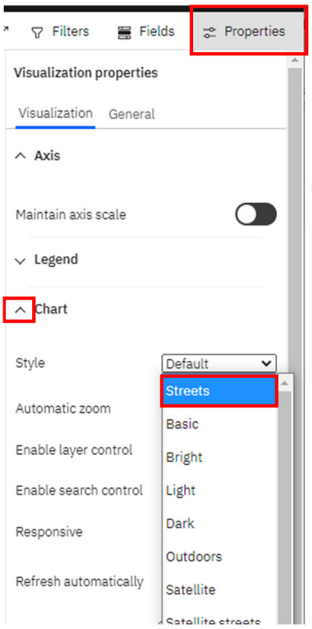
Cognos Analytics' built-in smarts has recognized that because you are working with geo-location data, the most appropriate way to visualize it is with a map.

__3. The map visualization appears, automatically zoomed in to optimize the rendering of the data points.



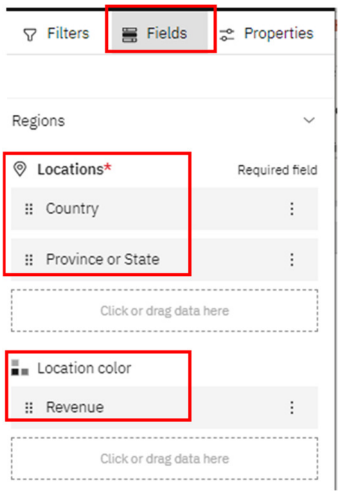
Cognos Analytics partnership with Mapbox® allows the User to select from a variety of different map styles such as street maps, satellite, varying color schemes, etc.

__4. To change the map style, open the **Properties panel** and click the **down arrow** next to **Chart** to see the various options of maps available. Select **Streets**.

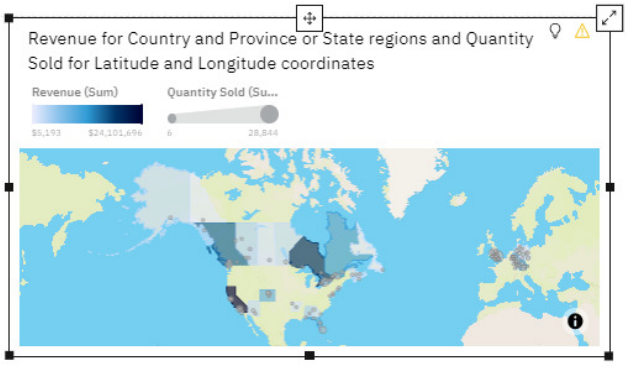


__5. Open the **Fields** panel to view the data slots. From here, you can add in an additional region layer to render on the map. From the **Data Source Panel**, drag **Country**, **Province or State** and **Revenue** into the **Regions** data slots as follows:

- Locations: **Country**
- Locations: **Province or state** (drop under country when the horizontal blue line appears to indicate the drop zone
- Location color: **Revenue**



__6. Your map should now look similar to the following:



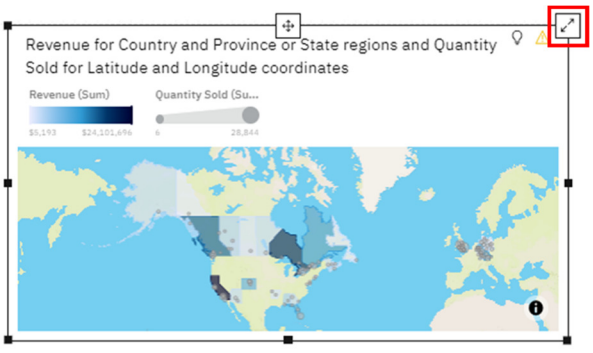
Adding in the additional regions provides location context, removing location ambiguity for data points. For instance, both the UK and Canada have a city named "London"; and in the US, 36 of the 50 states have a city named "Springfield". By adding in the additional regional context, data is mapped to the proper Country and State.

__7. You can the **Zoom buttons**  or mouse wheel to **Zoom** in and out on the map.

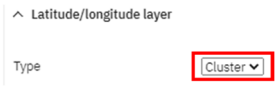
Many times, there are so many individual locations in the data that rendering individual location indicators for each makes the map difficult to read when zoomed out to show larger areas. To optimize the map presentation at all zoom levels, Cognos Analytics provides Map Clustering to aggregate individual locations into Clusters so that when zoomed out, the map renders a single location indicator with an aggregate sum of locations represented. When the User zooms in on the map, the Clusters update to show more discrete clusters, until fully zoomed in where it shows the individual locations.

__8. Click the **Map** widget to bring it into focus.

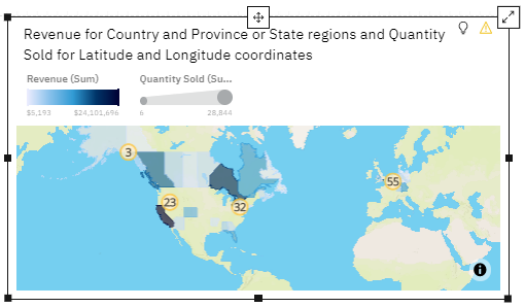
__9. Any widget can be maximized for the User while working with the content. Click the **Expand button** in the upper right corner of the Map widget to maximize the widget size.



__10. Open the **Properties** panel to the **Visualization** tab. Expand the **Latitude/longitude layer** and change **Type** to **Cluster**.



__11. The map updates to consolidate the data points into clusters. This view makes maps with many data points much more consumable for Users.



__12. Begin to **zoom in** over North America to view the Clusters update as they split apart to smaller clusters. As you zoom in, notice also that you begin to see the street level detail on the map. Examples are shown as follows:

__13. **Zoom out** of the map to see the Clusters reaggregate.

__14. Click the **collapse button** in the upper right corner of the widget to restore the widget to its original position on the dashboard.

__15. **Save** the Dashboard.

You've got a great start to your dashboard and have gained some valuable insight into the performance of Smart Electronics product lines. You've analyzed Coupon redemption rates, Average Sales price and Quantity sold trends, Loyalty Status Purchasing behavior and yearly sales trends. You've even uncovered potential opportunities on marketing to your Customer Loyalty Program base. Next, you'll format it a bit for easier consumption by your Users.

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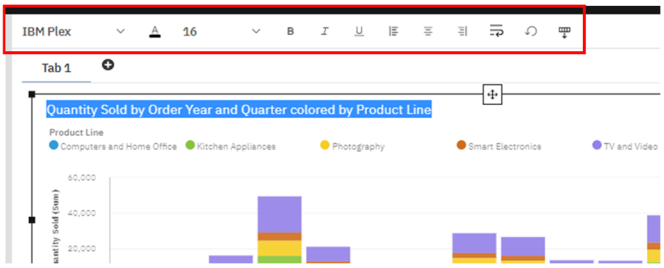
4 Formatting the Dashboard

4.1 Widget Titles

Titles help put the visualization and its data into context, so the User knows exactly what the visualization is representing. As you created your dashboard widgets, Cognos Analytics automatically added a title to identify the data being shown in context. These titles may be updated by the user and customized for font style, font size and justification from the on-demand toolbar when you select the widget title text in a visualization.

__1. Click the widget title for the **Column chart in panel 1** to bring it into focus and render the title's **on-demand toolbar**.



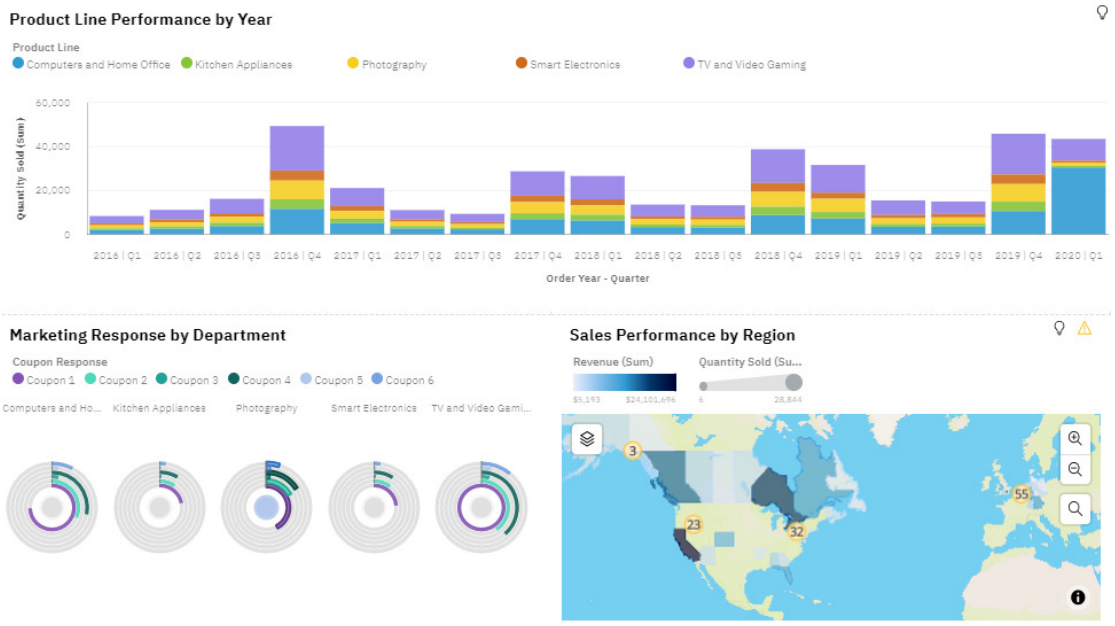
There are many options for Widget title formatting - For a widget title, you can modify the font family, font size, text color, alignment, text wrapping and styles. For this lab, all examples will be shown with the default text settings. but feel free to format your titles as time permits. If you make changes and wish to return to the default settings, you may highlight the title to bring up the on-demand toolbar, then select Restore defaults icon .

__2. Enter the title "**Product Line Performance by Year**" to the visualization and set the title to **Bold**.

__3. Click the **Radial chart** widget in **Panel 3** to bring it into focus**.** Enter the Title "**Marketing Response by Department**" visualization and set the title to **Bold**.

__4. Click the **Map** widget in **Panel 4** to bring it into focus. Enter Title "**Sales Performance by Region**" visualization and set the title to **Bold**.

__5. Your dashboard may look similar to the following:



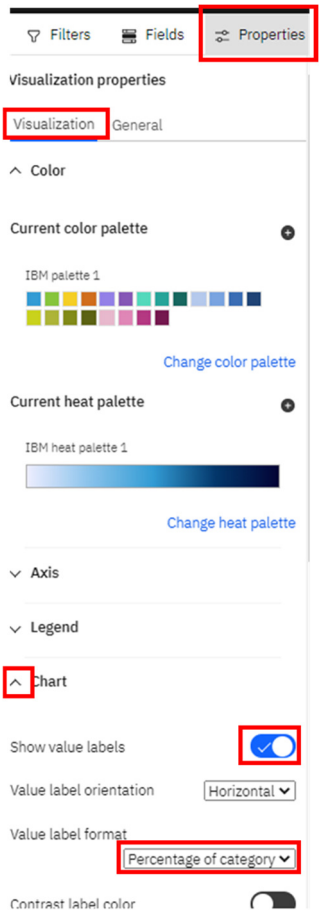
__6. **Save** the dashboard.

4.2 Displaying Chart Values

Users can hover over any data item in a visualization and the details render in separate window. Values can also be set to render directly on the visualization from the Properties panel for the widget. Values can be set to show the actual value or set to show the value as a percentage of the category or color.

__1. Click the **Stacked Column chart** to bring it into focus. Open the **Properties panel** if needed.

__2. From the **Visualization** tab, expand the **Chart** section and turn on the "**Show value labels**" checkbox. Then, use the **pull-down** menu for **Value label format** to view the various formats available. Set the format to **Percentage of Category.** Your **Properties panel** should appear as follows:



__3. Values have now been added on to the Visualization.

TECH TIP: *THE VALUE LABELS WILL OPTIMIZE AS BEST AS POSSIBLE BASED ON YOUR SCREEN RESOLUTION SIZE. VALUES WILL NOT RENDER UNTIL THE WIDGET AND/OR THE DATA SLICE SIZE IS LARGE ENOUGH TO RENDER VALUES. NOTICE IN THE SCREENSHOT ABOVE, THE DATA SLIVERS, WHICH ARE TOO SMALL TO RENDER VALUES LEGIBLY, HAVE BEEN REMOVED. YOU MAY HOVER OVER THESE DATA SLICES TO VIEW VALUES.*

__4. Expand the **down arrow** next to **Axis** to review the properties settings that can be defined for the Axis titles and labels, such as position, orientation, font, size, color and axis range.

__5. Expand the **down arrow** next to **Legend** to review the properties settings that can be defined for the Legend such as title, position, font, size, and color.

__6. Close the **Properties panel.**

__7. **Save** the dashboard**.**

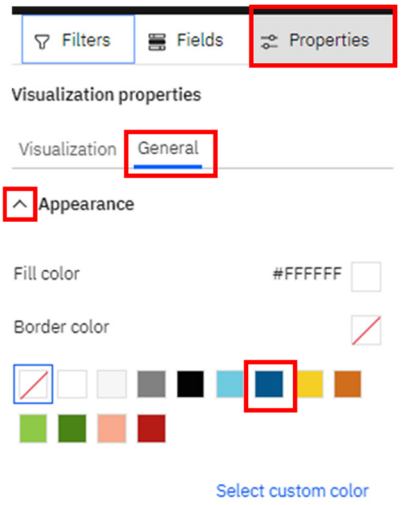
4.3 Borders

Using borders is an easy way to polish your dashboard for publication. Borders also make the dashboard easier to consume by defining the space dedicated for each widget.

__1. Click the **Stacked Column Chart** widget in **Panel 1** to bring it into focus.

__2. Open the **Properties panel** and click the **General** tab. Expand the **down arrow** next to **Appearance**. Click **Border Color** to open the color options for borders.

__3. Apply a "**Dark Blue**" border.



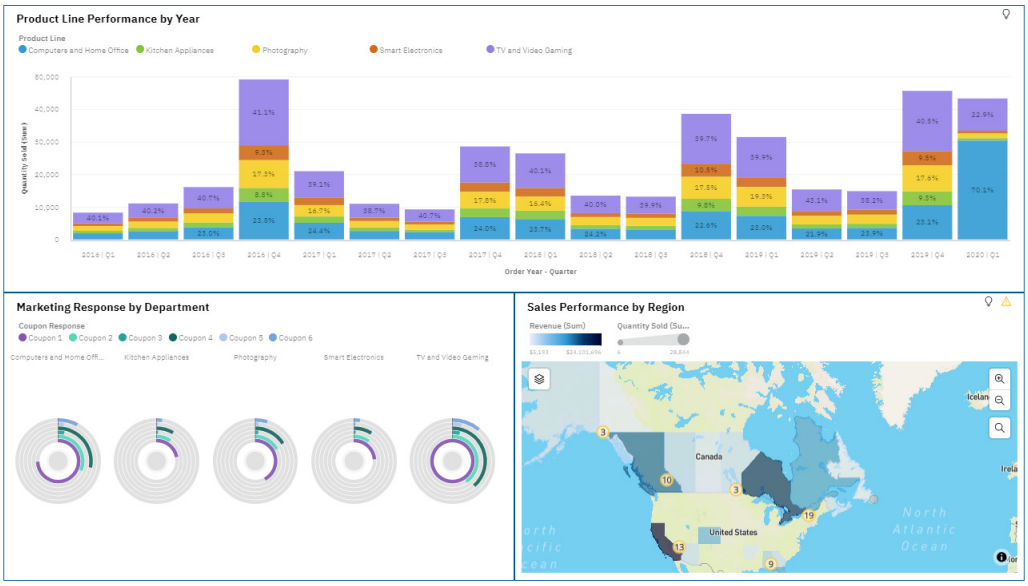
Tech Tip: *"Did I see Select Custom Color"??!! YES!! Cognos Analytics allows you to select your own color palettes and even define specific RBG, CMYK, HSB and HEX colors so Users can align their color palettes to the standard custom color schemes their organization use for branding. Custom colors are outside the scope of this lab, but we encourage you to play around with this feature using your Corporate Branding colors or make any color palette you choose.*

You can set the borders for multiple widgets at once by using the multi-select method for selecting multiple objects. The formatting applies to all selected widgets simultaneously.

__4. **Multi-select** the widgets in **Panels 3 and 4**.

__5. Add in the same border color as before by going to the **General tab** and select the "**Dark Blue**" border.

__6. Your dashboard should now look similar to the following:

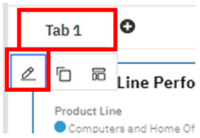


__7. **Save** the dashboard.

4.4 Dashboard Tabs

Now that your first dashboard is complete, you would like to rename the dashboard tab to be more descriptive. Then, you can add a new tab to continue building out another dashboard for advanced analysis.

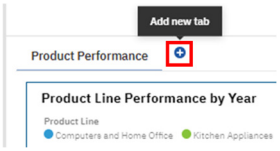
__1. Click the tab name **Tab 1** to bring up the Tab's on-demand toolbar.



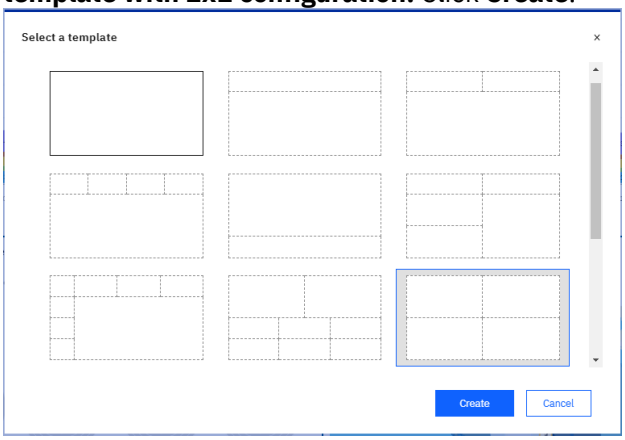
__2. Select the **Edit** icon. Rename the tab to "**Product Performance**".

Tech Tip: *Users can modify the colors for tabs, tab titles and selection indicators (line under the tab name). Tab location can also be set from the default location at the top, to the left, right or bottom of the dashboard. These additional formatting options for tabs are available under the Properties panel*

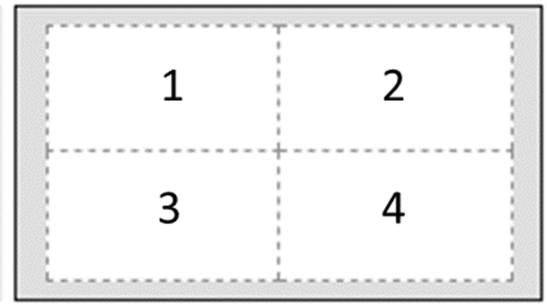
__3. Click the "**Add new tab**" button to the right of the Product Performance tab.



__4. The Template window appears allowing you to select the template style. Select the **four-panel template with 2x2 configuration.** Click **Create**.



__5. As you build the dashboard, the lab will reference the location placement for **Widgets** in the dashboard template using the following **Panel** numbers



__6. Click the tab name to bring up the tab's on-demand toolbar. Select the **Edit** icon to rename the tab to "**Key Insights**". You use this new tab to extend your analysis later in the lab.

__7. **Save** the Dashboard.

You're off to a great start with your first dashboard. Next, you'll extend your analysis further by leveraging the Augmented Intelligence (AI) capabilities in Cognos Analytics to answer more of your questions regarding product line performance.

---

5 Infusing AI Into your Dashboard

5.1 Forecasts

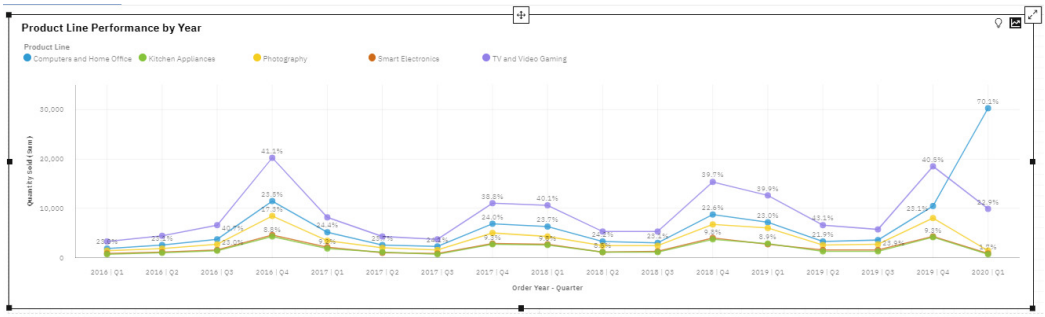
The Forecast feature in Cognos Analytics provides time series data modeling and forecasts based on data presented in corresponding visualizations. This makes it applicable to a broad range of time series data encountered in business and industry. Automated model selection and tuning makes forecasting easy to use, even for the users not familiar with time series modeling. Forecasts and corresponding confidence bounds are very easy to understand when displayed in a visualization as a continuation of historic data. Statistical details for generated models provide technical background information.

__1. Click the **Product Performance tab** to return to the dashboard.

__2. Click the **Product Line Performance by Year** widget to bring it into focus.

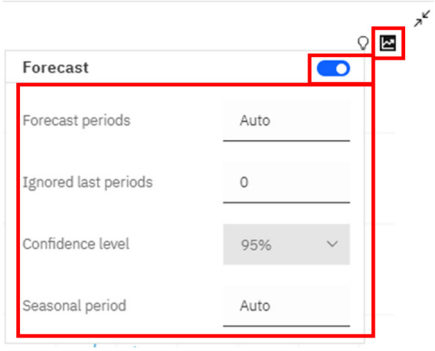
__3. From the on-demand toolbar, select **Change visualization** . Click the **expand arrow** next to **All visualizations** to view the entire visualization library.

__4. Select **Line Chart** Line . The visualization updates, but still maintains the customized property settings, such as the value labels.



__5. Click the **Expand button** on the upper right of the widget. This will maximize the visualization while you work with it.

__6. Click the **Forecast icon** in the upper right corner of the visualization to open the **Forecast dialog box**.



***TECH TIP**: FORECASTING REQUIRES A TIME SERIES DIMENSION. THE TIME SERIES VISUALIZATIONS THAT SUPPORT FORECASTING (FOR EXAMPLE, LINE, COLUMN) WILL PRESENT THE FORECAST ICON IN THE UPPER RIGHT CORNER.*

__7. Depending on the visualization, the following forecasting options are shown:

__a. **Forecast periods**. The number of steps to forecast ahead. The default value is Auto, which is 20% of the length of the historical data.

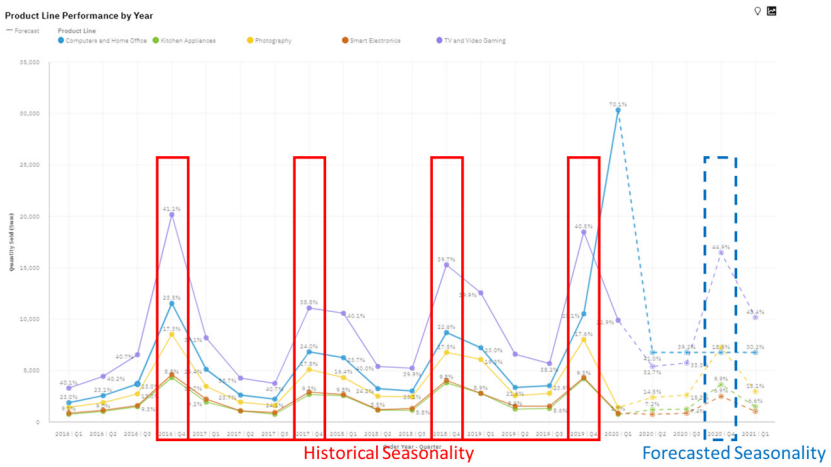
__b. **Ignored last periods**. Ignores a specified number of data points at the end of a time series when building the model and computing the forecasts. The default value is 0. Up to 100 data points can be ignored. Ignoring the last data period can be useful when the data is incomplete. For example, you might be doing a forecast halfway through a month. Exclude this month from the forecast by setting Ignored last periods to 1.

__c. **Confidence level**. The certainty with which the true value is expected to be within the given range. You can see corresponding confidence interval in a tooltip by hovering over any forecast value. The confidence interval is displayed as upper and lower bounds. Users can select from 3 different confidence levels: 90%, 95%, and 99%. The default is 95%.

__d. **Seasonal period.** The seasonality with which to build the model. Seasonality is when the time series has a predictable cyclic variation. For example, during a holiday period each year. The default value is Auto. Auto automatically detects seasonality by building multiple models with different seasonal periods and choosing the best one. Users can specify seasonality by entering a non-negative integer, such as: 0, 1, 2, 3 as the seasonal period.

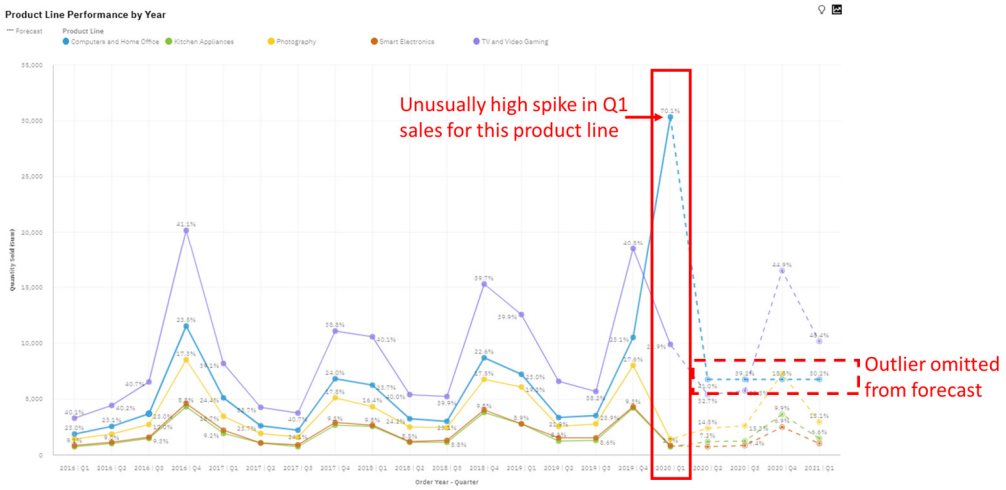
__8. For this exercise, you use all the default settings for Forecast. Click outside the **Forecast dialog box** to close it.

__9. The visualization updates with the forecasted periods plotted after the last historical data point. Forecasted values are indicated by donut markers (default shape) and connected by a dotted line.



Notice that this historical data indicates a seasonality to the data, whereby the highest sales historically occur in Q4. Cognos Analytics was able to identify this seasonality and incorporated it into the forecast. But what else does this visualization indicate?

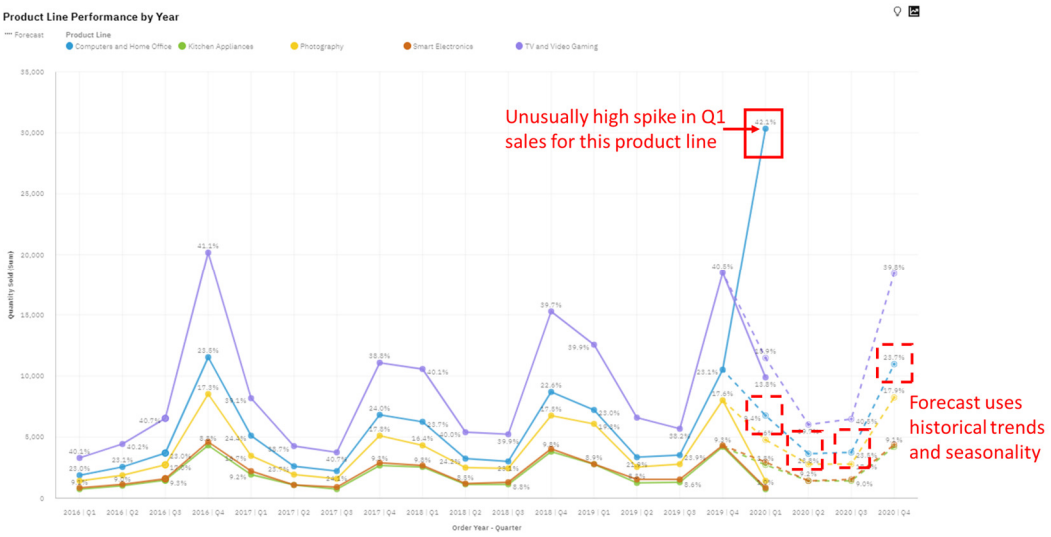
__10. Notice the sharp increase in sales for Q1 2020 for Computers and Home Office.



In addition to the historical seasonality that Cognos Analytics identified, it also can identify outliers in the data, which differs from historical performance. This sharp increase is likely due to the Covid-19 pandemic whereby many workers purchased home office equipment for remote work. Cognos Analytics did not take the outlier into account for the forecast. But without this outlier, what would the forecast have looked like before the Covid-19 pandemic?

__11. Click the **Forecast icon** in the visualization to reopen the **Forecast dialog box**.

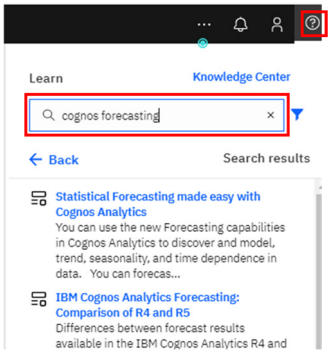
__12. This time set the **Ignore last periods** to **1**. Click outside the **Forecast dialog box** to close it. The visualization updates. This time, you see that Cognos Analytics generated a forecast for Computers and Home Office based on the historical data, without regard to the outlier in the most recent period.



__13. Click the **Collapse button** on the upper right of the widget to return the widget to the dashboard.

__14. **Save** the dashboard.

TECH TIP: *FOR MORE INFORMATION REGARDING FORECASTING IN COGNOS ANALYTICS, OR IF YOU HAVE OTHER COGNOS ANALYTICS INQUIRES, GO TO THE IBM KNOWLEDGE CENTER. YOU CAN ACCESS AND SEARCH THE IBM KNOWLEDGE CENTER FROM THE COGNOS ANALYTICS HOME SCREEN AND OPENING THE* ***LEARN PANEL****.*



5.2 Insights

You would like to leverage the Augmented Intelligence (AI) capabilities from Cognos Analytics to extend your analysis further. Recall that as the data file was uploaded into Cognos Analytics, it ran through several steps in the process. During the Analyzing step, Cognos Analytics ran several algorithms against all the rows and columns in the data in order to find statistically significant insights and patterns. These insights are surfaced up to the User in several ways including adding them into widgets designed by the User, through advanced visualizations which show patterns, and allows Cognos Analytics forecasting capabilities. In the remaining exercises, you work with some of these AI features.

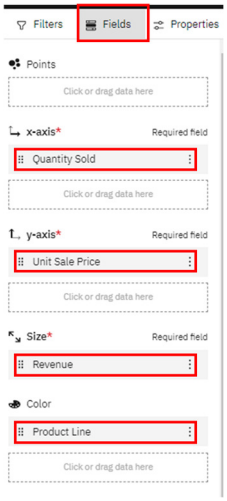
__1. Click the **Key Insights tab**.

__2. From the **Navigation Panel**, select **Visualizations** to open the Visualizations library.

__3. Select the **Bubble** chart and drag it to **panel 1** of the dashboard template, dropping it when the blue drop zone appears so it will auto-fill to the size of the panel.

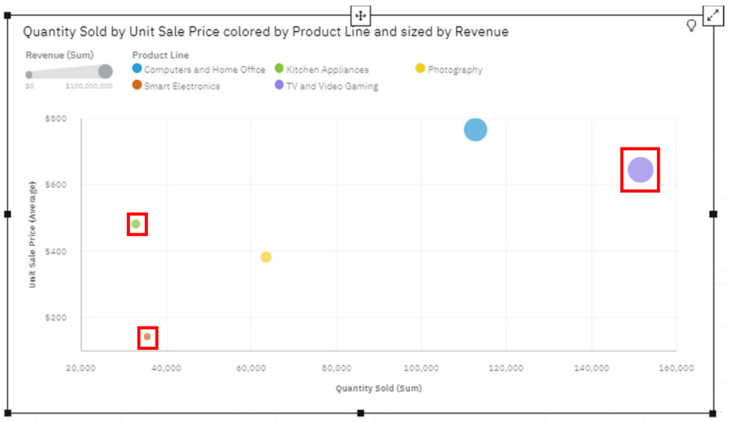
__4. Since you started by selecting a visualization this time, rather than by selecting data, the bubble chart visualization opens the **Fields panel** for you to set up your data definitions. From the **Data Source** panel, drag data items into **Fields Panel data slots** as follows:

- X-axis: **Quantity Sold**
- Y-axis: **Unit Sales Price**
- Size: **Revenue**
- Color: **Product Line**



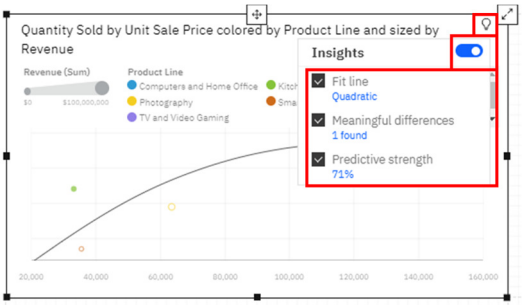
TECH TIP: *WHEN ADDING A NEW VISUALIZATION TO THE DASHBOARD, THE VISUALIZATION RENDERS THE AVAILABLE DATA SLOTS. USERS MAY USE THE* ***FIELDS PANEL*** *OR THE* ***VISUALIZATION DATA SLOTS*** *TO SET UP THE DATA DEFINITIONS. A RED ASTERISK (*) INDICATES REQUIRED FIELDS. ONCE ALL REQUIRED FIELDS HAVE BEEN DEFINED, THE VISUALIZATION RENDERS.*

__5. This visualization shows how the product lines are performing in comparison to one another. To get additional detail for each product line, **hover** your mouse over the respective **bubble**. Details of the underlying data measures for Quantity Sold, Average Unit Sales Price and Revenue renders. Hover over the **largest bubble** and **smallest bubbles** to render the additional information.

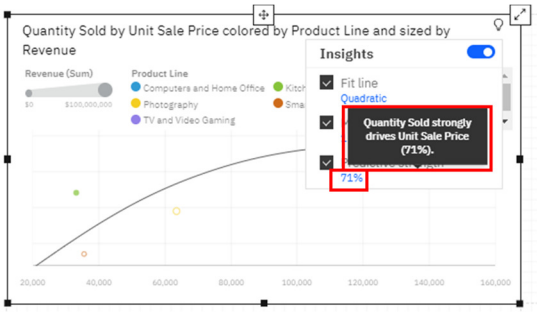


This visualization clearly indicates that Smart Electronics is the lowest performer of all product lines. And, even though Smart Electronics and Kitchen Appliances have a similar amount of Quantity sold, Smart Electronics average sales price is significantly lower, generating less revenue contribution to the company.

__6. The **Quantity Sold by Average Sales** includes insights from Cognos Analytics' AI. Click on the **Insights** Icon on the **Quantity Sold by Average Sale Price** chart. Click the **Toggle Insights On switch** to **Turn on insights** for this visualization.



__7. Clicking each of the **Insights** will render explanations of the findings. Hover over the **Predictive Strength value** to view the findings.



In this case, the best fit line for the data happens to be a quadratic equation (non-linear). The Smarts in Cognos Analytics allows it to run multiple algorithms to determine the "best fit equation. Less advanced software only attempts to place a straight trendline on data (linear regression) and thus would show a non-best fit.

__8. **Save** the dashboard.

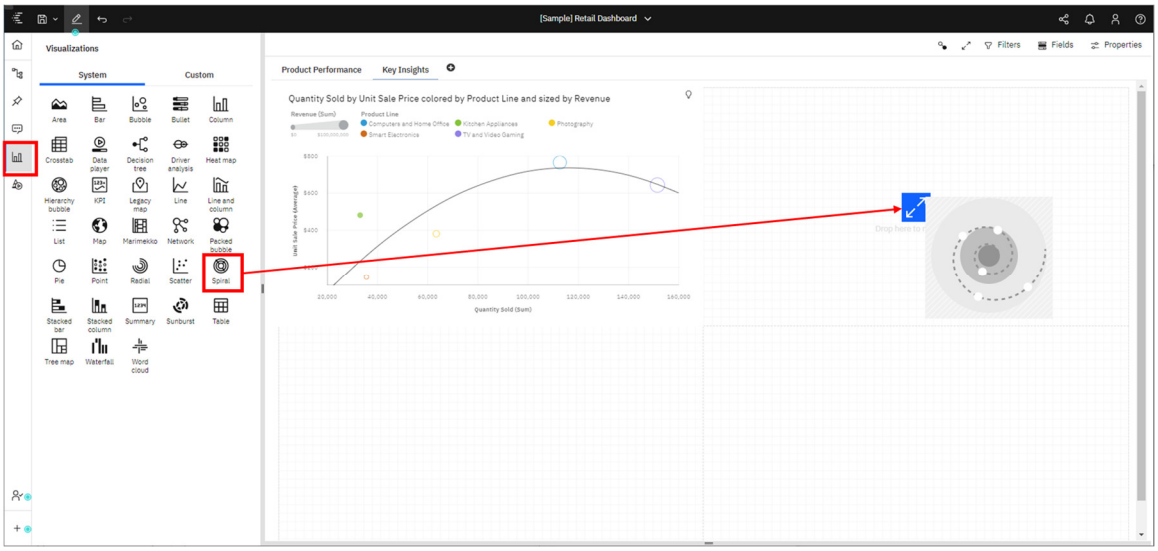
5.3 Pattern and Relationship Detection

Cognos Analytics 11.1 has a wide variety of AI capabilities which include several new visualizations for advanced analysis. These include the spiral analysis, which provides users with statistical pattern and relationship detection, sunburst and decision trees.

Continuing with your analysis of smart electronics, you can use your customer loyalty program data to understand what patterns exist that indicate key drivers of customer lifetime value. This information can be used to develop marketing programs to increase sales. You can easily identify key drivers by adding a spiral visualization to the dashboard to surface data relationships. You select your target, in this case your Customer Lifetime Value field, to uncover insights regarding potential drivers for Customer Lifetime Value.

__1. From the Navigation bar, select **Visualizations** .

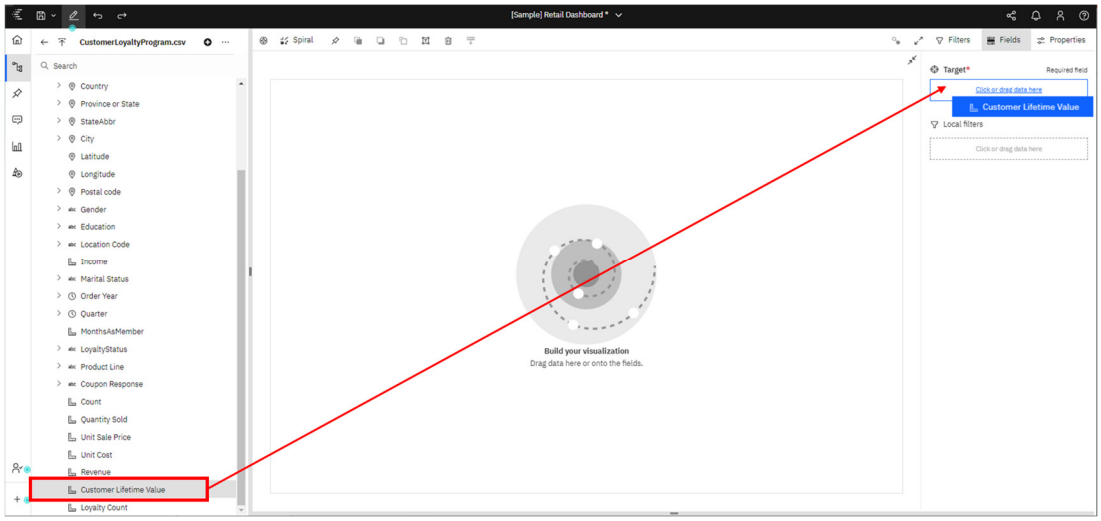
__2. Drag the **Spiral Chart** to the drop zone of **Panel 2**.



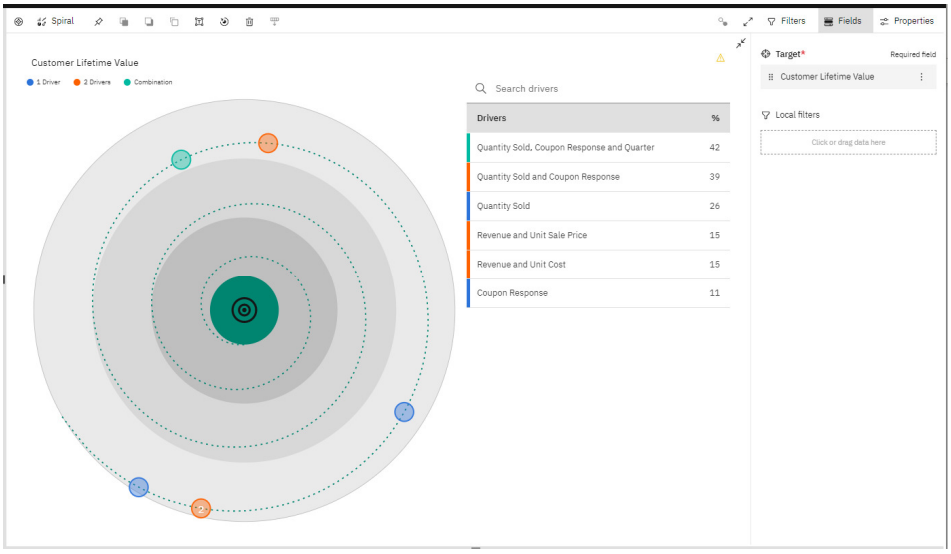
__3. Use the **Expand button** in the upper right corner to **maximize the widget**.

__4. From the Navigation bar, select **Sources** .

__5. Drag “**Customer Lifetime Value**” to the **Target data slot** .



__6. Cognos Analytics runs a number of algorithms to determine the drivers of Customer Lifetime Value. Once complete, the visualization renders.

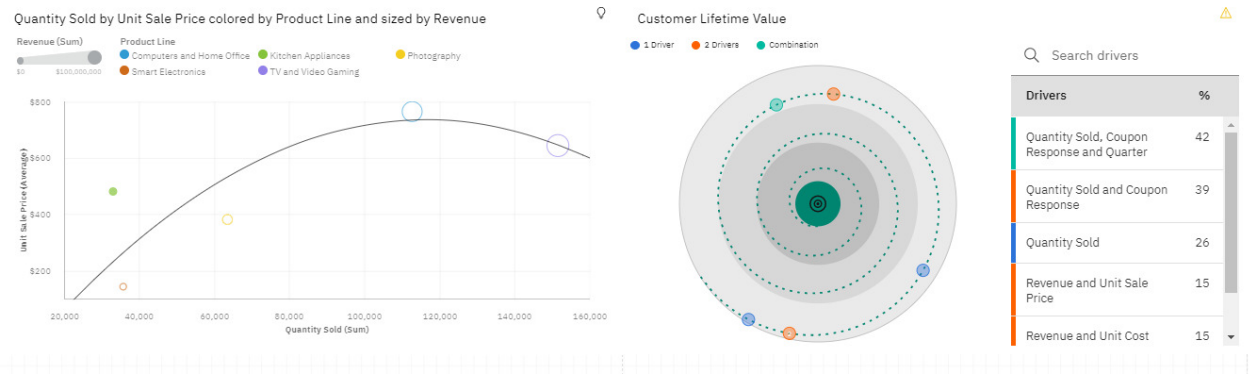


The target, in this case Customer Lifetime Value, is at the center of the spiral. The points that surround the spiral chart represent those data items found to have statistically significant relationships to Customer Lifetime Value. The Quantity Sold is intuitive, but it’s interesting to see that there’s a significant relationship with your coupon campaign. It’s encouraging to know the campaign had an impact, and that’s something you can now explore further.

__7. Click the **Collapse button** on the upper right of the widget to return the widget to the dashboard.

__8. Close the **Fields panel**.

__9. Your dashboard should now look similar to the following:



Next, you would like to understand the underlying drivers related to product line. You are interested in finding patterns in the buyer's attributes so that you can better target buyers with a high propensity to buy.

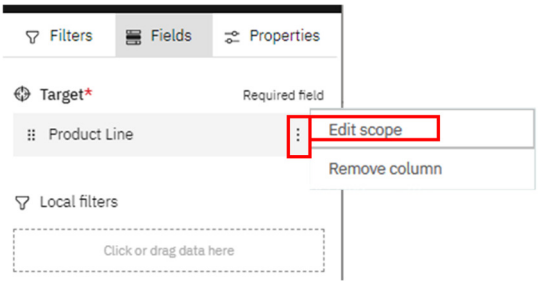
__10. From the Navigation bar, select **Visualizations** .

__11. Drag the **Sunburst** to the **drop zone** of **Panel 3**.

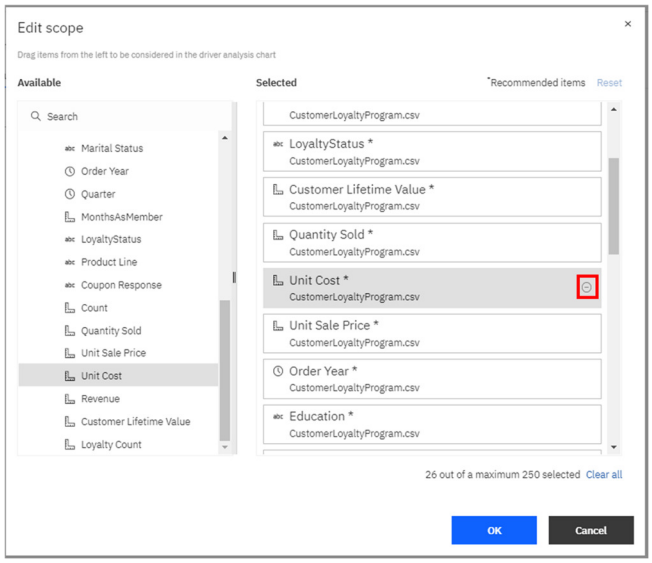
__12. Use the **Expand button** in the upper right corner to **maximize the widget**.

__13. Drag "**Product Line**" as the **Target.**

__14. Click three **ellipses** (...) to the right of **Product line** and select **Edit scope**.



__15. The **Edit Scope** window opens. Here, you can see all the data items from your data source. You can select which drivers to use for the analysis. Since you are now interested in patterns and drivers based on buyer attributes, you remove some measures from the analysis. In the **Drivers** list, scroll down and use the **Remove** button for **Unit Cost** and **Unit Sale Price**.

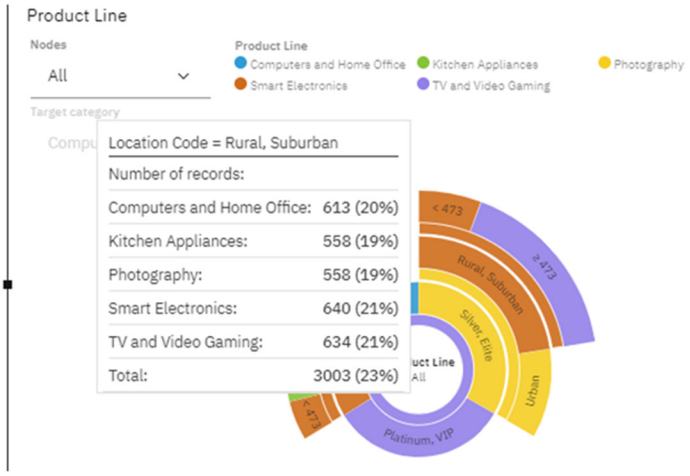


__16. Click **OK**.

__17. Close the **Fields** panel.

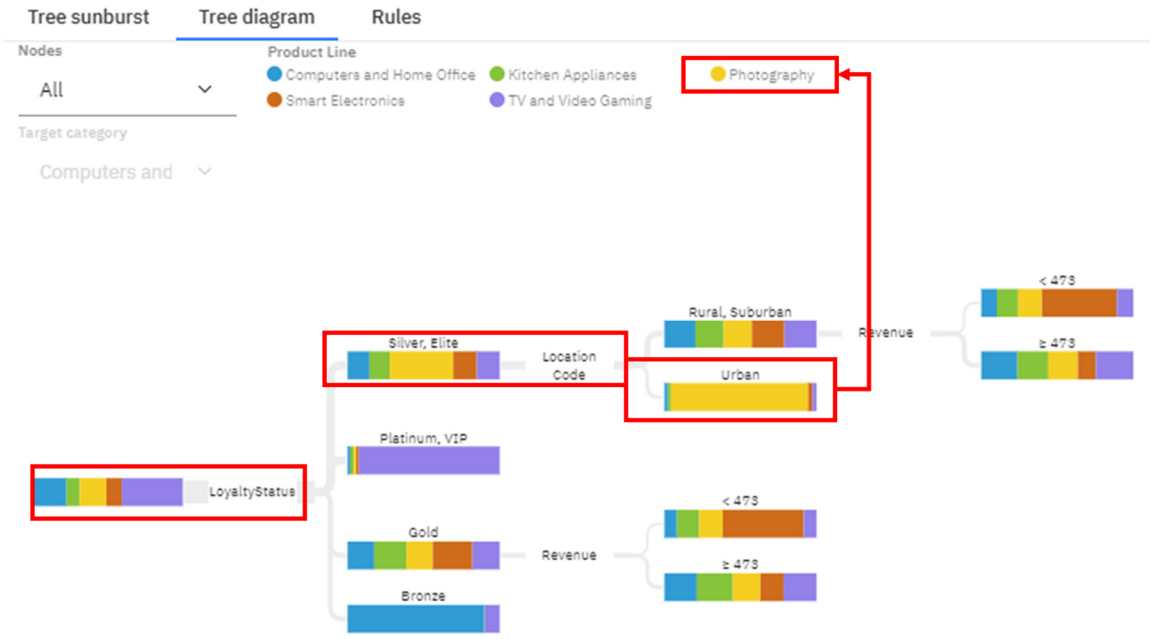
The Sunburst updates showing the various patterns found in the data. Each set of rings of the sunburst represents an attribute (data column), with each section representing the attributes with a statistically significant driver/set of drivers. Hovering over a section shows the percentage breakdown by product line (your target) for that section.

__18. Hover over the section showing “**Rural, Suburban**”. The details show the percentage breakdown by product line for buyers in rural and suburban areas.



__19. Click the **Tree Diagram tab**. The Tree diagram provides a Decision Tree view of the results. In reading left to right, you can see the relationships patterns between Loyalty Status and Location codes.

__20. In following the flow of the diagram from left to right, you see the vast majority of customers in Loyalty tiers of Silver and Elite are from Urban areas, purchasing Video Games and Consoles. This information would provide support for Marketing campaigns for this product line, targeting Urban areas, such as Billboards, and signage at bus/train terminals.



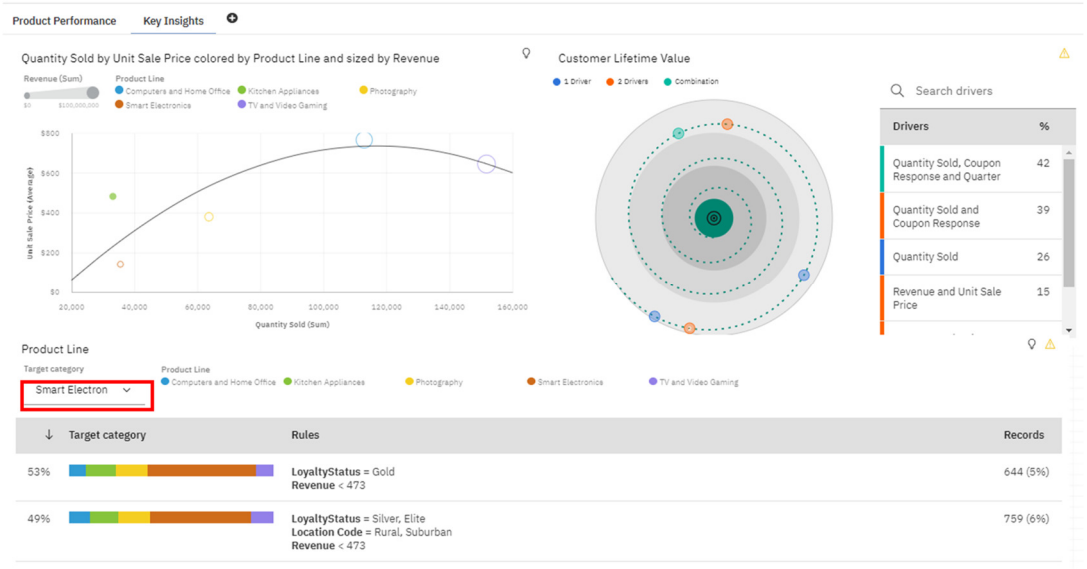
__21. Click the **Rules tab**. Decision rules provide plain language explanations of the individuals who are buying your product lines.

__22. Collapse the **widget** to return the Decision rules to the dashboard.

__23. Resize the **widget** using the sizing button on the right center, drag the right edge of the widget to the right to cover both **panels 3** and **4.**

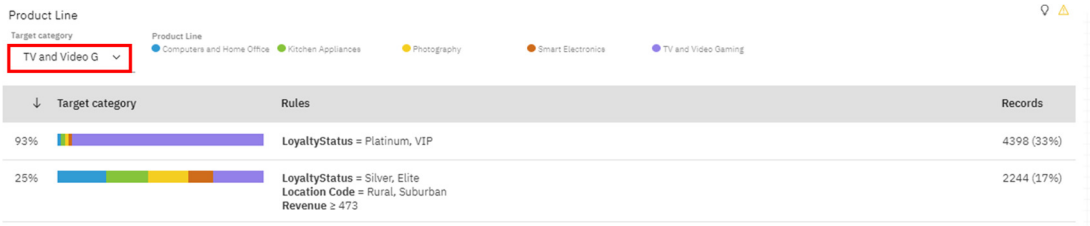
Next, you want to see the decision rules that drive the product line sales, specifically those for Smart Electronics.

__24. For **Target category**, use the **down arrow** and select **Smart Electronics**.



This provides a valuable insight: Buyers in your loyalty program who have a gold, silver or elite status, and those who live in the suburbs are more likely to purchase from Smart Electronics product line.

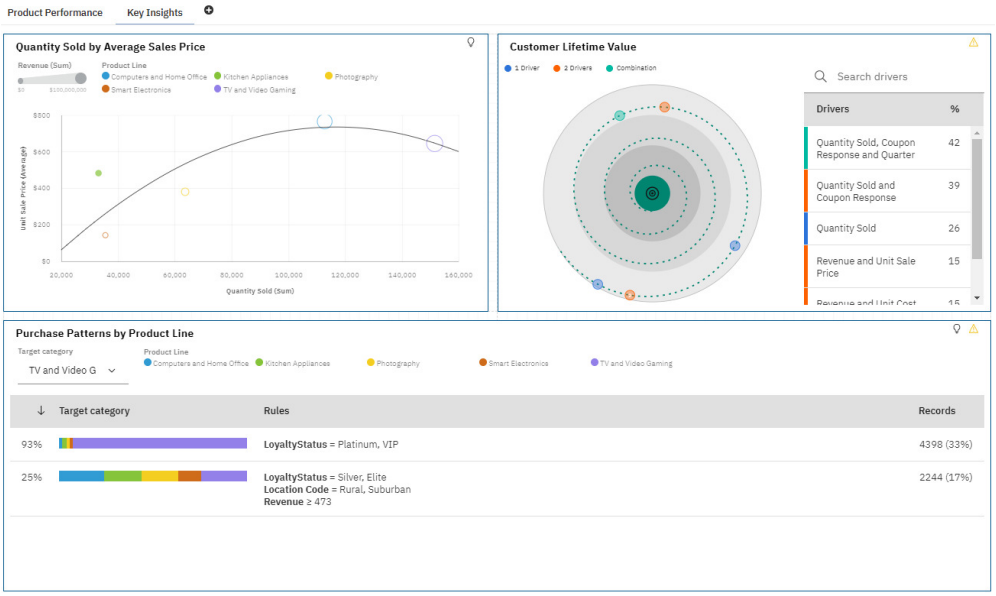
__25. Change the **Target category** to **TV and Video Gaming**. What insight does this give you?



Another great insight: Buyers in your loyalty program who have a VIP or Platinum status, make up the vast majority of customers purchasing from the TV and Video Gaming product line.

__26. Your dashboard should now look similar to the following:

__27. You can now use the formatting tools used earlier in this lab to format your widget titles and borders and resize the widgets to your preferences. A sample of a formatted dashboard is below:



__28. **Save** the dashboard**.**

Congratulations, you've completed your first set of dashboards including using Augmented Intelligence to uncover patterns, relationships and new insights in your data!

What other insights did you find along the way?
What recommendations would you make for Marketing programs?
What recommendations would you make for inventory levels?
What would you do next to extend your analysis?

If you have any questions or would like any more information, please feel free to ask your lab instructor.

Thank you for attending this Cognos Analytics Lab and we look forward to working with you on your Analytics Journey..

Appendix A: Cognos Analytics User Interface

__1. **Navigation panel.** On the left side of the UI is the main **Navigation panel**. This navigation panel is present on the UI at all times and updates dynamically as the User works with the various capabilities within Cognos Analytics. The upper part of the panel provides Users with direct access to search for their content, and links to content to which they have access. The bottom portion of the panel provides Users with one-click access to capabilities to create and manage new activities such as creating new content, uploading personal data files, accessing notifications and managing the environment (dependent on User permissions as set by the Administrator). The Navigation panel will dynamically update with capabilities based on the content the User is working with on the canvas.

-  **Home**. The Home page is main screen the User comes to when entering Cognos Analytics. The default view will render lists of recently used content, a file drop zone for uploading files, and a quick reference section, which allows the User resources to get started, sample data sets, and links to support materials. For the home page, the User can change their view by selecting a saved Dashboard, Report or Story to render on this home page. Administrators can also set the home page view globally, or by User Group.

__2.  **Search**. The New Smart Search in Cognos Analytics provides a modernized search engine that uses a smart, intent-driven search algorithm to assist the User. Click Search to open the search panel. Type “Sales” in the search dialog box. As you type, an auto-fill feature will launch and render search suggestions for related terms. Click outside the Search panel to close it.

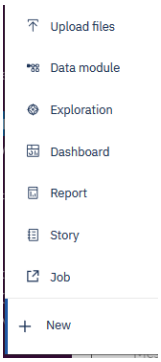
-  **My Content.** The **My Content** folder provides the User with direct access to the content they have saved. This is content owned by the User and may only be viewed by the User. You will save your work from today’s lab in this folder. Click **My Content** to open the navigation panel to see if there is any User content in your environment. **Click** outside the **My Content** panel to close it.

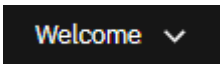
-  **Team Content.** The **Team Content** folder contains all the published enterprise and shared content the user has permissions to view. Click **Team Content** to open the navigation panel. Notice there is a list of folders. We go deeper into these later in the exercises. **Click** outside the Team Content panel to close it.

- **Recent**. IBM research shows that Users typically use the same set of content on a regular basis. The **Recent** button shows the User the most recently used list of content, up to 20 objects (reports, dashboards, data modules, etc.). Objects appear in order based on most recently used. Once an object is viewed, it moves to the top of the list. Click **Recent** to see what, if any, are the most recently used objects in your environment. **Hover** your mouse over the icon to the left of each object to identify the type of object. Click outside the **Recent** panel to close it.

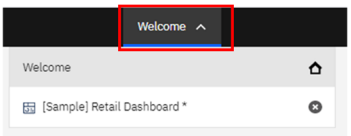
- **Manage**. Users who have been granted departmental administration permissions are able to manage content and create or modify Users, schedules, data sources and customize the environment.

- **New**. The New button allows Users to create new content. It is intent-driven, meaning that it allows Users to select what type of content they wish to create, and the Cognos Analytics UI opens the associated capabilities in UI. From here, Users can create new Reports, Dashboards, Explorations, Stories, Data Modules, Upload files, and Jobs.



__3. 

Switcher Menu. The Switcher menu at the top center of the UI provides a dropdown button that allows Users to easily move between the different objects they have worked with during their current session, without opening additional browser windows. (None will currently show as you have not opened any objects so far, but example is shown below).



__4.  **Drop Zone**. Users may now easily upload files to Cognos Analytics using the **Drag and drop files** or open **Quick Launch or Browse** section at the bottom of the home page.

__5. **Coach Marks**. **Coach Marks** are available as indicated by a green button next to action buttons. Coach marks provide a pop-up window with User Interface hints and are provided to enhance the user experience by providing information to the user on how to use features.

TECH TIP: *YOUR LAB IMAGE MAY NOT HAVE COACH MARKS TURNED ON. TO TURN ON COACH MARKS, CLICK ON THE PERSONAL MENU BUTTON*  *ON THE UPPER RIGHT OF THE APPLICATION TOOLBAR. SELECT MY PREFERENCES AND CLICK THE BOX NEXT TO "SHOW HINTS". CLICK OUTSIDE THE PANE TO CLOSE IT.*

__6. **Canvas**. The majority of the UI is dedicated to the **Canvas**. This is the interactive work area where the User will interact with all their data. The Canvas will dynamically update based on the content the User is working on.

Now that you are familiar with the User Interface, you're ready to take Cognos Analytics for a test drive.

NOTES:

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