IBM Cognos Analytics

IBM Cognos Analytics: AI-Infused data discovery with dashboards

Lab Exercise Guide

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1 Introduction

IBM Cognos Analytics with Watson 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

For the purposes of this lab, we will refer to IBM Cognos Analytics with Watson as “Cognos Analytics”.

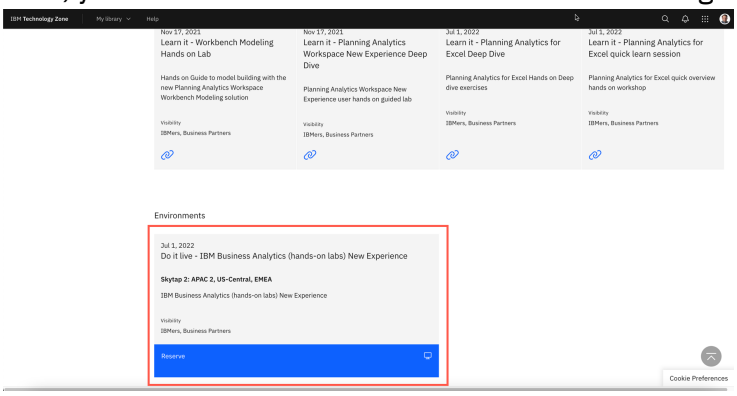
In this lab, you will experience the following capabilities in IBM Cognos Analytics with Watson:

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

1.2 Provision the Virtual Machine

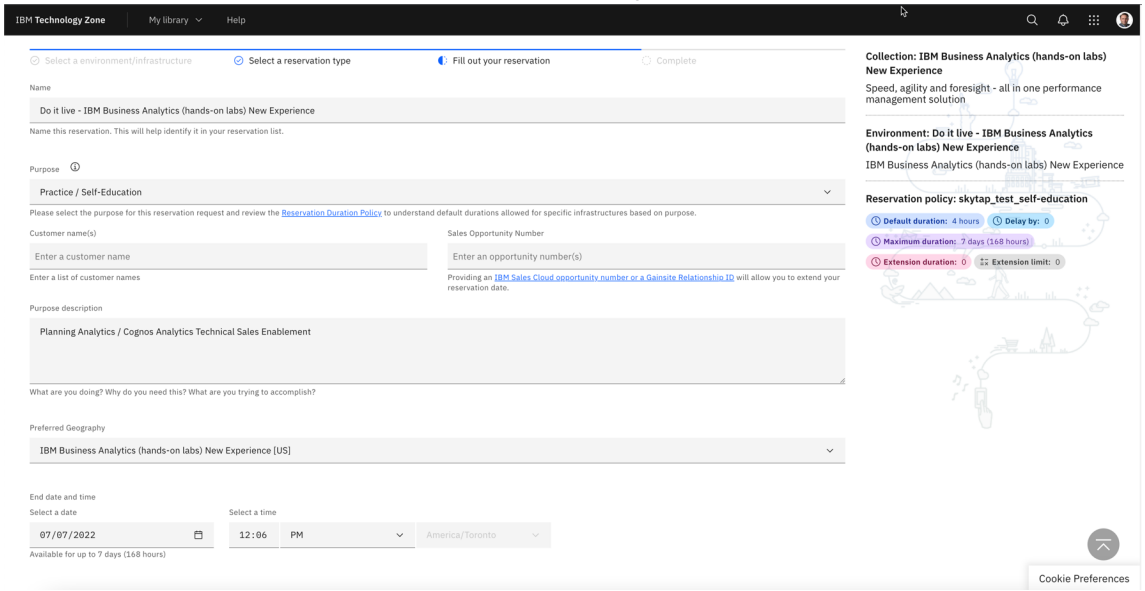
Provision the virtual machine (VM) that will be used as your Planning Analytics environment throughout the demo by performing the following steps:

1. Begin by opening your browser and navigating to the provisioning platform IBM Technology Zone (https://techzone.ibm.com/collection/IBM-Business-Analytics-(hands-on-labs)-New-Experience)
2. Enter your credentials and accept any terms and conditions, then scroll down to the **Environments** section, you should see a window similar to the following:



3. Click **Reserve**

a. Click on **Reserve now** (or schedule a preferred time to provision your image)
b. Click **Purpose** and select Practice/Self-Education from the drop-down
c. Click **Purpose Description**, and enter **Cognos Analytics L3 Technical Sales Enablement**
d. Click **Preferred Geography** and select the data center closest to you.
e. Use the **End date and time**. Choose an end date which ensures you have the time required to complete the lab. Reservations are only available for 7 days (which can be renewed to extend the duration if needed).



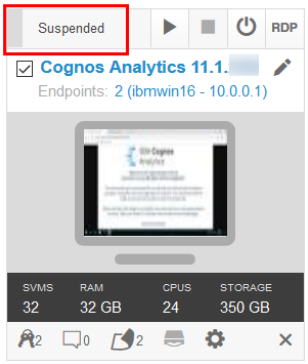
f. Click **Submit**. You will receive an email almost immediately that your environment has begun provisioning. After 5-10 minutes you'll receive a second email that your environment is ready, with details on how to access it.
g. Locate a click on the **Desktop URL** in that email, and use the provided **Desktop password** (also included under the Desktop URL) and when prompted click **Submit.**

2 Get Started with your Cognos Analytics Lab

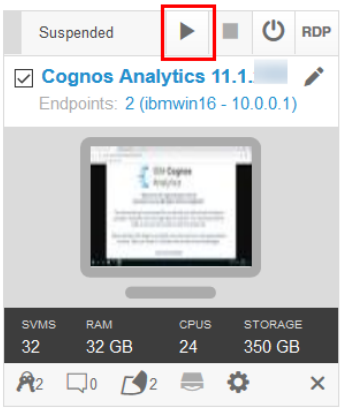
2.1 Start the Virtual Machine (VM) for your lab

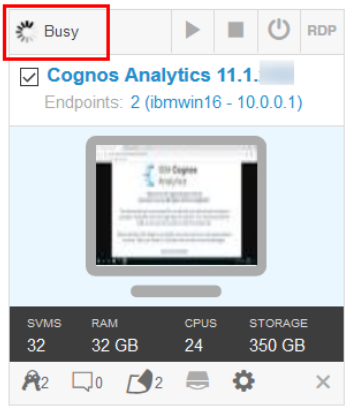
Your lab environment has only one (1) virtual machine (VM) that should have already been started up for your convenience (green background, status "Running"). If it is not running, you can start your VM using the steps below to start.

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

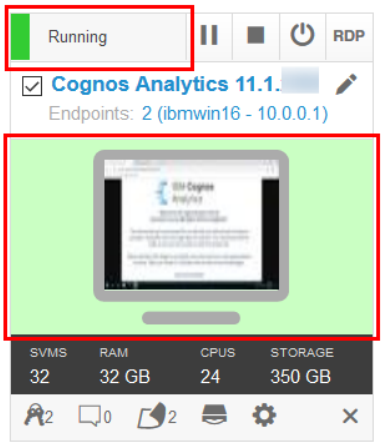


__2. If your image is already running (green background, status "Running"), skip this step. If it's Suspended or Powered off, click the **Play** button to start the VM and wait until the VM has booted (you can see the spinning gear).

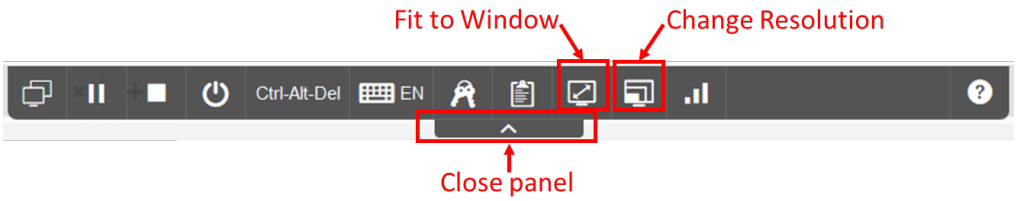




__3. Once the VM is ready the computer monitor thumbnail will have a light green background. Click the **monitor** to start the VM.

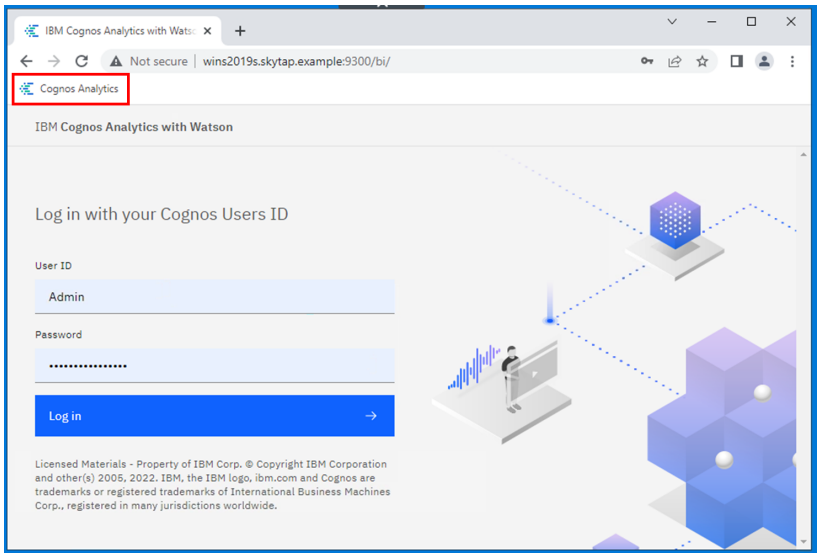


__4. The VM opens in a new browser tab. You can use the controls toolbar at the top of the screen to adjust the resolution. Click the **Fit to Window** button to fit the screen to the size of the browser. Also, it is recommended to set the window size of the browser to full screen using the **Change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



2.2 Start Cognos Analytics for your Lab

__1. From the desktop, open **Chrome**. From the **Bookmarks Toolbar**, click on the "**Cognos Analytics**" **bookmark** to open IBM Cognos Analytics with Watson login page.



__2. Enter the sign-in credentials as follows:

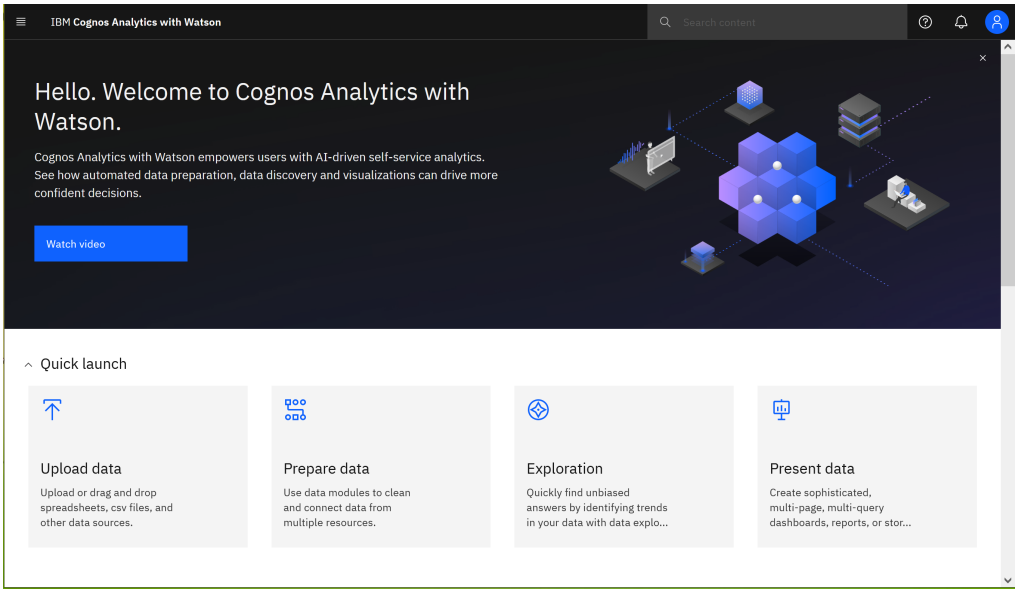
- User ID: **pm**
- Password: **IBMDem0s**

__3. Click the **Log in** button.

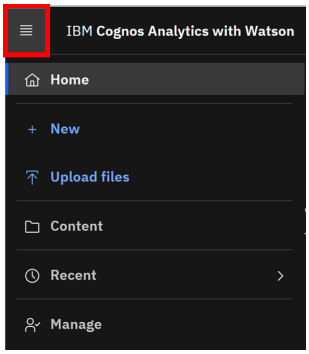
2.3 Cognos Analytics User Interface

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 welcome page provides quick access to the product functionalities, content, samples, and learning materials. This is the perfect place to start exploring Cognos Analytics.



__2. The **Open menu** button is the main access point to the IBM Cognos Analytics content and functionalities. Click the **Open menu** icon in the application bar to access the menu options.



TECH TIP: For additional information see Welcome Page in the online IBM Documentation.

2.4 Business Use Case for this workshop

For the purposes of this workshop, 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 helps you understand what's happening in your business. You will begin by uploading this file and building a Cognos Analytics dashboard to analyze department sales. Using a dashboard template, you will 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.

3 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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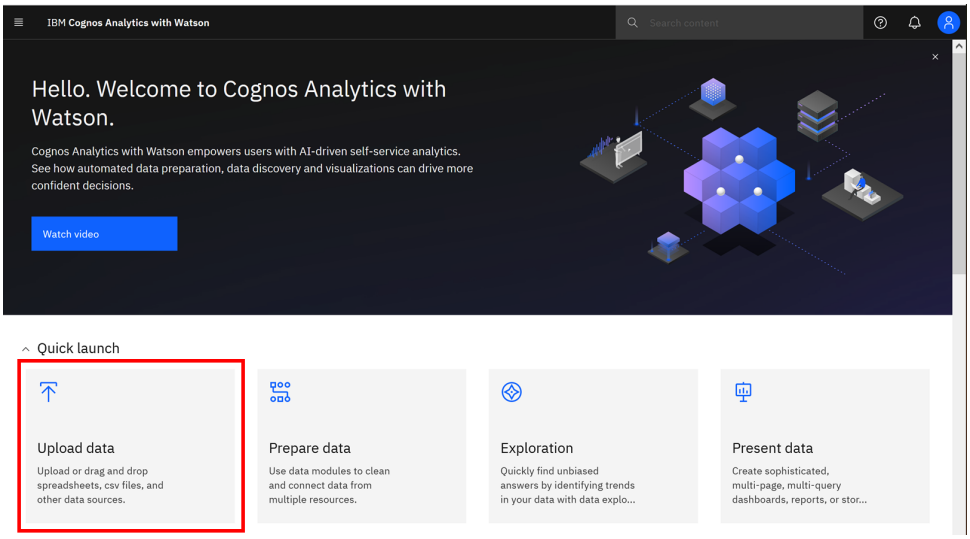
*For the first exercise, use the file "**CUSTOMER_SUMMARY.csv**". This file is located in a folder on the desktop of your Cognos Analytics instance: **Desktop> Cognos Analytics – Data Discovery with Dashboards Tutorial**.*

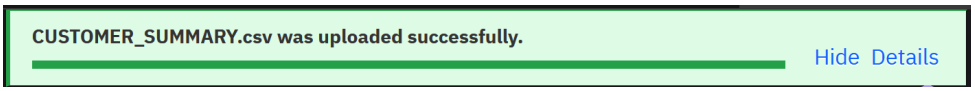
__1. To upload a file, click the **Upload data** tile in the **Quick launch** section of the Welcome page. Navigate to the file ***CUSTOMER_SUMMARY.CSV*** and click **Open**.



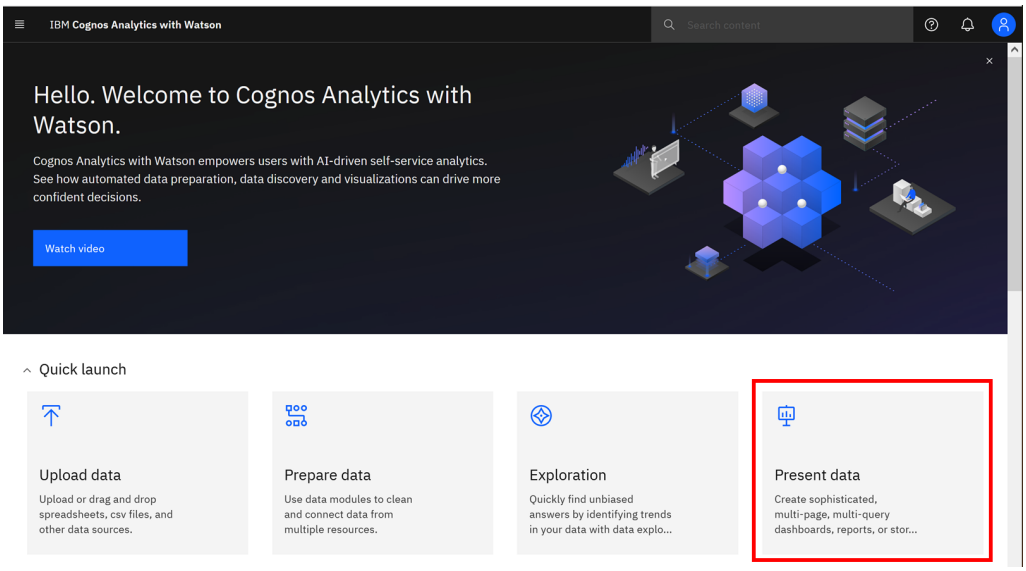
__2. Using this method, Cognos Analytics automatically uploads the file to your **My content** folder.

__3. As the file uploads, notice that a **status bar** is visible as the upload process reads and analyzes the data being brought in.

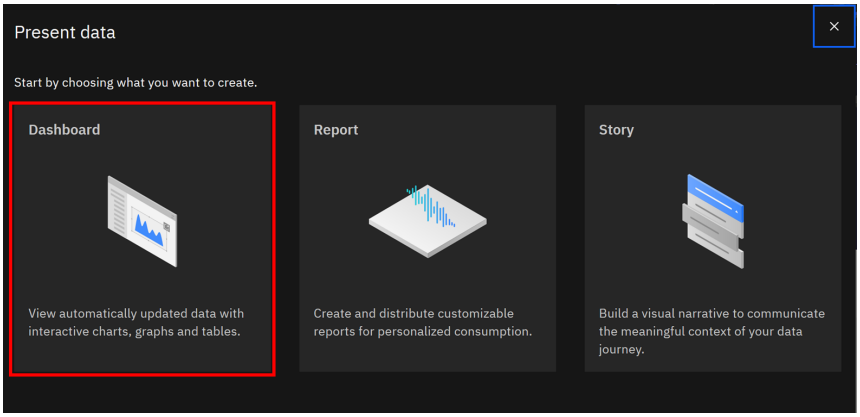
__4. Once it completes, the status bar will update to show the successful completion before closing.



__5. To build your first dashboard, click the **Present data** tile.



__6. Select **Dashboard**.

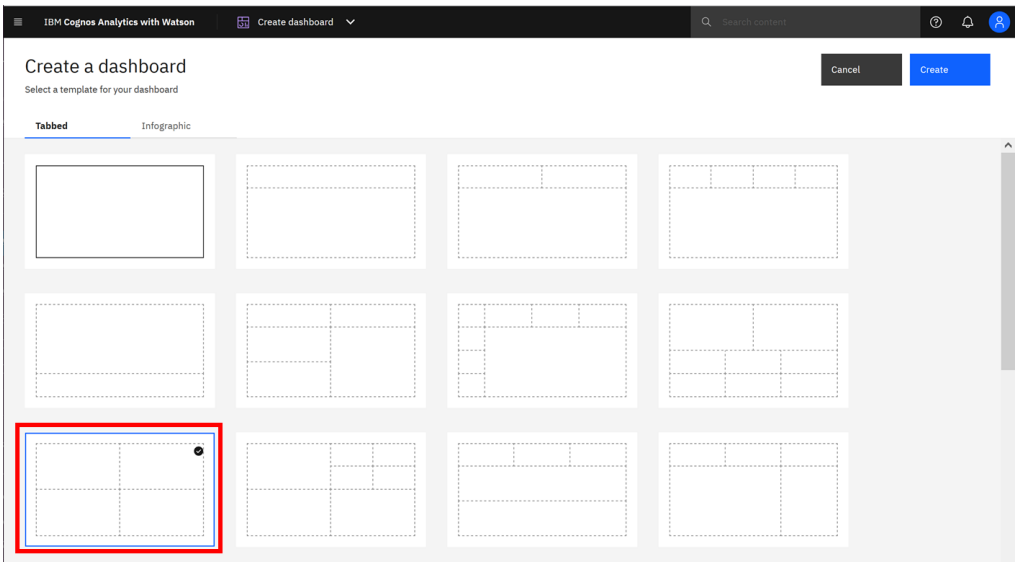


3.2 Using Templates

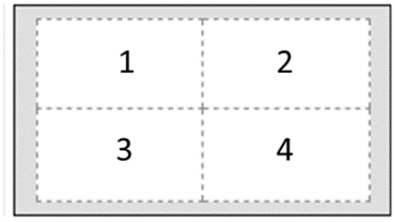
Dashboard templates provide many easy to use, predefined layout styles to assist users in the layout of content. Templates contain one or more panels where users quickly assemble various content items, known as widgets, onto a dashboard. Widgets can be a visualization, a list, a crosstab, a single value,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

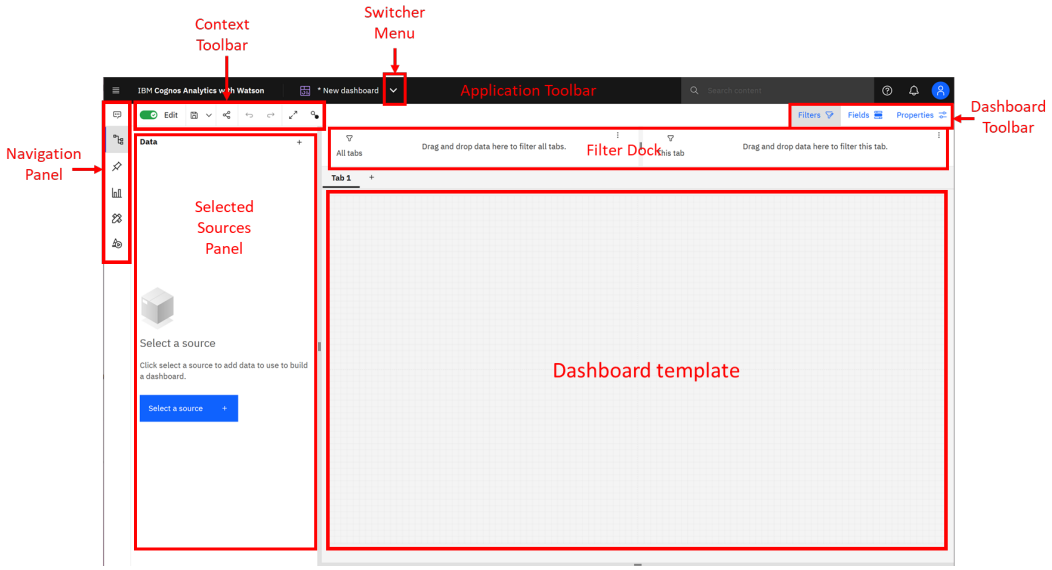
__1. Continuing from the last step, the **Template** window will display allowing you to select the type of dashboard and the template style. The default is the Tabbed dashboard style. This will allow you to have multiple pages for your dashboards. Scroll down and select the **four-panel template with 2x2 configuration**. Click **Create**.



__2. As you build the dashboard, this workshop references the location placement for widgets in the dashboard template using the following panel numbers:

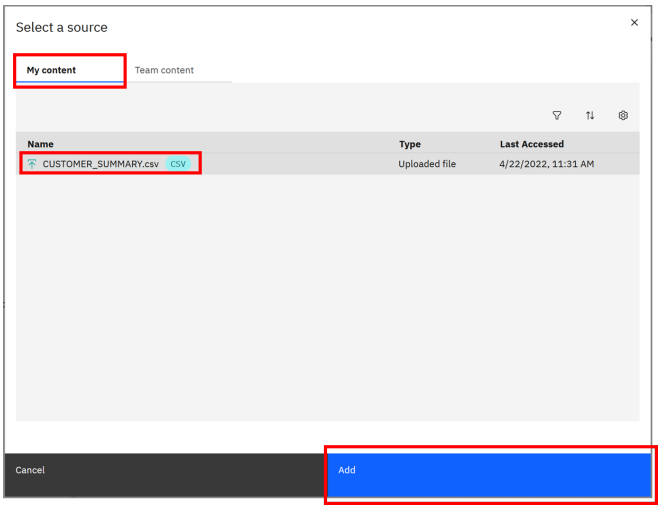


__3. The dashboard template opens in the **Canvas**. Notice that the icons on the upper left side have now updated to show the dashboard toolbox capabilities available for assembling a dashboard. The main toolbar (App Bar) has also updated, exposing the dashboard editing and sharing functions available.

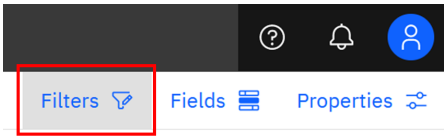


TECH TIP: For ease of dashboard design, the default view presents a convenient grid to assist in dashboard layout. This grid, and other layout settings may be set by the user in the **Properties** of the dashboard.

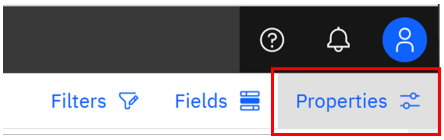
__4. To add data, click the **Select a source** button in the Sources panel. Click the **My content** tab. Select ***CUSTOMER_SUMMARY.csv*** and click **Add**.



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



__6. Click the dashboard template to bring it into focus. To open the 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 the Canvas section, 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.

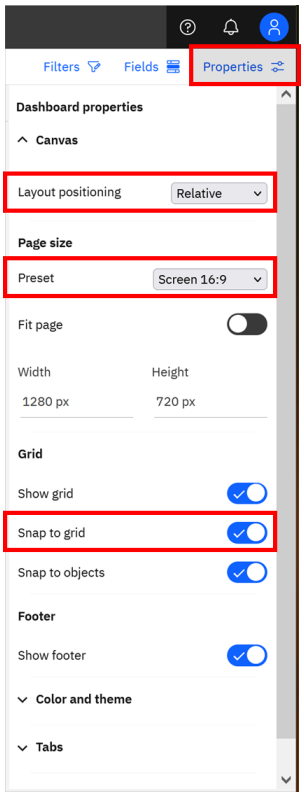
- **Layout positioning** - In the properties for a dashboard or story, you can set whether the layout positioning is relative or absolute. In a relative layout, the size and position of widgets adjust to fit into the screen. Widgets in an absolute layout appear exactly as you size and place them in the 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.

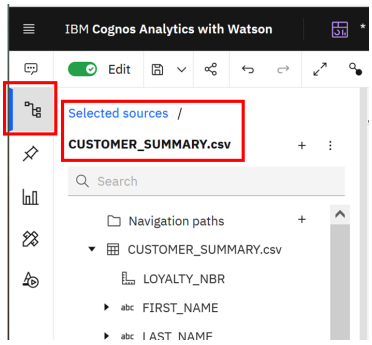
TECH TIP: The properties in the Properties panel are grouped by categories such as Canvas, Page size, Grid, Footer, Color and theme, Tabs, and Advanced. These sections are collapsible and expandable to improve the organization and usability of the Properties panel.

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

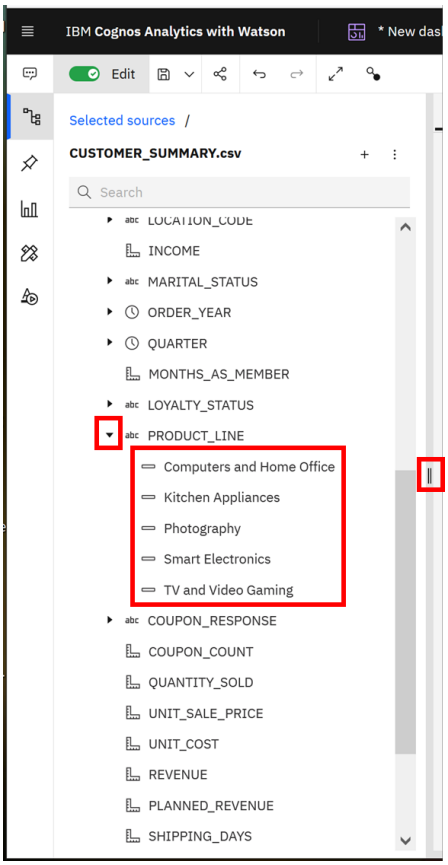


__9. Click on the **Properties** button to close the Properties panel.

__10. Open the **Sources** panel, if it is not already open. It displays the uploaded file "***CUSTOMER_SUMMARY.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. Scroll down the list to view all the data available. 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.



TECH TIP: You can increase or decrease the width of the **Assistant** panel by using the handle on the right edge of the panel.

3.3 AI Assistant

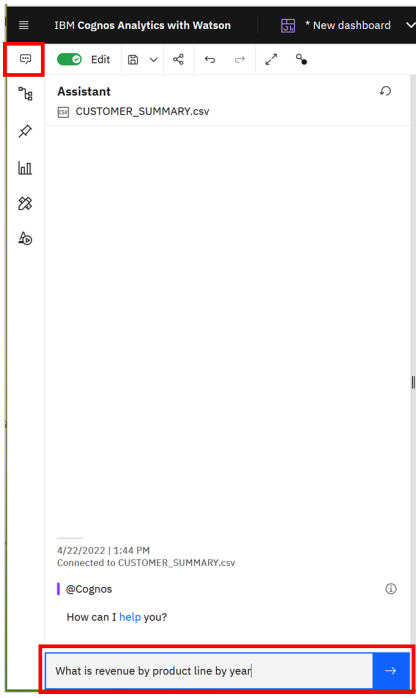
The Cognos Analytics Assistant provides recommendations to help answer questions and provide the user with quick insights into their data. Many times, users will have specific questions they are looking to answer but may not be familiar with the dataset or exact data items they need to uncover the insight 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 new or existing dashboard or exploration. Simply enter text related to the users' analytical intentions, and an AI conversational agent responds with visualizations and other information to satisfy the request.

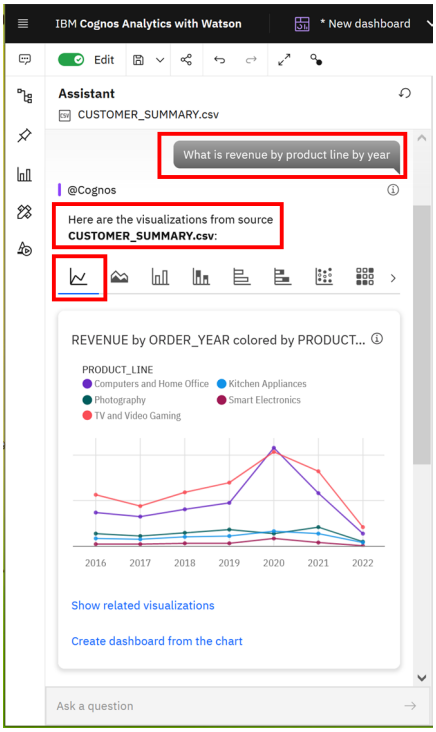
The AI Assistant allows users an easy starting point to begin working with their data. In this case, the first question the user may have is how Product Line sales have historically trended over time. To get started, the user can ask questions to the AI Assistant.

__1. From the Navigation panel, click the **Assistant** icon to open the Assistant panel.

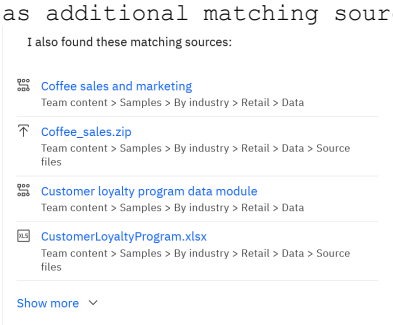
__2. In the **Ask a question** field, type "***What is revenue by product line by year***" and click **Enter**.



__3. Cognos Analytics identifies **Product Line**, **Revenue** and **Year** in the ***CUSTOMER_SUMMARY.csv*** file uploaded earlier, and provides recommendations to visualize this data for analysis, starting with a **Line chart**.

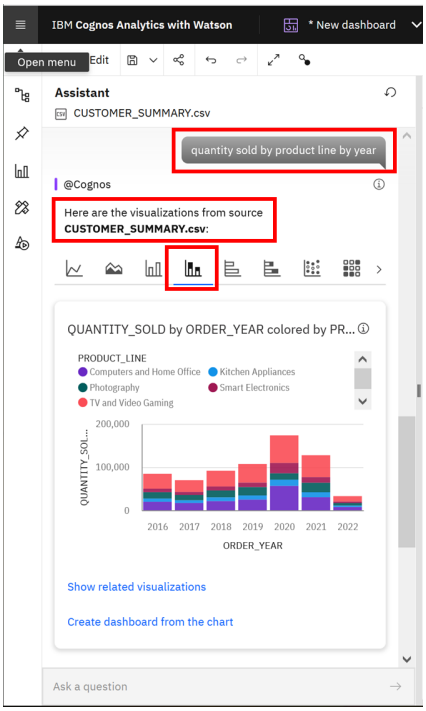


TECH TIP: If the data items from your inquiry exist in any other data sources, they will be listed as additional matching sources.

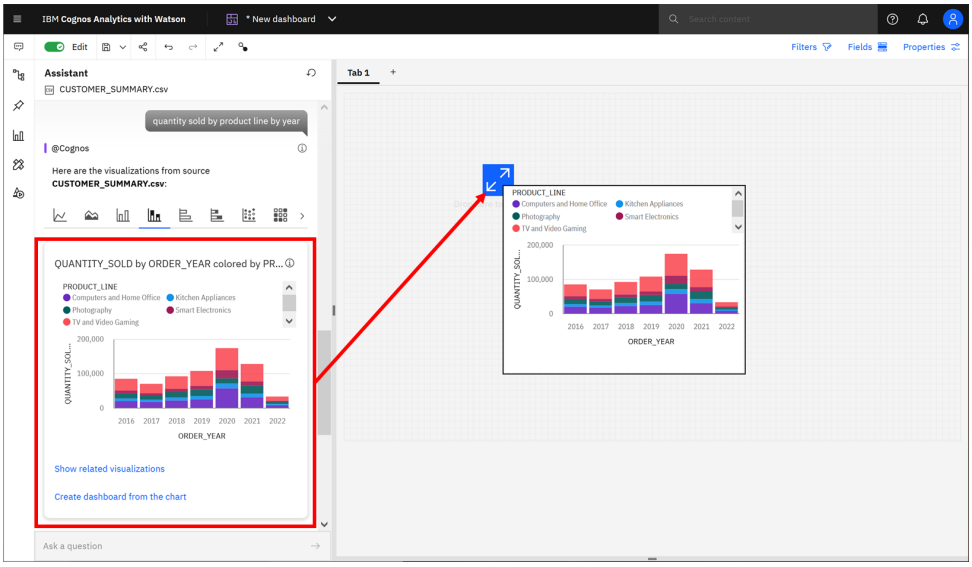


Your workshop environment may have more, fewer, or no other matching sources. This will not impact the exercise in this workshop.

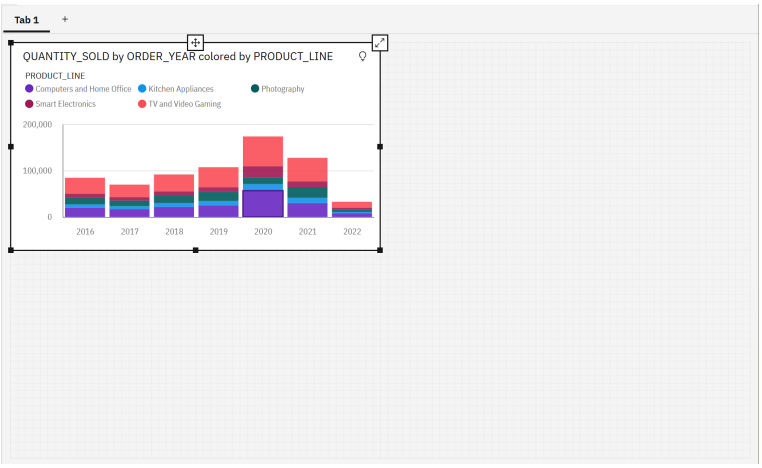
__4. Questions made to the AI Assistant do not need to be in full context or use proper sentence case and capitalization. In the **Ask a question** field, type "***quantity sold by product line by year***" and click **Enter**. Based on the data items in the inquiry, Cognos Analytics also provides a series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



__5. Click the **Stacked Column** visualization and drag it over to the canvas into **Panel** 1, dropping it when the **Drop here to maximize** drop zone icon turns blue.

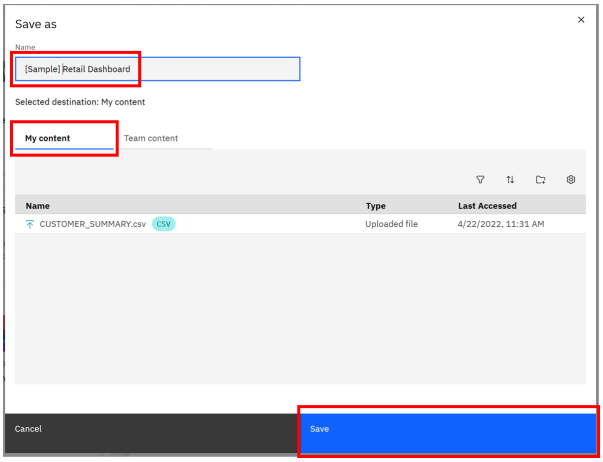


__6. Your dashboard canvas should now appear as follows:



*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 steadily increased for 2018 and 2019, then spiked in 2020. This appears due in large part to increases in two product lines: Computers and Home Office, and TV and Video Gaming. Sales. Sales in 2021 appear to have returned to the growth rate seen before the sales spike. The current year 2022 is only a **partial year**, so next 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.*

__7. To save your progress, click the down arrow next to the **Save** icon on the dashboard context toolbar. Click **Save as**. In the resulting dialog, click the **My content** tab. Type ***"[YourName] Retail Dashboard"*** in the **Name** field. Click **Save**.



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

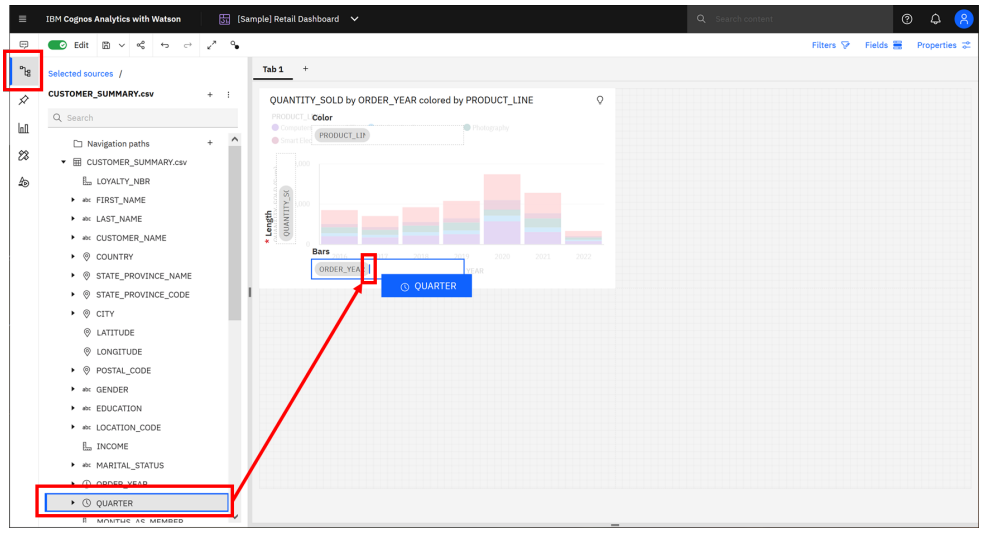
3.4 Nesting Data

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.

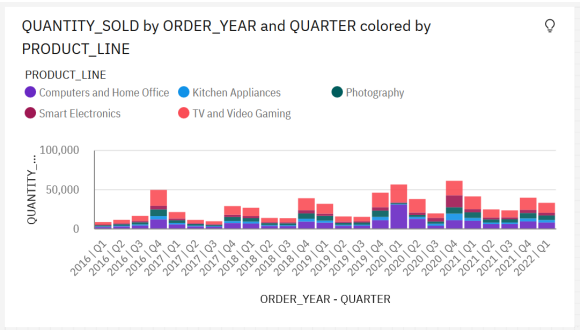
To see a more granular view of how product sales have trended over time, you will add in quarterly data to show a more detailed sales history.

__1. From the **navigation panel**, click the **Sources** icon to open the data source panel. Use the panel's handles to adjust the width of the data sources panel as preferred.

__2. From the **Sources** panel, drag **Quarter** over to the **Order Year** axis. The **Bars data slot** opens. Drop **Quarter** to the right of **Order Year**. A vertical blue bar renders when you've found the correct location for the drop zone.



__3. **Quarter** is now nested under **Order Year**, providing a much more detailed view of historical sales trends. Your visualization 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 handles on the edges of the widgets to resize them, while using the grid to assist you with alignment. As you resize your widget, size guidelines render to show you the relative size of the widget to the overall template.

__4. Using the right **Resize handle**, 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 ratio renders 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. 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's 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

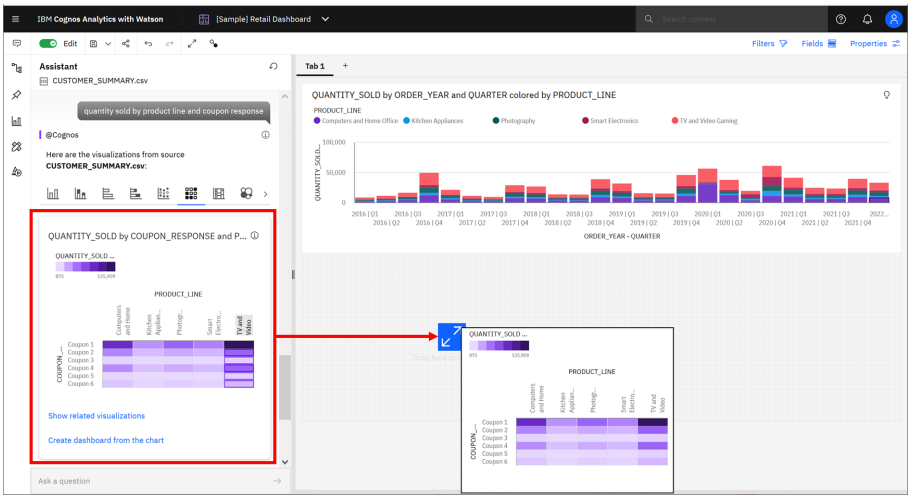
Dashboards provide users with a line of sight into their business that allows them to easily monitor KPIs and metrics. With Cognos Analytics, users have the flexibility to create and assemble very attractive and engaging dashboards with meaningful visualizations that are automatically generated, with 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 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 from marketing for each of the product lines. You'll use the AI Assistant to get started, and then modify the visualization for your analysis.

__1. Open the **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:

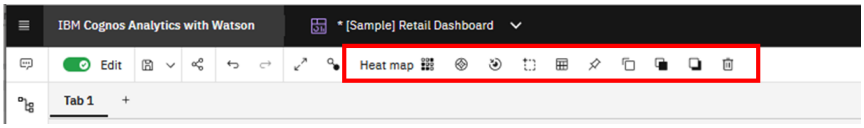
__2. Click the **Heat Map** visualization and drag it over to the canvas onto **Panel 3**, dropping it when the drop zone turns blue.



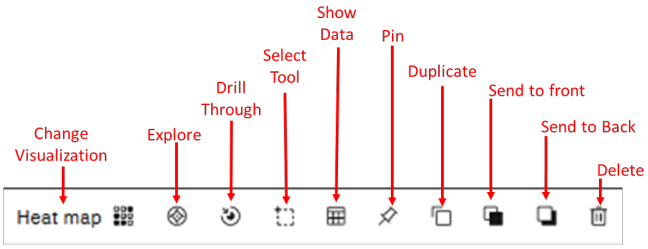
Heat maps use color intensity in a matrix, which provides the viewer with an immediate visual summary of information. The darkest colors indicate the highest values. From the heat map, you can immediately see that the highest quantities sold are under Coupon 1. Two product lines, 'Computers and Home Office' and 'TV and Video Gaming' have the highest quantities sold for all the coupon programs across all product lines.

__3. Close the Assistant panel by clicking on the **Assistant** button.

__4. Users can easily select other visualization options from the Visualization library. Click the **Heat Map** in Panel 3 to view the context toolbar for the widget. The context toolbar is docked above the dashboard.

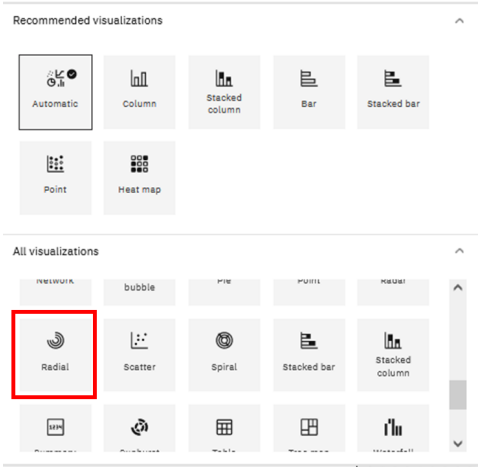


__5. The toolbar renders tools in context based on the user's selection within the widget. Hover over the context toolbar to view the capabilities available.

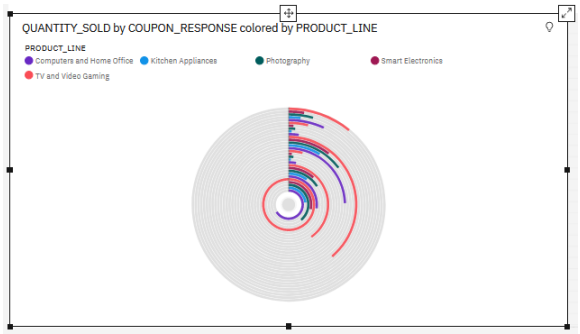


__6. Click the **Change visualization** icon on the context toolbar to view the visualization library.

__7. A list of **Recommended visualizations** renders. Additional visualizations are also available in the visualization library. Scroll down to review them. For this exercise, click **Radial** chart.

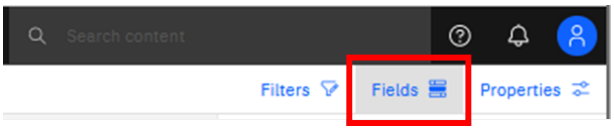


__8. The visualization updates to a **Radial** chart.



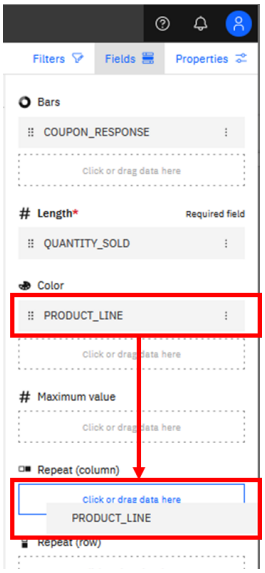
The new Radial chart shows all data rendered in a single radial. For your analysis, you would like to have each product line have its own radial visualization, so you will customize the visualization to suit your analysis.

__9. Select the **Radial** visualization. Click the **Fields** button on the Dashboard toolbar to open the Fields panel.

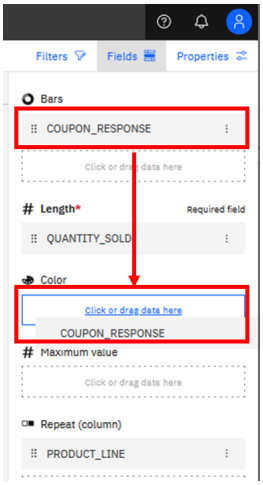


Once the Fields panel opens, you are in design mode and will see the data slots available for the widget. The data slots are used to set the definitions for how you want the data items to be defined for visualization rendering. You would like to see the coupon promotions on individual radial charts repeated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

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

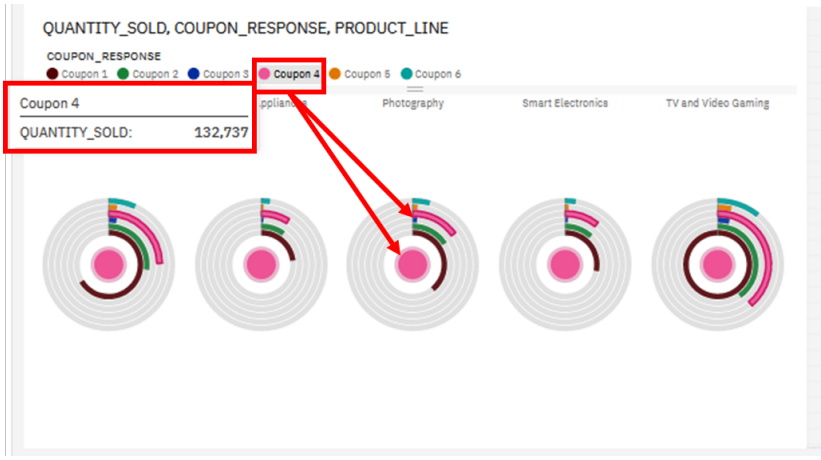


__11. Next, drag **Coupon Response** to the **Color** slot.



__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** values in the legend. The visualization highlights the Coupon Response legend color in the center, and the corresponding radial bar.



The individual Radial charts make it easy to see the coupon response by product line. 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.

TECH TIP: Each time you make changes to the dashboard, an asterisk (*) will appear to the left of the dashboard's name in the Switcher. This indicates that there are unsaved changes in your dashboard.

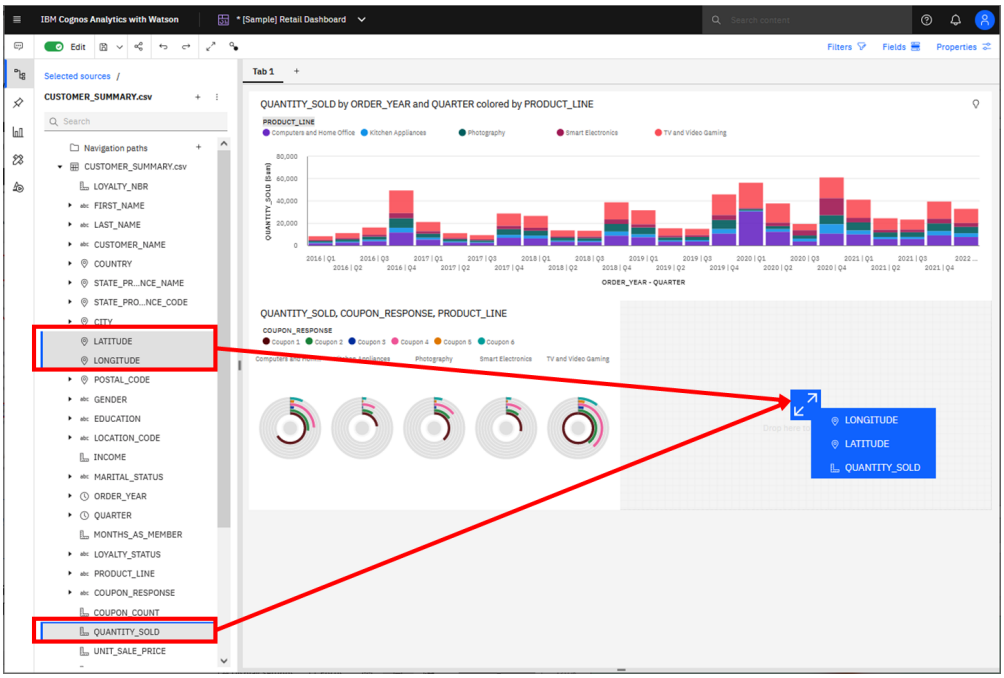
__14. **Save** the dashboard.

3.6 Working with Geospatial Mapping

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

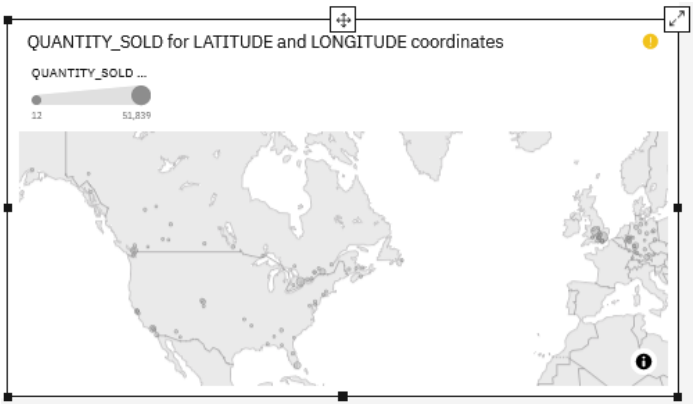
__1. From the navigation panel, click the **Sources** icon to open the data source panel.

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



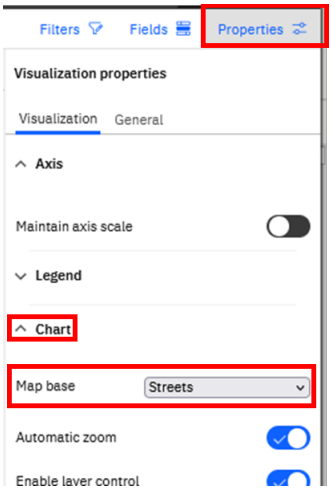
Cognos Analytics' built-in smarts has recognized that because you are working with geo- location data, the most appropriate way to visualize it is with a map.

__3. A Map visualization is generated, automatically zoomed in to optimize the rendering of the data points.



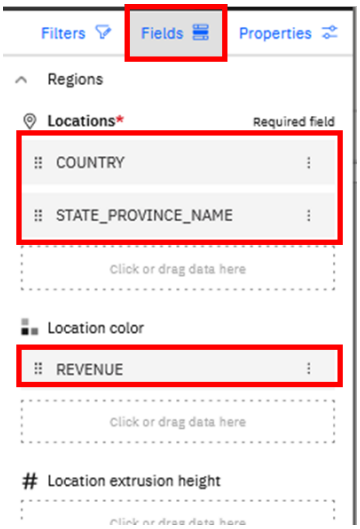
Cognos Analytics' partnership with Mapbox allows the user to select from a variety of different map styles such as street maps, satellite, varying color schemes, etc.

__4. To change the map's style, with the Map visualization selected, open the **Properties** panel and open the **Chart** section. For the **Map base** property, select **Streets**.

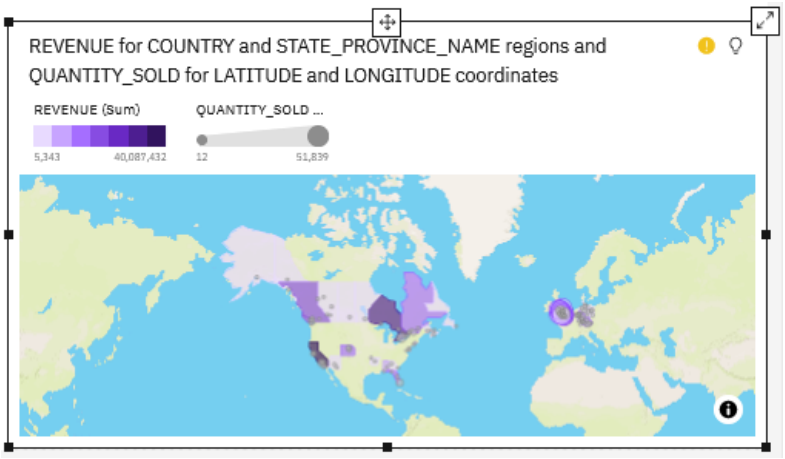


__5. Open the **Fields** panel to view the map's data slots. From here, you can add in an additional region layer to render on the map. From the **Sources** panel, drag **Country**, **Province** or **State** and **Revenue** into the **Regions data slots** as follows:

- 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:



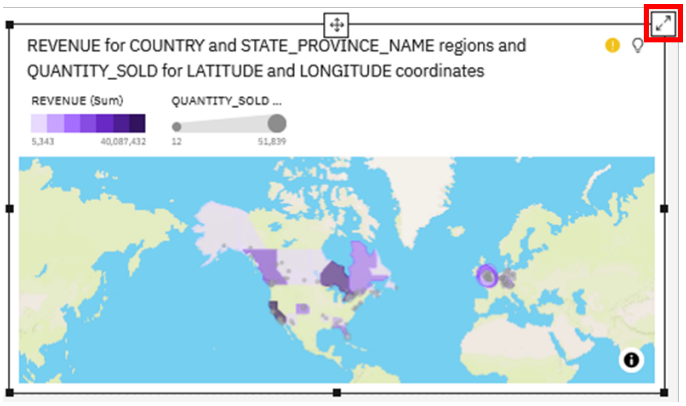
*Adding in the additional fields (Country and Province or State) provides location **context**, removing location ambiguity for data points. For example, both the UK and Canada have a city named "London", and in the United States, 36 states have a city named "Springfield". By adding in the additional regional context, the data is mapped to the proper Country and State.*

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

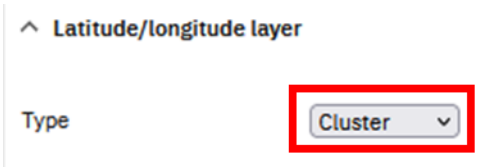
*Many times, there are so many individual locations in the data that rendering location indicators for each makes the map difficult to read when zoomed out to show larger areas. To optimize the map presentation at all zoom levels, Cognos Analytics provides **map clustering** to aggregate individual locations into clusters so that when zoomed out, the map renders a single location indicator with an aggregate total 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** visualization to bring it into focus.

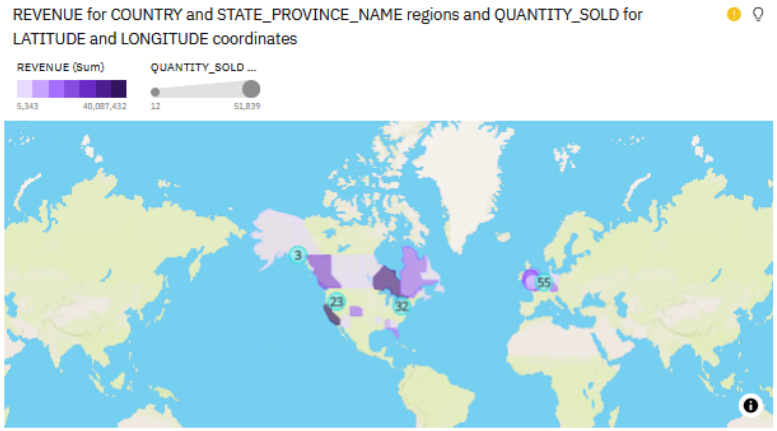
__9. Any widget can be maximized for the user while working with the content. Click the Expand button in the upper right corner of the Map visualization to maximize the widget's size.



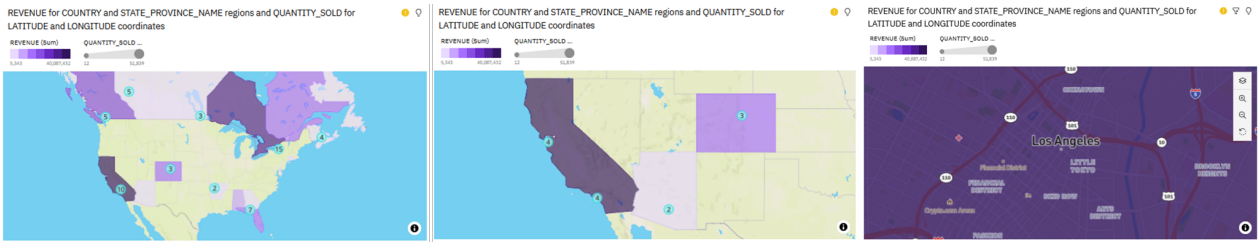
__10. Open the **Properties** panel to the **Visualization** tab. Expand the **Latitude/longitude** layer section and change **Type** to **Cluster**.



__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. **Zoom in** over North America to view the clusters 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 the 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 for marketing to your customer loyalty program base. Next, you'll format the dashboard for

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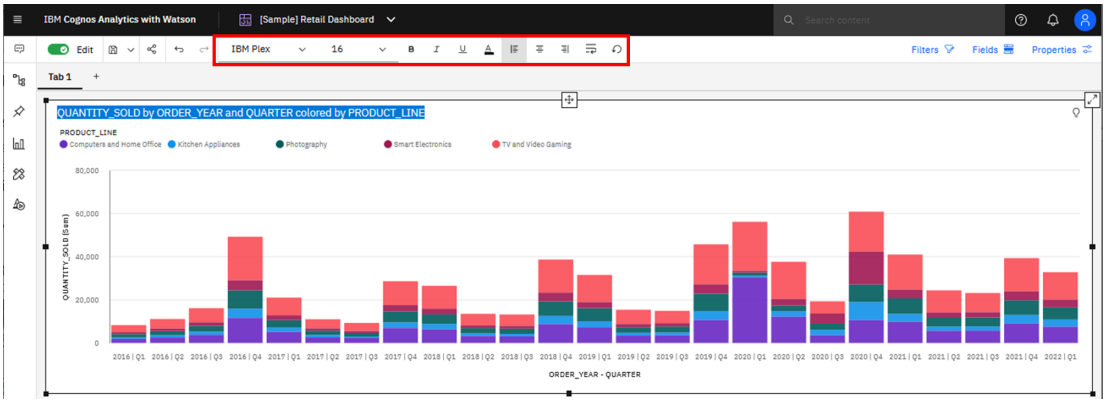
4 4 Formatting the Dashboard

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 context toolbar when you select the widget title text in a visualization.

__1. Click the widget **Title** for the **Stacked Column chart** in Panels 1 and 2 to bring it into focus and render the title's context toolbar.



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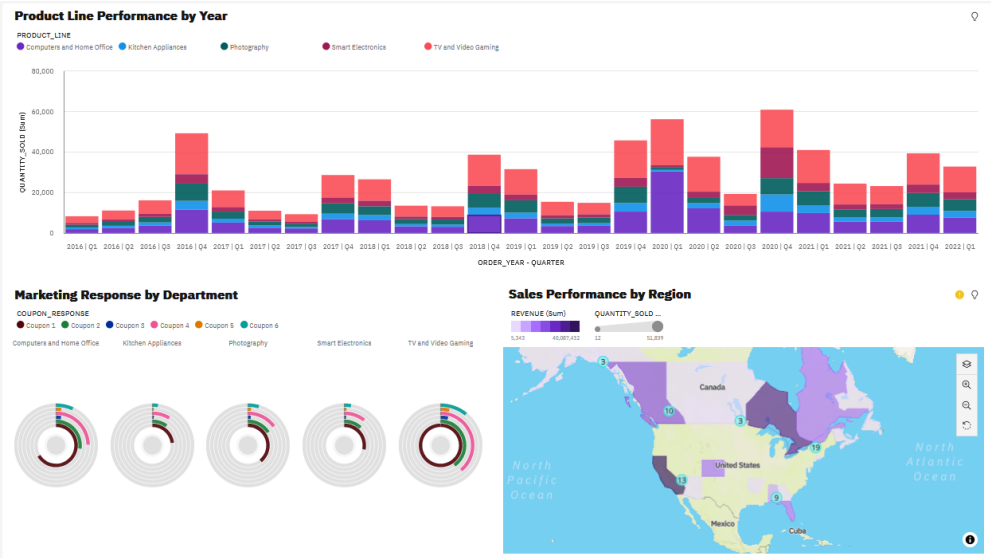
*There are many options for widget title formatting. You can modify the font family, font size, text color, alignment, text wrapping and styles. If you make changes and wish to return to the default settings, you may highlight the title to bring up the context toolbar, then select the **Restore defaults** icon.*

__2. Change the **Title** to "***Product Line Performance by Year***". Set the title to **Bold** and the font size to **20**.

__3. Click the **Radial chart** in Panel 3 to bring it into focus. Change the title to "***Marketing Response by Department***". Set the title to **Bold** and the font size to **20**.

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

__5. Your dashboard will look similar to the following:



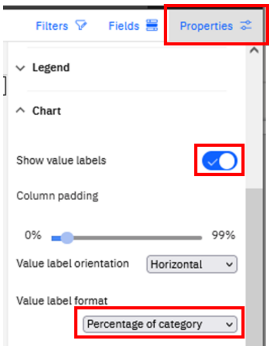
__6. **Save** the dashboard.

4.2 Displaying Chart Values

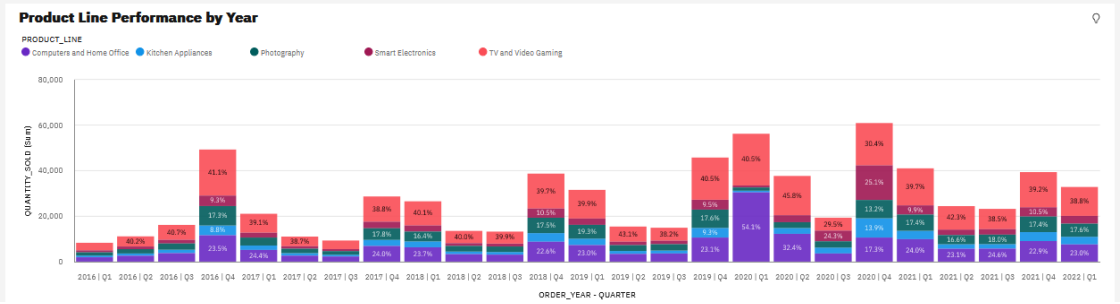
Users can hover over any data item in a visualization and the details will render in a tooltip. Values can also be set to render directly on the visualization from the Properties panel for the widget. Values can be set to show the actual value or the value as a percentage of the category or color.

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

__2. From the **Visualization** tab, expand the **Chart** section and turn on the **Show value labels** toggle. 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 to the visualization.



TOOL TIP: The value labels will optimize visually 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 screen capture above, the values for the data slivers that are too small to render values legibly have been removed. You may hover over these data slices to view the values in a tooltip.

__4. In the properties, expand the **Axis** section and review the settings that can be defined for the axis titles and labels, such as position, orientation, font, size, color and axis range.

__5. Expand the **Legend** section to review the 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.

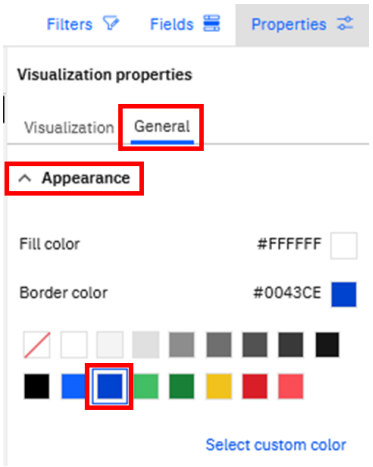
4.3 Borders

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 in Panels 1 and 2 to bring it into focus.

__2. Open the **Properties** panel and click the **General** tab. Expand the **Appearance** section. Click **Border color** to view the color options for borders.

__3. Click the **Blue 70** swatch.



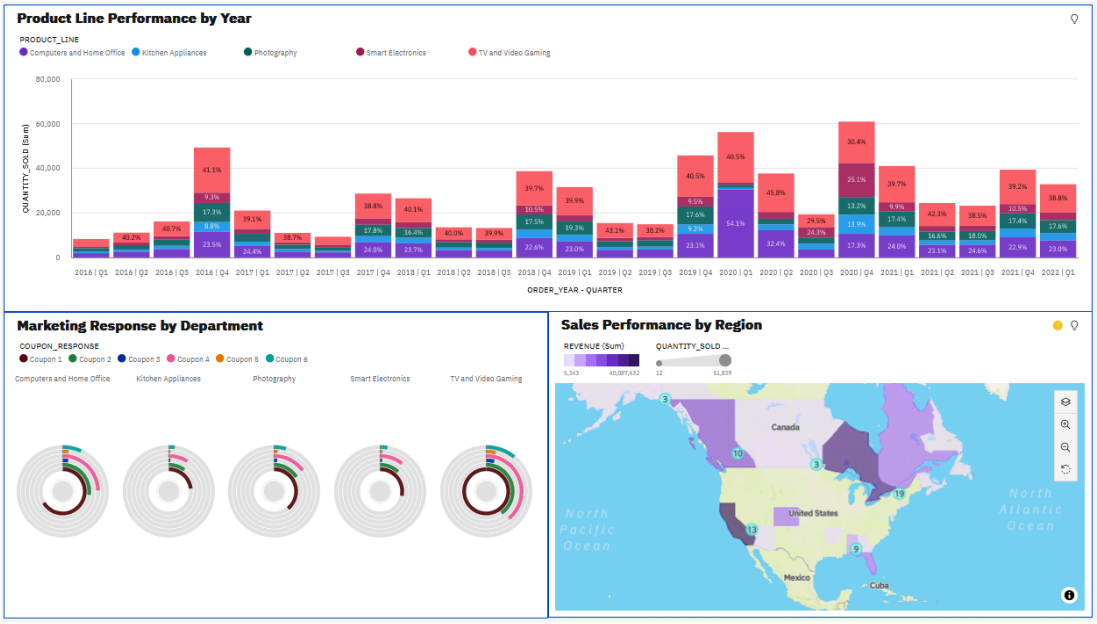
TECH TIP: Cognos Analytics allows you to select your own color palettes and even define specific RGB, HSB, and HEX colors so users can align their color palettes to the standard custom color schemes their organization uses for branding. Custom colors are outside the scope of this workshop, but we encourage you to try the **Select custom color** feature using your corporate branding colors.

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 visualizations in Panels 3 and 4.

__5. Repeat steps 2-3 above.

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

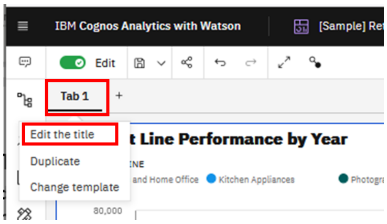


__7. **Save** the dashboard.

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 for advanced analysis.

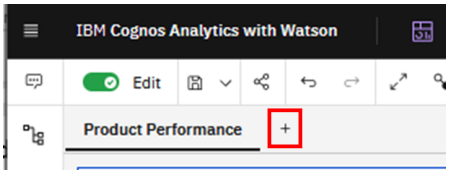
__1. Click the tab named **Tab 1** to bring up the tab's menu.



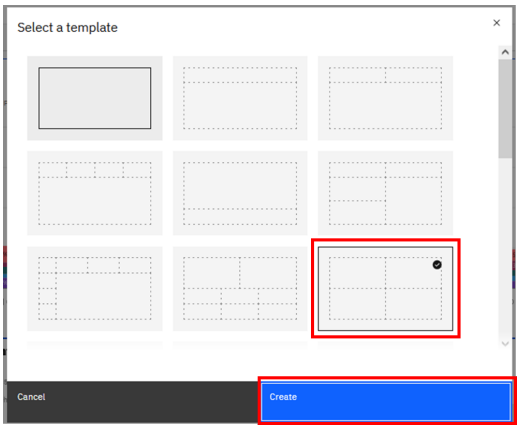
__2. Select **Edit the title**. Rename the tab to "***Product Performance***" and click **Enter**.

> **TECH TIP:** Users can modify the colors for the tabs, the selection indicator, and add an icon. The location of the tabs can be set to render at the top (default), left, bottom, or right of the dashboard. These additional formatting options can be set up in the **Tabs** section of the **Properties** of the dashboard.

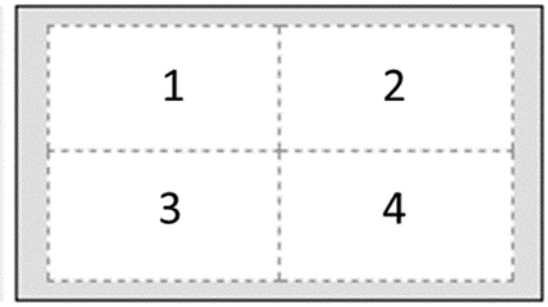
__3. Click the **Add new tab** icon to the right of the **Product Performance** tab.



__4. The **Select a template** dialog appears. Select the four-panel template with 2x2 configuration. Click **Create**.



__5. As you build the dashboard, the workshop will reference the location placement for widgets in the dashboard template using the following panel numbers:



__6. Click the new tab to bring up the tab's menu. Select **Edit the title**. Rename the tab to "***Key Insights***" and click **Enter**. You will use this new tab to extend your analysis later in the workshop.

__7. **Save** the 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.

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5 5 Infusing AI Into your Dashboard

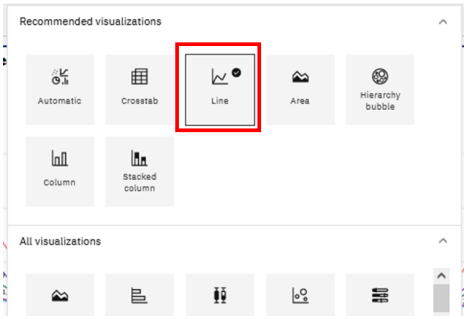
5.1 Forecasts

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.

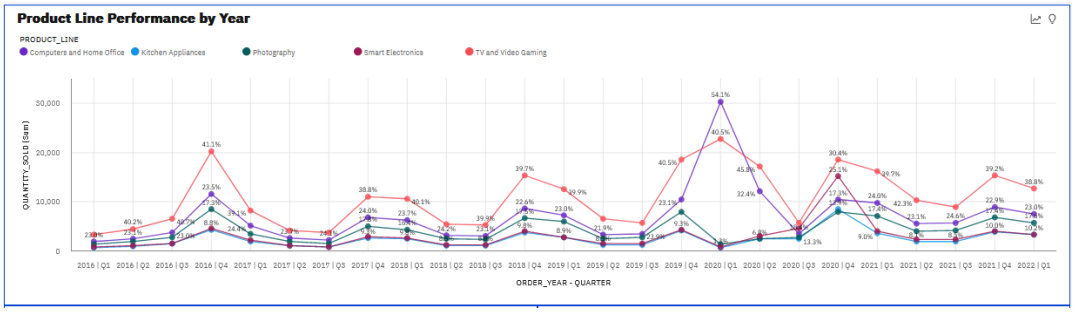
__1. Click the **Product Performance** tab to select it.

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

__3. From the context toolbar, select **Change visualization**. Scroll down and select **Line**.

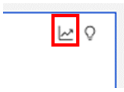


__4. The visualization updates, but still maintains the previously customized property settings, such as the addition of the value labels.



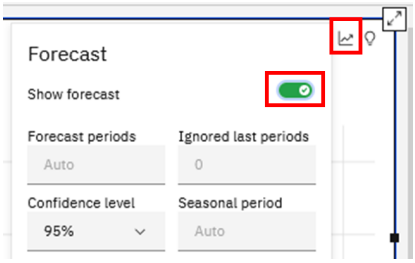
__5. Click the **Expand** icon on the upper right corner of the visualization. This will maximize the visualization while you work with it.

__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 (e.g. Line, Column, Bar) will present the Forecast icon in the upper right corner.

__7. Click the **toggle** button to turn forecasting on. For this exercise, you will use all the default settings for Forecast.



__8. 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.

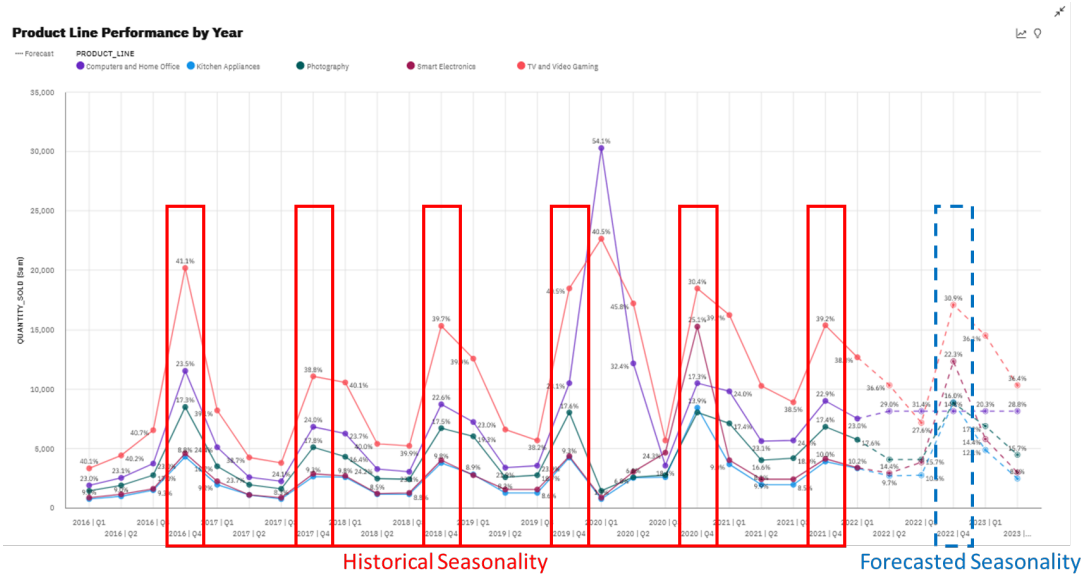
__b. **Ignored last periods**. Ignores a specified number of data points at the end of a time series when building the model and computing the forecasts. The default value is 0. Up to 100 data points can be ignored. Ignoring the last data period can be useful when the data is incomplete. For example, 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.

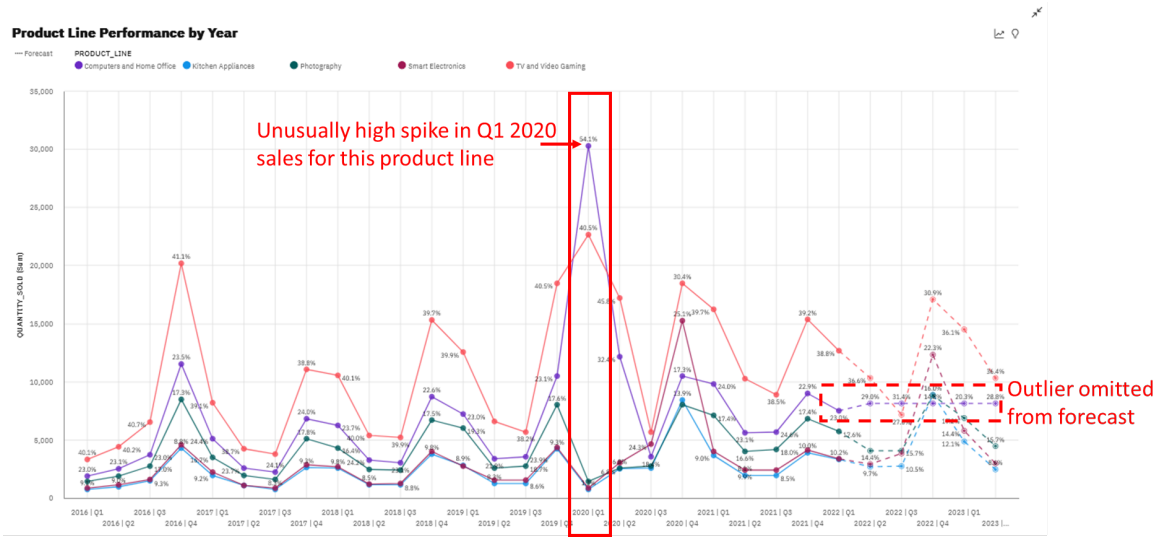
__9. Click outside the Forecast dialog box to close it.

__10. 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 incorporate it into the forecast. But what else does this visualization indicate?

__11. Notice the unusually high spike in sales for Q1 2020 for Computers and Home Office, and how this outlier was omitted from the forecast:



In addition to the historical seasonality that Cognos Analytics identified, it also can identify outliers in the data that differ 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.

__12. Click the **Collapse** icon on the upper right corner of the Line visualization.

__13. **Save** the dashboard.

5.2 Insights

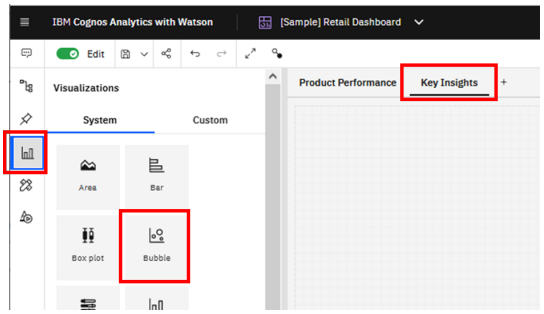
Insights in visualizations provide analytic insights that can help users to detect and validate any important relationships and meaningful differences based on the data that is presented by the visualization.

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 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 relationships. In the remaining exercises, you will work with some of these AI features.

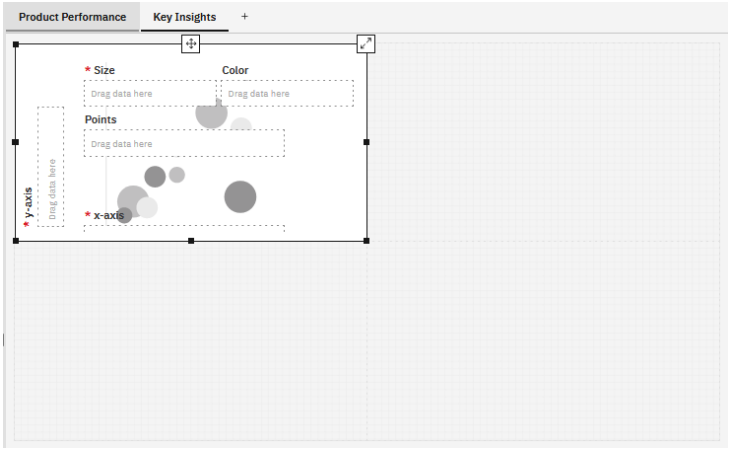
__1. Click the **Key Insights** tab on the dashboard.

__2. From the Navigation panel, click the **Visualizations** icon to open the Visualizations library.

__3. Click the **Bubble** chart.

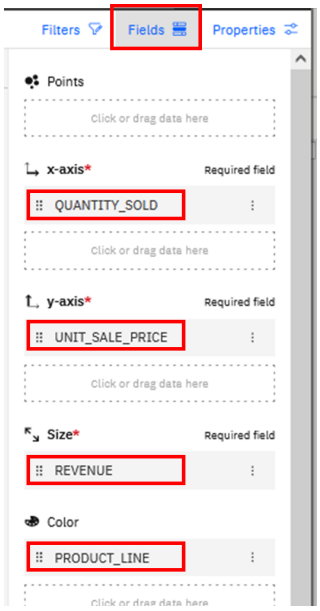


__4. It will be automatically added to Panel 1 of the dashboard template in a maximized state.

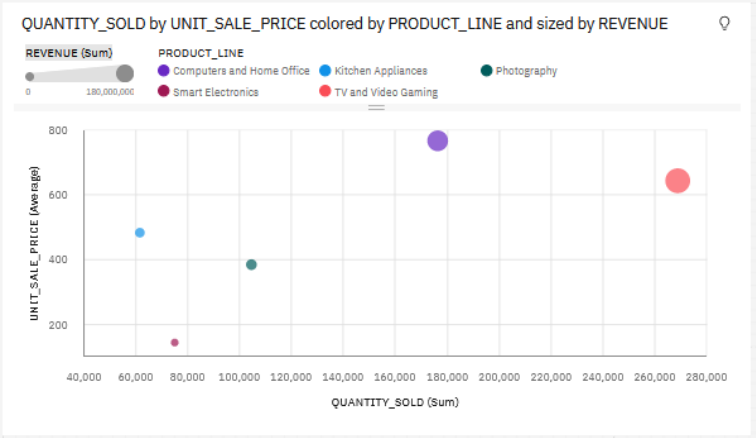


__5. Since you started by selecting a visualization type this time, rather than by selecting data, the bubble chart visualization opens the Fields panel and the Sources panel for you to set up your data definitions. From the Sources panel, drag data items into the Fields panel data slots as follows:

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

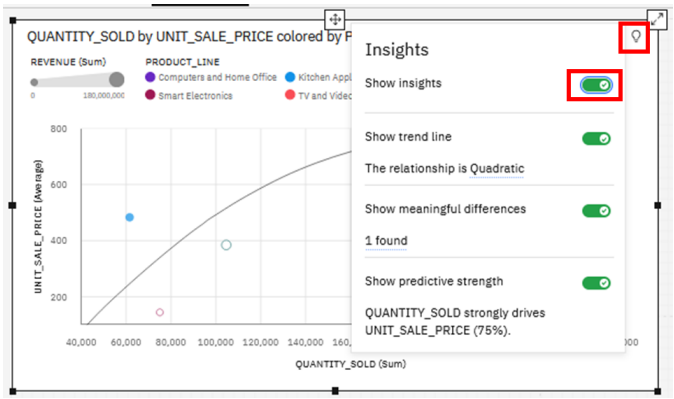


__6. This Bubble visualization shows how the product lines are performing in comparison to one another. To get additional detail for each product line, hover your mouse over the respective bubble. Details of the underlying data measures for Quantity Sold, Unit Sale Price and Revenue are displayed. Hover over each of the bubbles to view additional information.

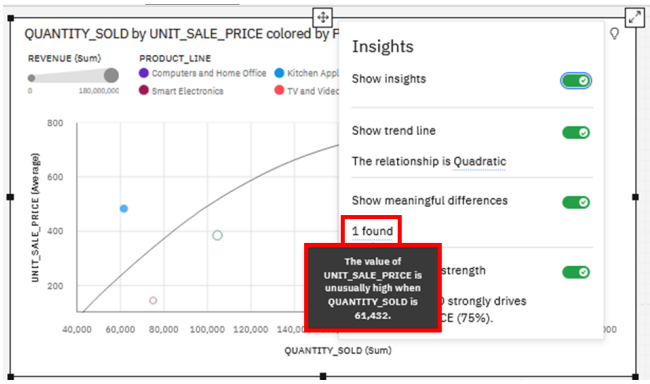


This visualization clearly indicates that Smart Electronics is the lowest performer of all product lines. Additionally, even though Smart Electronics and Kitchen Appliances have a similar amount of Quantity Sold, the Smart Electronics average Unit Sale Price is significantly lower, generating less revenue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

__7. The Bubble chart includes insights from Cognos Analytics' Augmented Intelligence (AI). Click on the **Insights** icon. Click the **Show insights** toggle to turn on insights for this visualization.



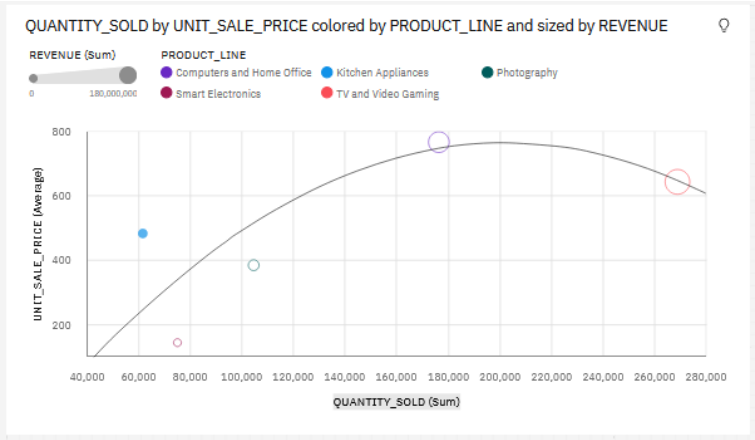
__8. Under **Show meaningful differences**, hover over the underlined text **1 found** to view the findings.



The surfaced insight indicates a suspected anomaly in the data which was a statistically significant meaningful difference. These insights are valuable as they surface up potential issues that may warrant further future analysis. In this case, we may wish to determine if there is a legitimate outlier in the data, or a possible error in unit price, etc. For now, we'll continue looking at the other insights presented.

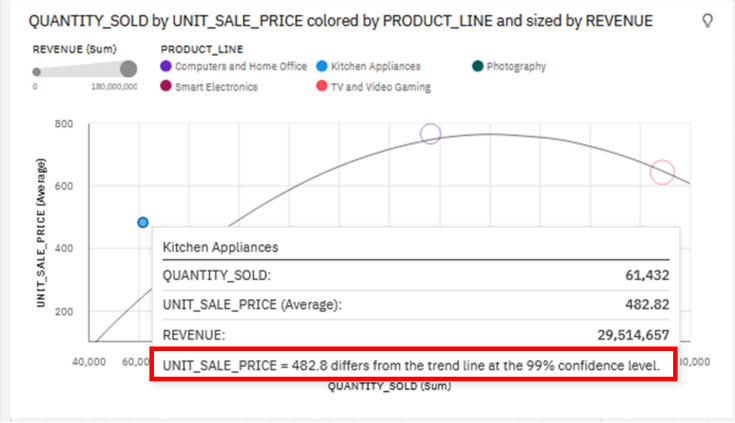
__9. Click outside the **Insights** dialog box to close it.

__10. The visualization has updated to render a “best fit” line for our analysis.



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. In this case, we see that Kitchen Appliances falls just outside the best fit line and is rendered as a solid dot indicating it is an outlier.

__11. Hover over the solid blue dot for Kitchen Appliances.



Cognos Analytics identifies for us that this data point, average unit sales price, falls outside the 99% confidence level used for the best fit line.

__12. **Save** the dashboard.

5.3 Pattern and Relationship Detection

Cognos Analytics has a wide variety of AI capabilities which include several visualizations for advanced analysis. These include the Sunburst, Decision Tree, and Driver Analysis visualizations.

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 sales. This information can be used to develop marketing programs, pricing strategy and target markets. You can easily identify patterns by adding advanced visualizations to the dashboard to surface data relationships. You select your target, in this case your Product Line field, to uncover insights regarding potential insights, patterns and relationships influencing sales.

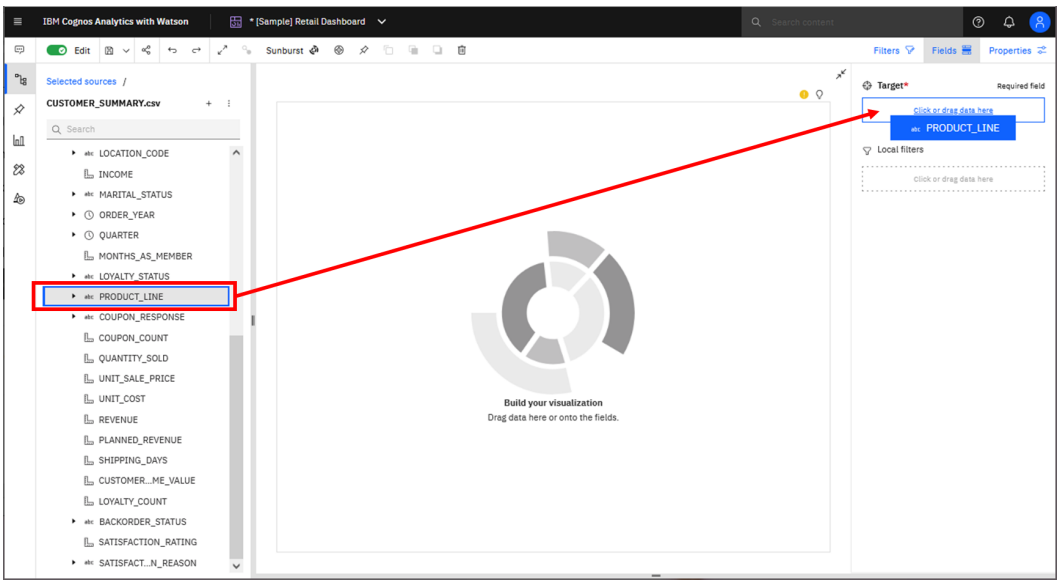
To begin, you would like to understand the underlying drivers related to product line. You are interested in finding patterns in the buyer's attributes so that you can better target customers with a high propensity to buy.

__1. From the Navigation panel, click **Visualizations**.

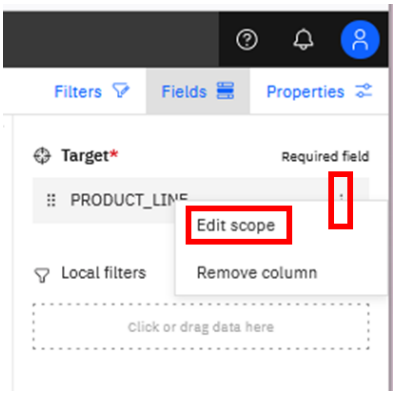
__2. Scroll down and click **Sunburst**. It will be automatically added to Panel 2 in a maximized state to fill the panel.

__3. Click the **Expand** icon in the upper right corner of the visualization.

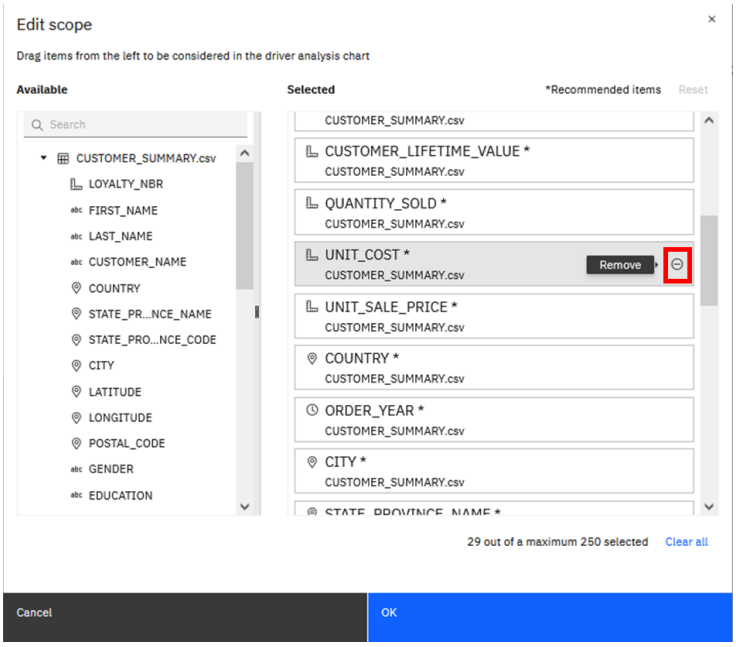
__4. From the **Sources** panel, drag **Product Line** and drop it on the **Target** slot.



__5. Click the **ellipsis** icon to the right of Product line and select **Edit scope**.



__6. 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 can remove some irrelevant measures from the analysis. In the Selected list, scroll down and use the **Remove** button for **Unit Cost** and **Unit Sale Price.**

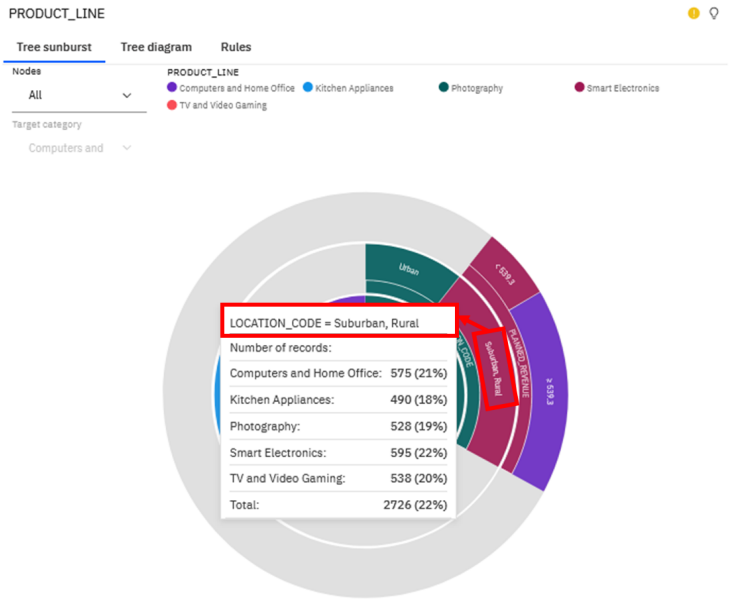


__7. Click **OK**.

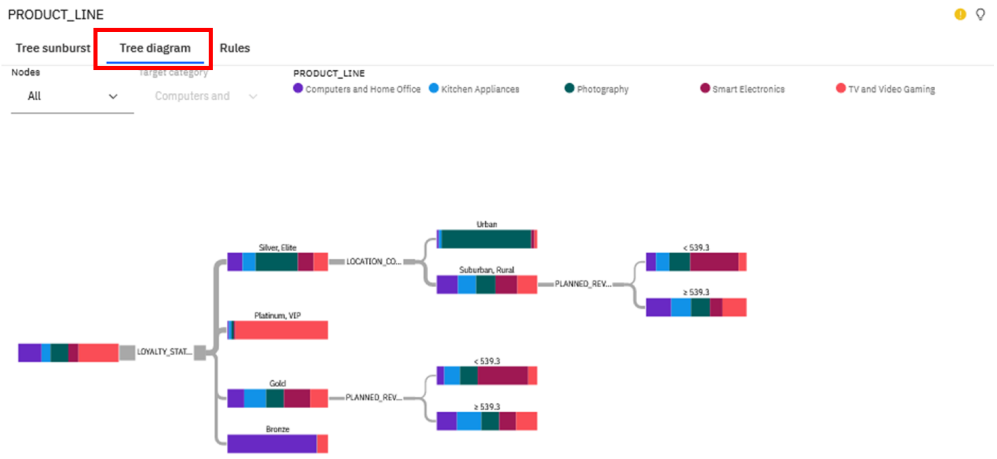
__8. Close the **Fields** panel.

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.

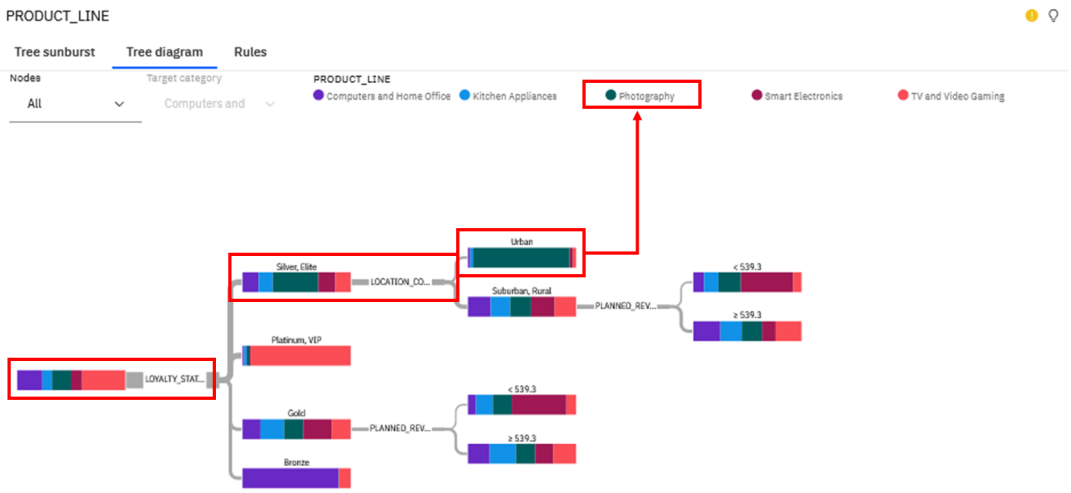
__9. Hover over the section labeled **Rural, Suburban**. The tooltip shows the percentage breakdown by product line for buyers in rural and suburban areas.



__10. Click the **Tree diagram** tab of the visualization. The Tree Diagram provides a decision tree view of the results. In reading left to right, you can see the relationships between Loyalty Status and Location Code.

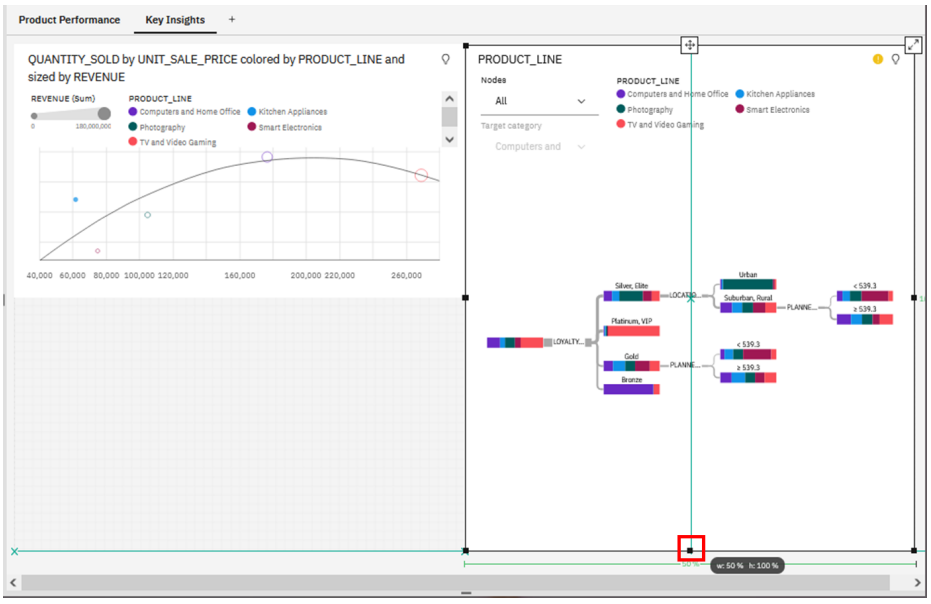


__11. In following the flow of the diagram from left to right, you see that most customers in loyalty tiers of Silver and Elite are from urban areas, purchasing Photography items. This information would provide support for marketing campaigns for this product line, targeting billboards and signage at bus/train terminals in urban areas.



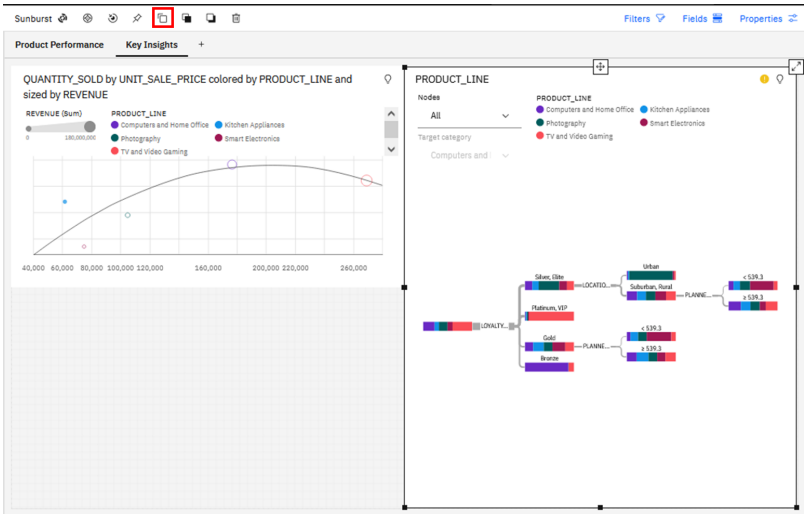
__12. Click the **Collapse** button on the upper right corner of the visualization.

__13. Use the **Resize** button at the bottom center of the visualization to resize the visualization to cover panels 2 and 4.



When working with a visualization such as the Sunburst that provides multiple views, you may wish to have more than one rendered on your dashboard. Cognos Analytics makes this easy by allowing you to duplicate a widget, so you do not have to build out the same visualization multiple times.

__14. With the Decision Tree widget on panels 2 and 4 in focus, click the **Duplicate** button on the context toolbar.



A duplicate of the widget is generated and placed slightly offset over the original. You can now move this widget around on the dashboard.

__15. Using the **Move Widget** button at the top center of the widget, drag the widget to panel 3, dropping when the drop zone turns blue.

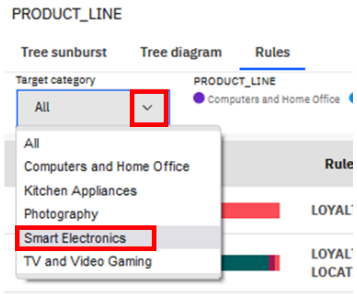
Next, you want to see the decision rules that drive the product line sales, specifically those for Smart Electronics.

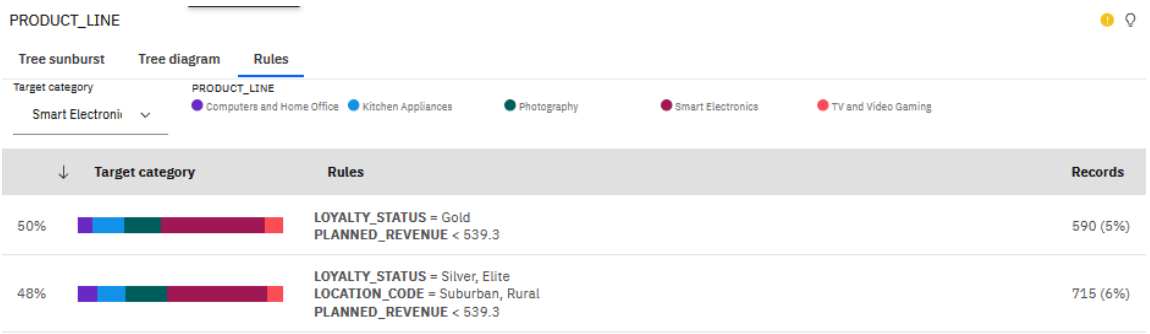
__16. Click the **Expand** icon in the upper right corner of the visualization to maximize the widget.

__17. Click the **Rules** tab. Decision rules provide plain language explanations of the individuals who are buying your product lines.

This default view shows all rules based on the patterns identified in the data. Now you wish to look at the individual product lines to get more insight.

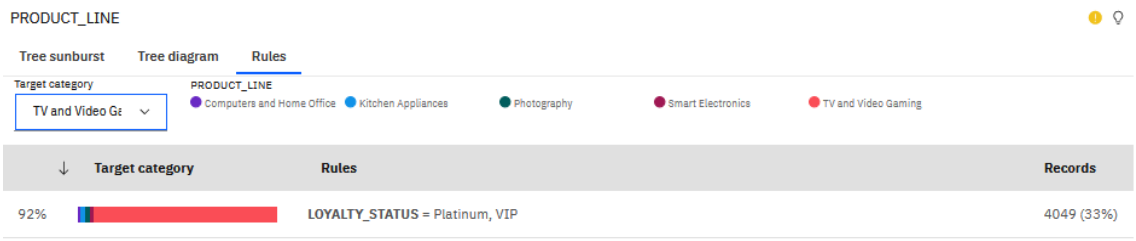
__18. To change the Target category, use the **down arrow** and select **Smart Electronics**.





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

__19. Change the Target category to **TV and Video Gaming**.



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

__20. **Collapse** the visualization.

__21. Your dashboard should now look similar to the following:

__22. **Save** the dashboard.

Congratulations! You've completed your first set of dashboards and used AI to uncover patterns, relationships, and new insights in your data.

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