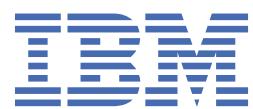


IBM Cognos Analytics  
Version 11.1.0

*Dashboards and Stories User Guide*





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# Chapter 1. Get started with Dashboards and Stories

IBM® Cognos® Analytics provides dashboards and stories to communicate your insights and analysis. You can assemble a view that contains visualizations such as a graph, chart, plot, table, map, or any other visual representation of data.

## Creating a dashboard or story

If you're new to dashboards and stories, review the following steps to understand the general workflow to create a view.

1. Click +, and click **Dashboard**, or click **Story**.
2. Select a template. Cognos Analytics provides templates that contain predefined layouts and grid lines for easy arrangement and alignment of the visualizations in a view.
3. Add visualizations to your view in one or more of the following ways:
  - If you know the type of visualization you want to use, select the visualization type and then add columns to it.
  - If you know the data that you want to see, but are not sure about how to present it, click  and add a source to the **Selected sources** pane. Then, drag columns onto the canvas. Cognos Analytics displays them in the appropriate visualization.
  - Drag your collected visualizations from the My pins panel to quickly build a story.
4. Limit the data that is displayed by filtering in one or more of the following ways:
  - You can filter individual visualizations or on all visualizations in the view.
  - You can even filter on a column that is not displayed in the visualization by using a context filter.
  - You can select a specific value or a range of values.
5. Enhance your view and draw attention to visualizations by adding media, web pages, images, shapes, and text.
6. Personalize your view by changing the theme. You can choose from default, light, or dark themes. You can also customize specific visualization properties such as fill and border color, and opacity.
7. Create more meaningful or complex visualizations by adding columns to an existing visualization. Drag another column onto a visualization and it changes to match the new data added.
8. You can undo and redo your last actions in succession. The ability to undo and redo previous actions is available until you close the view.
9. Test the view.



# Chapter 2. Dashboards

---

Explore powerful visualizations of your data in IBM Cognos Analytics and discover patterns and relationships that impact your business. Then, communicate the insights that you discovered in a dashboard and share it with others.

## Cognos Analytics dashboards: a tutorial

---

IBM Cognos Analytics integrates reporting, modeling, analysis, exploration, dashboards, stories, and event management so you can understand your organization's data, and make effective business decisions.

This tutorial shows you the basics of creating a dashboard.

### Scenario for the tutorial

In this tutorial, you're a Human Resources manager who has been given a big project – you'll be leading a new training initiative for your entire global company. You want to better understand where the training budget is currently invested in all areas of the company because at this moment, you just know how it's spent in your area of the company.

## Uploading data

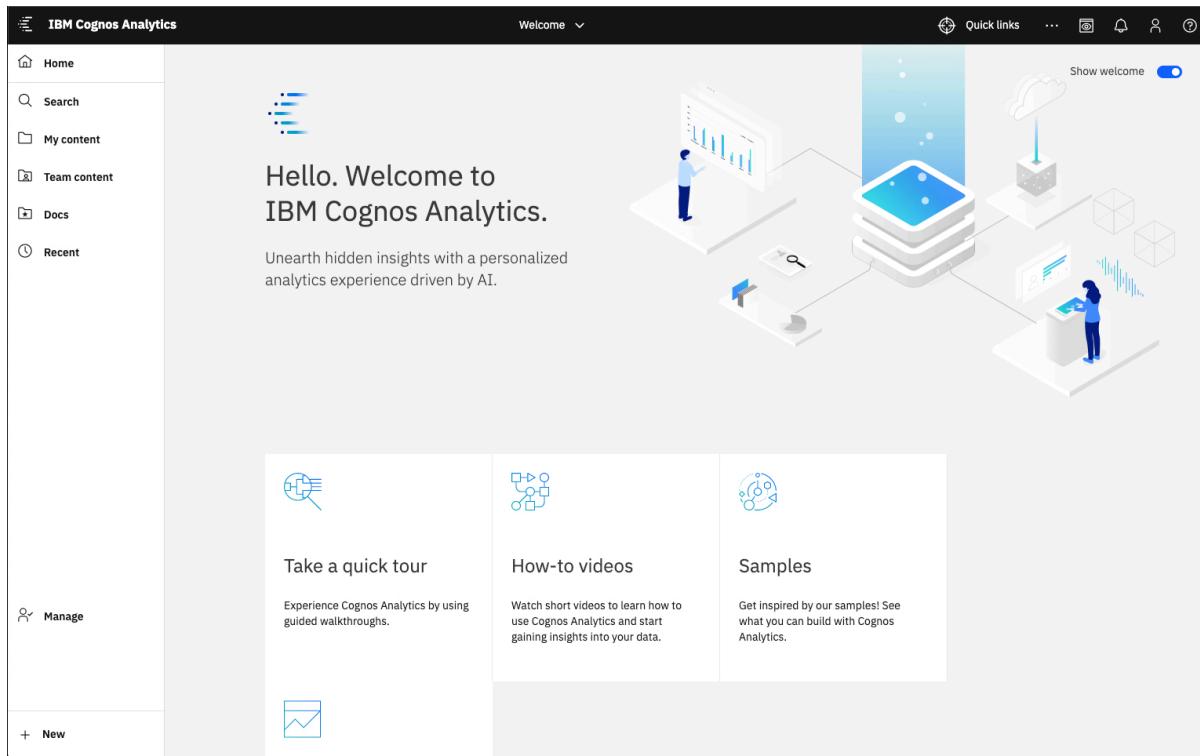
Let's start by getting data for the tutorial.

### Procedure

1. Go to [the IBM\\_HR\\_Training\\_2014-17.csv.](#)  
([https://www.ibm.com/support/knowledgecenter/SSEP7J\\_11.1.0/com.ibm.swg.ba.cognos.ug\\_ca\\_dshb.doc/IBM\\_HR\\_Training\\_2014-17.csv](https://www.ibm.com/support/knowledgecenter/SSEP7J_11.1.0/com.ibm.swg.ba.cognos.ug_ca_dshb.doc/IBM_HR_Training_2014-17.csv))
2. Depending on your browser, you may be asked what you want to do with it. Click **Save**.
3. In Cognos Analytics, click **Browse**.

You can also click the **New** icon and then click **Upload files**.





4. Go to where you saved "IBM\_HR\_Training 2014-17.csv" and select it.

The data asset appears in the **My content** folder.

**Note:** You can refine the data by filtering it or changing the properties. However, we won't refine it in this tutorial.

5. Click **OK**.

## Creating a dashboard

You can explore your data and easily communicate the analysis and insights that you discover.

### Procedure

1. On the home page, click the **New** icon at the bottom of the window.



2. Click **Dashboard**.

 Upload files

 Data module

 Exploration

 Notebook

 Dashboard

 Report

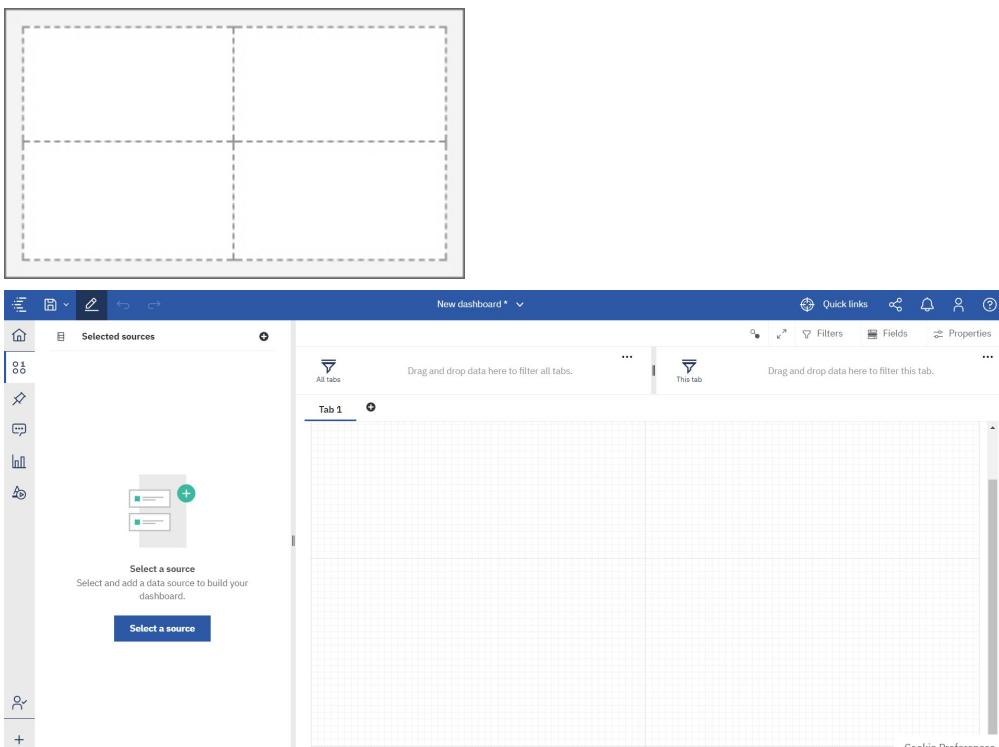
 Story

 Job

 Other

3. You see predefined templates that contain grid lines for easy arrangement and alignment of visualizations and other elements in a dashboard.

Select the template with 4 panes and then click **OK**.



4. Let's add a data asset to this dashboard so that we can explore its data.

a) In the **Data** panel, click the **Add a source** icon.

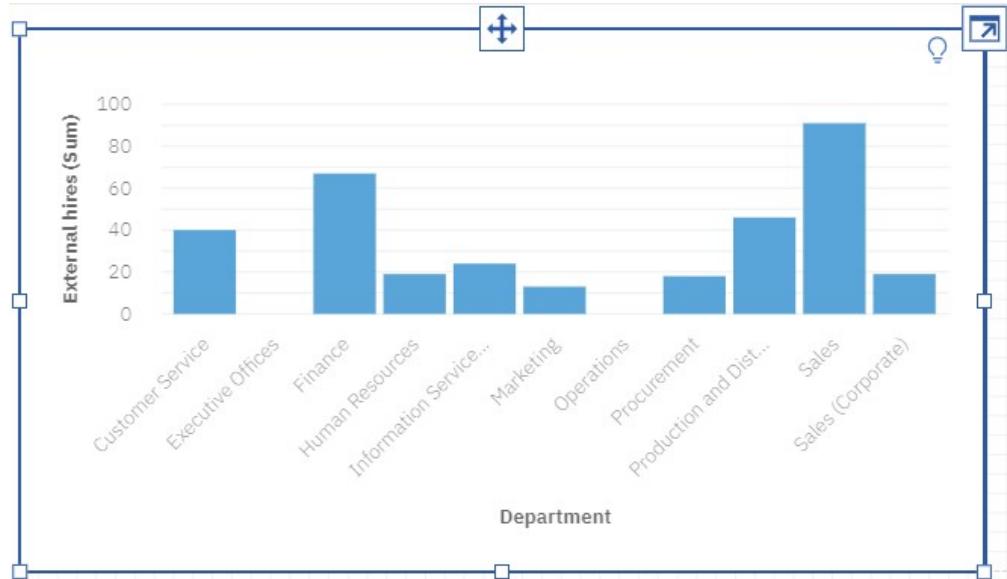


- b) Go to the **My content** folder and select "IBM\_HR\_Training\_2014-17.csv". Click **Add**.
5. Let's explore the data by adding a visualization to the dashboard.
- a) Drag "Department" to the top left pane and drop it on the square that appears in the pane.



You now see a list of departments.

- b) Drag "External hires" to the canvas and drop it on the "Department" list. In the column visualization, you see that the Sales departments hire the most external people followed by the Finance departments.



6. Let's change the visualization type.
- a) Click any white space in the column visualization. A toolbar appears.
- 
- b) Click the **Change visualization** icon in the toolbar.
- 
- c) Click **All visualizations**.

d) Click the **Packed bubble** icon.



7. Let's add a second visualization, using a different way to create a visualization.

a) Click the **Visualizations** icon in the side panel.



b) Click the **Tree map** icon.



An empty tree map is created with empty data fields on the side, indicating where you need to add data.

c) Click the **Sources** icon.



A screenshot of the Power BI desktop interface. On the left, the 'Fields' pane is open, listing various data sources and their fields. A 'Required field' section on the right lists 'Area hierarchy \*' and 'Size \*'. The main workspace shows a 'Tab 1' with a 'Packed bubble' visualization and an empty 'Tree map' visualization. The ribbon at the top includes 'New dashboard \*', 'Quick links', 'Filters', 'Fields', and 'Properties'.

d) Drag "Organization" to the **Area hierarchy** field.

e) Drag "Course cost" to the **Size** field.

f) Close the **Fields** panel for more room for the visualizations.

A screenshot of the Power BI desktop interface with the 'Fields' pane closed. The main workspace now has two visible visualizations: a 'Packed bubble' visualization on the left and a 'Tree map' visualization on the right. The 'Tree map' visualization displays hierarchical data with color-coded categories. The ribbon at the top remains the same.

8. Let's hide the legend to have more room for the tree map.

a) Select the tree map visualization.

b) Click the **Properties** icon.



- c) Click **Legend** and clear the **Show legend** check box.

Take a look at the visualization. The size of each box in the tree map tells you the amount of training spent by each organization.

9. You have two more panes where you can create more visualizations or add widgets such as text or shapes.

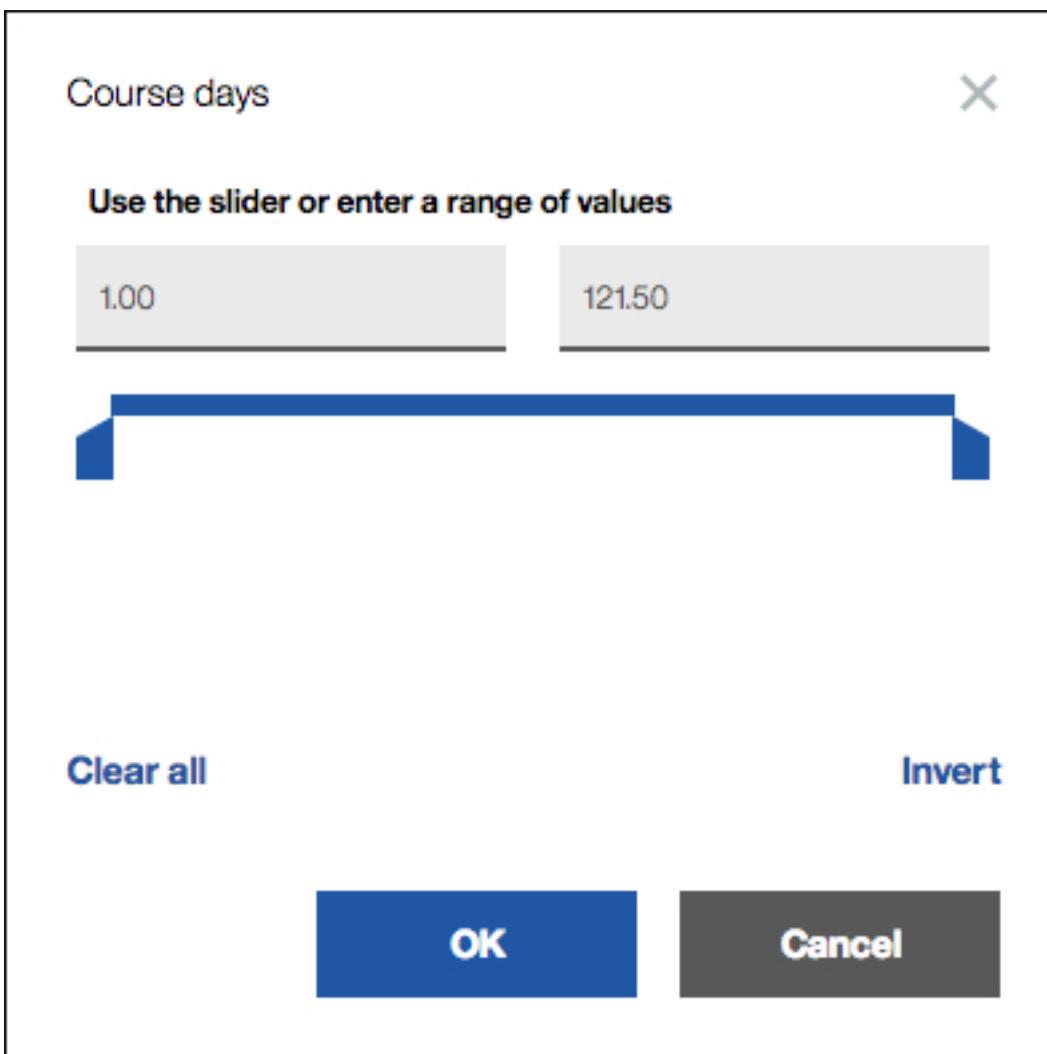
10. Let's add a filter to see the impact of the duration of courses on the visualizations.

- a) Click the **Sources** icon.

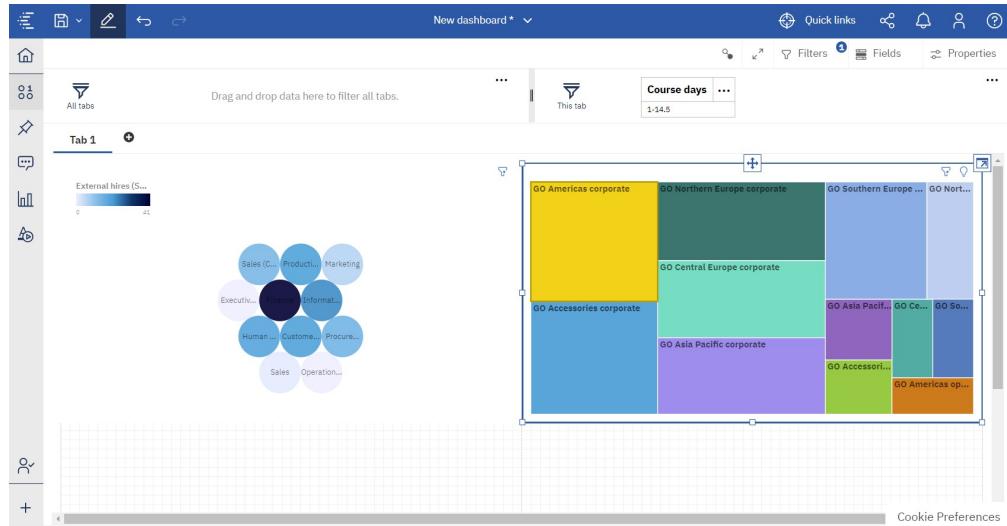


- b) Drag "Course days" to the **This tab** filter area.

- c) To define the filter, click **Course days** in the filter area.

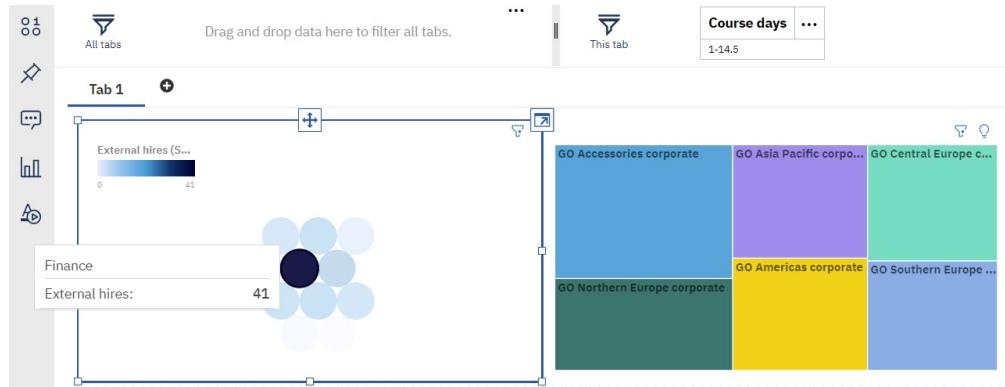


- d) Move the slider to show courses with a shorter duration, or type a new end point. We picked 14.5 as the end point but feel free to select a different one. Click **OK**.

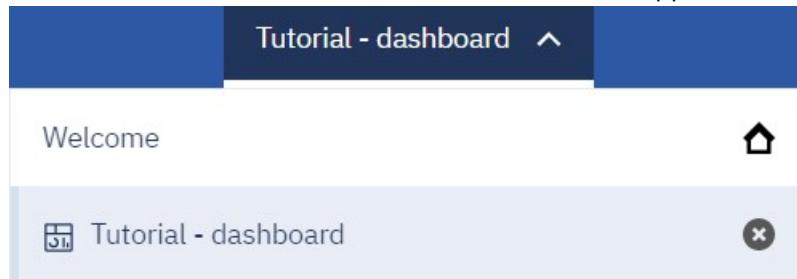


11. Another way to filter data is to select one or more data points in a visualization and see the impact on the other visualizations. Click "Finance" in the packed bubble visualization.

Take a look at the tree map visualization. It doesn't contain the Department column so it is filtered by the Finance department.



12. Save the dashboard and then use the switcher in the app bar to close it.



## What's next in Cognos Analytics?

Let's recap: you learned how to upload data, you created visualizations that showed you new insights about your data, and you filtered data in several different ways. Now you can start exploring your own data.

### What else can you do with the dashboard?

You can enhance the dashboard that you created. Here are a few ideas:

- Use text widgets to annotate the dashboard with descriptions.
- Provide more info by adding media and links to web pages.

- Format the dashboard, such as changing the colors or theme.
- Add images and shapes to add visual appeal.
- Create a story in your dashboard. A story consists of visualizations and an over-time narrative.
- Open a dashboard visualization in Explore to get advanced analytic insights and see relationships in your data.

## **Wait, there's more!**

There is much more you can do in Cognos Analytics:

- Build sophisticated, multi-page, multi-query reports against multiple databases.
- Use data modeling to access and shape data from data servers or uploaded files.
- Schedule activities.
- Manage content and manage the account.
- And more!

For more info, check out the **Help** menu.

## **Have fun!**

# **Creating a dashboard**

---

A dashboard helps you to monitor events or activities at a glance by providing key insights and analysis about your data on one or more pages or screens.

## **Procedure**

1. Click the **New** icon  and then click **Dashboard**.
2. Select a template to use and click **OK**.

Predefined templates contain grid lines for easy arrangement and alignment of visualizations and other elements. For example, you can create an infographic to convey information with pictures on one page that you scroll through.

## **Templates**

IBM Cognos Analytics provides templates that contain predefined designs and grid lines for easy arrangement and alignment of the visualizations.

When you create a new dashboard, choose a tabbed template to create a dashboard with multiple tabs or choose an infographic for a long, scrollable dashboard. You can also hide tabs on a tabbed dashboard if you want just one tab and less clutter on the screen.

## **Hiding the tab button**

If your dashboard has only one tab, you might find the single tab button to be unnecessary when you switch to preview mode. You can hide the tab button to create more space on the screen.

## **Procedure**

1. Open a tabbed dashboard that has only one tab.
2. On the app bar, click the **Properties** icon.  

3. Click **Tabs**.
4. Click the **Show tabs in preview** toggle to hide the tab button.

5. Click the **Edit or preview** icon to see preview mode with the tab hidden.

## Setting up the page in a dashboard

**11.1.0** You can setup your dashboard to create the layout you need for your business purposes.

### About this task

You can set whether the layout positioning is relative or absolute.

When you choose a layout style, consider the screen size of the device that will be used to view the dashboard.

You can define the page size or select the page size from a number of presets.

If you choose absolute layout positioning, the objects retain their size and position, regardless of the screen size of the device that they are being viewed in. For small screen sizes, absolute positioning can increase the need for scrolling because objects are larger than the screen. Absolute positioning results in one large area that is not divided into sections. Choose absolute if you want visualizations to appear exactly as you size and place them, regardless of the screen size of the device that they are viewed in.

The option **Fit page** resets the view of the dashboard to fit your screen. When you select absolute layout positioning, then the option **Fit page** is not available.

If you choose relative layout positioning, the objects adjust their size and position, relative to each other, the data they show, and the screen size of the device that they are viewed in. Select relative layout positioning if you want the size and position of visualizations to adjust to fit into the screen size of the device that they are viewed in. The appearance of the dashboard can change depending on the size of the screen that it is viewed in.

### Procedure

1. Open a dashboard.
2. On the app bar, click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. Under **Canvas**, select a relative or absolute layout positioning.
4. Under **Page size** select the page size from the **Preset** menu or specify the width and height yourself. Optionally select the **Fit page** option.

## Changing the template on a tabbed dashboard

You can change the template while you're assembling a tabbed dashboard. After you change the template, move the objects around to fit.

### Before you begin

If there are no tabs on your dashboard, open the dashboard properties, expand the **Tabs** menu, and click **Show tabs**.

### Procedure

1. On a dashboard, select a tab and then click the selected tab.
2. Click the **Change template** icon.



3. Select a template.

## Creating a custom template

Create custom templates to use to quickly create new dashboards.

### About this task

You can create templates that have color palettes and styles that match your company branding and standards. Complete the following steps to create a custom template:

### Procedure

1. Open a dashboard or create a new dashboard.
2. Click the down arrow beside the **Save** icon.



3. Select **Save as a template**.
4. Browse to a folder location to save the template, and click **Save**.

### Using a custom template

After you create a custom template, you can use the custom template to create a new dashboard.

### Procedure

1. Click **New** +.
2. Click **Dashboard**.
3. From the **Select a template** page, click **Custom**.

#### Select a template



4. Select a thumbnail from the **Custom template** list.
5. Click **Create**.

A new dashboard opens with chart types, colors, placement, and other formatting.

6. Select a data source and build your dashboard.

## Editing or deleting a custom template

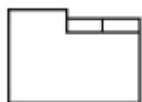
You can edit or delete your custom templates.

### Procedure

1. Click **New** .
2. Click **Dashboard**.
3. From the **Select a template** page, click **Custom**.

#### Select a template

Layout



Tabbed



Infographic



Custom

4. Click the **More** menu on a custom template thumbnail and click **Edit** or **Delete**.

#### Custom template



Template: Customer Lifetime Value

My content

## Customizing tabs

Customize tab styling for individual tabs or for all the tabs in your dashboard. You can move the tabs to the top, left, bottom, or right of your dashboard and you can add icons to your tabs.

### Customizing tab styling for individual tabs

**11.1.5** For individual tabs on your dashboard, you can change the tab title color, the bar under the title that indicates which tab is selected, and the tab fill color.

#### Procedure

1. Open a dashboard that has at least one tab.
2. On the app bar, click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. Click **Tabs**.
4. Under **Individual tab styling**, select the tab that you want to customize.
5. Select a color for the tab title.
6. Select a color for the bar under the tab title that indicates which tab is selected.
7. Select a fill color for this tab.

**Tip:** You can also click **Select custom color** to open the color picker instead of choosing from the default color options.

### Customizing tab styling for all tabs

**11.1.5** At a global level for all tabs on your dashboard, you can change the tab title color, the bar under the title that indicates which tab is selected, and the tab fill color.

#### Procedure

1. Open a dashboard that has at least one tab.
2. On the app bar, click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. Click **Tabs**.
4. Under **Master tab styling**, select a color for tab titles.
5. Select a color for the bar under the tab title that indicates which tab is selected.
6. Select a fill color for the tabs.

**Tip:** You can also click **Select custom color** to open the color picker instead of choosing from the default color options.

### Changing tab position

**11.1.5** You can move the tabs to be displayed on the top, left, bottom, or right of your dashboard.

#### Procedure

1. Open a dashboard that has at least one tab.

2. On the app bar, click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. Click **Tabs**.

4. From **Tab position**, select **Top**, **Left**, **Bottom**, or **Right**.

## Adding icons to tabs

**11.1.5** You can add icons to your tabs and control the placement and color of the icons.

### Procedure

1. Open a dashboard that has at least one tab.

2. On the app bar, click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. Click **Tabs**.

4. Under **Individual tab styling**, select the tab that you want to add an icon to.

5. Under **Visual**, select an icon.

6. Select a color for the icon.

7. Click **Back** on the properties pane.

8. Under **Tabs**, select the position of the icon on the tab, relative to the title, for example, **Right of title**.

## Snapping objects to a grid and to each other

**11.1.0** You can display a grid on your dashboard or story to help you place objects exactly where you want them. You can snap objects to the grid and snap objects to each other.

### Procedure

1. On the app bar, click the **Properties** icon.



2. If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. For the entire dashboard or story, ensure that nothing else has focus by clicking the background, away from any visualization or object.

4. On the **General** tab, open **Canvas**.

5. In the **Grid** section, complete one or more of the following actions:

Goal	Action
Show or hide the grid on the canvas	Set the <b>Show grid</b> option to on or off. This option is on by default for dashboards that are created in the current release.
Snap objects to the grid on the canvas	Set the <b>Snap to grid</b> option to on or off. This option is on by default for dashboards that are created in the current release.

Goal	Action
Snap objects to each other	Set the <b>Snap to objects</b> option to on or off. This option is on by default.

## Creating a visualization in a dashboard

While you assemble a dashboard, you might realize that you need another visualization. You can create one in the dashboard.

### Procedure

1. Click **Sources**.



If you don't see the **Sources** icon, click the **Switch to edit** icon.



2. In the **Selected sources** pane, expand the data asset that you want to use.

If a different data asset is open, click the **Go back** icon next to the name of the data asset that is open.



3. To create the new visualization, complete one of the following actions:

- Drag a column onto the canvas.

IBM Cognos Analytics creates a visualization to match the column. For example, when you add Year or Department, a table is created. Drag in a measure, such as Revenue, and a bar visualization is created.

- Click **Visualizations** and select a type. Then, add a column to each data slot.



## Creating a visualization using drop zones

You can drag data directly onto a visualization to quickly build a visualization.

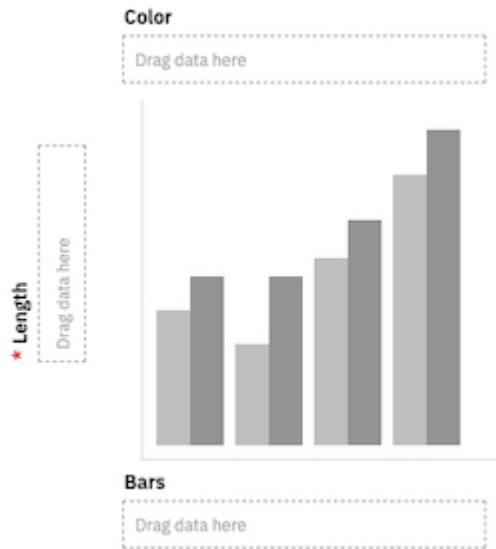
### About this task

To quickly create a visualization, start with a blank visualization.

### Procedure

1. Click **Visualizations**  and select a type.

The visualization is displayed on the dashboards with drop zones and without data.



2. Drag data from the **Sources** pane to the **Drag data here** drop zones.

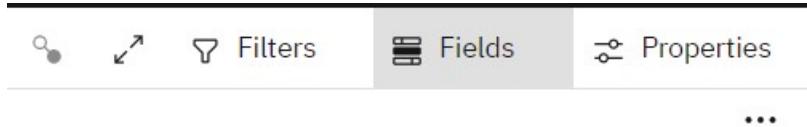
## Creating a visualization using search in data fields

You can quickly build a visualization that uses search in data fields.

### Procedure

1. Click **Visualizations**  and select a type.  
The visualization is displayed on the dashboards without data.
2. Click **Fields** and search for the data you are looking for. Click the data to populate the data field.

## Results



## Sharing content

If an administrator connects Cognos Analytics to Slack or enables email sharing, you can send Cognos Analytics report and dashboard content to other users. You can also share your Cognos Analytics content via URL links and embedded html in web pages. For Dashboards only, you can save your content as an exported PDF document.

You can share content from two locations:

- your [Cognos Analytics canvas](#)
- the [Team content folder](#)

### Sharing content from the canvas

In Cognos Analytics, you can send Cognos Analytics content that you are currently viewing on your Reporting or Dashboard canvas to your colleagues via [Email](#) or [Slack](#).

For more information, see the Blog post [Increased Collaboration with Slack Integration in IBM Cognos Analytics 11.1!](#)

### Before you begin

Your administrator must configure a mail server and/or a collaboration platform before you can use this feature.

## Procedure

1. While viewing your Cognos Analytics content in the Reporting or Dashboard component, click the **Share** icon  in the application bar that appears at the top of your Cognos Analytics window.

**Tip:** A different **Share** icon  appears in a context menu, after you click the More icon \*\*\* for a content folder or on the **Welcome** page. However, the **Share** panel that you invoke from a context menu only allows you to share saved report outputs or dashboards. To share an image of an asset that is open and that you are currently viewing, you must click the **Share** icon  in the application bar.

2. In the **Share** panel, click the **Send** tab.

**Tip:** If the **Send** tab does not appear, the administrator did not configure a mail server and did not configure a collaboration platform.

3. Click one of these platforms:

- **Email** - go to step “4” on page 19.

**Tip:** If **Email** does not appear as a platform, your administrator did not enable content sharing by email.

- **Slack\_platform\_name** - go to step “5” on page 19.

**Tip:** If a **Slack** platform appears grayed out, your administrator has disabled the platform. If you are not part of a slack workspace, you can join it through the pop-up window and then click on the workspace again in Cognos Analytics to continue sharing your content.

4. If you selected **Email**, in the **Share with email** panel, perform these steps:

- a) Search for a recipient name, group, role, distribution list, or contact and then click **Search directory**. Repeat this step as necessary.

### Tips:

- To add an external email address, enter the full address and then press Enter.
- If you start typing someone's name that you emailed recently, the full name quickly appears and you can select it.
- You can narrow the search results and speed up retrieval time by typing more characters in the recipient fields.
- Search results appear for all namespaces that you are logged into. You may need to scroll to see results for a different namespace.
- You can also browse for a recipient, by clicking **Directory > namespace**.

To quickly find an entry:

- Type text in the  **Find** field.

You can click the Search Method icon  to find entries that either contain, start with, or are an exact match with the text that you type.

- Click the filter  icon to narrow the view of entries.

- b) Enter the email subject.

- c) Enter the message that you want to send.

**Tip:** To format your message, use the **Styles** and **Format** buttons.

5. If you selected **Slack\_platform\_name**, in the **Share with Slack: platform\_name** panel, perform these steps:

- a) Enter a channel or recipient name.

**Tip:** Start typing either a Slack channel name (starting with the hashtag symbol (#) or a Slack user name if you want to send a Direct Message in Slack. As you type, the list of possible choices is filtered, until you can select the one you want.

- b) Enter the message that you want to send.

**Tip:** You must include some text in your message.

6. Select **Include link** if you want your recipient to click a link to your content.

**Tip:** **Include link** appears only if your content is located in the **Team content** folder. Other users cannot link to content located in **My content**.

7. Select **Include image** if you want to attach an image of your content to your Email or Slack message.
8. If you selected the **Include image** option, you can go to the **Modify your image (optional)** pane on the left and edit the image before you send it.
9. Click **Send**.

## Results

Your message (and your image, if applicable) is sent to your selected recipients via email or Slack.

## ***Editing canvas content for sharing***

You can annotate a screen shot image of your Cognos Analytics content before you share it via email or Slack.

## Before you begin

Open a dashboard or report, go to the view that you want to edit, and then begin the steps to send a message via email or via Slack.

## Procedure

1. Go to the **Modify your image (optional)** pane on the left.

### Tips:

- As you annotate your image, the only way you can lose your changes is to click **Cancel** in the **Share with Slack** panel on the right. If you accidentally click the top or left toolbar, the **Modify your image (optional)** temporarily disappears. However, you can resume your editing where you left off by clicking the **Share** icon .
- Use the Expand button  to enlarge the **Modify your image** window and hide the **Share with Slack** or **Share with Email** panel. Use the Collapse button  to revert to the original view.

2. To add text, an arrow, or a freehand line to your image, follow these steps:
  - a) Go to the toolbar  of the **Modify your image (optional)** pane and click one of these icons:
    - The Textbox icon 
    - The Arrow icon 
    - The Pen icon 
  - b) Select a color.
  - c) Type your text or draw an arrow or line.
  - d) Click **Done**.
3. To add a rectangle to your image, follow these steps:
  - a) Go to the toolbar of the **Modify your image (optional)** pane and click the Rectangle icon .
  - b) Click the Border icon , and then select the border color.

**Tip:** If you previously selected a border color, the Border icon appears in that color.

- c) Click the Fill icon  , and then select the fill color.

**Tip:** If you previously selected a fill color, the Fill icon appears in that color.

- d) Hover over the image and click, drag, and then release to draw a rectangle.

- e) Click **Done**.

4. To edit any text, arrow, freehand line, or rectangle that you added, follow these steps:

- a) Ensure that you selected **Done** in the previous steps so that the Modify your image toolbar appears .

- b) Click on the image.

- c) To select an object, click on it.

A rectangle with drag handles appears around the object.

**Tip:** You can also press **Tab** successively to select each object that you created in the order that you created them. For more information, see “Keyboard commands to edit canvas content” on page 21.

- d) To move a selected object, move your cursor over the selected object so that the cursor changes to the Move cursor icon  and then drag the object to the position you want.

- e) To resize a selected object, select and drag one of its handles.

- f) To delete one or more selected objects, click the Delete icon .

- g) To delete every object that you added to the image, from the Modify your image toolbar , click **Clear**.

5. To crop your image, follow these steps:

- a) Go to the toolbar of the **Modify your image (optional)** pane and click the Crop icon .

- b) On the image, click, drag, and then release to draw a highlighted rectangle over the area that you want to crop.

- c) Click **Done**.

6. If necessary, complete any remaining steps to send a message via email or Slack.

## Results

Your message and edited Cognos Analytics content are shared with the Slack recipients that you selected.

### Keyboard commands to edit canvas content

You can use keyboard shortcuts as an alternative way to invoke a command by pressing a combination of keyboard keys.

The following tables list keyboard shortcuts to edit an image on your canvas that you plan to share with your colleagues.

PC keyboard command	Macintosh keyboard command	Description
t	t	Activate the Textbox Tool
a	a	Activate the Arrow Tool
p	p	Activate the Pen Tool
r	r	Activate the Rectangle Tool
c	c	Activate the Crop Tool
q	q	Rotate object(s) clockwise 10 degrees

<b>PC keyboard command</b>	<b>Macintosh keyboard command</b>	<b>Description</b>
Shift + Q	Shift + Q	Rotate object(s) counter-clockwise 10 degrees
Delete/Backspace	Delete	Delete object(s)
[	[	If the active select object is a textbox, shrink the word-wrapped area horizontally by 5 px.
Shift + {	Shift + {	If the active select object is a textbox, shrink the word-wrapped area horizontally by 50 px.
]	]	If the active select object is a textbox, expand the word wrapped area horizontally by 5 px.
Shift + }	Shift + }	If the active select object is a textbox, expand the word wrapped area horizontally by 50 px.
Ctrl + z	Ctrl + z / Command + z	Undo Previous Action
Ctrl + y	Ctrl + y / Command + y /	Redo Previous Action
Escape	Escape	Close Entire Panel

<b>PC keyboard command</b>	<b>Macintosh keyboard command</b>	<b>Description</b>
Tab	Tab	Move the tool selection on the toolbar from Left to Right one at a time. If you press Tab on the final tool (for example, Clear/Done) the focus moves from the toolbar to the image.
Shift + Tab	Shift + Tab	Move the tool selection on the toolbar from Right to Left one at a time. Pressing Shift + Tab on the First tool moves the focus from the toolbar to the parent element.
Enter	Enter/Return	Activate the selected tool/color

<b>PC keyboard command</b>	<b>Macintosh keyboard command</b>	<b>Description</b>
Up Arrow	Up Arrow	Scroll the image up (If applicable)
Down Arrow	Down Arrow	Scroll the image down (If applicable)
Left Arrow	Left Arrow	Scroll the image left (If applicable)

<b>PC keyboard command</b>	<b>Macintosh keyboard command</b>	<b>Description</b>
Right Arrow	Right Arrow	Scroll the image right (If applicable)
Up Arrow	Up Arrow	Move the selected Object(s) up by 5 px.
Down Arrow	Down Arrow	Move the selected Object(s) down by 5 px.
Left Arrow	Left Arrow	Move the selected Object(s) left by 5 px.
Right Arrow	Right Arrow	Move the selected Object(s) right by 5 px.
Shift + Up Arrow	Shift + Up Arrow	Move the selected Object(s) up by 50 px.
Shift + Down Arrow	Shift + Down Arrow	Move the selected Object(s) down by 50 px.
Shift + Left Arrow	Shift + Left Arrow	Move the selected Object(s) left by 50 px.
Shift + Right Arrow	Shift + Right Arrow	Move the selected Object(s) right by 50 px.
Shift + Alt + Up Arrow	Alt + Up Arrow	Scale the selected Object(s) up by 5 px. Bottom Right Corner is selected for scaling.
Shift + Alt + Down Arrow	Alt + Down Arrow	Scale the selected Object(s) down by 5 px. Bottom Right Corner is selected for scaling.
Shift + Alt + Left Arrow	Alt + Left Arrow	Scale the selected Object(s) left by 5 px. Bottom Right Corner is selected for scaling.
Shift + Alt + Right Arrow	Alt + Right Arrow	Scale the selected Object(s) right by 5 px. Bottom Right Corner is selected for scaling.
Shift + Alt + Up Arrow	Shift + Alt + Up Arrow	Scale the selected Object(s) up by 50 px. Bottom Right Corner is selected for scaling.
Shift + Alt + Down Arrow	Shift + Alt + Down Arrow	Scale the selected Object(s) down by 50 px. Bottom Right Corner is selected for scaling.
Shift + Alt + Left Arrow	Shift + Alt + Left Arrow	Scale the selected Object(s) left by 50 px. Bottom Right Corner is selected for scaling.
Shift + Alt + Right Arrow	Shift + Alt + Right Arrow	Scale the selected Object(s) right by 50 px. Bottom Right Corner is selected for scaling.
Tab	Tab	Press successively to select each object that you created in the order that you created them. If

<b>PC keyboard command</b>	<b>Macintosh keyboard command</b>	<b>Description</b>
		the final object is already selected, hitting Tab will move focus from the image to the Share Panel.
Shift + Tab	Shift + Tab	Press successively to select each object that you created in the order that you created them. If the first object is already selected, hitting Shift + Tab will move the focus from the image to the toolbar.
Enter	Enter/Return	Enter Textbox Editing Mode if the active select object is a textbox.
Escape	Escape	Deselect any active object. If the selected object is a textbox and is currently in Textbox Editing Mode, it exits Textbox Editing Mode.
Escape	Escape	Deselect the active object and stop drawing. If the active select object is a textbox, exit Textbox Editing Mode
Enter	Enter/Return	Begin drawing an object with the virtual cursor by simulating a mouse down event.
Enter	Enter/Return	End drawing an object with the virtual cursor by simulating a mouse
Up Arrow	Up Arrow	Move the Virtual Cursor up by 5 px.
Down Arrow	Down Arrow	Move the Virtual Cursor down by 5 px.
Left Arrow	Left Arrow	Move the Virtual Cursor left by 5 px.
Right Arrow	Right Arrow	Move the Virtual Cursor right by 5 px.
Shift + Up Arrow	Shift + Up Arrow	Move the Virtual Cursor up by 50 px.
Shift + Down Arrow	Shift + Down Arrow	Move the Virtual Cursor down by 50 px.
Shift + Left Arrow	Shift + Left Arrow	Move the Virtual Cursor left by 50 px.
Shift + Right Arrow	Shift + Right Arrow	Move the Virtual Cursor right by 50 px.

## **Exporting a dashboard to PDF**

You can create a PDF of your dashboard to print or to share electronically.

### **Before you begin**

Before you export your dashboard to PDF, consider the following points:

- Keep the default print margins in your browser print window.
- What you see that on your screen is what you see on the PDF output. For example, a large screen displays more rows in a table than a small screen and this difference is captured in the PDF.
- Ensure that your printer device driver is set to use the maximum resolution.
- Use print preview to see what your PDF looks like before printing.

**Tip:** To get the best PDF output results, you might need to try a different web browser such as Google Chrome.

### **About this task**

Because each web browser handles printing differently, depending on which browser and operating system that you are using, you must select particular settings in the print window. When you export a dashboard to PDF, refer to the steps below for more details for your specific browser and OS.

### **Procedure**

1. Open a dashboard.
2. If you are in edit mode, click the **Switch to preview** icon to switch to preview mode.  

3. On the app bar, click the share icon.  

4. Select the **Export** tab.
5. Select a page size and orientation.
6. To include a list of the filters that are applied to your dashboard, select **Include filters**.
7. Click **Export**.

**Important:** The Cognos Analytics dialog for page size and orientation is the first step to properly formatting your dashboard to export to PDF. The print window for the browser is where you must ensure that the page size and orientation are properly set.

The print window for the browser opens.

8. Ensure the settings in the print window for the browser match the **Export to PDF** options that you selected.  
For example, if you selected the **Portrait** orientation in the IBM Cognos Analytics user interface, before you print the PDF, ensure that the print window for your browser is set to **Portrait**.

**Note:** If you select the **Tabloid** page size, some browsers label this page size as 11x17.

### **What to do next**

The generated PDF should look like your dashboard. However, you might see some small differences. For detailed instructions for your specific browser and OS, see the following instructions:

[Windows 10, Browser: Chrome, Print Destination: Microsoft Print to PDF](#)

[Windows 10, Browser: Firefox, Print Destination: Microsoft Print to PDF](#)

[Windows 10, Browser: Internet Explorer, Print Destination: Microsoft Print to PDF](#)

[Windows 8, Browser: Firefox or Internet Explorer, Print Destination: Adobe Acrobat Print to PDF](#)

[macOS or iOS, Browser: Safari](#)

[macOS, Browser: Chrome](#)

[macOS, Browser: Firefox](#)

*Windows 10, Browser: Chrome, Print Destination: Microsoft Print to PDF*

Complete the following steps if you are exporting a dashboard to PDF using Chrome on Windows.

## Procedure

1. In the print window for the browser, select the print destination: **Microsoft Print to PDF**.
2. In the **Print** dialogue, expand **More settings**.
3. From the **Paper size** list, select the page that matches the **Paper size** you selected from the IBM Cognos Analytics **Export to PDF** dialogue. The page orientation is automatically selected.
4. Ensure **Background graphics** is cleared.
5. Click **Print** to export your file to PDF.

*Windows 10, Browser: Firefox, Print Destination: Microsoft Print to PDF*

Complete the following steps if you are exporting a dashboard to PDF with Firefox on Windows.

## Procedure

1. From the Firefox application bar, select the **Open** menu and select **Print**.
2. Click **Page Setup**.
3. From the **Page Setup** dialogue, ensure **Print Background (colors & images)** is selected and **Shrink to fit Page Width** is cleared.  
**Note:** Do not adjust the default margins in the **Margins & Header/Footer** tab.
4. Click **OK**.
5. On the IBM Cognos Analytics app bar, click the more icon.
6. If you don't see the more icon, click the **Switch to preview icon** to switch to preview mode first.
7. Select **Export to PDF**.
8. Select a page size and orientation, and then click **OK**.

The print window for the browser opens.

9. Select the print destination: Microsoft Print to PDF.
10. From the print window for the browser, click **Properties**.
11. From the **Microsoft Print to PDF Document Properties** dialogue, click the **Orientation** drop-down and select the value that matches the **Orientation** you selected in the IBM Cognos Analytics **Export to PDF** dialogue.
12. Click **Advanced**.
13. From the **Microsoft Print to PDF Advanced Options** dialogue, click the **Paper Size** drop-down and select the value that matches the **Page size** you selected from the IBM Cognos Analytics **Export to PDF** dialogue.
14. Click **OK**.
15. Click **OK** to close the **Microsoft Print to PDF Document Properties** dialogue.
16. Click **OK** to export your file to PDF.

*Windows 10, Browser: Internet Explorer, Print Destination: Microsoft Print to PDF*

Complete the following steps if you are exporting a dashboard to PDF with Internet Explorer on Windows.

## Procedure

1. In the print window for the browser, select the print destination: **Microsoft Print to PDF**.

- From the **Microsoft Print to PDF** dialogue, set the page size and orientation to match what you selected in the **Export to PDF** dialogue.
- Click **OK**.

*Windows 8, Browser: Firefox or Internet Explorer, Print Destination: Adobe Acrobat Print to PDF*  
**Microsoft Print to PDF** is not available with Windows 8 (or older). Therefore, you must install Adobe Acrobat DC or another print driver and add it as one of your print devices.

*macOS or iOS, Browser: Safari*

Complete the following steps if you are exporting a dashboard to PDF with Safari on macOS or iOS.

## Procedure

- In the print window for the browser, select the page size.

**Note:** If you selected the **Tabloid** page size in the IBM Cognos Analytics **Export to PDF** dialogue, select **11x17** in the macOS print window.

- From the print window for the browser, select the **Orientation** you selected in the IBM Cognos Analytics **Export to PDF** dialogue.
- Enable **Print backgrounds**.
- Enable **Print headers and footers**.
- From the **PDF** drop-down, select **Save as PDF**.
- Type a name, select a folder location, and click **Save** to save your PDF.

*macOS, Browser: Chrome*

Complete the following steps if you are exporting a dashboard with Chrome on macOS.

## Procedure

- In the print window for the browser, enable **Headers and footers**.
- Enable **Background graphics**.
- Click **Save**.
- Type a name, select a folder location, and click **Save** to save your PDF.

*macOS, Browser: Firefox*

Complete the following steps if you are exporting a dashboard with Firefox on macOS.

## Procedure

- From the print window for the browser, select the page size.

**Note:** If you selected the **Tabloid** page size in the IBM Cognos Analytics **Export to PDF** dialogue, select **11x17** in the macOS print window.

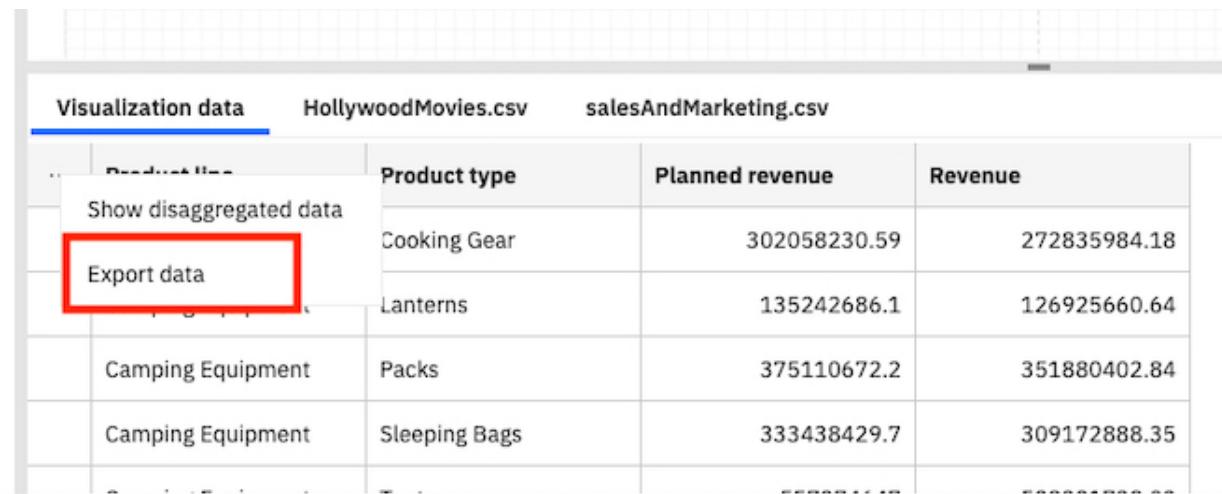
- From the print window for the browser, select the **Orientation** you selected in the IBM Cognos Analytics **Export to PDF** dialogue.
- Clear **Ignore Scaling and Shrink to Page Width**.
- Enable **Print Background Colors**.
- Enable **Print Background Images**.
- From the **PDF** drop-down, select **Save as PDF**.
- Type a name, select a folder location, and click **Save** to save your PDF.

## **Exporting visualization data to a CSV file**

From the toolbar for a visualization, or from the data tray, you can export the data that makes up your visualization.

### **Procedure**

1. Open a dashboard.
2. Select the visualization that you want to export the data for.
3. On the toolbar at the top of your dashboard, click **Show data** . If you don't see the **Show data** icon, click **Switch to edit** .
- The data for the selected visualization is displayed at the bottom of your dashboard in a table on the **Visualization data** tab.
4. Click the **Visualization data** menu  and select **Export data**.



Visualization data		HollywoodMovies.csv	salesAndMarketing.csv
Product type	Planned revenue	Revenue	
Cooking Gear	302058230.59	272835984.18	
Lanterns	135242686.1	126925660.64	
Camping Equipment	Packs	375110672.2	351880402.84
Camping Equipment	Sleeping Bags	333438429.7	309172888.35

## **Sharing assets from the Team content folder**

You can share with your colleagues report outputs or dashboards that are located in the **Team content** folder.

### **Sharing assets from Team content via email**

You can share Cognos Analytics report outputs or dashboards in the **Team content** folder by  **Email**.

### **Before you begin**

Your administrator must configure a mail server before you can use this feature.

### **About this task**

Cognos Analytics allows you to select  **Share** in an asset's context menu from several access points:

- the **Team content**  folder
- the **Home**  page, in the list of recently opened assets
- the **Search results**  pane
- the **Recent**  pane

**Note:** The following task describes accessing the context menu from the **Team content** folder. However, you can use any of the access points listed above.

## Procedure

1. Save your dashboard or report output in the **Team content** folder.

**Tip:** Other users are not authorized to open content in your **My content** folder.

2. Navigate to the saved asset in the **Team content** folder.

3. Click the More icon  for the asset and then, in the context menu, click  **Share**.

**Tip:** A different **Share** icon  appears in the application bar at the top of your window when you are viewing content on your canvas:

- If you are editing a new report or dashboard on your canvas and you click the **Share** icon  in the application bar, the **Share** panel only allows you to share the content from your current view.

Previously saved report output cannot be shared by clicking the **Share** icon  in the application bar.

- If you are viewing a saved report output PDF and you click the **Share** icon  in the application bar, the **Share** panel only allows you to share the saved PDF version as a link or an attachment.

4. In the **Share** panel, click the **Send** tab.

**Tip:** If the **Send** tab does not appear, the administrator did not configure a mail server and did not configure a collaboration platform.

5. Click **Email**.

**Tip:** If **Email** does not appear as a platform, your administrator did not enable content sharing by email.

The **Share with email** panel appears.

6. Search for a recipient name, group, role, distribution list, or contact and then click **Search directory**. Repeat this step as necessary.

### Tips:

- To add an external email address, enter the full address and then press Enter.
- If you start typing someone's name that you emailed recently, the full name quickly appears and you can select it.
- You can narrow the search results and speed up retrieval time by typing more characters in the recipient fields.
- Search results appear for all namespaces that you are logged into. You may need to scroll to see results for a different namespace.
- You can also browse for a recipient, by clicking **Directory > namespace**.

To quickly find an entry:

- Type text in the  **Find** field.

You can click the Search Method icon  to find entries that either contain, start with, or are an exact match with the text that you type.

- Click the filter  icon to narrow the view of entries.

7. Keep the default subject or enter a new one.

8. Enter the message that you want to send.

**Tip:** To format your message, use the **Styles** and **Format** buttons.

9. Select **Include link** if you want your recipient to click a link to your content.

**Tip: Include link** appears only if your content is located in the **Team content** folder. Other users cannot link to content located in **My content**.

10. Click **Send**.

## Results

Your message is sent to your selected recipients via email.

### Sharing assets from Team content via Slack

In Cognos Analytics, you can send Cognos Analytics report outputs or dashboards in the **Team content** folder by  **Slack**.

For more information, see the Blog post [Increased Collaboration with Slack Integration in IBM Cognos Analytics 11.1!](#)

## Before you begin

Your administrator must configure a collaboration platform before you can use this feature.

## About this task

Cognos Analytics allows you to select  **Share** in an asset's context menu from several access points:

- the **Team content**  folder
- the **Home**  page, in the list of recently opened assets
- the **Search results**  pane
- the **Recent**  pane

**Note:** The following task describes accessing the context menu from the **Team content** folder. However, you can use any of the access points listed above.

## Procedure

1. Save your Cognos Analytics dashboard or report output in the **Team content** folder.

**Tip:** Other users are not authorized to open content in your **My content** folder.

2. Navigate to the saved asset in the **Team content** folder.

3. Click the More icon  for the asset and then, in the context menu, click  **Share**.

**Tip:** A different **Share** icon  appears in the application bar at the top of your window when you are viewing content on your canvas:

- If you are editing a new report or dashboard on your canvas and you click the **Share** icon  in the application bar, the **Share** panel only allows you to [share the content from your current view](#).

Previously saved report output cannot be shared by clicking the **Share** icon  in the application bar.

- If you are viewing a saved report output PDF and you click the **Share** icon  in the application bar, the **Share** panel only allows you to share the saved PDF version as a link or an attachment.

4. In the **Share** panel, click the **Send** tab.

**Tip:** If the **Send** tab does not appear, the administrator did not configure a collaboration platform.

5. Click *Slack\_platform\_name*.

**Tip:** If a **Slack** platform appears grayed out, your administrator has disabled the platform. If you are not part of a slack workspace, you can join it through the pop-up window and then click on the workspace again in Cognos Analytics to continue sharing your content.

The **Share with Slack: platform\_name** panel appears.

6. Enter a channel or recipient name.

**Tip:** Start typing either a Slack channel name (starting with the hashtag symbol (#) or a Slack user name if you want to send a Direct Message in Slack. As you type, the list of possible choices is filtered, until you can select the one you want.

7. Enter the message that you want to send.

**Tip:** You must include some text in your message.

8. Select **Include link** if you want your recipient to click a link to your content.

**Tip: Include link** appears only if your content is located in the **Team content** folder. Other users cannot link to content located in **My content**.

9. Click **Send**.

## Results

Your message is sent to your selected recipients via Slack.

### Linking to saved content

In Cognos Analytics, you can create a URL for any view in your dashboard or report. You can then send the URL by email or embed the URL in a web page or another dashboard or report.

You can share content objects, such as reports and dashboards, with a URL that opens the content object directly, instead of having to browse to the content object from the Cognos Analytics welcome screen. You can also embed Cognos Analytics content objects (except for data modules) in customized web pages. An embedded content object does not display the application or navigation bars.

## Procedure

1. Save your Cognos Analytics dashboard or report output in the **Team content** folder.

**Tip:** Other users are not authorized to open content in your **My content** folder.

2. Navigate to the view that you want to send to a co-worker.

3. Click the More icon \*\*\* for the asset and then, in the context menu, click  **Share**.

**Tip:** A different **Share** icon  appears in the application bar at the top of your window if you are viewing content on your canvas. However, if you click that icon, the **Share** panel only allows you to share the content from your current view, not previously saved output.

4. In the **Share** panel, click the **Link** tab.

**Tip:** You can modify the URL to perform other actions, such as opening a report for editing instead of running the report, or changing the output format of the report. For more information, see *Creating custom URLs to display and run Cognos Analytics content in IBM Cognos Analytics Getting Started User Guide*.

5. If you want to send the link to a co-worker by email, do the following:

a) In the **Link** section, click the Copy icon .

The URL is copied to your clipboard.

b) Paste the URL into your email and send the email.

6. If you want to embed the html code for your view in a web page, go to the **Embed code:** section, and follow these steps:

a) If you want to change the height and width of the iframe that will contain the code, adjust the values in the **Width** and **Height** fields.

b) click the Copy icon .

The URL is copied to your clipboard.

c) Paste the URL into the html text of your web page.

#### *Authentication sample with embedded content*

The embedded content sample shows how to use the IBM Cognos Analytics REST API to sign in a user and then display embedded content.

### Procedure

1. Copy the embedded\_content folder from the <installation\_location>\samples folder to the <installation\_location>\webcontent folder.
2. Open the \webcontent\embedded\_content\preLoginSample.html file in a text editor, and locate the <select> element:

```
<select size="1" name="namespace">
    <option value="CognosEx">CognosEx (Example)</option>
    <option value="LDAP">LDAP (Example)</option>
</select>
```

3. For any of the configured namespaces that you want to see as a selection in the login page, define the <option> element within the <select> element, using the following syntax:

```
<option value="namespace_ID">namespace_name</option>
```

The *namespace\_ID* corresponds to the **Namespace ID** property, as defined for the namespace in Cognos Configuration, under **Security > Authentication**. The *namespace\_name* can be any word; however, the name defined in Cognos Configuration is preferred.

4. Open the \webcontent\embedded\_content\iFrameSample.html file, and replace the iFrame objects with **Embed** iFrame objects from your Cognos Analytics installation.
5. In a web browser, type `http://<server_name>:<port>/embedded_content/preLoginSample.html`

### Results

A sign-in web page is displayed. After you sign in, the embedded content objects are shown.

## Resetting a dashboard

You can reset your dashboard to revert to the last saved version of the dashboard.

### Before you begin

If you don't see the option to reset the dashboard, the dashboard you are viewing was never saved.

To reset all the changes you have applied since you last saved the dashboard, complete the following actions:

### Procedure

1. Open a saved dashboard.
2. Click the **Switch to edit** icon .
3. Make one or more changes to the dashboard.
4. Click the **Switch to preview** icon .

5. **11.1.6** On the toolbar, click the Reset dashboard icon .

6. Click **OK**.

The dashboard returns to its last saved view. Any changes you made since the last saved view are lost.

**Tip:** After you save the dashboard, the Reset dashboard icon disappears from the toolbar.

## Creating multilingual dashboards

You can create a dashboard or story in different languages so that a user can experience a dashboard in their language of choice. This activity is also called localizing your dashboard.

### About this task

In the dashboard properties, in the **Advanced** section, there is a languages option. This option is where you get started by setting a default language and where the different languages for your localized dashboards are displayed.

The localized content can include tab titles, visualization titles, and border colors on visualizations. For text widget properties, changes to font family, font size, style, text color, fill color, and border color can all be captured in a localized dashboard. You can also localize the descriptions in image, media, and web page widgets. In a story, you can localize the scene names and other items.

Users can set the content language in **My preferences**. After you localize a dashboard, a user opens the dashboard and IBM Cognos Analytics matches the content language to the available languages in the **Languages** list. If the content language does not match any language in the **Languages** list, the default language is displayed for the dashboard. For example, if a user's content language is set to French (Canada), when the user opens the dashboard, the languages in the **Languages** list are matched according to the following order:

- French (Canada)
- French
- French (*any country*)
- Default language in the **Languages** list

Users can also select the preferred language for the IBM Cognos Analytics user interface. For more information, see [Language settings](#).

### Procedure

1. Open a dashboard.
2. On the app bar, click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. Click **Advanced**.
4. Click **Set default language** and select the language to localize to.

The first language that you choose becomes the default language and starts your list of languages on the **Dashboard properties** pane. You can set a different language to the default later.

5. In the **Dashboard properties** pane, under **Languages**, click the menu icon \*\*\* for the language you want to localize to, and click **Edit translations**.  
You can now translate the dashboard.
6. Localize the default language by translating text widgets, titles on your visualizations, titles on tabs, and so on.
7. Click **Done**.

**Note:** If the language is not already added and you click **Done** without changing the dashboard, the language is not added to the **Languages** list.

8. Alternatively, download a CSV file that lists all of the text strings in your dashboard that require localization. To do so, click the menu icon \*\*\* for the default language, and click **Download**. You can send this list to a translator for localization.

**Note:** You cannot upload the CSV file. A translated CSV file is a reference for you to manually localize a dashboard.

9. Click **Add another language** and select a language from the list.

Localize each translatable area that is marked with a translation mode icon.



10. Click **Done**.

11. To change the default language, click the menu icon \*\*\* for the language you want to set to the default language, and then click **Set as default**.

12. To switch any language in your **Languages** list to another language, click the menu icon \*\*\* for the language you want to switch, and then click **Switch language**.

## Results

A localized dashboard opens for users based on the languages in the **Languages** list and the content language set in the user's preferences.

## Exploring your data

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You can explore the data that is shown in a visualization by using the interactive title, drilling up or down columns, and viewing the details of a data point.

## Assistant

IBM Cognos Analytics includes an embedded assistant that supports text-based input to help you gain quick insights into your data and simplify your analytics. In just a few steps, you can access key data sources, create visualizations, and drag them onto your Exploration or Dashboard canvas. Text input is supported in English only.

You can use two interfaces:

1. Full assistant panel
2. Compact assistant panel

### Full assistant panel

The full assistant panel is made up of three sections: toolbar, output, and input field. You can run actions in the toolbar, such as resetting your history. The output is displayed in a scrollable area that includes all past responses. The input field, labeled as **Ask a question** by default, is where you can enter text-based conversational input.

Open the full panel view by clicking the **Assistant** icon . If you're using the compact panel, in **Exploration** only, you can switch to the full panel by clicking **Open in full view**.

### Compact assistant panel

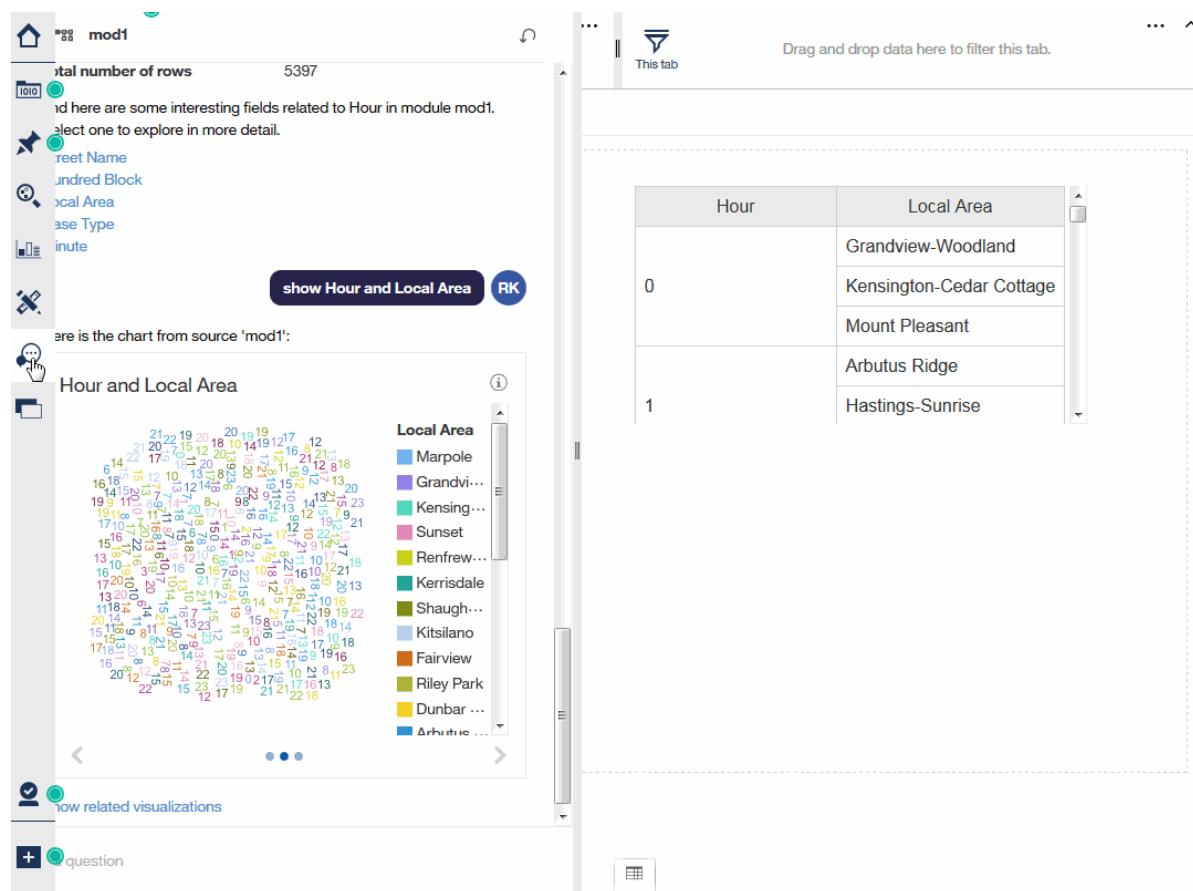
The compact panel is available in the **Exploration** interface only. You can open the compact panel by clicking **Ask a question** in the compact panel area.

The compact panel shows the last input and response only. To view the full history, click the **Open in full view** link in the compact panel or the **Assistant** icon .

In the **Ask a question** field, you can click the keyboard up-arrow or down-arrow to see a list of recommended commands. As you enter text, a type-ahead feature offers suggestions on what you can ask. This is a great way to formulate proper questions and it saves typing.

To repeat your last question, click the response bubble or use the keyboard shortcut (Shift + up-arrow), and then press Enter. You can scroll through your previous questions by pressing Shift + up/down arrows.

Visualizations that appear in the **Assistant** panel are condensed and might exclude some information. You can view the complete visualization details in **Explore** or **Dashboard**. From the **Assistant**, you can drag visualizations onto an **Exploration** or **Dashboard** canvas.



To clear your conversation history, and return it to its initial state, click the **Reset** icon  in the toolbar. Entering reset or clear produces the same result. The **Reset** icon appears in the full panel only; it is not available in the compact panel.

**Important:** Refreshing your Cognos Analytics browser tab also resets your history.

## Assistant capabilities

The Assistant is a powerful feature that allows you to ask questions in natural language. This topic demonstrates some of the commands that you can use with the Assistant.

Ask questions using natural language. For example, show Profit is synonymous with list Profit, what is Profit?, tell me about Profit, and Profit.

Here are some commonly used questions to get you started:

### help

Displays overview and general usage information.

## **show data**

Lists all supported data sources that you have access to in **My content** and **Team content**. Supported data sources include:

- Uploaded files (csv, tsv, xls, xlsx, and zip)
- Data modules
- Data set
- Framework Manager packages

**Note:** See *Enriching packages* in the *Managing* document.

When results exceed the number of displayed items, click **More** to view up to 100 data sources. Scroll to the bottom of the list and click **Less** to collapse the list.

## **show source <source-name>**

Displays a list of relevant fields and details for the specified data source. The toolbar displays the <source-name> that is in context. By default, Cognos Analytics uses the active source in your dashboard or exploration panel. From the results, you can click field names to obtain more information for those particular fields. Clicking field names is equivalent to asking **show column <column-name>**.

When results exceed the number of displayed items, click **More** to view up to 100 data sources. Scroll to the bottom of the list and click **Less** to collapse the list.

## **show column <column-name>**

For the specified column, information and related fields are displayed. Clicking the related fields is equivalent to asking **show chart <column1> and <column2>**. If the specified column is determined to have influencers, you can enter what influences <column-name> to see its list of influencers.

## **what influences column <column-name>**

Displays a list of fields that influences the results in the specified column.

## **show chart <column1> and <column2>**

Displays visualizations that show the relationship between <column1> and <column2>. Scroll through the visualizations by clicking the left and right arrows. Each visualization includes an information icon in the upper-right corner. Hover over the icon to see descriptions about the underlying data. You can optionally enter more columns, but excessive columns can result in less effective visualizations.

Clicking **Show related visualizations** returns visualizations based on influential and related fields.

Clicking **Create dashboard** from the charts creates a new dashboard based on the most recently generated charts. Typing **Create related dashboard** produces the same resulting dashboard. If the charts contain top or bottom aggregations, these modifiers are applied to the generated dashboard.

Applying aggregations and filters can help to add focus and create more compelling visualizations. Common aggregations include total, average, count, maximum/minimum, top/bottom, best/worst, and so on. Here are a few aggregation examples:

## **show top <num> <column1> by <column2>**

Displays the top values from <column1> based on the context of <column2>. For example, **show top 5 Sales by Region**. If <num> is not specified, a default value of 10 is used.

<column1> is an aggregated or non-aggregated measure, while <column2> is a categorical column.

## **show average <column-name>**

Displays the average for all values found in <column-name>.

## **how many <column-name>**

If <column-name> is a category, the number of distinct items is returned. If <column-name> is a measure, the sum total is returned.

**show maximum <column-name>**

Displays the highest value found in <column-name>.

**show minimum <column-name>**

Displays the lowest value found in <column-name>.

**show total <column-name>**

Displays the sum total for all values found in <column-name>.

You can add filters for geographical strings (such as Country or State) or temporal strings (such as Month or Year). Filtering by date is not supported, at this time. Aggregations and filters can be combined to produce more granular results. Here are some examples, based on sample data:

- show Education by Income where Income is less than 1000
- show Education by Income where Income > 100K
  - Optionally use K (to denote thousands) or M (to denote millions).
- show Revenue in 2017 and 2018
- show Income by Month for New York City
- what are the top 5 States by average Inventory, excluding California

Filtered visualizations include a filter icon (  ), located in the upper-right corner of the chart. Hover over the icon to display the applied filtering.

**create dashboard**

Generates a new dashboard based on the currently selected data source. You can modify the visualizations, tabs, order, etc. and save your new dashboard. By default, the generated dashboard will include advanced analytics and predictive charts.

Automatically generating dashboards for larger data sources may result in performance issues. To circumvent this, you can enter `create simple dashboard` to generate a basic dashboard. Then you can modify the dashboard by replacing charts with more sophisticated visualizations, such as driver analysis or spiral charts.

## Viewing the underlying data

The data tray shows you all the rows and columns that are available for you to analyze.

### Procedure

1. Click the **Sources** icon.



If you don't see the **Sources** icon, click the **Switch to edit** icon.



2. Review and explore the columns that are available for you to use.

## Viewing the underlying visualization data

**11.1.0** From the toolbar for a visualization, or from the data tray, you can view the data that makes up your visualization.

### Procedure

1. Open a dashboard.
2. Select the visualization that you want to view the data for.
3. Click the **Open data tray** icon at the bottom of the canvas.



If you don't see the **Open data tray** icon, click the **Switch to edit** icon.



The data for the selected visualization is displayed in a table on the **Visualization data** tab.

4. Click the **Visualization data menu** \*\*\* to toggle between an aggregated and disaggregated display.

## Changing the columns or members in a visualization

You can focus on points that are of interest to you by changing the data that appears in the visualization.

### Procedure

1. Select the visualization that you want to work with.
2. In the **Selected sources** panel, expand the data asset that you want to use.

If a different data asset is open, click the **Go back** icon next to the name of the data asset that is open.
3. To replace the column, drag a new column to the axis.

For example, if you have years in one axis and you drop months on top of it, you now see data for months.
4. To remove a column, click the **Menu** icon and then click **Remove column**.

\*\*\*

## Selecting columns from a different data asset

You can use data from more than one data asset in your dashboard. Each visualization must use data from a single data asset. You cannot use data from multiple data assets in the same visualization.

### Procedure

1. In the **Selected sources** panel, click the **Add a source** icon.
2. If you don't see the **Add a source** icon, click the **Go back** icon next to the name of the data asset that is open.
3. Find and select the data asset that you want to use.
4. Now you can drag items from the new data asset to the canvas of your dashboard.

## Drilling up and down in your data

Explore your data at different levels to gain a broader perspective or a more detailed view.

**Note:** When you drill back up after drilling down, you may lose filters that are applied. For example, you create a filter to include the data for sales regions of the USA and Canada. You drill down on Florida. When you drill up again, the analysis no longer includes Canada in its scope.

### Procedure

1. Right-click a label in the visualization.
2. To see more details, click the **Drill down** icon.
3. To gain a different or broader perspective, click the **Navigate** icon and select another column to explore.



## Working with a data point

You can view details, select, or perform actions on a data point.

### About this task

You can work with an individual data point in different ways:

- You can view its details. Sometimes you want to see the data for one specific part of a visualization. For example, a bar visualization shows you the monthly sales revenue for each country that you sell in. The bar for the UK in January shows you the proportional share for the UK but not the revenue number.
- You can select it. This allows you to see the data point highlighted in all related visualizations in the current tab of the dashboard.
- You can perform actions on it. For example, you can keep or exclude it in the visualization, drill down into it, sort it, or filter it.

### Procedure

1. To view the details of a data point, such as a bar, slice, or bubble, hover over it.

A tooltip appears, showing information about the data point.

2. To select the data point, click it.

3. To perform actions on the data point, right-click on it.

A tooltip appears with details about the data point. At the bottom of the tooltip, action buttons appear.

## Relinking sources

You can relink a dashboard to the same source or to a different source directly from the dashboard.

### About this task

The relinked (target) source must be of the same type as the original source. For example, a package can be relinked only to another package and an uploaded file to an uploaded file.

**Note:** Relinking data modules is not supported.

In addition to the matching source types, the following conditions must be met:

- All columns from the original source must exist in the target source, and the columns **Identifier** properties (case-sensitive) and data types must match. For example, file A with columns ColA and ColB can be relinked to file A (in a different folder) with columns ColA and ColB. Relinking to file A with columns colA and colB would not work.
- For packages, all tables from the original source must exist in the target source and the tables **Identifier** properties (case-insensitive) must match.
- For files, the target file name must match exactly the source file name. All column names between the two files must match.
- If the file is a multi-sheet spreadsheet, then all sheet names must match between the two files.

For example, your visualizations are linked to a source called Sales\_Data.xlsx. You can relink your visualizations to an updated Sales\_Data.xlsx source or to a different source called Sales\_Data.xlsx, stored in a different folder. If the same columns appear in both sources, the visualizations are updated automatically. If the columns don't match, the visualization indicates that a field is missing. To resolve the mismatched columns, expand the visualization and manually update the columns.

**Note:** When you relink a data source and multiple data source connections and data source signons are associated with your credentials, a message prompts you to resolve the ambiguous connections.

To switch the data source connection while you are authoring a dashboard or story, use **Relink** in the Selected sources pane.

## Procedure

1. Open the Selected sources pane.
2. Click the **More** icon next to a data source.  
...
3. Click **Relink** and browse to the data source that you want to use.



## Resolving ambiguous data source connections

When you open a dashboard or story and there are multiple data source connections and data source sign-ons associated with your credentials, a prompt asks you to resolve the ambiguous connections.

## Procedure

When prompted, select a connection to use for your data source, and click **OK**.

If your connection also has an ambiguous sign-on, you will get prompted twice; one prompt for the connection and then a second prompt for the sign-on.

## Zooming in and out

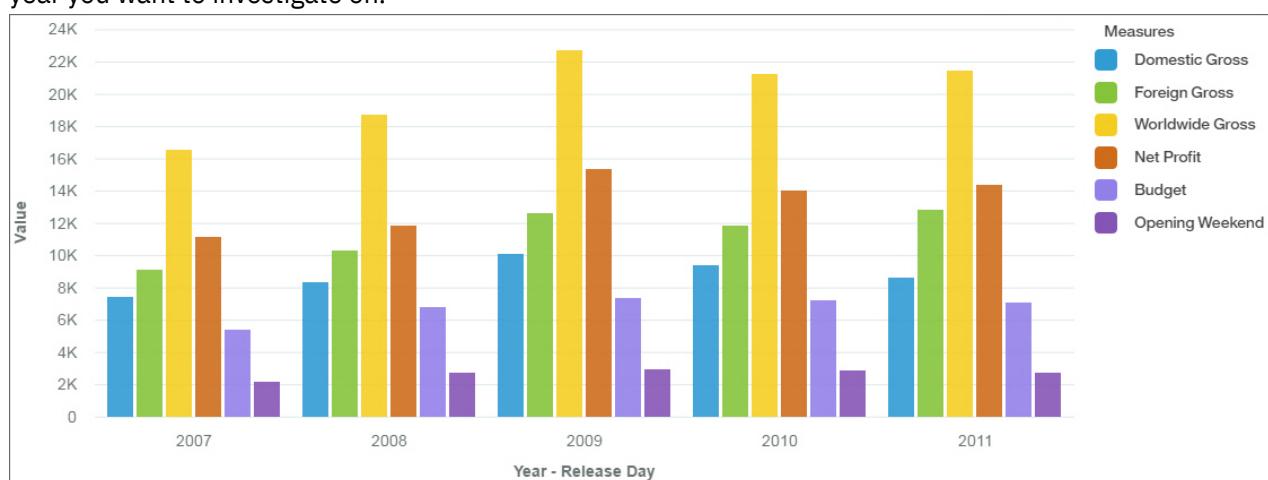
Sometimes you want to zoom in on a visualization to see the details, such as in a large bar visualization. For the visualizations that support zoom, use the scroll button on your mouse or the icons in the visualization to zoom in and out.

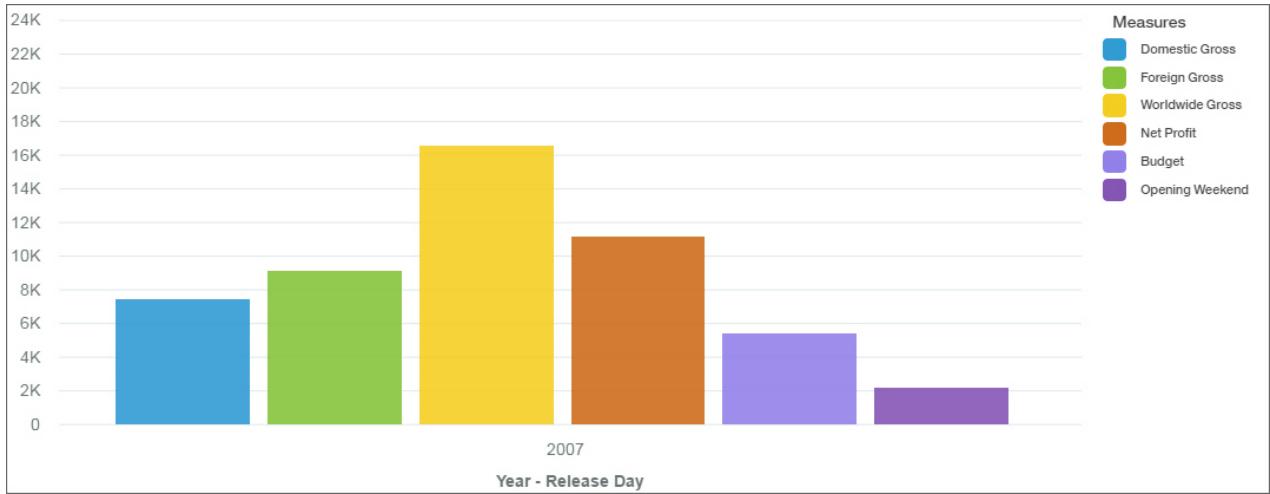
## Procedure

To zoom in or out, use the wheel on your mouse.

## Results

When you have a column visualization that shows the results for all years, you can zoom in and pan on the year you want to investigate on.





## Expanding and collapsing hierarchies in crosstabs

You can expand hierarchies in a crosstab that displays data from an OLAP data source and view several levels of data at one time.

### About this task

Complete the following steps to expand or collapse a crosstab hierarchy:

### Procedure

1. Open a crosstab that is using an OLAP data source.
2. Click the plus icon in a cell to expand the hierarchy and view the levels of data.
3. Click the minus icon in an expanded cell to collapse the hierarchy.

## Expanding visualizations

Use focus mode to maximize the size of a visualization to quickly review chart content.

### About this task

Focus mode is also available in preview for dashboard consumers.

### Procedure

1. Select a visualization.
2. Click the **Expand** icon .

## Visualizations

---

You can change the visualization type or change the columns that are used in the visualization.

## Using a different visualization type

Visualizations communicate comparisons, relationships, and trends. They emphasize and clarify numbers. To choose a visualization type, consider what you want the visualization to illustrate and what will appeal to the audience for the visualization.

### Procedure

1. Select the visualization that you want to work with.

2. Click the **Change visualization** icon in the toolbar.



The toolbar is located at the top of the dashboard by default. Click the undock toolbar icon if you want to move the toolbar to a selected visualization.

3. Click the visualization type that you want to use.

Take a look at how each visualization type communicates data differently. For example, use a bar, column, or line visualization to compare a set of values. Use a line or area visualization to track relationships. Use a tree map or pie visualization to see the parts of a whole.

4. If you select a visualization type that requires different data slots to be used, add a column to each empty data slot that has an asterisk (\*) in it.

## Area

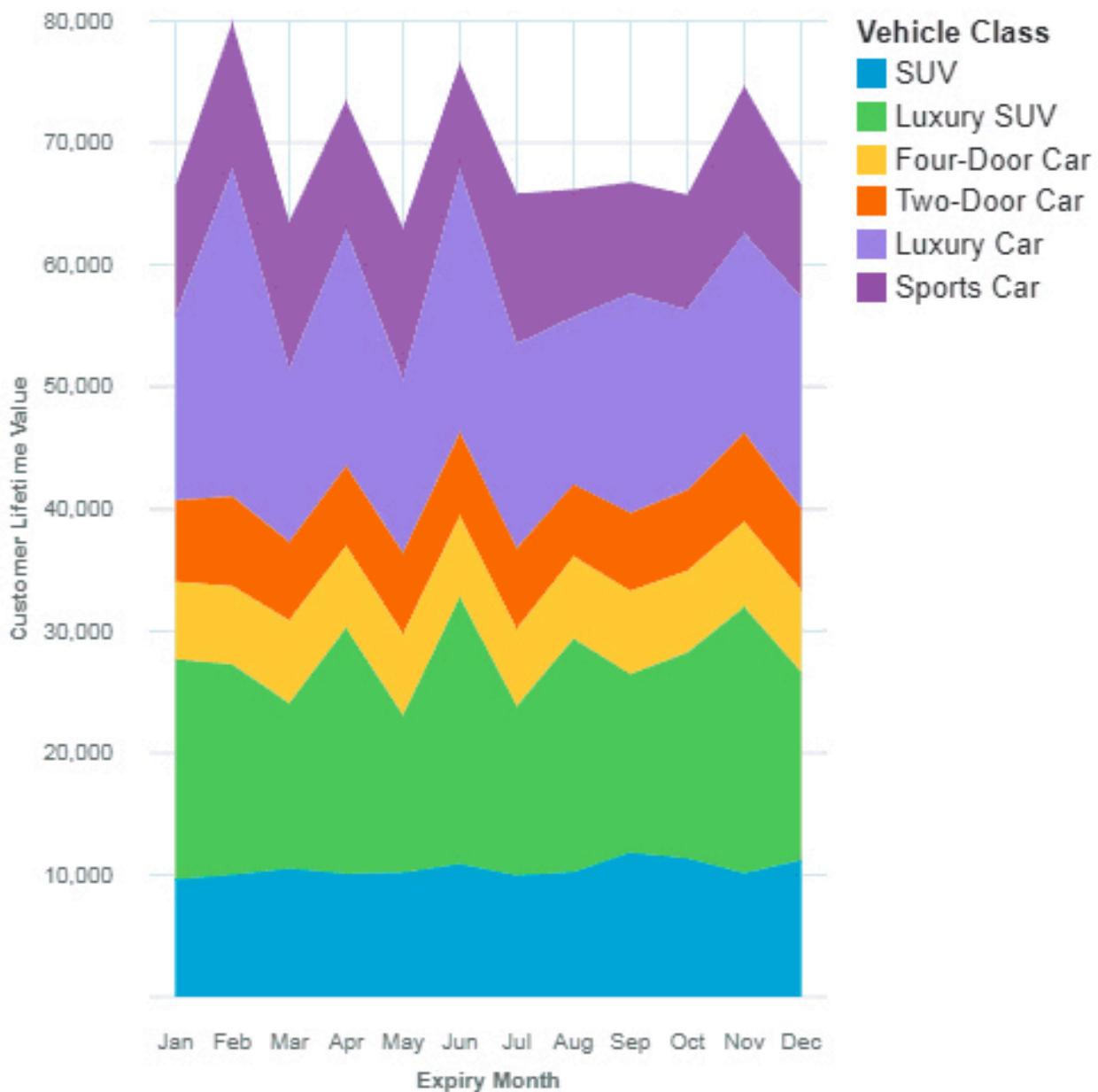
Use an area visualization to emphasize the magnitude of change over time.

Area charts are like line charts, but the areas below the lines are filled with colors or patterns. Stacked charts are useful for comparing proportional contributions in a category. They plot the relative value that each data series contributes to the total.

Because an area visualization stacks the results for each column or item, the total of all results is easily seen.

For example, an area visualization is excellent for looking at revenue over time across several products.

For example, this area visualization shows the customer lifetime value for each vehicle class per month. Because the area visualization stacks the results, you see the totals for each month.



The area visualization was created by dragging the following data items from the Sources panel:

- Drag **Expiry Month** type onto the **x-axis** field.
- Drag **Vehicle Class** onto the **Color** field.
- Drag **Customer Lifetime Value** onto the **y-axis** field

## Samples

You can see an example of a word cloud visualization in the sample report **Customer lifetime value analysis**. You can find the sample here: **Team content > Samples > Reports > Customer lifetime value analysis**.

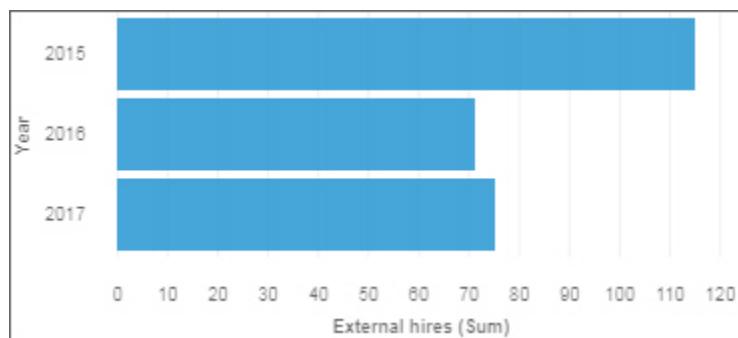
If any of the sample objects are missing, contact your administrator.

## Bar

Use a bar visualization to compare values by one or more columns, such as sales for products or sales for products each month.

Bar visualizations use horizontal data markers that are arranged in groups to compare individual values. You can use bar visualizations to compare discrete data or to show trends over time.

A bar visualization can show change over a specific time period or can compare and contrast two or more columns in a time period or over time. If there are so many bars that the labels are impossible to read, filter the data to focus on a subset of the data or use a tree map.



Use the **Target** field to show measures that need to be compared against a target value.

Use the **y-start** field to define where the measure must start.

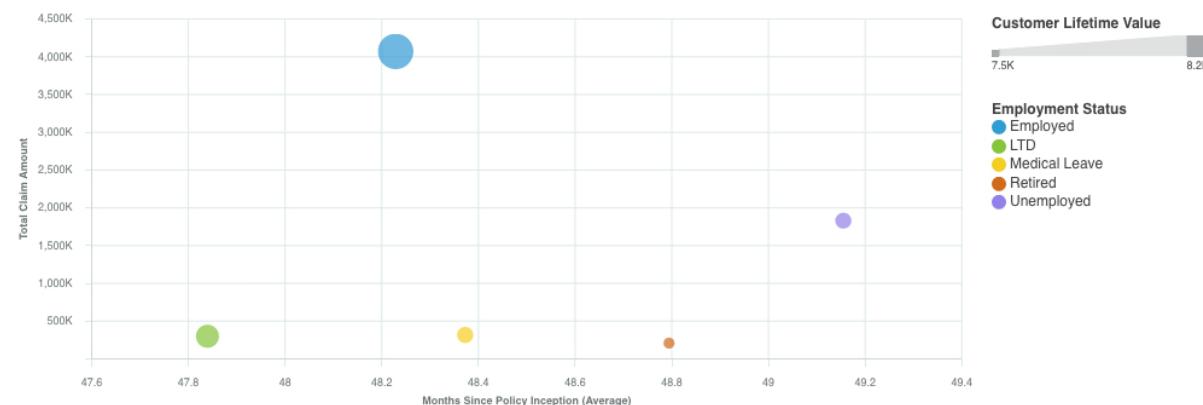
## Bubble

Use a bubble visualization to show relationships among columns that contain numeric values, such as revenue and profit.

A bubble visualization uses data points and bubbles to plot measures anywhere along a scale. One measure is plotted along each axis. The size of the bubble represents a third measure. Use bubble visualizations to represent financial data or any data where measure values are related.

The bubbles are in different sizes and colors. The x-axis represents one measure. The y-axis represents another measure, and the size of the bubbles represents the third measure. In the example shown below, color is represented by an identifier.

The example that is shown represents the months since the policy inception.



Create the Bubble visualization by dragging the following data items from **Customer Analysis** in the

:

- Drag **Months Since Policy Inception** onto the **x-axis** field.
- Drag **Total Claim Amount** onto the **y-axis** field.

- Drag **Customer Lifetime Value** onto the **Size** field.
- Drag **Employment Status** onto the **Color** field.

You can customize the bubble chart. For example, to make the x-axis of the bubble chart appear as it does in the sample, do the following steps:

1. Click the visualization, then in the **Field**  pane, click the <**Total Claim Amount**> data item.
2. Click \*\*\* and set the following options:
  - **Format type:** Currency
  - **Currency symbol:** K
  - **Currency symbol position:** End
  - **Number of decimal places:** 0
  - **Scale:** -3 (this presents values in thousands).

To change the size of the visualization, click the visualization, then set the following option in the properties pane:

- **Size - Width:** 700 px, **Height:** 300 px

Click  to close the **Properties** pane.

## Samples

You can see examples of visualizations in the sample report **Customer lifetime value analysis**. You can find the samples here: **Team content > Samples > Reports > Customer lifetime value analysis**.

If any of the sample objects are missing, contact your administrator.

## Bullet

Use bullet charts to show measures that need to be compared against a target value.

In a call center, a bullet chart can be used to measure metrics like call volume, call answer speed, and percentage of abandoned calls.

In manufacturing, a bullet chart can be used to track metrics like number of defects and orders that are shipped.

In a fitness context, a bullet chart can be used to measure metrics like steps that are taken and calories that are burnt.

Bullet visualizations compare an actual measure (the bullet) to targeted measure (the target). Bullet visualizations also relate the compared measures against colored regions in the background that provide more qualitative measurements, such as good, satisfactory, and poor. Bullet visualizations can be shown at small sizes while still effectively conveying information.

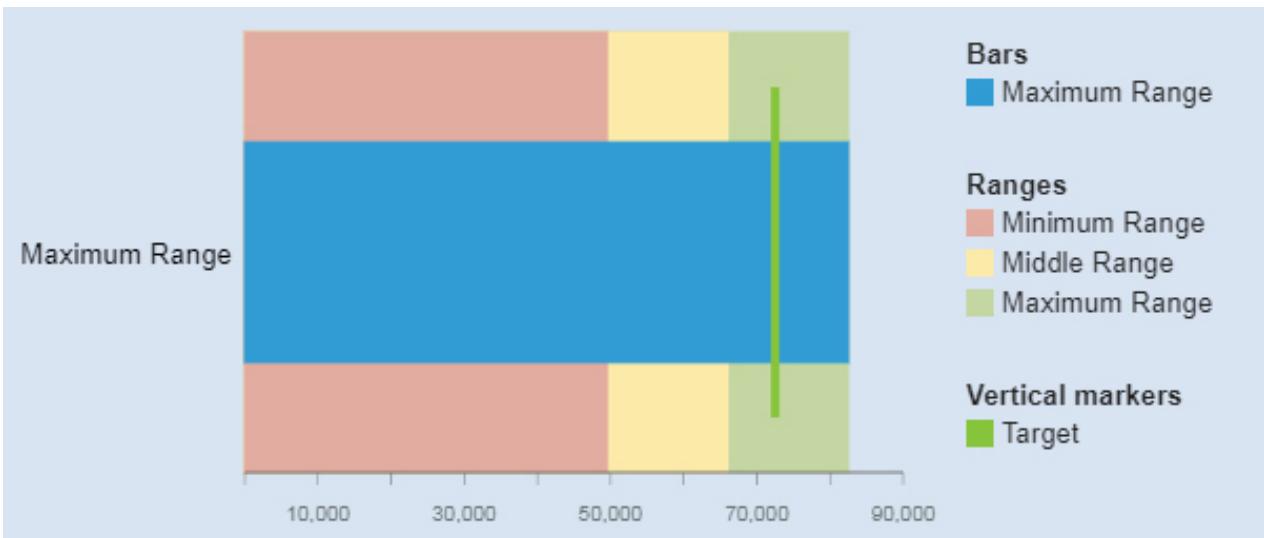
A bullet visualization features a single, primary measure. For example, current year-to-date revenue. And compares that measure to one or more other measures to enrich its meaning. For example, compared to a target. The primary measure is displayed in the context of a qualitative range of performance, such as poor, satisfactory, and good.

If you select a bullet visualization, then specify the following fields:

- The **Actual bar** field specifies the actual measure.
- The **Target** field specifies the target measure.
- The **Minimum range** field specifies the minimum qualitative range.
- The **Medium range** field specifies the middle qualitative range.
- The **Maximum range** field specifies the higher qualitative range.

**Note:** Drill-through is not available for a bullet visualization.

Make sure the minimum, medium, and maximum ranges relate to the actual and target measure.



The bullet visualization was created by dragging the following data items from the Sources panel:

- Drag **Minimum Range** onto the **Minimum Range** field.
- Drag **Minimum Range** onto the **Minimum Range** field.
- Drag **Maximum Range** onto the **Maximum Range** field
- Drag **Maximum Range** onto the **Actual Bar** field
- Drag **Target** onto the **Target** field
- Drag **Vehicle class** onto the **Extra Data** field

## Samples

You can see an example of a bullet visualization in the sample report **Customer lifetime value analysis**. You can find the sample here: **Team content > Samples > Reports > Customer lifetime value analysis**.

If any of the sample objects are missing, contact your administrator.

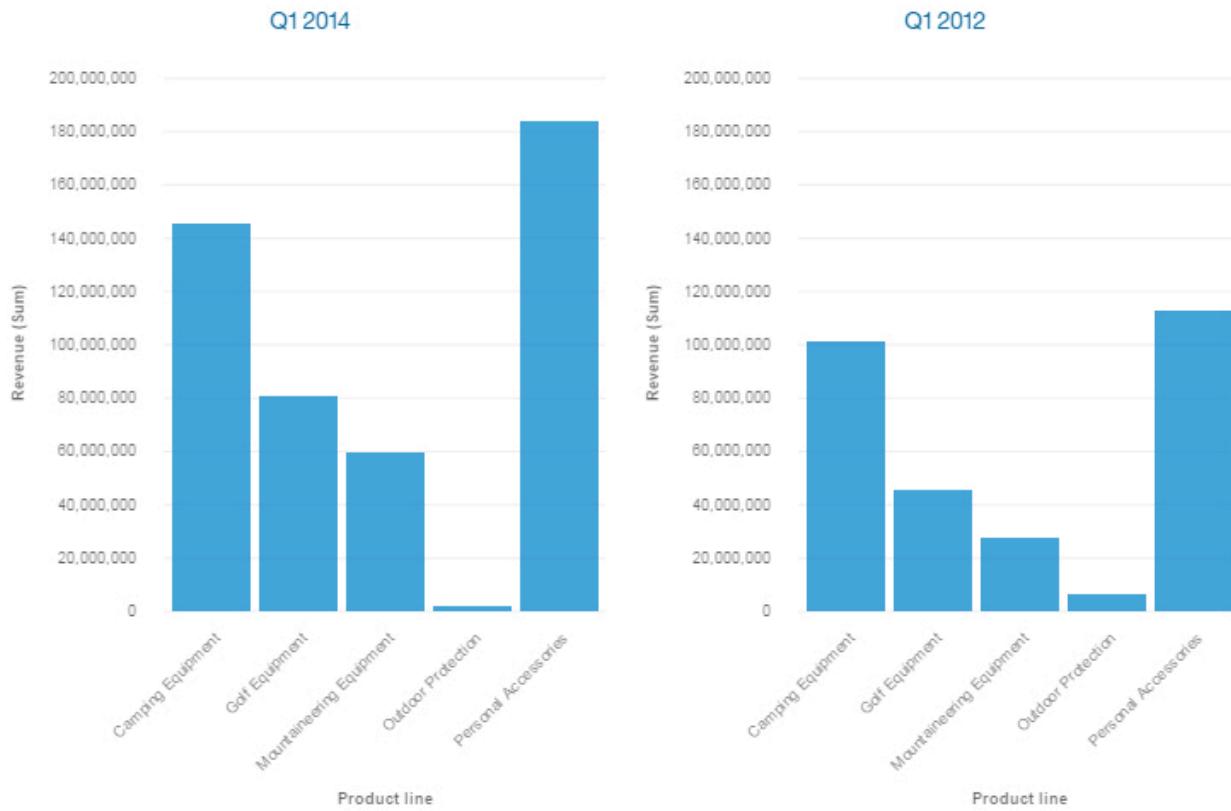
## Column

Use a column visualization to compare values by one or more columns, such as sales for products or sales for products each month.

Column visualizations use vertical data markers that are arranged in groups to compare individual values. Use column visualizations to compare discrete data or show trends over time.

A column visualization shows change over a specific time period or can compare and contrast two or more columns in a time period or over time. If there are so many bars that the labels are impossible to read, filter the data to focus on a subset of the data or use a tree map.

For example, revenue for each product line is grouped by quarter, which emphasizes performance in each quarter.



Use the **Target** field to show measures that need to be compared against a target value.

Use the **y-start** field to define where the measure must start.

## Crosstab

Use a crosstab when you want to show the relationships between three or more columns. Crosstabs show data in rows and columns with information summarized at the intersection points.

For example, this crosstab shows the course costs for each department by organization.

Course cost	GO Asia Pacific corporate							
	Executive Offices	Finance	Sales (Corporate)	Procurement	Human Resources	Marketing	Summary	
2014	10,500	29,750	10,500	18,250	11,000	15,500	95,500	
2015	11,500	46,250	14,750	7,750	11,500	30,750	122,500	
2016	12,500	43,000	33,250	5,000	14,500	22,500	130,750	
2017	13,500	24,000	36,000	7,000	15,750	21,750	118,000	
Summary	48,000	143,000	94,500	38,000	52,750	90,500	466,750	

Starting from Cognos Analytics version 11.1.4, you can drag data from the **Selected sources** pane and insert data in a column/row or drop the data on top of existing data to replace it.

## Data player

Use a data player to see an animation of the impact of a column on the other visualizations.

## Decision tree

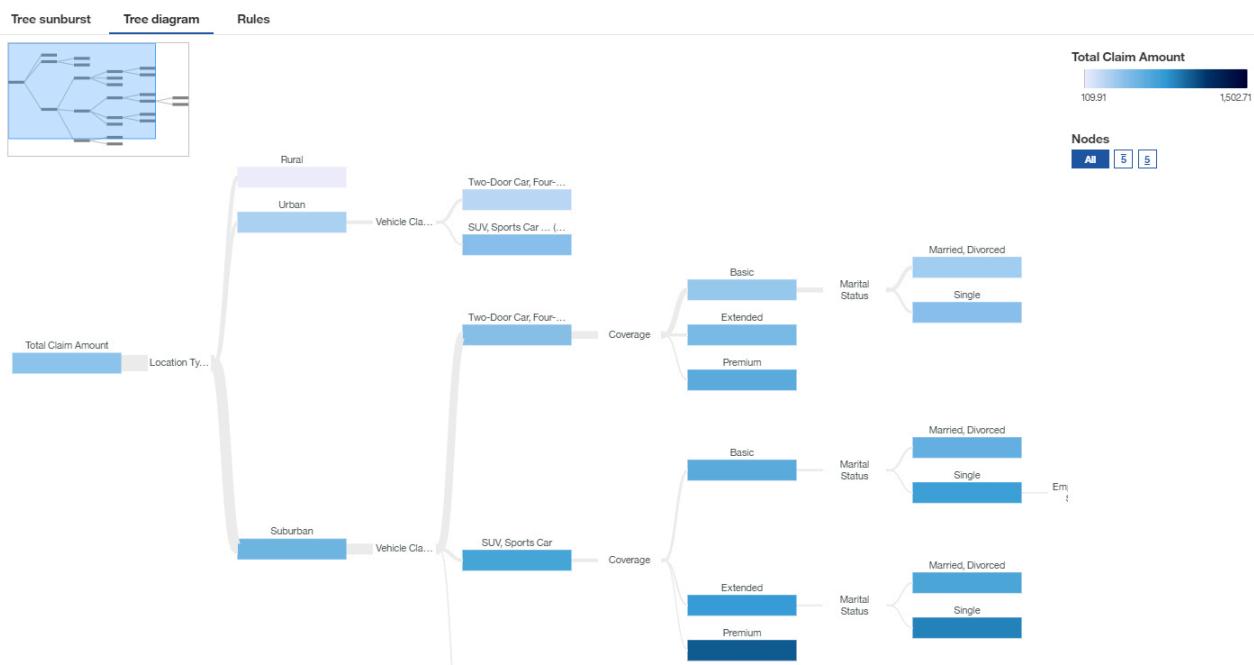
A decision tree shows a connected hierarchy of boxes to represent the values of records.

Records are segmented into groups, which are called nodes. Each node contains records that are statistically similar to each other with respect to the target field. For example, a node might contain the records for males who have more than 18 years of education. Nodes can then be used to predict a target's field value. For example, the node about males and education might be used to predict salary.

Each branch in a decision tree corresponds to a decision rule. For more info about decision rules, see [“Viewing decision rules” on page 51](#).

To improve performance, due to number of rows in the data source, the analysis is based on a representative sample of the entire data.

For example, a decision tree visualization can look like this:



**Note:** Filters are not supported for decision tree visualizations.

For more information, see [“Exploring a decision tree visualization” on page 48](#).

### Exploring a decision tree visualization

A decision tree visualization is used to illustrate how underlying data predicts a chosen target and highlights key insights about the decision tree.

## About this task

The predictive strength of a decision tree determines the degree to which the decisions represented by each branch that is shown in the tree, predicts the value of the target.

Decision trees have a single target. If the target field of the decision tree is continuous, then the key insight indicators highlight unusually high or low groups. If the target field of the decision tree is categorical, then the key insight is the mode of the node. The mode of the node is the most frequently occurring category or categories of the target field within the group.

To improve performance, due to number of rows in the data source, the analysis is based on a representative sample of the entire data.

When you review a decision tree:

- If you want to see all the drivers, use either the **Tree diagram** tab or the **Rules** tab.
- If you want to focus on key drivers, use the **Tree sunburst** tab.

To edit or add key drivers, click the \*\*\* on the target field.

Insights are different depending on the type of your target. If you are predicting a continuous measure, for example income, age, or profit, then the decision tree shows within the node the average value of the target given the conditions so far within the group that is represented by the node. For example, if you have a tree that is predicting income and you have a branch that has gender and then city. If you follow the path from male to Chicago, then the value that is in the Chicago node, is the average income of males in Chicago.

## Procedure

1. If you have a continuous measure, the following example illustrates the decision tree.

The color shows whether the value of the node is associated with high, medium, or low values of the target. The color of the node is based on the average of the target for the measure. The higher the average value of the target for a node, the darker the color.

For example, shown next is the detailed visualization for Restaurant Spending. The international terminal is a strong predictor for high restaurant spending for business travelers. Poor airport cleanliness is a predictor of low spending for conference/convention travelers.

The minimap helps you move around the areas of the tree. The minimap is especially useful if there are many nodes.

In this example, the top five highest target values are indicated with a number. You can choose between the following options:

- Full tree. No highest, or lowest values are indicated specifically.

**Full tree**

- Top five highest target values. The top five highest target values are shown.

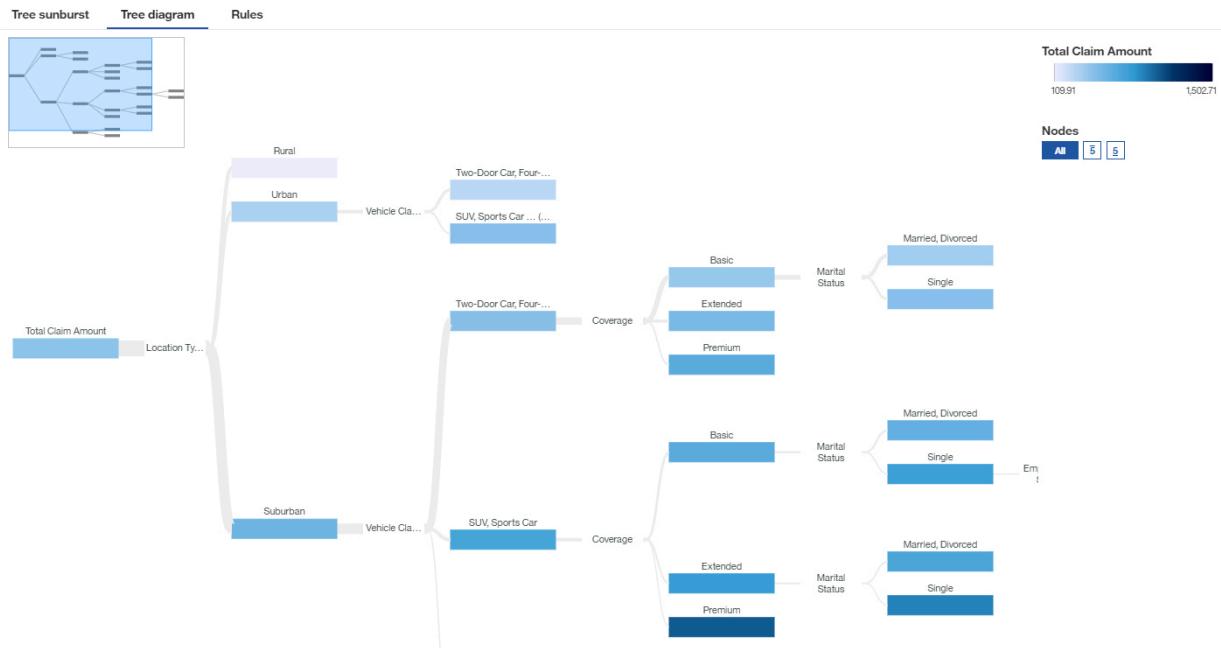
A small square icon containing the number 5, representing the top five highest target values.

- Top five lowest target values. The five lowest target values are shown.

A small square icon containing the number 5, representing the top five lowest target values.

If you have a categorical measure, select the category for which you want to see the top five or lowest five targets from the **Top 5 nodes for:** menu or from the **Bottom 5 nodes for:** menu.

In case you zoomed in too far, the top five or bottom five nodes are not visible.

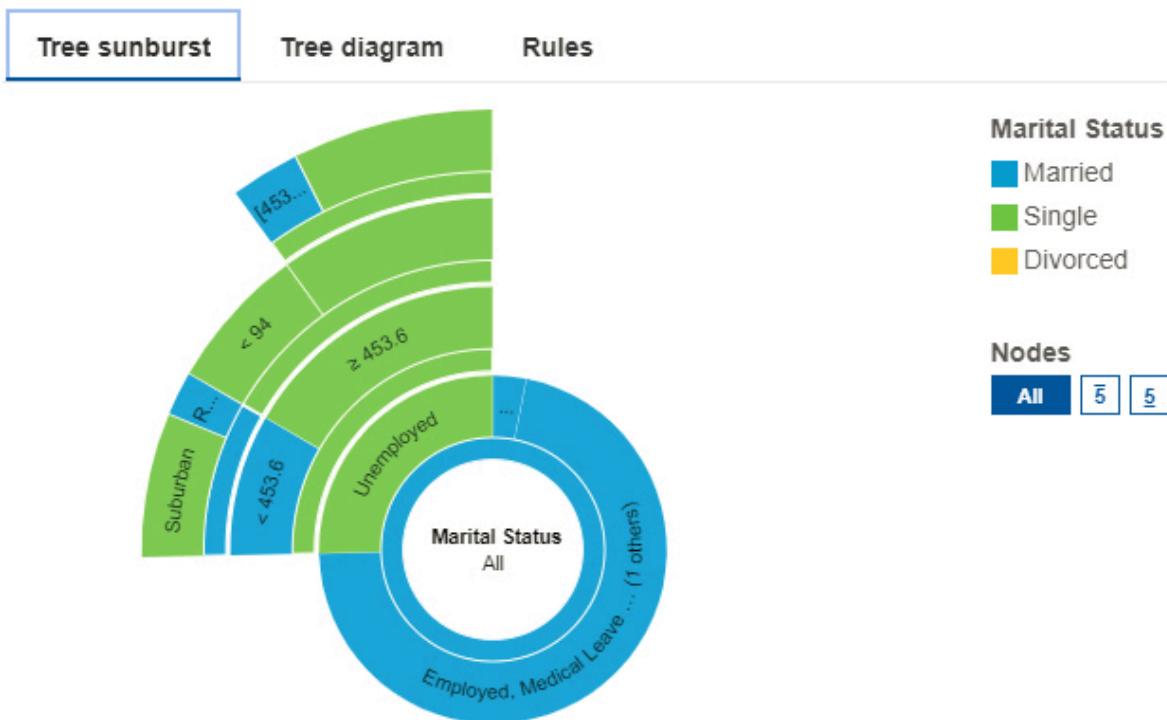


2. If you have a categorical measure, the following example illustrates the decision tree.

The color shows which field value or values are represented the most.

In the **Tree sunburst** tab, you can see that if the measures within the decision tree are strong predictors for a target value or target values, then the colors prevail in that node. The non-significant values are left out.

For example, shown next is the detailed visualization of the marital status in the **Tree sunburst** tab. It shows that being employed is a strong predictor for being married.



In the **Tree diagram** tab, the nodes visually show the distribution of the people by marital status.



## Viewing decision rules

A decision rule predicts an outcome in the target field. Viewing the decision rules helps you determine which conditions are likely to result in a specific outcome.

For example, consider some hypothetical decision rules that might predict churn. These rules might identify classifications based on the ranges for customer age and number of previous claims. From these rules, you might observe that customers who have no or 1 claim and are older than 50 are more likely to churn.

Each branch in a decision tree corresponds to a decision rule.

## Procedure

1. In a decision tree, tap **Rules**.
2. Review the decision rules.
3. To return to the visualization, tap **Tree diagram**.

## Driver analysis

A driver analysis visualization shows you the key drivers, or predictors, for a target. The closer the driver is to the right, the stronger that driver is.

IBM Cognos Analytics uses sophisticated algorithms to deliver highly interpretable insights that are based on complex modeling. You don't have to know which statistical tests to run on your data. Cognos Analytics picks the right tests for the data.

Key drivers for both continuous and categorical targets are available in the driver analysis visualization in dashboards and explorations.

For more info, see *Statistical tests* documentation in the *IBM Cognos Analytics Dashboards and Stories User Guide*.

For example, this driver analysis visualization shows that the combination of vehicle class, location type, coverage, marital status, and employment status are the strongest drivers of the target, total claim amount.

To edit or add key drivers, click the \*\*\* on the target field.

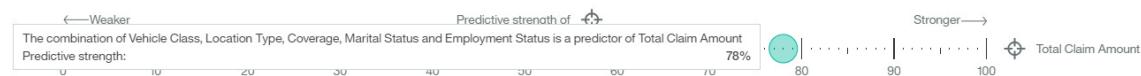
To improve performance, due to number of rows in the data source, the analysis is based on a representative sample of the entire data.

- 1 Driver
- 2 Drivers
- Combination



If you hover over a data point, then the driver analysis visualization shows what drives total claim amount.

- 1 Driver
- 2 Drivers
- Combination



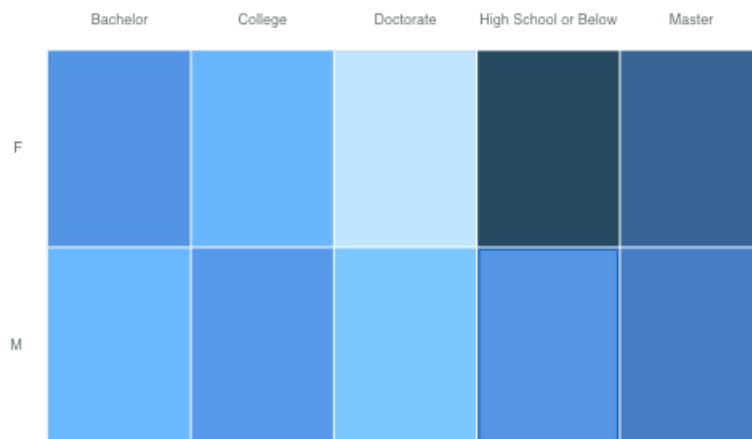
**Note:** Filters are not supported for driver analysis visualizations.

## Heat map

Use a heat map visualization to visualize the relationship between columns, represented in a matrix type view.

A heat map visualization uses color and intensity of the color to show the relationship between two columns.

For example, this heat map visualization shows the average customer lifetime value by gender and education.



Create the heatmap visualization by dragging the following data items from the **Sources** panel :

- Drag **Gender** onto the **Rows** field.
- Drag **Education** onto the **Columns** field.
- Drag **Customer Lifetime Value** onto the **Heat** field.

## Samples

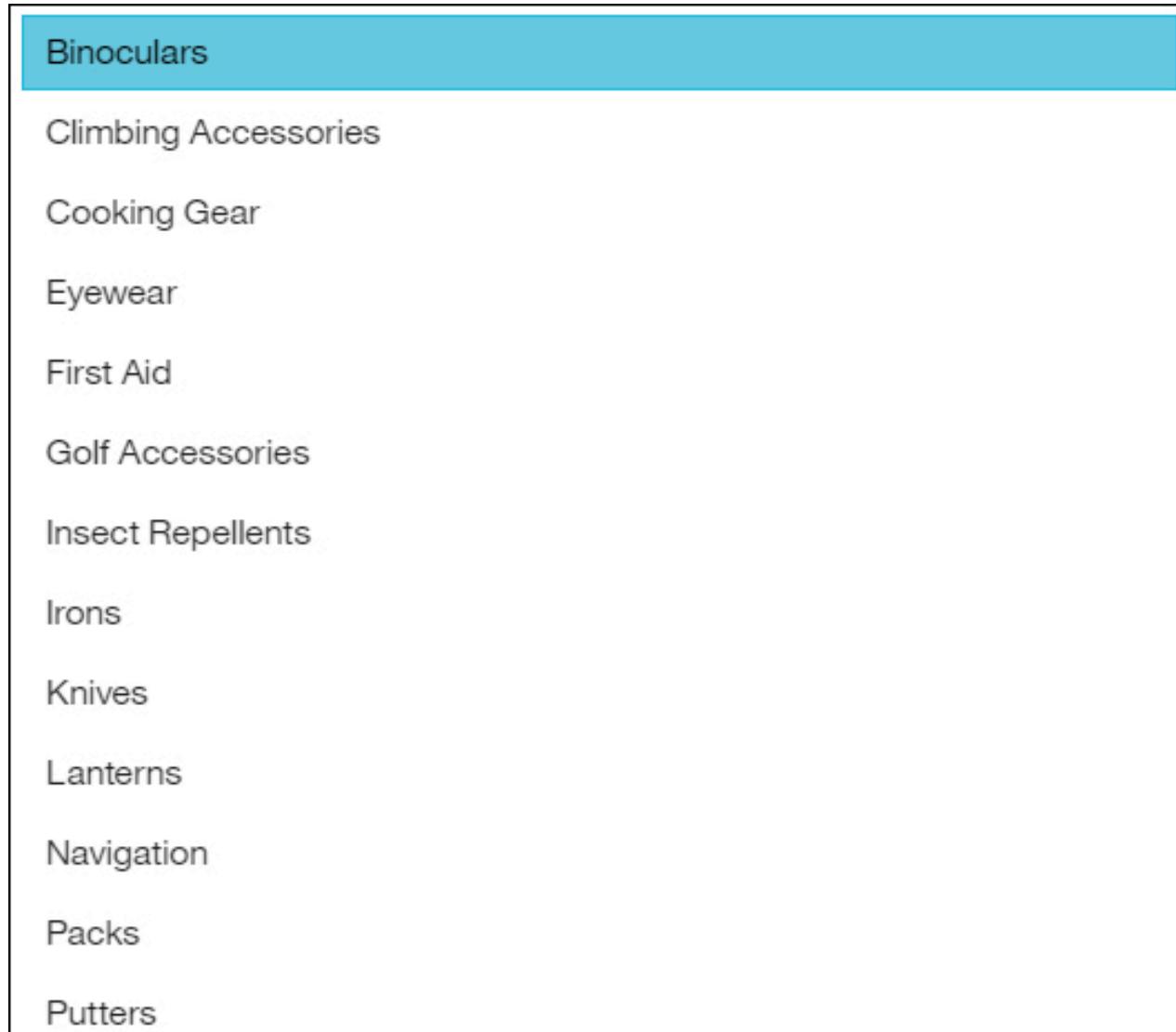
You can see examples of visualizations in the sample report **Customer lifetime value analysis**. You can find the samples here: **Team content > Samples > Reports > Customer lifetime value analysis**.

If any of the sample objects are missing, contact your administrator.

## Hierarchy

Use a hierarchy when you want to see the data in rows and columns.

For example, this hierarchy shows product types.



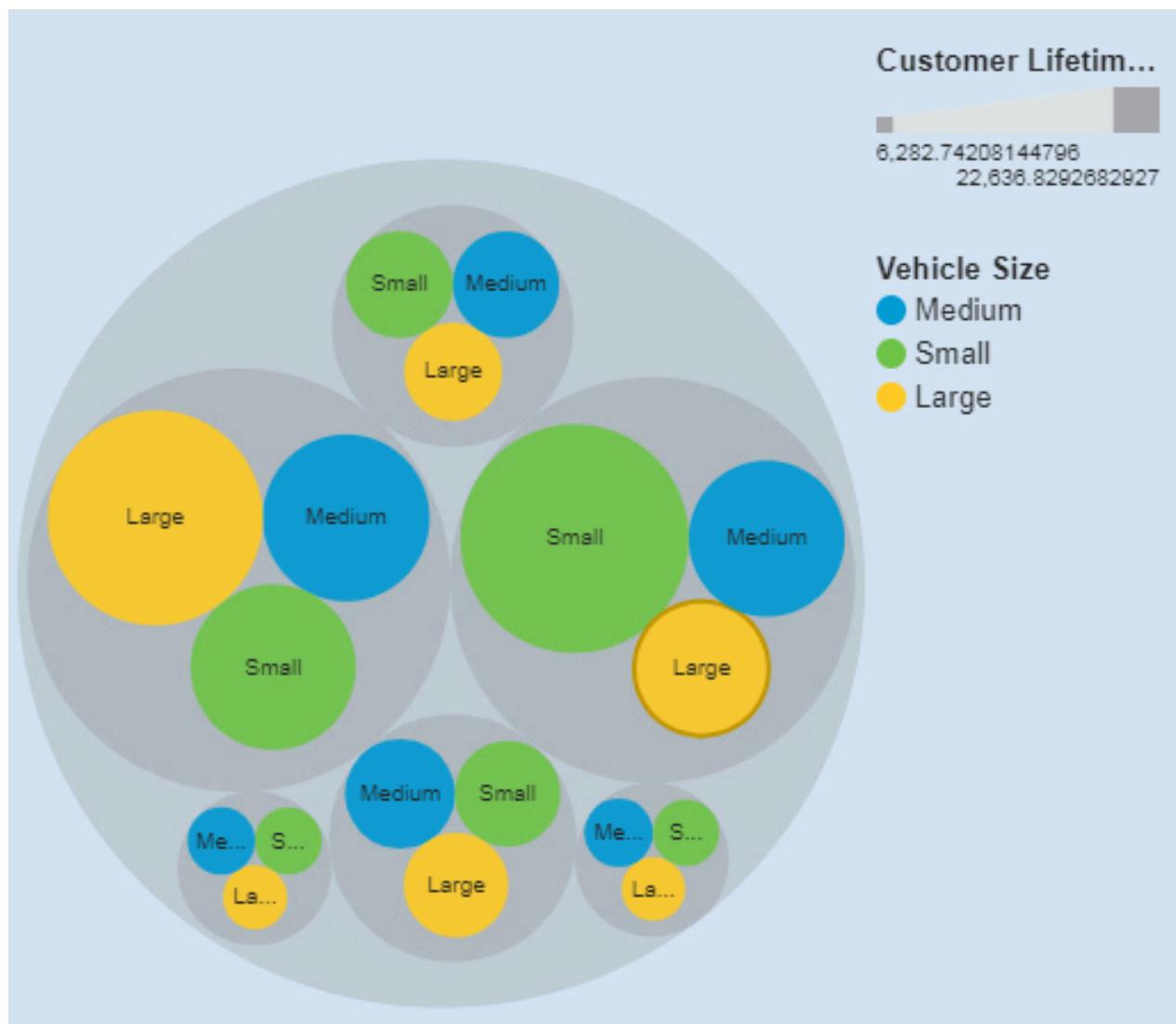
## Hierarchy bubble

Use a hierarchy bubble visualization when you want to show relationships among columns that contain values, such as net loss. It is similar to the bubble visualization but the bubbles are tightly packed instead of spread over a grid. The bubbles use nesting to represent the hierarchy. A hierarchy bubble visualization shows a large amount of data in a small space.

The size of each bubble shows a quantitative dimension of each data point. It shows many levels within a hierarchy and relationships between groups based on assigned attributes. It uses bubble size and color to convey comparative information about categories.

The bubbles are in different sizes and colors.

For example, this hierarchy bubble visualization shows customer lifetime value by vehicle class per vehicle size. Each bubble is a different vehicle class in one of the three vehicle size. The size of each bubble is determined by the customer lifetime value of that vehicle class. The colors of the bubbles are determined by the vehicle size.



The hierarchical packed bubble visualization was created by dragging the following data items from the Sources panel:

- Drag **Vehicle Class** and **Vehicle Class** onto the **Bubbles** field.
- Drag **Customer Lifetime Value** onto the **Size** field.
- Drag **Vehicle Size** onto the **Color** field

## Samples

You can see an example of a word cloud visualization in the sample report **Customer lifetime value analysis**. You can find the sample here: **Team content > Samples > Reports > Customer lifetime value analysis**.

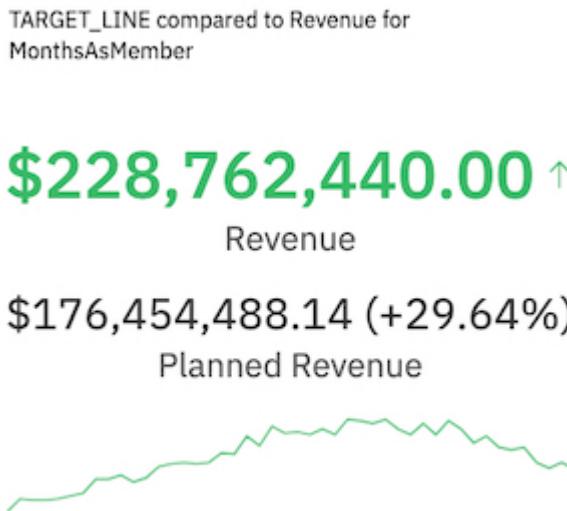
If any of the sample objects are missing, contact your administrator.

## KPI

Use a KPI visualization to display a key performance indicator (KPI) that contains two related measures, such as revenue and planned revenue. Optionally, you can display a sparkline and a meaningful shape in your KPI visualizations.

A KPI visualization compares a base value to a target value and shows the variance between the two measures.

For example, this KPI visualization shows the actual revenue in green with an up arrow to indicate that revenue is up compared to the target. In this case, the target value is planned revenue. A sparkline displays the shape of the variation over time and is the same color as the base value.



Create a similar KPI visualization by dragging measures from your own data source to the fields in an empty KPI visualization:

1. From the side bar, click the visualizations icon and then click **KPI**.
2. Drag a measure onto the **Target value** field.
3. Drag another measure onto the **Base value** field. This value is the actual target.
4. Drag another measure onto the **Time** field. This value creates a sparkline for your KPI visualization. You can add multiple measures, for example Years and Months, to the **Time** field.

Use the properties to customize a KPI visualization. For example, the properties are set by default to display a green conditional color when the target is met and a red conditional color if the target is not met. To display the actual target in another color, under properties, expand the rule and then select a different **Text color**.

Complete the following steps to edit a conditional color rule and select a custom colors:

1. Select the KPI visualization on your dashboard.
2. Click the properties icon .
3. In the **Visualization** tab, click **Color**.
4. Under **Rules**, expand the rule that you want to edit.
5. From **Text color**, select a color.

The following information describes the KPI properties under **Rule style**:

- **Text color**

Set the color for the value, sparkline, and indicator shape.

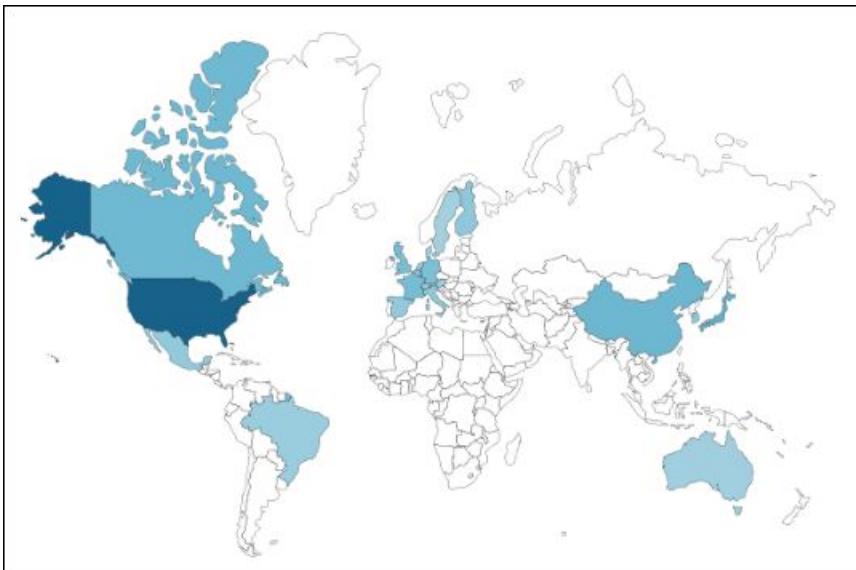
- **Indicator**

Select a shape to display on the KPI visualization when the rule is met. For example, you might want to display a down arrow when your base value falls below a certain threshold compared to the target value.

## Legacy map

Use a legacy map when you want to see patterns in your data by geography. You can use a legacy map when you are not connected to the internet.

For example, this legacy map visualization shows revenue by retailer country with the darker color indicating higher revenue.



For more information, see [https://www.ibm.com/support/knowledgecenter/SSEP7J\\_11.1.0/com.ibm.swg.ba.cognos.ug\\_ca\\_legacymaps.doc/ug\\_ca\\_legacymaps.pdf](https://www.ibm.com/support/knowledgecenter/SSEP7J_11.1.0/com.ibm.swg.ba.cognos.ug_ca_legacymaps.doc/ug_ca_legacymaps.pdf).

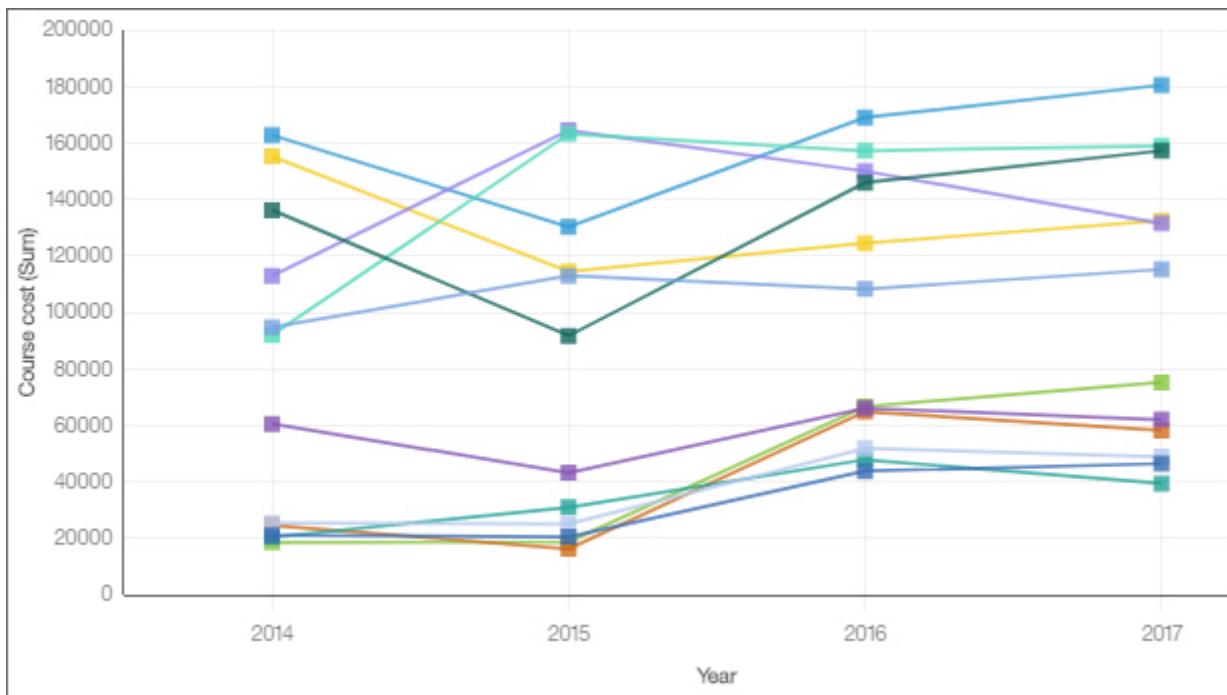
## Line

Use a line visualization to show trends over time.

A line visualization can compare trends and cycles, infer relationships between variables, or show how a single variable is performing over time.

For an effective line visualization, use a time column in the x-axis, such as years, quarters, months, or days. If the x-axis shows something else, such as Canada, Netherlands, UK, and US, use a bar or column visualization.

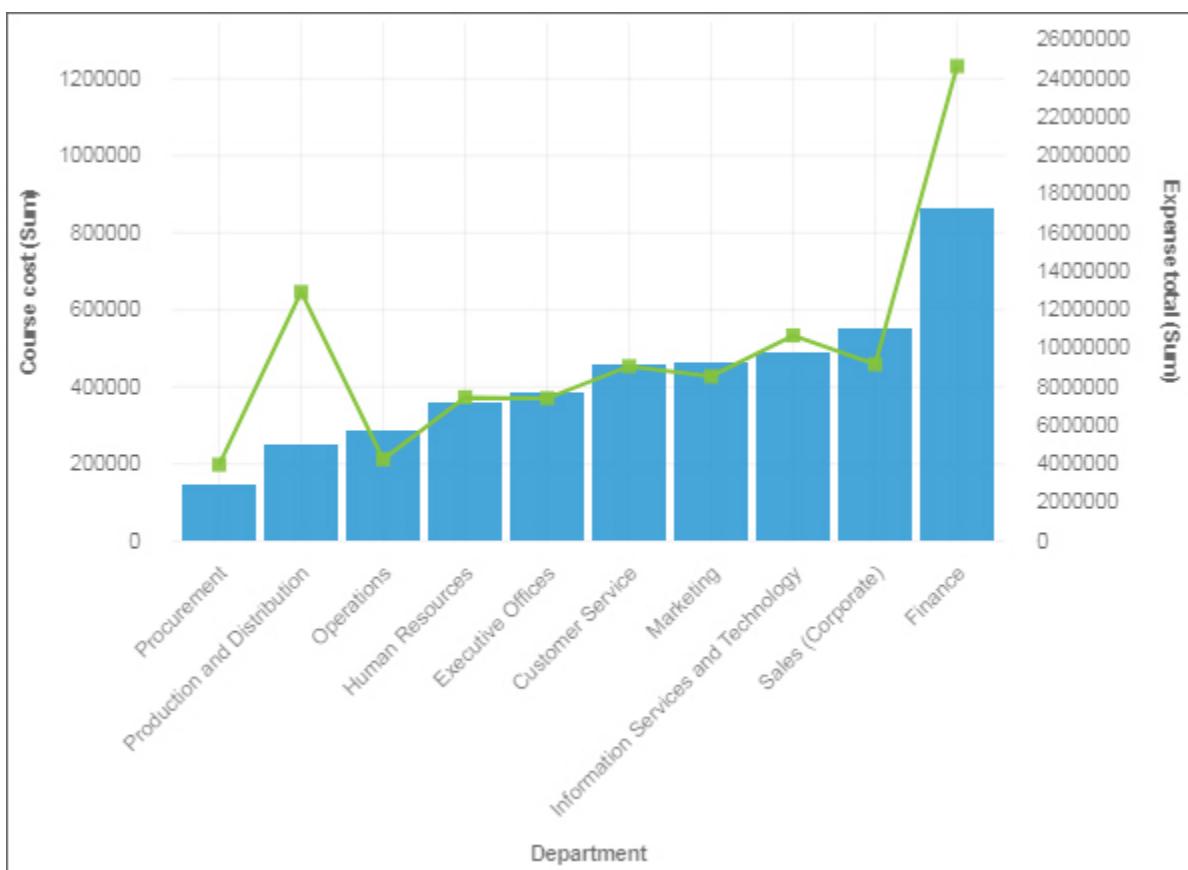
For example, this line visualization shows the trend in course costs by department over year.



## Line and column

Use a line and column visualization to highlight relationships between multiple data series by combining bars and lines with one visualization.

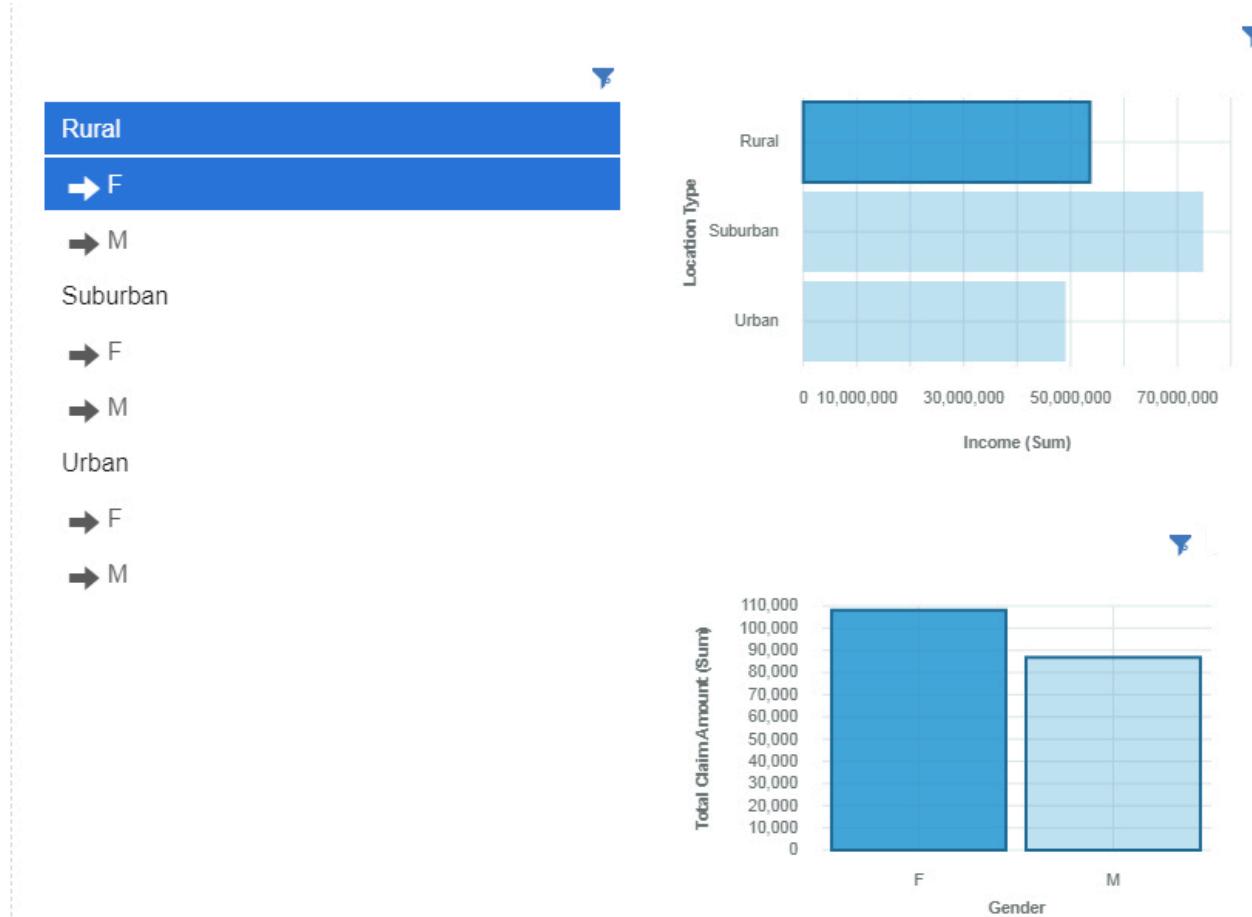
For example, this line and column visualization shows the relationship between course cost and expense totals by department.



## List

Use a list visualization to create an overview the data in a hierarchical way.

Another use of the list visualization is to create filter widget. The next example show how you can use the list visualization as a filter widget.



## Map

Use a map when you want to see patterns in your data by geography.

Your data asset must contain geographical data, such as countries, states, provinces, or continents.

**Note:** Maps do not show animations if you set your ease of access system settings to not display animations.

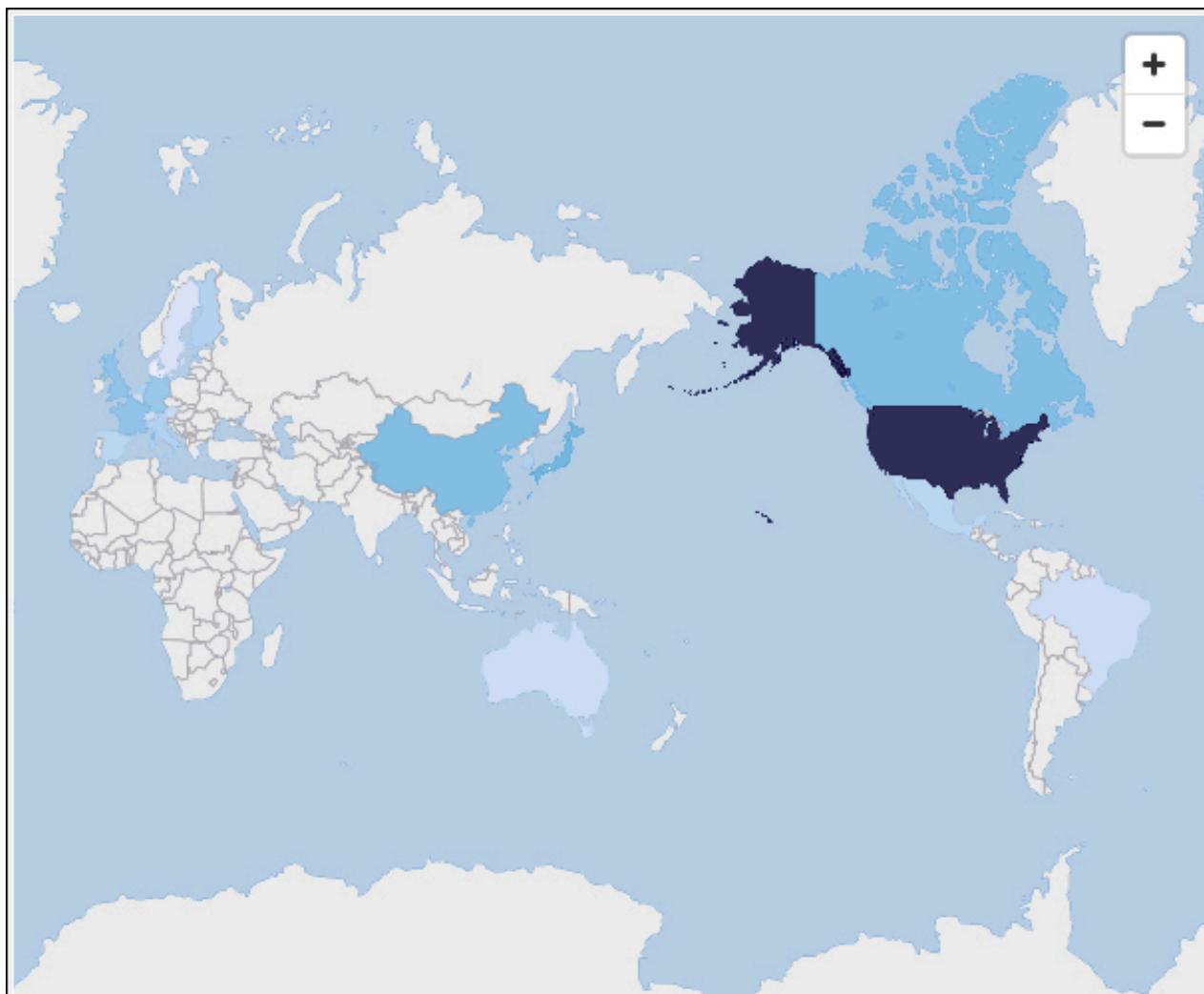
Maps in Cognos Analytics support the following continents:

- North America
- South America
- Africa
- Asia
- Europe
- Antarctica
- Oceania

To determine whether a column is mappable, Cognos Analytics analyzes a sample of 2000 values in the location column, looking for recognizable place names. If 80% or more are recognized as map values, Cognos Analytics produces a map.

For example, you have four countries in your location column: Brazil, China, India, and Russia. The typographical error for India means that only 75% of the values are recognizable place names and you will not see a map as a starting point. But if you have five countries and one has a typographical error in it, you see a map.

For example, this map visualization shows revenue by retailer country with the darker color indicating higher revenue.



## Marimekko

A marimekko visualization is similar to a stacked column visualization. It shows data through varying heights and includes an added dimension of data through varying column widths. The width of the columns is based on the value that is assigned to the width field. Individual segment height is a percentage of the respective column total value.

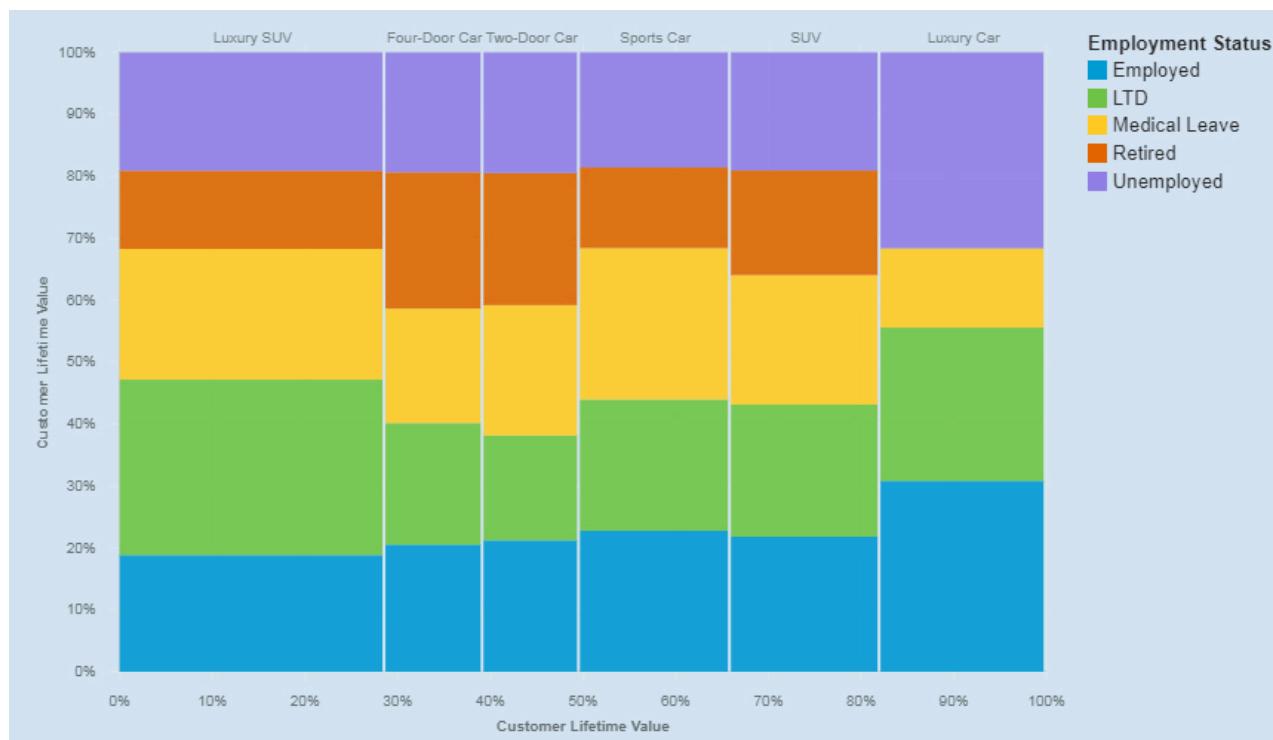
You can quickly spot large segments, such as a specific vertical that has a large share of a region. You can also identify white space such as an under-represented vertical in a specific region.

The marimekko visualization is useful for part-to-whole comparisons, where you need to show an extra measure/variable.

The marimekko visualization allows data to be depicted along two dimensions simultaneously. For example, market segments are often arrayed along the x-axis, with the width of each column corresponding to the financial value of a segment. You use marimekko visualizations in cases, for example, where you want to show the revenue contribution per product line. Or the gross domestic product per country.

The marimekko visualization can display total or partial number. If you want to use stacked percentages instead of number, then use the **Display as stacked percentage chart** option.

The following example shows the contribution of customer lifetime value and employment status in different vehicle classes with the option **Display as stacked percentage chart** enabled.



The marimekko visualization was created by dragging the following data items from the Sources panel:

- Drag **Vehicle Class** type onto the **Bars** field.
- Drag **Customer Lifetime Value** onto the **Length** field.
- Drag **Employment Status** onto the **Color** field

## Samples

You can see an example of a word cloud visualization in the sample report **Customer lifetime value analysis**. You can find the sample here: **Team content > Samples > Reports > Customer lifetime value analysis**.

If any of the sample objects are missing, contact your administrator.

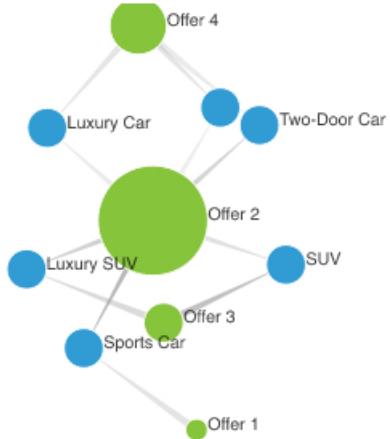
## Network

Use a network visualization when you want to see the connections among columns in your data asset. A network visualization is a good choice to show connections, networks, and points of intersection.

Network visualizations display a set of nodes, represented by symbols, and links, represented by paths, to show the relationship between entities or items.

Use the **From** and **To** fields to define the relationship that you want to investigate.

For example, a network visualization can show offer acceptance by Vehicle Class.



Create the Network visualization by dragging the following data items from the **Offers** section in the **Sources** pane  :

- Drag **Offer** onto the **From** field.
- Drag **Vehicle Class** onto the **To** field.
- Drag **Accepted** onto the **Line width** field.

Next, set the size and node properties.

1. Click the visualization, then click  . Set the following options in the **Properties** pane:
  - **Size - Width:** 500 px, **Height:** 300 px
  - **Nodes minimum size:** 20
  - **Nodes maximum size:** 100
2. Click  to close the **Properties** pane.

## Samples

You can see examples of visualizations in the sample report **Customer lifetime value analysis**. You can find the samples here: **Team content > Samples > Reports > Customer lifetime value analysis**.

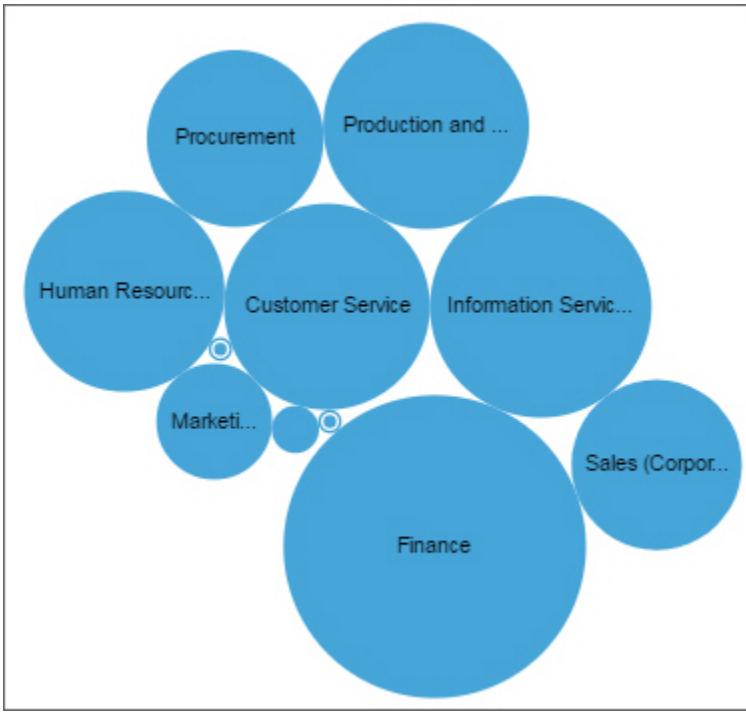
If any of the sample objects are missing, contact your administrator.

## Packed bubble

Use a packed bubble visualization when you want to show relationships among columns that contain numeric values, such as revenue. It is similar to the bubble visualization but the bubbles are tightly packed instead of spread over a grid. A packed bubble visualization shows a large amount of data in a small space.

The bubbles are in different sizes and colors.

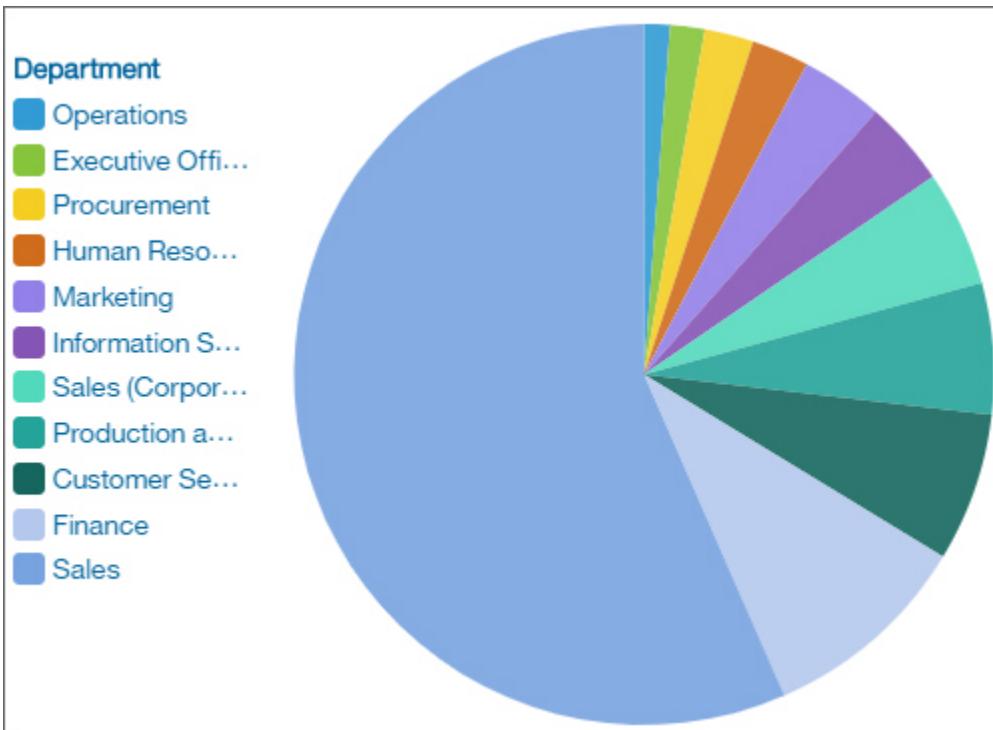
For example, this packed bubble visualization shows external hires by department. Each bubble is a different department. The size of each bubble is determined by the number of external hires for that department.



## Pie

Use a pie visualization to highlight proportions. Each slice shows the relative relationship of each part to the whole.

For example, this pie visualization shows the number of course days for each department.



## Point

Use a point visualization to show trends over time.

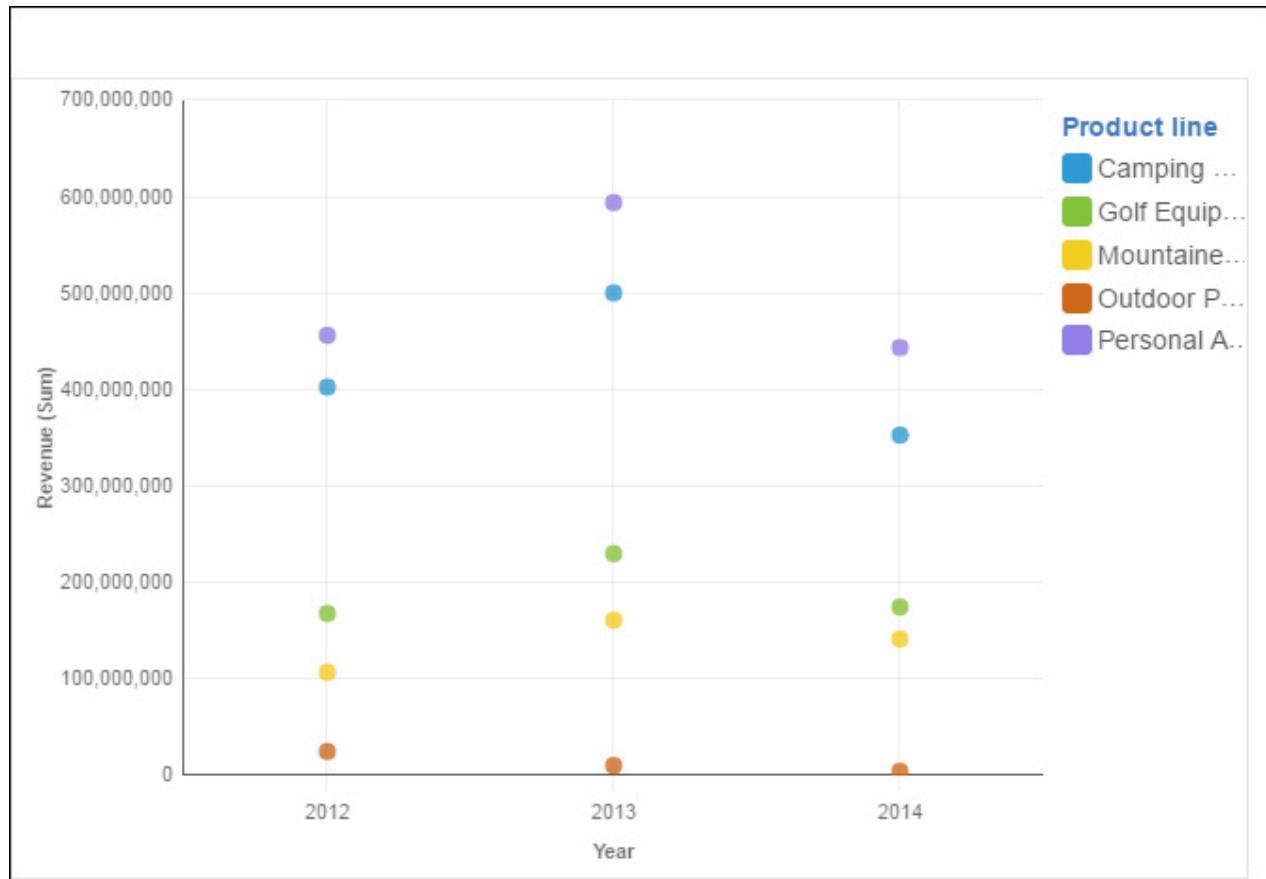
A point visualization can compare trends and cycles, infer relationships between variables, or show how a single variable is performing over time.

A point visualization is like a line chart without the connecting lines.

For an effective line visualization, the x-axis should show time, such as years, quarters, months, or days. If the x-axis shows something else, such as Canada, Netherlands, UK, and US, use a bar visualization.

Data values are plotted vertically.

For example, this line visualization shows revenue over quarter by order method type. Web orders have grown dramatically over this period.

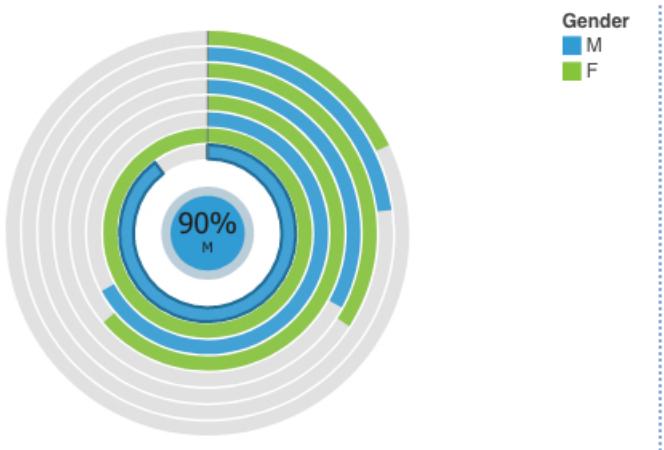


## Radial

In a radial visualization, each bar appears in a circle with longer bars that represent larger values. Hover over a bar to see the details about it, such as the exact value represented by the bar. Each bar starts at 12 noon and goes in a clockwise direction for positive values and counterclockwise for negative values.

Radial visualizations, also known as dial charts or speedometer charts, show information as reading on a dial. The radial visualization is valid only with one category.

For example, this visualization shows renewals by offer type and gender.



Create the Radial visualization by dragging the following data items from the **Customer Analysis** section in the **Sources** pane  :

- Drag **Renew Offer Type** onto the **Bars** field.
- Drag **Number of Policies** onto the **Length** field.
- Drag **Gender** onto the **Color** field.

The next step is to set the sort properties for **Renew Offer Type** and **Gender**.

1. Click the visualization, then in the **Data** pane, click the **<Renew Offer Type>** data item.
2. Click 
3. In the **Properties** pane, for **Sort order**, select **Ascending**.
4. In the **Data** pane, click the **<Gender>** data item.
5. In the **Properties** pane, for **Sort order**, select **Descending**.
6. Click  to close the **Properties** pane.

## Samples

You can see examples of visualizations in the sample report **Customer lifetime value analysis**. You can find the samples here: **Team content > Samples > Reports > Customer lifetime value analysis**.

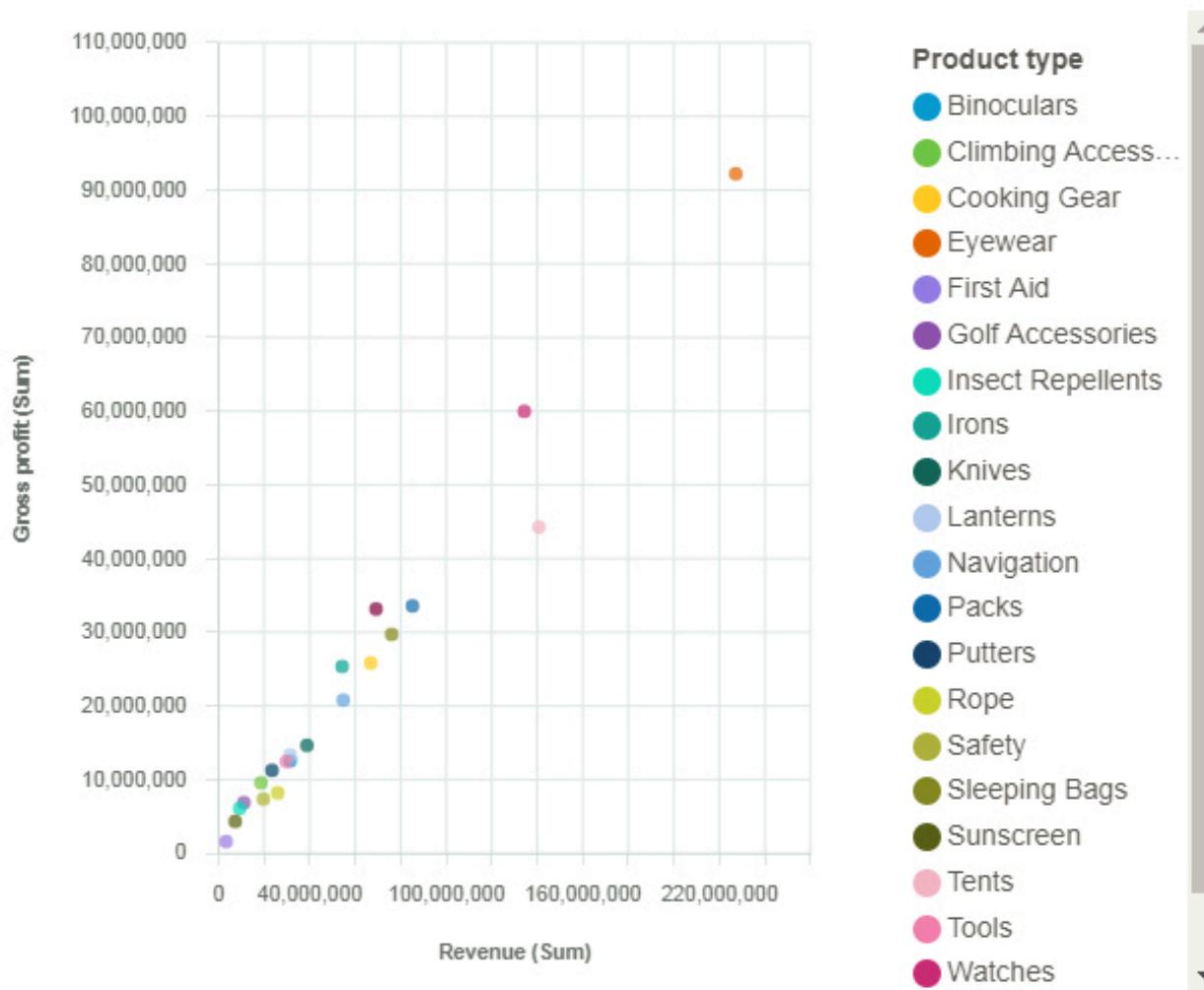
If any of the sample objects are missing, contact your administrator.

## Scatter

Scatter visualizations use data points to plot two measures anywhere along a scale, not only at regular tick marks.

Scatter visualizations are useful for exploring correlations between different sets of data.

The following example shows the correlation between revenue and gross profit for each product type.



## Spiral

A spiral visualization shows you the key drivers, or predictors, for a given target. The closer the driver is to the center, the stronger that driver is.

IBM Cognos Analytics uses sophisticated algorithms to deliver highly interpretable insights that are based on complex modeling. You don't have to know which statistical tests to run on your data. Cognos Analytics picks the right tests for the data.

Key drivers for both continuous and categorical targets are available in the spiral visualization in dashboards and explorations.

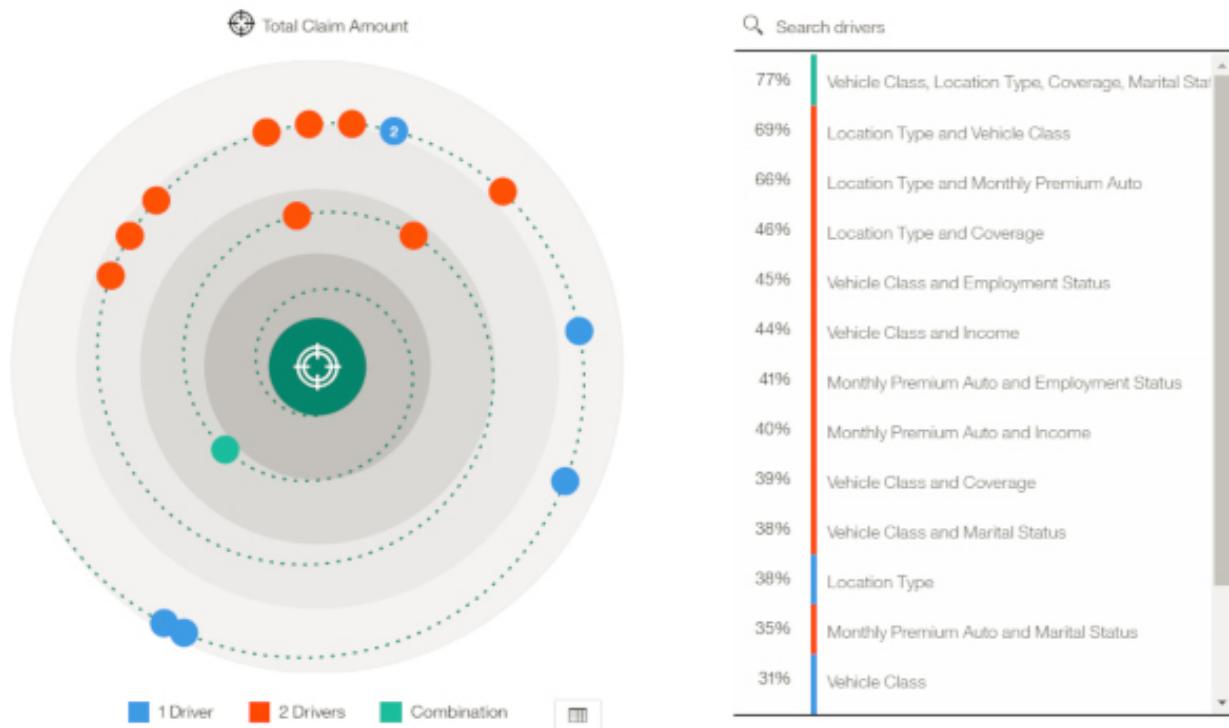
For more information, see *Statistical tests* documentation in the *IBM Cognos Analytics Dashboards and Stories User Guide*.

For example, this spiral visualization shows that the combination of vehicle class, location type, coverage, marital status, and employment status are the strongest drivers of the target, total claim amount.

You can exclude drivers from the analysis. Right-click on a driver and click the **Edit drivers** icon . Select the drivers that you want to include in the analysis.

To edit or add key drivers, click the \*\*\* on the target field.

To improve performance, due to number of rows in the data source, the analysis is based on a representative sample of the entire data.

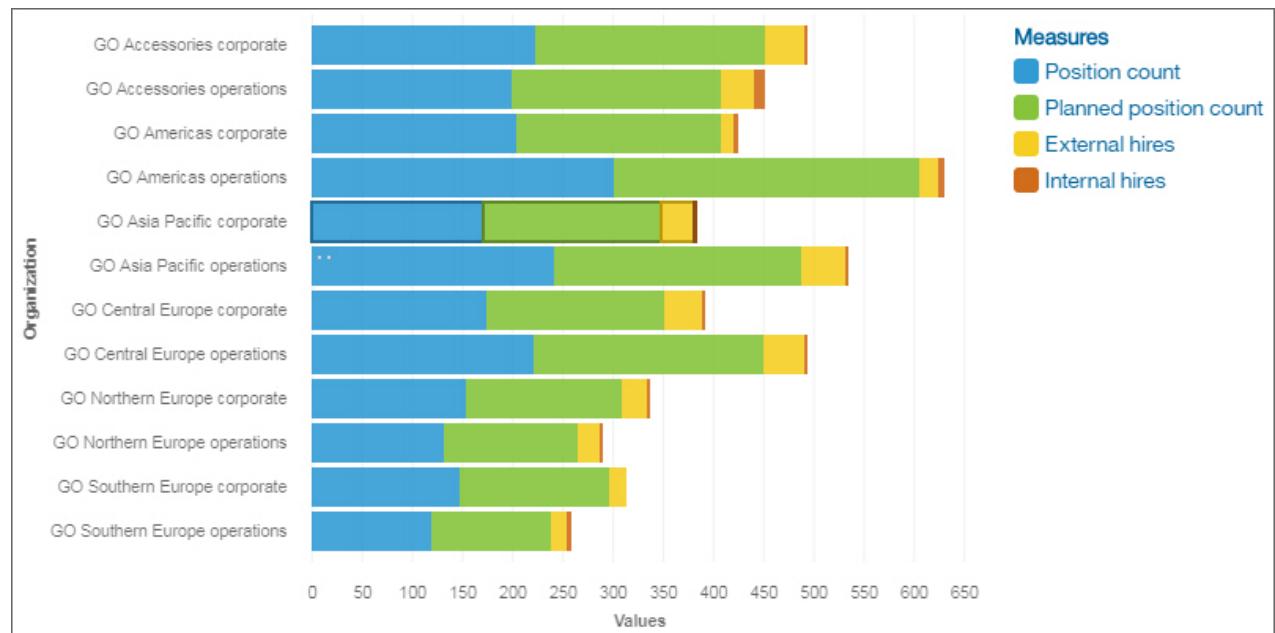


**Note:** Filters are not supported for spiral visualizations.

## Stacked bar

Use a stacked bar visualization to compare the proportional contributions for each item to the total, such as sales for products and sales for products each month.

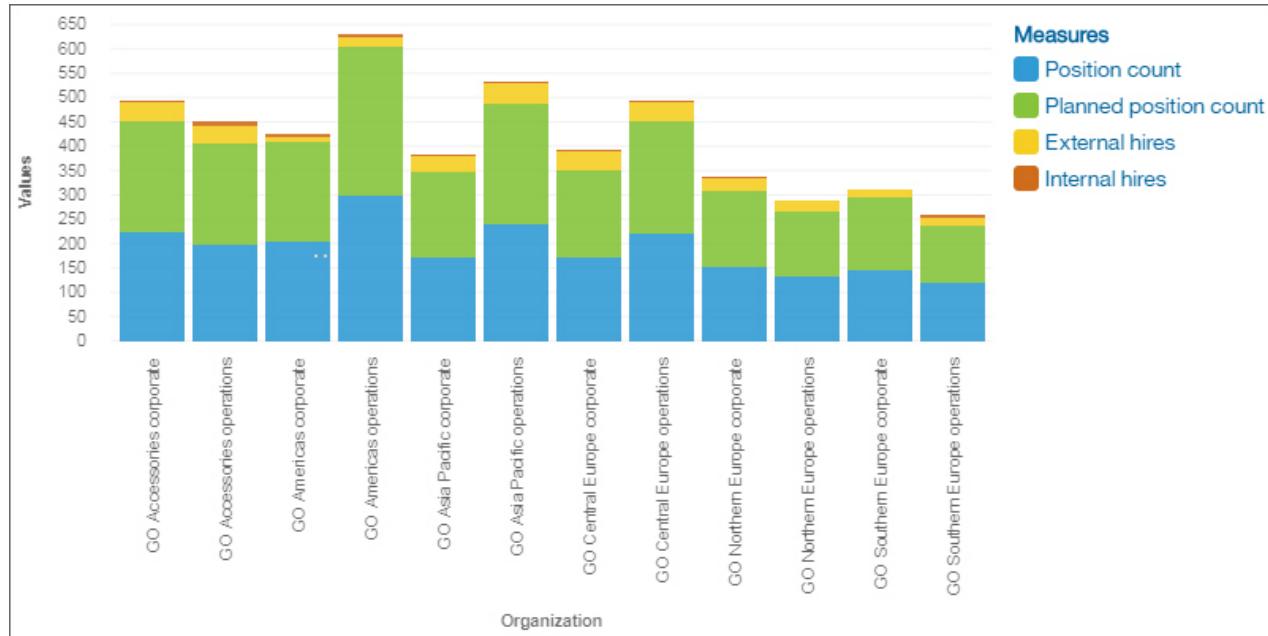
A stacked bar visualization can show change over a specific time period or compare the proportional contributions for each item to the total. If there are so many bars that the labels are impossible to read, filter the data to focus on a subset of the data or use a tree map.



## Stacked column

Use a stacked column visualization to compare the proportional contributions for each item to the total, such as sales for products and sales for products each month.

A stacked column visualization can show change over a specific time period or can compare the proportional contributions for each item to the total. If there are so many bars that the labels are impossible to read, filter the data to focus on a subset of the data or use a tree map.



## Summary

Use a summary visualization when you want to see the total for a measure or the count for a categorical column.

For example, this summary visualization shows total revenue for all product types.



For example, this summary visualization shows the number of departments in your organization.

# 11

## Department (Count distinct)

For example, this summary visualization uses a shape. If you drag a shape from the **Widgets** panel onto the summary visualization, the value will be represented by multiples of the shape.



To change the color of the shape, select the summary visualization, open the **Properties**, and on the **Visualization** tab, modify the **Element color** property.

### Visualization properties

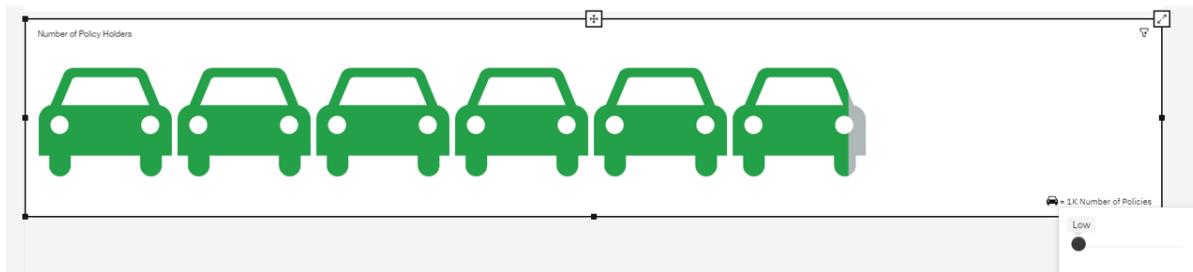
Visualization General

Color

Element color #24A148

Chart

To change the scale represented by the shape, click the legend in the bottom right corner and use the slider to select **Low**, **Default**, or **High**.



## Sunburst

A sunburst visualization is used to illustrate how underlying data predicts a chosen target and highlights key insights.

For more information about the sunburst visualization, see “[Exploring a decision tree visualization](#)” on page 48.

## Table

Use a table to show detailed information from your database, such as product lists and customer lists. A table shows data in rows and columns. Each column shows all the values for a data item in the database or a calculation based on data items in the database.

For example, this table shows the course cost for each department.

Department	Course cost
Customer Service	459,250
Executive Offices	384,000
Finance	863,750
Human Resources	361,250
Information Services and Technology	491,750
Marketing	465,750
Operations	288,000
Procurement	146,250
Production and Distribution	249,450
Sales	4,056,000
Sales (Corporate)	549,550
Summary	8,315,000

## Adding more columns to a table

You can focus on points that are of interest to you by adding more data to the visualization.

1. Drag another column to the field where you want additional data.
2. Drop the column beside the existing column.

Starting from Cognos Analytics version 11.1.4, you can drag data from the **Selected sources** pane and insert data in a column/row or drop the data on top of an existing data to replace it.

## Treemap

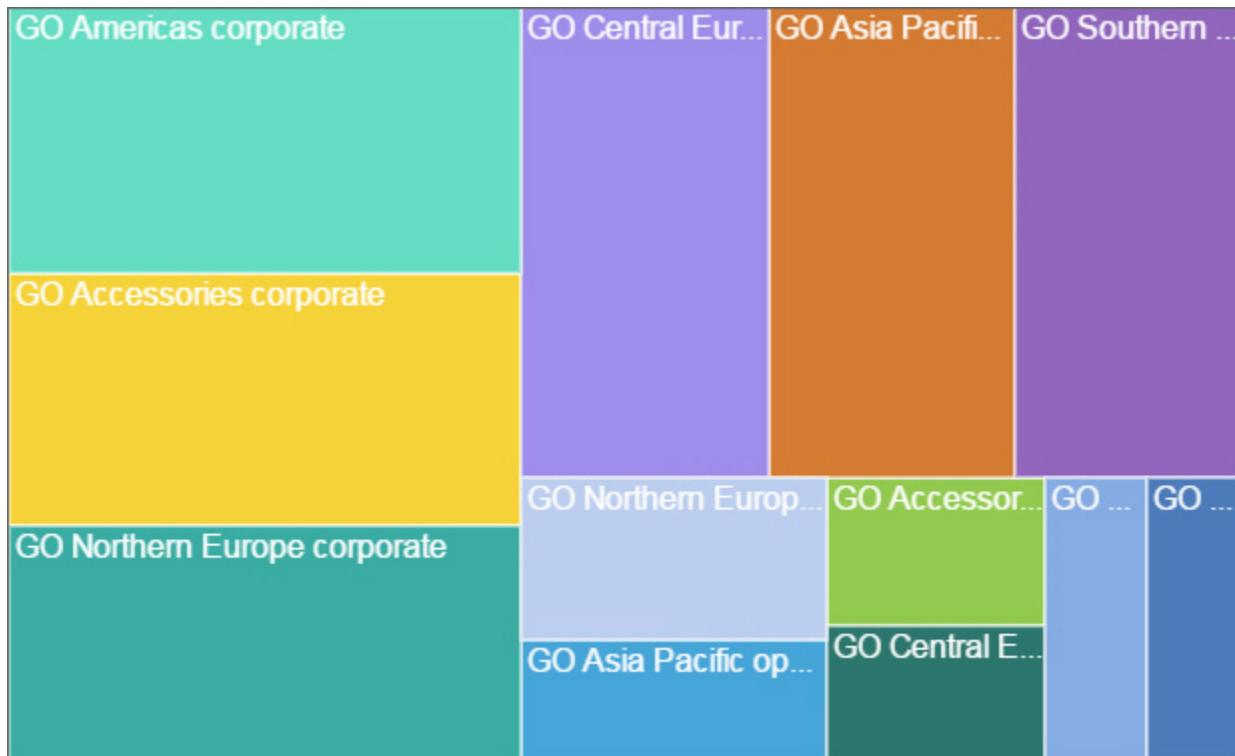
Use a treemap visualization to identify patterns and exceptions in a large, complex data asset.

Tree maps show relationships among large numbers of components by using size and color coding in a set of nested rectangles.

A treemap that is colored by category identifies the level 1 category by color. The sizes of the rectangles represent the values. In a treemap that is colored by value, the sizes of the rectangles represent one of the values and the color represents a second set of values. Do not use data that includes negative numbers. A treemap ignores negative numbers.

Many data assets have a hierarchical structure. For example, you have data about the profit margin of food items in a grocery store. Under the general category of fruit, there is a category for citrus fruit. Various citrus fruits are listed, such as grapefruit, orange, and lemon. A treemap displays how each citrus fruit is performing when compared to each other and to other types of food.

For example, this treemap visualization shows course cost by organization.



To deselect a box that you selected, Ctrl+click the selected box.

Treemap visualizations support the following display modes:

- **Squareified:** The default display mode.
- **Slice:** Displays measures that belong to the same node in a vertically sliced way.
- **Dice:** Displays measures that belong to the same node in a horizontally sliced way.
- **Slice - Dice:** Displays stacked hierarchical measures that belong to the same node in a vertically sliced way.

The following screen capture displays a treemap with the Organization and Department measures on the **Area hierarchy** field, and Expense total on the **Size** field.

## Expense total for Organization and Department hierarchy



## Waterfall

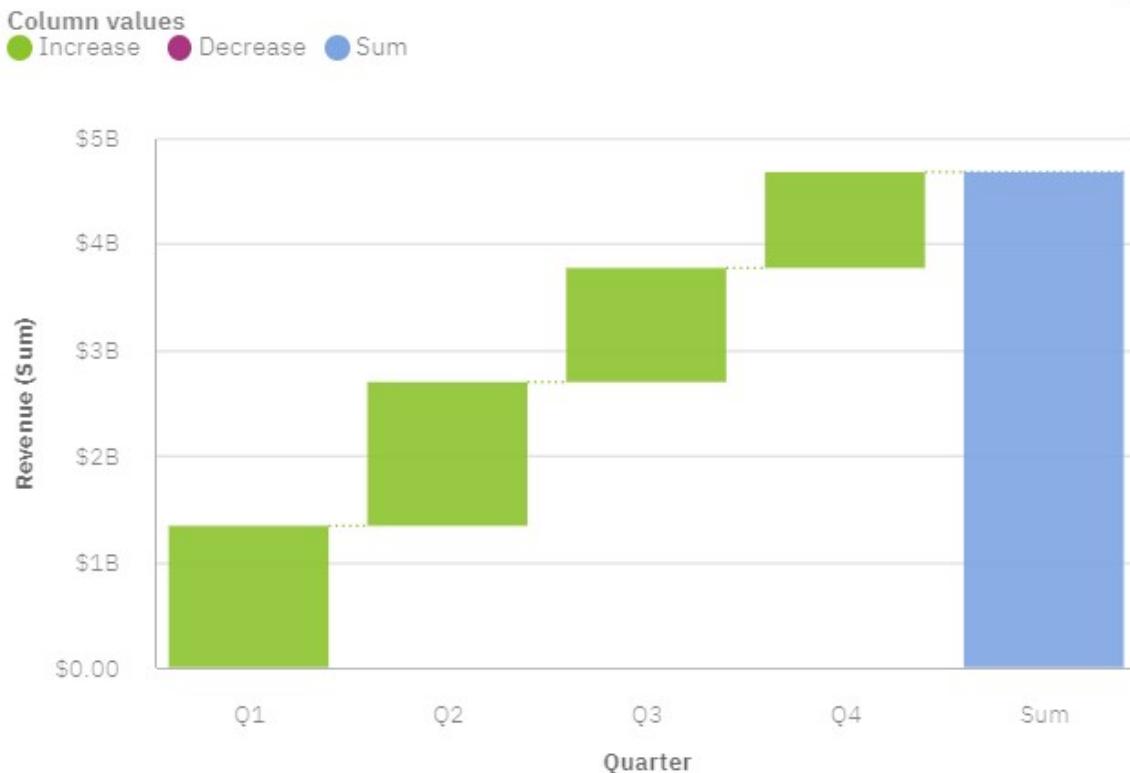
Use a waterfall visualization to understand the cumulative effect a series of positive and negative values have on an initial value. The bars in a waterfall visualization are not totals.

A waterfall visualization shows how an initial value is increased and decreased by a series of intermediate values, leading to a final cumulative value shown in the far right column. The intermediate values can either be time-based or category-based.

Some examples of waterfall visualizations are as follows:

- Viewing the net income after you add the increases and decreases of revenue and costs for an enterprise over a quarter.
- Cumulative sales for products across a year with an annual total.

This waterfall visualization shows the revenue delta by quarter.



## Creating a waterfall visualization

1. Create a new dashboard.
2. Open the sample data module: **Select a source > Team content > Samples > Data > Sporting Goods Company**.
3. Click **Visualizations** and click **Waterfall** to add the waterfall visualization to the dashboard.
4. Click **Sources**



5. Drag the following data items from the Policy Holders section:
  - Drag **Quarter** onto the **x-axis** field.
  - Drag **Revenue** onto the **y-axis** field.
6. Set the properties for the Delta data item. Click **...**, select, and **Format > Currency** set the following options:

- **Abbreviate**

- **Currency:** Default

- **Currency display:** Default

7. Set the properties for the appearance of the visualization. Click



In the **Visualization** tab, you can set column color options, axis, legend position, and chart properties.

For example, set these options:

- **Total column positive color:** #8DC945

- **Show legend:** Off

In the **General** tab, you can set appearance, layout, position, and size.

**Note:** Size properties are set in percent if the **Dashboard > Canvas > Layout positioning** property is set to **Relative**, and in px if **Layout positioning** is set to **Absolute**. To find out more, see “[Setting up the page in a dashboard](#)” on page 11.

When you are done, click



to close the **Properties** pane.

#### 8. Click **Collapse**



to return the Waterfall visualization to the dashboard.

## Sub-categories

You can use sub-categories in waterfall visualizations. Use sub-categories to display how categories are built up.

#### 1. While in edit mode, drag **month** onto the **Sub-categories** field.

You can see how the revenue of each month contributes to the quarters.



## Showing the sub-categories as actual or as changed values

You can display the values of the sub-categories as actual or as changes.

#### 1. While in edit mode, click . In the **Visualization** tab, click **Chart > Sub-category values**. Select from the menu either **Actual** or **Change**.

You can see how the changes in revenue of each month contribute to the quarters.

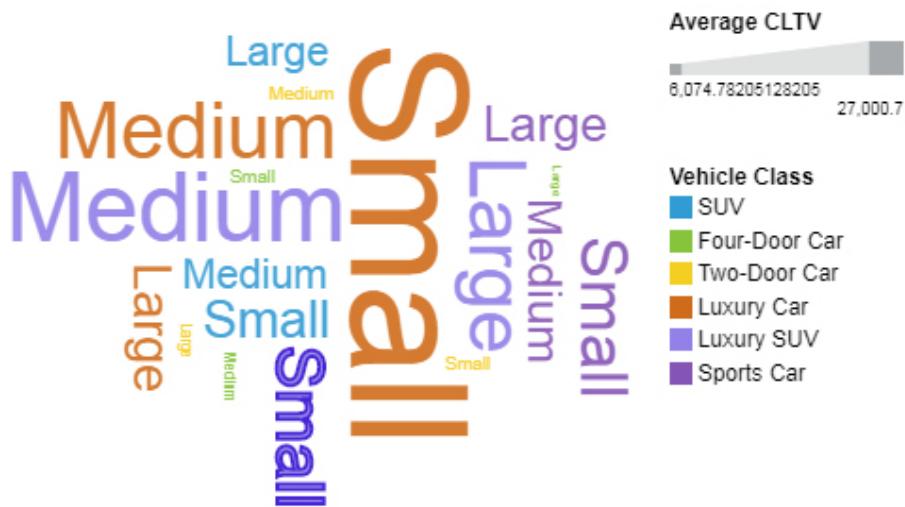


## Word cloud

Use a word cloud visualization when you want to see a text-based visualization of a column. The text height represents the scale. The name itself is the different members of the column.

**Tip:** The data asset should contain at least 15 columns and at least 100 rows to create an effective word cloud.

For example, this word cloud visualization shows the customer life time value by vehicle size and class.



The word cloud was created by dragging the following data items from the Sources panel:

- Drag **Vehicle size** type onto the **Words** field.
- Drag **Average CLTV** onto the **Size** field.
- Drag **Vehicle class** onto the **Color** field

## Samples

You can see an example of a word cloud visualization in the sample report **Customer lifetime value analysis**. You can find the sample here: **Team content > Samples > Reports > Customer lifetime value analysis**.

If any of the sample objects are missing, contact your administrator.

## Insights in visualizations

IBM Cognos Analytics provides analytic insights that help you to detect and validate important relationships and meaningful differences based on the data that is presented by the visualization.

Insights are available by clicking the **Insights** icon  of eligible visualizations. When you turn on insights, the summary appears in the **Insights** box and related visualization elements are highlighted and details are provided in the corresponding tooltip message. You can control each available insight separately.

### Procedure

1. In a visualization that supports insights, click the **Insights** icon .
2. Depending on the visualization, the following insights are shown:
  - **Average** Provides the mean of the displayed target value.
  - **Predictive strength** Shows the predictive strength of the relationship between the target and explanatory fields.
  - **Fit line** Shows when either a linear or quadratic relationship exists between the target and explanatory fields.
  - **Meaningful differences** Shows values that are most significantly higher or less than the average or trend.
  - **Most frequent** Shows values that are most frequently reported.

## Importing a custom visualization in a dashboard

You can import custom visualizations in your IBM Cognos Analytics dashboard.

### About this task

For more information on developing custom visualizations, see the *Developing custom visualizations* documentation in the *IBM Cognos Analytics Custom Visualizations Developer Guide*.

### Procedure

1. Create a dashboard.
2. Click the **Visualization**  icon in the toolbar.
3. Click the **Custom** tab.  
If there are no custom visuals available, then you can add a custom visual via the **Add a custom visual** icon on the **Custom** tab.  

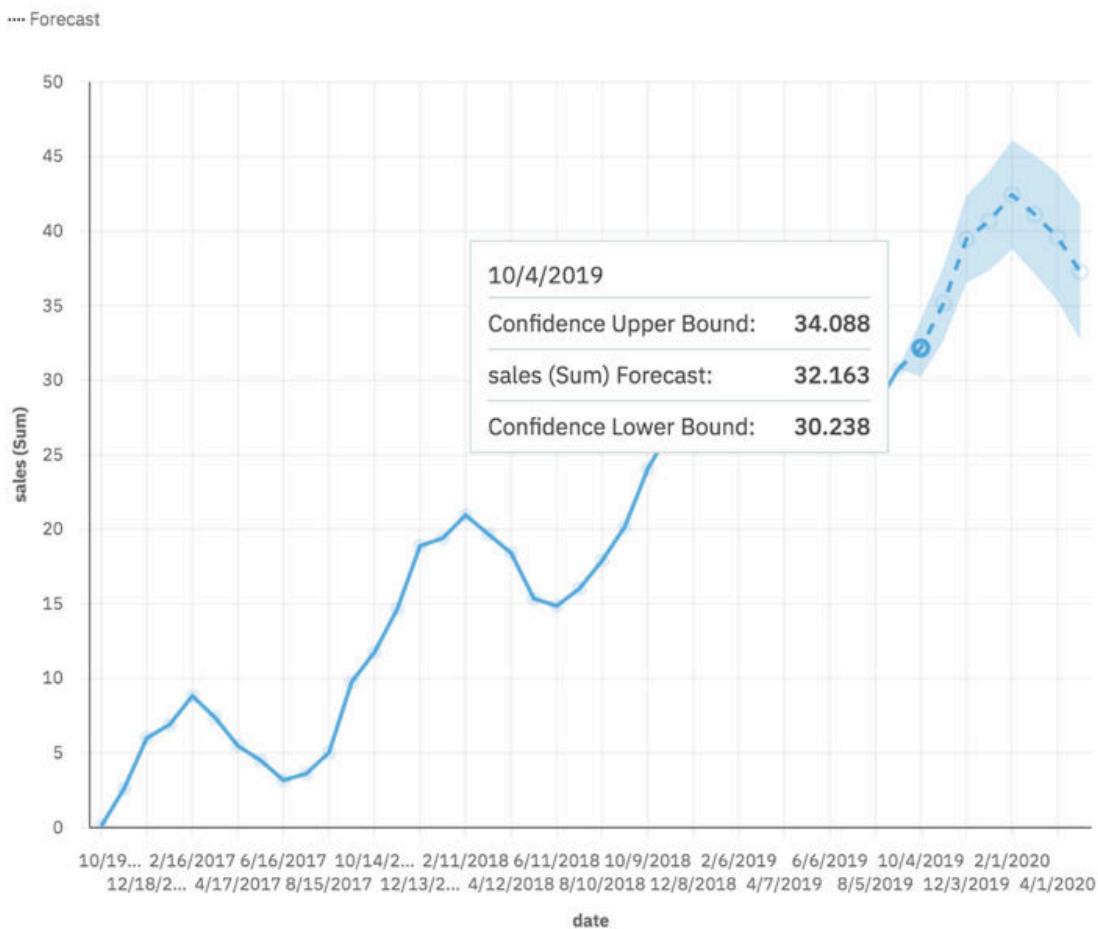
4. From the **Custom visuals** pane, select the custom visualization that you want to use.

## Forecasting in visualizations

The forecasting feature provides time series data modeling and forecasts based on data presented in corresponding visualizations.

The forecasting feature is controlled by the **Forecast** dialog box available at the right corner of each eligible visualization. A visualization is eligible if both the visualization type and specified data are supported for forecasting. When the **Forecast** dialog box is available and the feature is turned on, appropriate time series models are estimated and computed forecasts are displayed in the visualization. The **Forecast** dialog box contains user controls to assist in generating suitable models, forecasts, and corresponding confidence bounds. All results are updated when any of the controls are adjusted. While forecasts and confidence bounds are displayed or available in the visualization, the corresponding time series model's specification and data processing summary are available in Forecasting statistical details found in the data tray below the visualization.

The tooltip corresponding to a future value displays the corresponding time point, the forecast value, as well as upper and lower confidence bounds for the forecast value. Forecasting values and confidence bounds appear in a visualization.



## Procedure

- In a visualization that supports forecasting, click the **Forecasting** icon .
- Depending on the visualization, the following forecasting options are shown:

### Forecast periods

The number of steps to forecast ahead.

The default value is **Auto**, which is 20% of the length of the historical data. Any missing values at the end of a particular series will also be forecast, but they will not count towards the specified number of forecast periods.

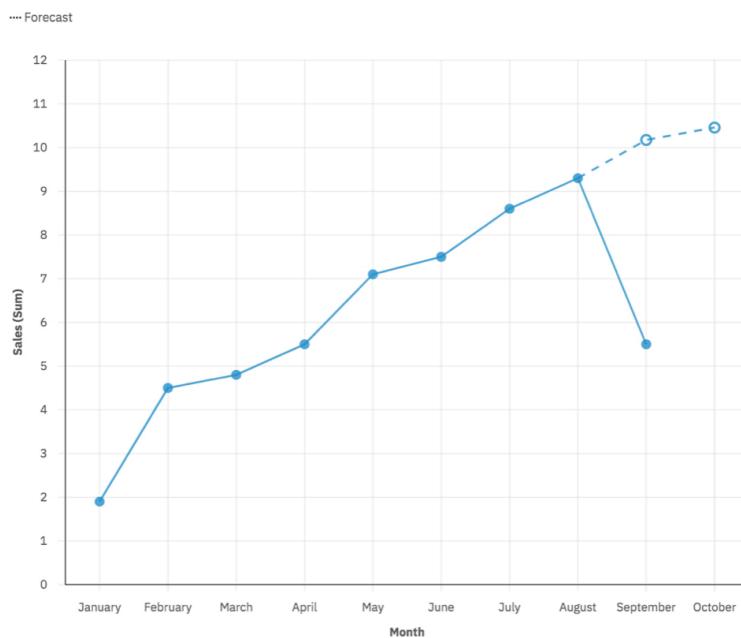
### Ignored last periods

Ignores a specified number of data points at the end of a time series when building the model and computing the forecasts. Any missing values at the end of a non-ignored portion of a series will also be forecast. Ignored last periods value must be specified as a non-negative integer, such as: 0, 1, 2, 3.

The default value is 0. If there are no missing values, then all of the historical data is used in model generation and the first forecast point is after the last historical data point. 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.

The following visualization shows a forecast that ignores September's results by setting **Ignored last periods** to 1.



### 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.

You can select 3 different confidence levels: 90%, 95%, and 99%. The default is 95% and the lower and upper bound define the range at which you can be 95% confident that the true value lies within that range.

### 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.

You can specify seasonality by entering a non-negative integer, such as: 0, 1, 2, 3 as the seasonal period.

To specify a non-seasonal model, set the **Seasonal period** to 0 or 1. A model with user specified seasonality is displayed only if the seasonal model is more accurate than all of the non-seasonal models

## Recommended visualizations

IBM Cognos Analytics provides a number of recommended visualizations based on the data that you are working with.

Using a machine learning pipeline that is derived from training data and the input from visualization specialists, Cognos Analytics matches your data with the visualizations that illustrates your data.

When you drag a measure or column on to the canvas, Cognos Analytics chooses a recommended visualization for you. You can change it by selecting another visualization from either **Recommended visualizations** or from **All visualizations**.

## Highlighting conditionally formatted data with color

Conditional formatting allows you to see the distribution of your data and highlight exceptional data points by using color in your table or crosstab visualizations. For example, you might want to highlight low sales numbers in red, or use green to highlight sales numbers over a certain threshold.

### Procedure

1. Select a table or crosstab visualization and click the **Properties** tab .
2. In the **Visualization** tab, under **Color**, select a measure from the **Available data** list.
3. Under **Rules**, select the properties for your conditionally formatted data.
4. To add a new rule, under **Rules** select **Add rule**.
5. To delete a rule, expand the rule and select **Delete rule**.
6. To prioritize which rules take precedence, click and drag the rules to place them in the order that you want.

## Grouping data

You can automatically group data into bins to organize and display all your data in one visualization.

### About this task

Enable the **Auto-group** feature when there is too much data to display or anytime you want to group your data.

**Note:** **Auto-group** can be applied to measures and to relational databases only. If you are using an OLAP package, the **Auto-group** option is not available.

### Procedure

1. Open the **Fields** pane.
2. Select a measure from a non-measure field, click the **More** icon , and click **Auto-group**.
3. Click the toggle to enable **Auto-group**.
4. In the **Number of groups** field, type a number in the range of 5 - 100 to set how many groups to display.

**Note:** You might not see the exact number of groups that you set in the **Number of groups** field because when a group does not have a value, it is not displayed.

## Value axis options

With the value axis options, you can modify the value axis on eligible visualizations.

### About this task

The following options are available:

- **Value axis show zero origin**

With the option, **Value axis show zero origin** you can set if you want to show or hide the zero origin on the value axis.

- **Value axis tick interval**

With the option, **Value axis tick interval** you can set the interval on the value axis.

- **Value axis minimum value**

With the option, **Value axis minimum value** you can set the minimum value of the value axis.

- **Value axis maximum value**

With the option, **Value axis maximum value** you can set the maximum value of the value axis.

## Procedure

1. Select the visualization and click the **Properties**  icon.
2. On the **Visualization** tab, set the options.

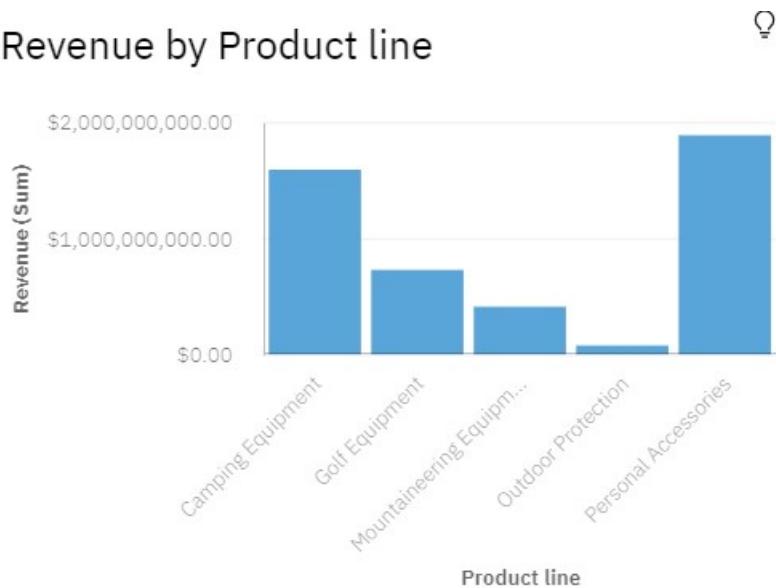
## Logarithmic scale

Logarithmic scales are useful when the data you are displaying is much less or much more than the rest of the data or when the percentage differences between values are important.

You can specify whether to use a logarithmic scale, if the values in the chart cover a very large range.

A logarithmic scale shows the base value of 10 raised to the power of a value. For example, 10 has a logarithm of 1 because 10 raised to the power of 1 is 10. 100 has a logarithm of 2 because 10 raised to the power of 2 is 100, and so on.

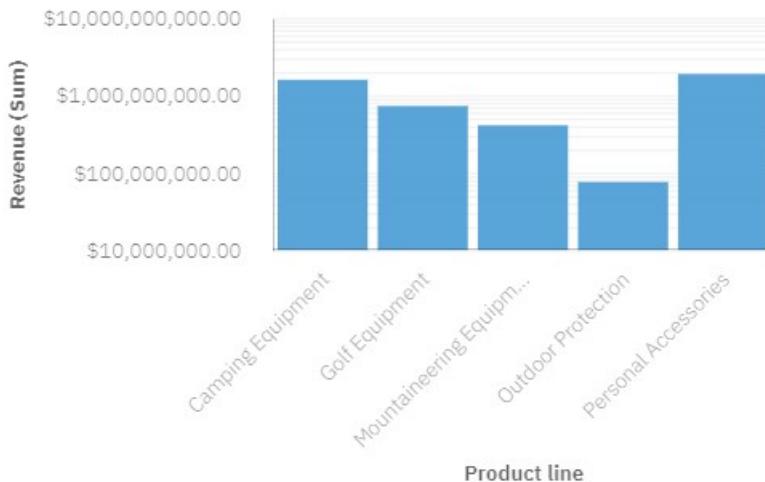
For example, the following chart is using a normal scale:



In this chart, the Y-axis shows values up to 2,000,000,000 with evenly spaced intervals of 1,000,000,000. However, the Outdoor Protection column is so much less than the other columns that it is difficult to compare them.

The following is the same chart that uses a logarithmic scale:

## Revenue by Product line



In this chart, the Y-axis still shows the same revenue values, but the intervals reflect a logarithmic scale, which increases exponentially. You can now compare all the product lines because none of the product lines have much higher or much lower values than the others.

Logarithmic scales can also be useful when the percentage or ratio differences between values are important. For example, if the logarithmic scale chart above represents data from 2011, and you add data from 2012 as a second set of colored bars, you could see the differences between the 2011 revenue and 2012 revenue. In a logarithmic scale, differences between values on the Y-axis represent the same percentage for each bar. So if the 2011 and 2012 data differs by the same distance for each product line, you could deduce that your revenue went up by the same percentage for each product line. This would not be clear on a normal scale.

### Procedure

1. Select the visualization.
2. In the **Properties** pane, under **Chart**, select the **Value axis logarithmic scaling** option.

**Note:** If you choose to use a logarithmic scale, ensure that your chart consumers know that the scale is logarithmic by including that information in the axis title or in a note on the chart.

## Responsive option

Hides certain aspects of the visualization if the size is limited, to maximize the space that is available to display data.

### Procedure

1. Select the visualization and click the **Properties**  icon.
2. On the **Visualization** tab, click **Chart > Responsive**.

## Creating custom data groups

You can organize column data into custom groups so that the data is easier to read and analyze. Create custom data groups directly in a dashboard without having to open the data modeling component.

### About this task

Complete the following steps to create a group, see what columns are included in the group, edit the name of the group, or remove a group.

**Note:** Custom data groups can be applied to measures and to relational databases only. If you are using an OLAP package, the **Custom data group** option is not available.

## Procedure

1. Open a visualization that has a measure.
2. Click any white space in the visualization.  
A toolbar appears.
3. Click the **Select tool**  icon in the toolbar.
4. Select the columns that you want to include in a custom group.

**Tip:** Alternatively, Ctrl+click one or more columns that you want to include in a custom group.

5. Ctrl+click one of the columns.

A menu appears.



6. From the menu, click the **Custom data group**  icon.
7. Type a name for your custom data group and click **OK**.
8. To see what columns are included in a custom data group:

- a) Ctrl+click the custom data group column on a visualization and click the **Drill down**  icon.  
The separate individual columns that make up the custom data group are displayed.
- b) To redisplay the custom data group as one column, Ctrl+click a column and click the **Back**  icon.

9. To edit the name of a custom data group:

- a) Ctrl+click the custom data group column on a visualization and click the **Custom data group**  icon.
- b) Click **Rename**, type a name and click **OK**.

10. To remove a custom data group:

- a) Ctrl+click the custom data group column on the visualization and click the **Custom data group**  icon.
- b) Click **Ungroup**.

The custom data group is removed from the visualization.

## Results

Your custom data groups appear in the data tray for the dashboard and in the data slots for the visualizations that use the custom data groups. Custom data groups are not displayed in the **Selected sources** panel.

## Showing or hiding rows and columns in a crosstab

Show or hide individual rows and columns in a crosstab and maintain the correct values in the **Summary** cells.

## Procedure

1. Right-click on the row or column in a crosstab that you want to hide.
2. Select **Hide** .

A blue line is displayed to indicate that there are hidden values.

3. Double-click the blue bar to show the hidden values.
4. To show all of the hidden values, from the toolbar for a visualization, select **Show all** .

## Showing data as points in a visualization

Use the Points data slot to show the data for each of the values in a column as a point in the visualization.

### Procedure

1. Open a visualization that has a **Points** data field.



2. Drag the measure that you want to show the points for to the **Points** data field.

3. Close the visualization.



## Showing data as sizable points in a visualization

Use the Size data slot to include the values of a column by setting the size of each point in the visualization.

### Procedure

1. Open a visualization that has a **Size** data field.



2. Drag the measure that you want to show the points for to the **Size** data field.

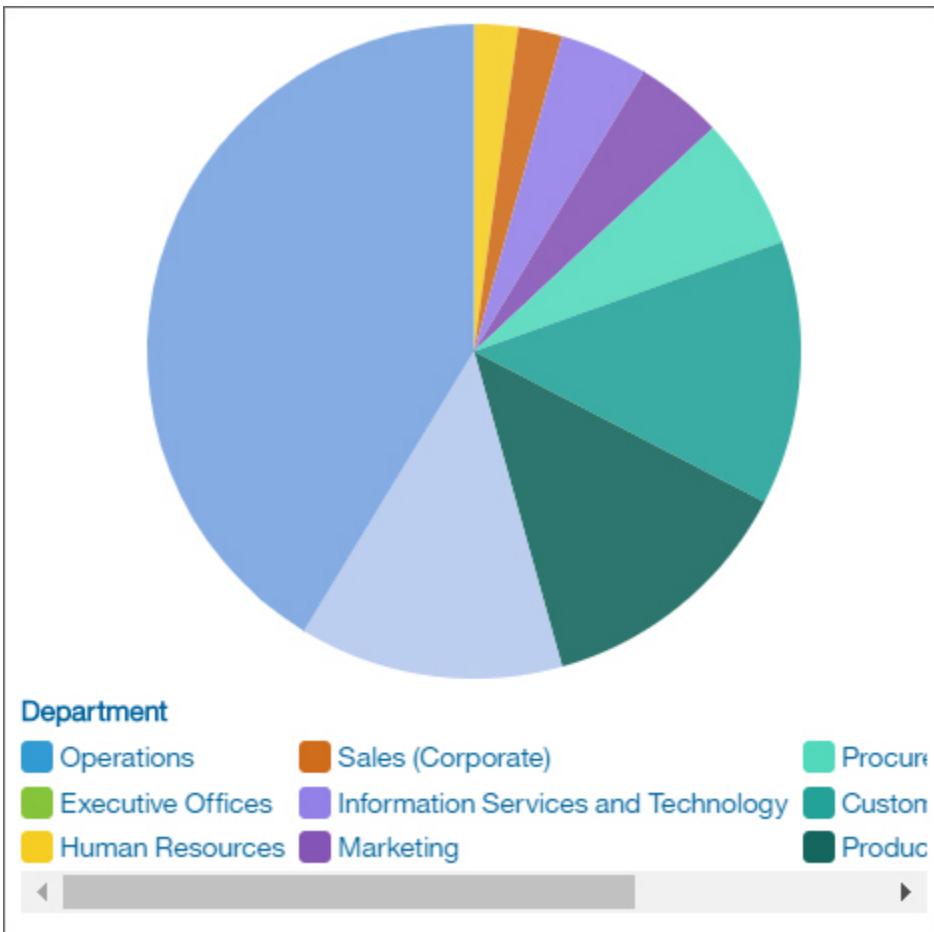
3. Close the visualization.



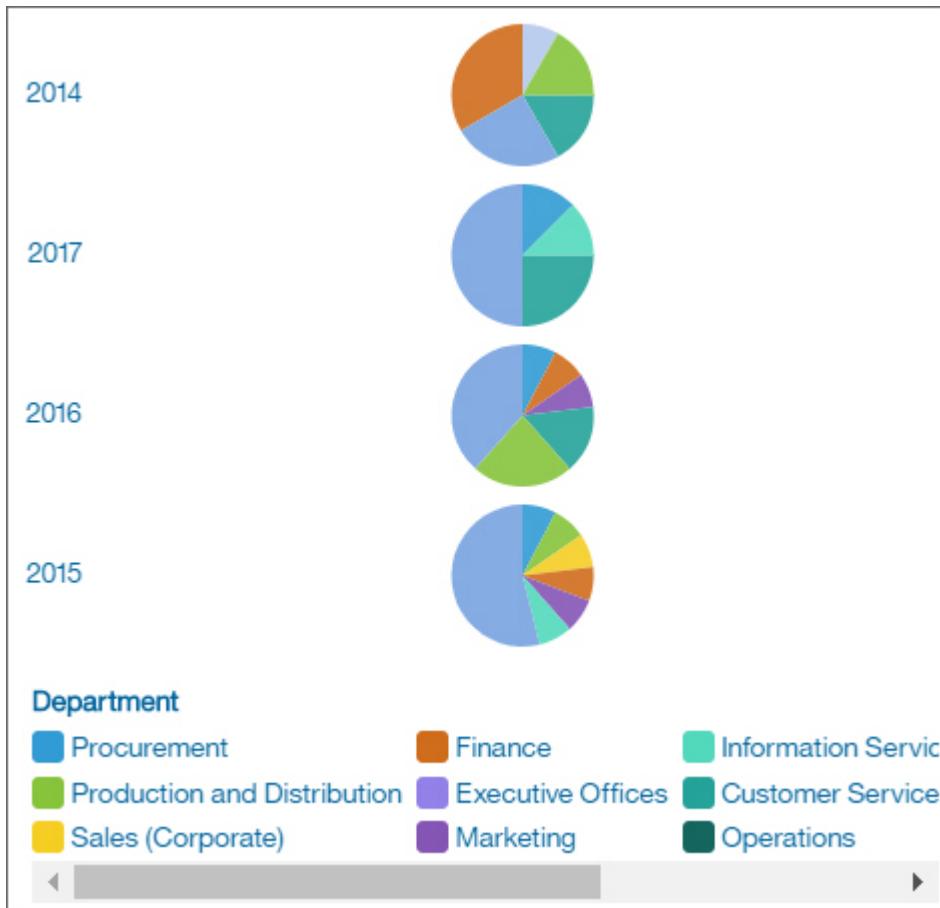
## Repeating a visualization by row or column

You can repeat a visualization for each member of a specified row or column.

For example, you have a pie visualization that shows the proportion of internal hires by department.



Adding "Year" to the **Repeat (row)** data slot replaces the single visualization with a visualization for each year.



## Procedure

1. To repeat the visualization vertically, drag a column to the **Repeat (column)** data slot.

**Note:** There is a limit of 20 visualizations that can be shown. Use a filter if you want to control which members of the column appear in the repeating visualizations.

2. To repeat the visualization vertically, drag a column to the **Repeat (row)** data slot.

## Suppressing null values in a crosstab or table

If you are using an OLAP package, you can suppress null cells in your tables and crosstabs.

### About this task

Null suppression is enabled by default. When null suppression is enabled and an entire row or column contains all null values, the row or column is not displayed. When only some cells in your visualization are null, individual null cell values are displayed as **(no value)**. When null suppression is turned off, null cell values are displayed as **(null)**.

## Procedure

1. Click the table or crosstab that contains null values.

2. Click the **Properties** icon

If you don't see the **Properties** icon, click the **Switch to edit** icon .

3. In the **Visualization** tab, under **Chart**, select the **Suppression** toggle to enable or disable the setting.

**Note:** Alternatively, click the table or chart and click the **Suppression** icon in the toolbar.

## Customizing null values

**11.1.5** You can format how missing values are displayed in your visualizations.

### About this task

This customization applies to all cells in a visualization.

### Procedure

1. Right-click on the cell, table header, or bar in a visualization.
2. Click **Format** .
3. Select a format from the list, such as **Text**, **Number**, **Percent**, or **Currency**.
4. In the **Missing value characters** field, type the value that you want to display for null values.
5. Click anywhere outside the **Format** window to save your changes.

## Customizing unit labels

You can format how unit labels are displayed in your visualizations.

### About this task

This customization applies to all cells in the column you apply the change to.

### Procedure

1. Right-click on the cell, table header, or bar in a visualization.
2. Click **Format** .
3. Select a format from the list, such as **Number** or **Currency**.
4. In the **Number label** field, type the value that you want to display for the formatted number.
5. In the **Label position** list, select **Default**, **Beginning**, or **End** depending on where you want to display the number label.
6. Click anywhere outside the **Format** window to save your changes.

## Setting a timer to automatically refresh a visualization

You can set a timer in individual visualizations to seconds, minutes, or hours to indicate how often you want the item to automatically refresh.

### Procedure

1. Click the visualization or object.
2. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. In the **Visualization** tab, under **Chart**, select the **Refresh automatically** check box and set the refresh frequency to seconds, minutes, or hours.

The **Widget timer** icon  appears on the visualization.

**Tip:** Click the **Widget timer** icon  to see when the last refresh occurred.

## Adding a title to a visualization

Add clarity by adding a title to any visualization.

### Procedure

1. Click the visualization or object.
2. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. In the **Visualization** tab, click **Chart > Title type**. Choose one of the following options:

- **Smart title** Data is used to display the title.
- **Custom title** You can specify the title.
- **No title**

## Limiting data to top or bottom values in a dashboard visualization

You want to focus your visualization on the items of greatest significance to your business question. For example, you want to identify your top 100 customers and what that group of customers is worth.

You can limit the data to the top or bottom values of a set. Limiting keeps the amount of data that is shown in the work area small, even when you use large data sources.

You can define a top or bottom rule by specifying:

- A number, such as the 10 top or bottom performing sales people.
- A percentage, such as customers who contribute to the top 10% of overall revenue.

If the selected set contains a filter, then the top or bottom rule applies only to the included values. For example, if you apply a filter to show only retailers with revenue greater than 1.000.000 dollars, the bottom rule applies to the lowest values within those results.

You can filter a set of members to show only those members at the top or bottom and base the filter on the measure you are using.

### Procedure

1. Click the **Switch to edit** icon.



2. Expand the visualization.

3. Select a column, click the **More** icon (three dots), and click **Top or bottom**.

4. Select whether to filter the **Top count**, **Top %**, **Bottom count**, or **Bottom %** values.

5. In the **By** field, specify a member that you want to use for the top or bottom filtering.

**Note:** If individual data points have the same value, then the visualization shows all these values even if you specified a limit of, for example, 10 values.

## Performing calculations on measures and create a new column

If you want to compute with values that are the result of an aggregation, then you can create calculations based on measures.

For example, you can create a calculation by adding a fixed value to a measure. The following example adds 1 million to the Total Claim Amount measure.

You can use a calculation based on measures only in the dashboard where you created the calculation. It is not stored with the data asset.

**Note:**

The calculation is added to a slot in the visualization as a new measure. This does not have to be the same slot as from where you created the calculation.

## Procedure

1. Expand the visualization.
2. Beside a measure, click the **More** icon  , and click **Calculation**.
3. In the **Create calculation** dialog box, provide a name for your calculation.
4. You can use these mathematical operations: addition (+), subtraction (-), multiplication (\*), division (/), percentage (%), or percentage change (% change).
5. Use the **Calculate after aggregation** option to set whether the calculation is run before or after the aggregation.
6. Click **OK**.

If you want to add the calculated measure to the slot you created the calculation from, then drag the calculated measure to that slot.

## Expanding hierarchies to display all members in the data tree

The data tree in a dashboard or exploration shows the content of relational and dimensional sources. In both relational and dimensional sources, members are shown in the data tree.

To view the content of a dimensional source, expand the package that contains the source items. Dimensional members are the nodes of the **Members** folder.

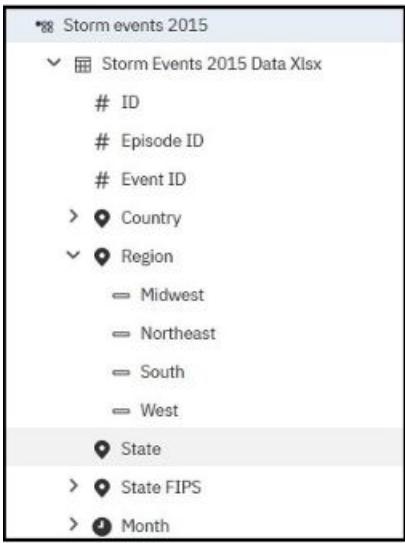
Relational members are the nodes of columns in relational sources.

You can initiate the search for members from the data tree, from the menu  of hierarchies, levels, members, or columns. For more information, see the *Searching for members* topic in the *Data Modeling* guide.

## Members in a data tree

Each unique value in a column is shown as a member in the data tree.

In the following sample data tree, the Region column contains the following members: Midwest, Northeast, South, and West.



## Using maps

Maps help you to do geographic analysis of data by using locations such as states, regions, and postal codes.

Over 235,000 administrative boundaries and over 220,000 zip and postal codes in over 245 countries are supported.

**Note:** For a complete list of supported locations, follow these steps:

1. Go to [https://github.com/IBM/ca\\_mapping\\_features/blob/master/README.md](https://github.com/IBM/ca_mapping_features/blob/master/README.md).
2. Follow the instruction in the README file.
3. There are spreadsheets available that contain the types of administrative and postal boundaries by country and spreadsheets that contain the names of the administrative boundaries by country.

Data is mapped by matching the location name on the map with a location in your data.

Dashboards have a limit of plotting or mapping a maximum of 3000 data points on any visualization.

### Adding a map to a dashboard

When you use a map in a dashboard, you can show data for one location measure, either as a filled region, a point, or both.

#### Before you begin

You must have access to the IBM Cognos samples. This procedure uses the IBM Cognos GO Sales sample data. If your administrator installed these samples, they are in **Team content > Samples > Models > GO Sales (query)**.

#### About this task

This procedure shows you how to create a map that shows revenue by region and gross profit as points.

**Note:** Other names for a map are *polygon*, *filled region*, and *choropleth*.

#### Procedure

Create the map and add revenue by region.

1. Click **New** and then click **Dashboard**.
2. Leave the default values in the **Select a template** window and click **OK**.

3. In the left pane, click the **Visualizations** icon , and then click the **Map** icon.
4. In the left pane, click **Sources**, and then click **Add a Source**.
5. Click **Team content > Samples > Models > GO Sales (query)** and click **Add**.
6. Expand **GO Sales (query) > go\_sales > Sales (query) > Sales**, and drag **Revenue** to the **Location color** data slot.
7. Expand **Branch** and drag **City** to the **Locations** data slot.  
The map is populated and a yellow triangle displays in the upper right corner of the map.
- Tip:** Zoom in and zoom out of the map to see more or less detail. Click and drag to move around the map.
8. Click the yellow triangle.  
A window displays the unresolved locations information. There are two types of unresolved locations: ambiguous region and unrecognized location. To resolve the first problem, add categories to refine the locations. For example, add **Province or state** and **Country** to the **Location** data slot. To resolve the second problem, cleanse your data by renaming the locations.
9. To add points to the map, drag measures to the **Point size** and **Point color** data slots.
10. Save the dashboard when you're done.

## Using latitude and longitude locations in a map

When you use a map in a dashboard, you can show data for multiple layers: regions, points, and latitude/longitude locations.

### Before you begin

To use latitude/longitude locations in your map, use a data source that contains latitude and longitude data. For example:

Table 1. Example table with latitude and longitude data				
City	Longitude	Latitude	Rating	Surveys
Antwerp	4.402771	51.260197	7	30.000
Brussels	4.355607	50.878899	9	76.000

At the top of the data slot pane, click the down arrow and select **Latitude/Longitude**.

**Note:** The format of the longitude and latitude data must be as follows: Lat 51.260197 , Long 4.402771. The format 51° 26' 01.97'' N , 4° 40' 2.771'' E is not supported.

### Procedure

1. Click **New** and then click **Dashboard**.
2. Leave the default values in the **Select a template** window and click **OK**.
3. In the left pane, click the **Visualizations** icon , and then click the **Map** icon.
4. In the left pane, click **Sources**, and then click **Add a source**. Select a data source that contains longitude and latitude data.
5. In the visualization, expand and select **Longitude/Longitude**.
6. In the left pane, expand your data items and drag latitude and longitude to the **Latitude** and **Longitude** data slots.
7. Drag City to the **Label** data slot. The latitude, longitude, name of the city appears when you hover over the data points.
8. Drag rating to the **Size** data slot and drag Surveys to the **Color** data slot.

## **Setting up Mapbox to work with Cognos Analytics**

IBM Cognos Analytics supports the use of custom polygons that come from Mapbox.

Create a free Mapbox account. When you have created your Mapbox account, upload your geoJSON custom polygon file to Mapbox as a tileset. If your geoJSON is less than 5 MB, then you can edit the geoJSON directly as a data set in Mapbox. After you edit the geoJSON files, export them into a tileset. Make sure that each polygon has at least one uniquely identifying property as a string value. For more information about tilesets, see the Mapbox documentation about a [tileset](#).

Custom polygons in formats such as .shp and KML can be converted to geoJSON, by using, for example QGIS.

### **Retrieving data from Mapbox**

When you have your tileset created in Mapbox, make note of the following information from the tileset page:

- Tileset Id
- Layer name
- Property name

You specify these values when you want to use Mapbox data in your map.

Enter the Tileset ID into the field marked Tileset Id.

### **Best practices**

- For increased performance and to make sure that polygons appear at zoom level 0 (world view), compress geoJSON files to less than 10 MB. A tool that can compress geoJSON files is <http://mapshaper.org/>.

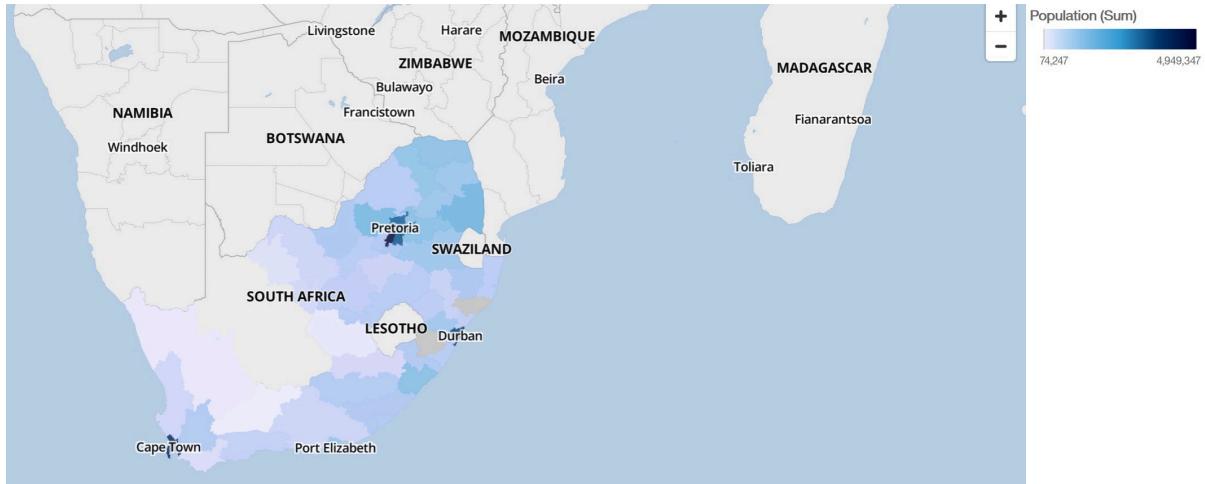
If your geoJSON files are larger than 10 MB, then Mapbox sets the default zoom to not start at worldview 0. If you want to manually change the zoom extents, there are few ways to do so:

- Tippecanoe APIs, which are available on Linux and Apple MacOs.
- Download Mapbox studio classic on your Microsoft Windows computer and change the minimum and maximum zoom levels.

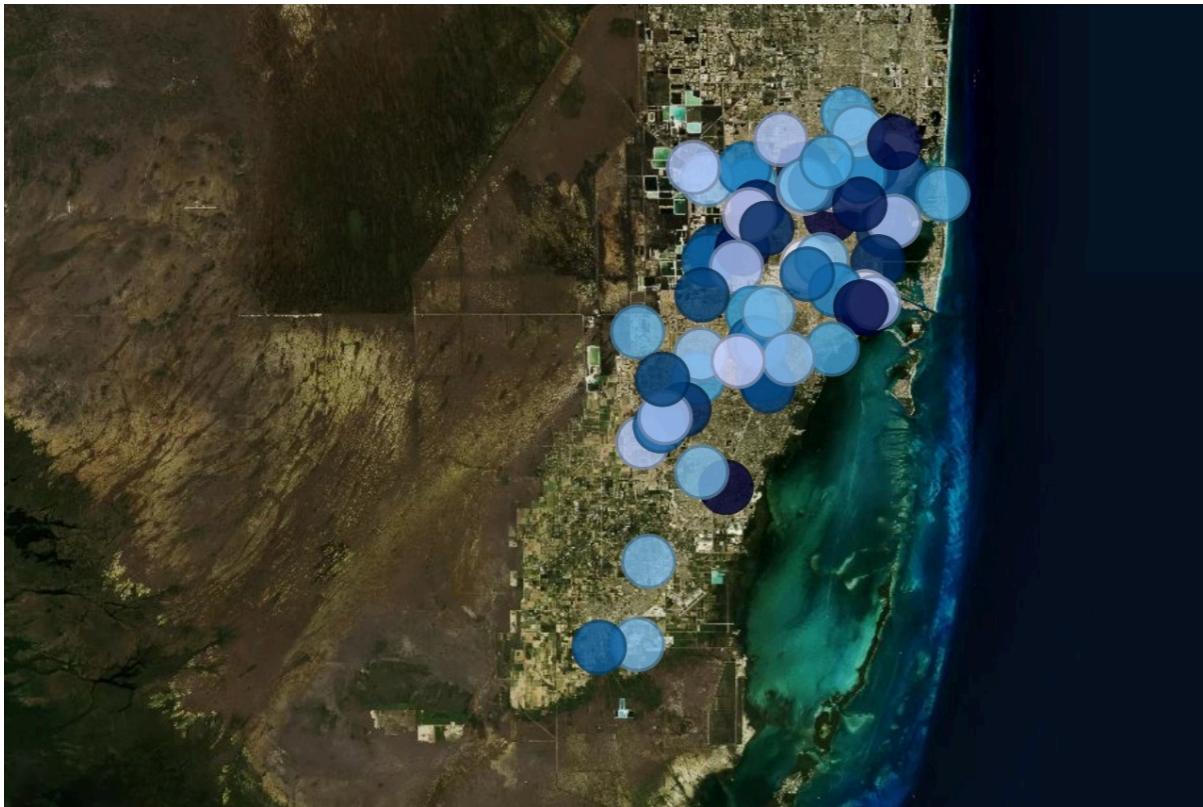
For more information, see <https://www.mapbox.com/help/adjust-tileset-zoom-extent/>.

- To ensure that auto-zoom works in IBM Cognos Analytics - Reporting set the unique polygon identifier as a string value.
- If you work with custom polygons in small areas, for example at postcode level, turning off auto zoom after the initial data loads. This results in a better experience when you filter because the map does not reset zoom and zoom in multiple times.
- Keep the Mapbox keys confidential.

Example of custom regions



Example of custom points



## Using custom point or region information from Mapbox in a map visualization in a dashboard

When you use a map in a dashboard, you can use custom point or region information from Mapbox in a map. You can use an extra layer on a map to display additional information. For example, a time-zone layer.

### Before you begin

To use the vector maps from Mapbox as location measures in your map visualization, use a data source that contains region or point data. An example of a table with point or region data is the following table:

Table 2. Table with point and region data

City	Population	Timezone	Timezone offset	TZ
Andorra la Vella	20430	Europe/Andorra	1	UTC+01:00
Abu Dhabi	603492	Asia/Dubai	4	UTC+04:00

The tileset that Mapbox generates has the following properties:

- Custom Tileset Id
- Custom layer name
- Custom property name

## Procedure

1. Create a Mapbox account.
2. Upload your geoJSON file to Mapbox.

**Important:** Before you upload any geoJSON file, ensure that its polygon properties do not contain any sensitive information.

3. In Mapbox, create a tileset based on the geoJSON file.
4. In IBM Cognos Analytics click **New** and then click **Dashboard**.
5. Leave the default values in the **Select a template** window and click **OK**.
6. In the left pane, click the **Visualizations** icon , and then click the **Map** icon.
7. In the left pane, click **Sources**, and then click **Add a Source**. Select a data source that contains that contains region or point data.
8. In the visualization, expand and select
  - **Regions**, if you want to use region data from Mapbox.
  - **Points**, if you want to use point data from Mapbox.
9. In the left pane, expand your data items and drag either point or region data to the **Location** data slot.
10. **Note:** Make sure you use the correct casing for the Mapbox properties.

Depending on whether you want to use Mapbox region or point data, specify the following properties. These properties are part of the Mapbox map. You must obtain the values of the properties from the Mapbox map creator.

From the **Properties** pane under **REGIONS**, specify the following properties:

Option	Description
<b>Region custom Tileset Id</b>	The Mapbox unique Tileset Id.
<b>Region custom layer name</b>	The layer name that is used in the Mapbox map.
<b>Region custom property name</b>	The custom property name that you want to use from the Map box map.

From the **Properties** pane under **POINTS**, specify the following properties:

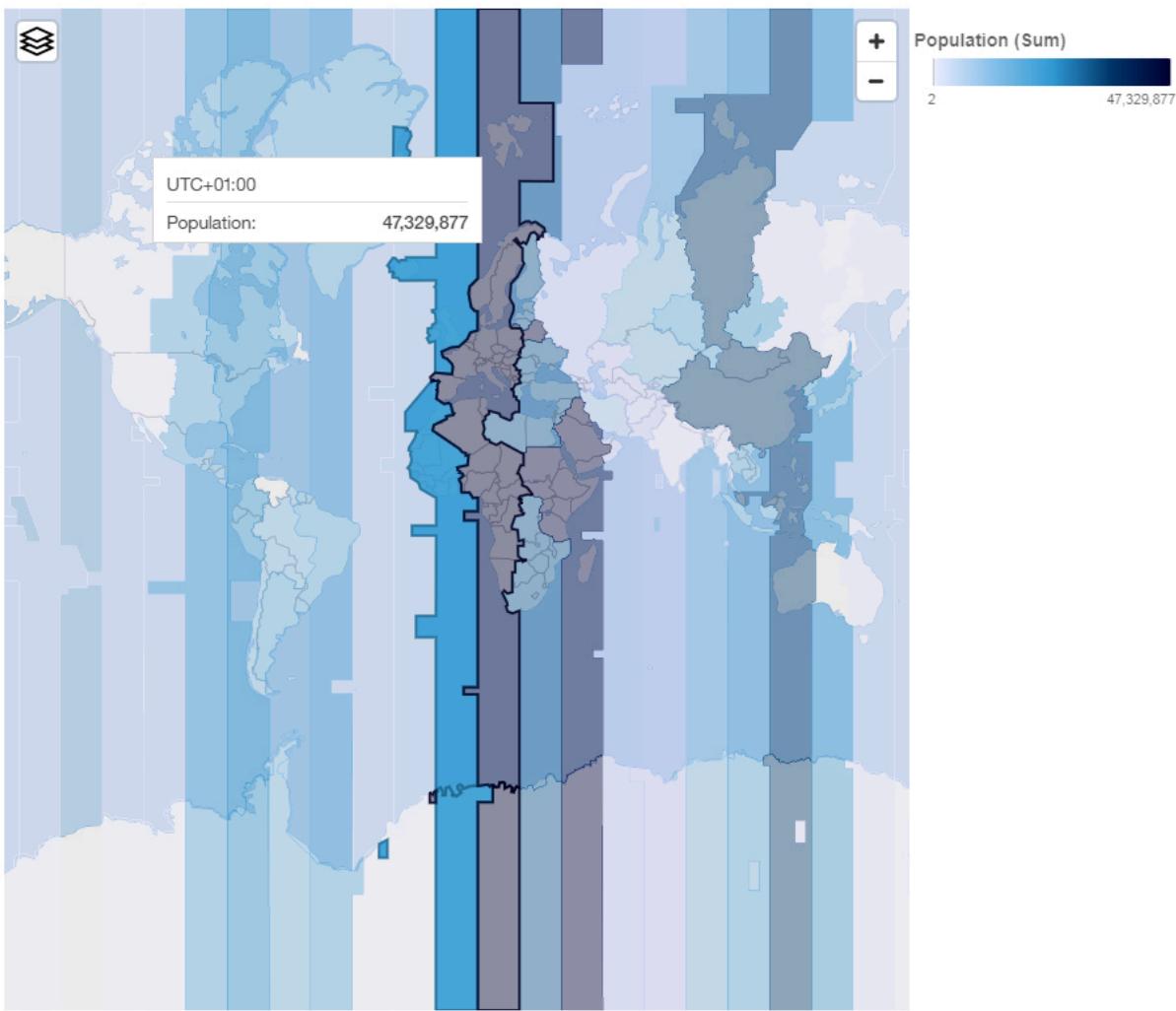
Option	Description
<b>Point custom Tileset Id</b>	The Mapbox unique Tileset Id.
<b>Point custom layer name</b>	The layer name that is used in the Mapbox map.
<b>Point custom property name</b>	The custom property name that you want to use from the Map box map.

11. Drag measurable data to the **Location color** data slot.

For example, use population.

### Example

An example of a map visualization with a region layer that shows the population for each time-zone. The layout of the time-zones is defined in a Mapbox map.



### Cluster map layer in a map

When you use a map in a dashboard, you can interact with different map layers to customize how a map is displayed. You can group points on a map to help report users to better analyze data at different zoom levels. Map clustering is available as a property on both points and latitude and longitude layers.

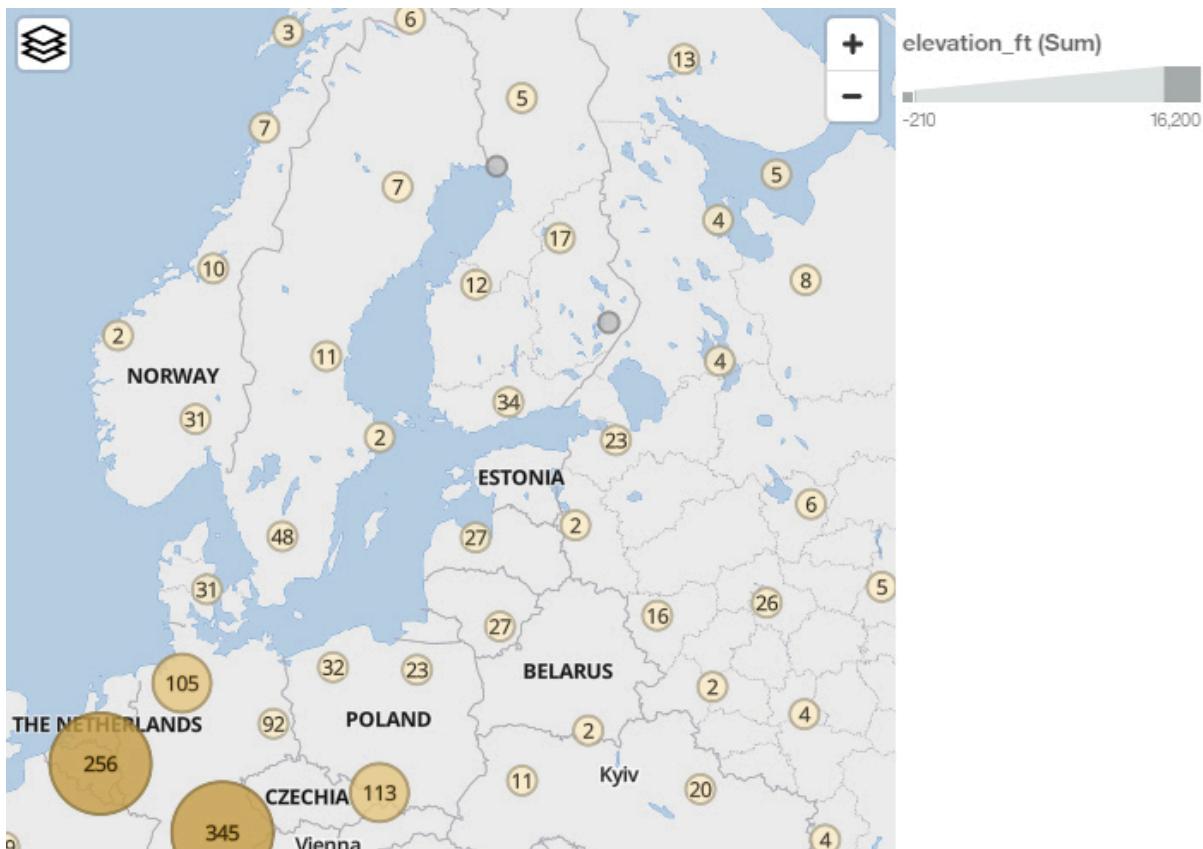
### Procedure

1. Click **New** and then click **Dashboard**.
2. Leave the default values in the **Select a template** window and click **OK**.
3. In the left pane, click the **Visualizations** icon , and then click the **Map** icon.
4. In the left pane, click **Sources**, and then click **Add a Source**. Select a data source that contains longitude and latitude data.
5. In the visualization, expand and select **Longitude/Longitude**.
6. In the left pane, expand your data items and drag latitude and longitude data to the **Latitude** and **Longitude** data slots.

7. Drag a measure to the **Size** data slot.
8. Click the **Show properties** icon  , and open the **Latitude/Longitude layer** section.
9. From the **Type** menu, select **Cluster**.
10. Optionally you can change the heat palette with the **Heat palette** option and change the transparency with the **Transparency** slider.

### Example

The following example shows latitude / longitude data that is combined with cluster as type. Locations with the same elevation are clustered.



### Heat map layer in a map

When you use a map in a dashboard, you can interact with different map layers to customize how a map is displayed. You can visualize data by location that uses a heat map layer on a map. The heat map layer is available as a property on both points and latitude and longitude layers.

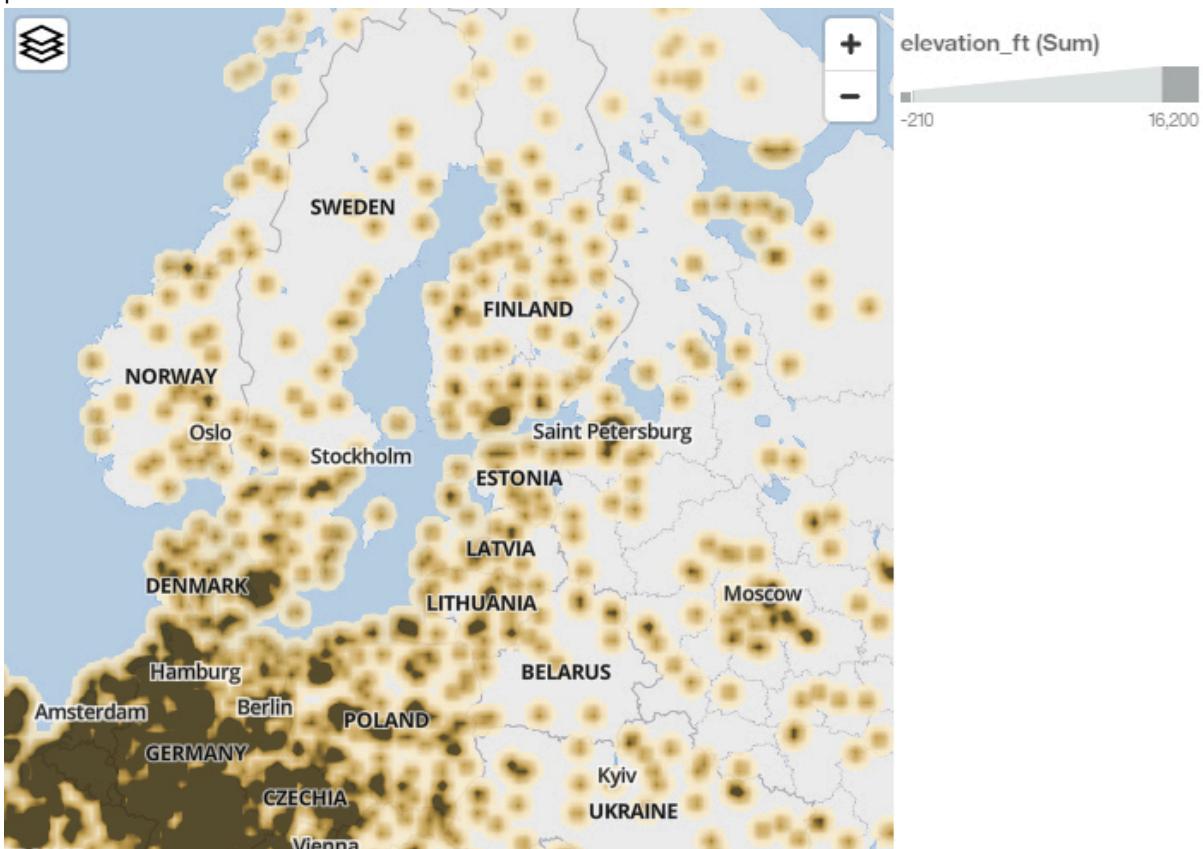
### Procedure

1. Click **New** and then click **Dashboard**.
2. Leave the default values in the **Select a template** window and click **OK**.
3. In the left pane, click the **Visualizations** icon  , and then click the **Map** icon.
4. In the left pane, click **Sources**, and then click **Add a Source**. Select a data source that contains longitude and latitude data.
5. In the visualization, expand and select **Longitude/Longitude**.
6. In the left pane, expand your data items and drag latitude and longitude data to the **Latitude** and **Longitude** data slots.
7. Drag a measure to the **Size** data slot.

8. Click the **Show properties** icon \*\*\* , and open the **Latitude/Longitude layer** section.
  9. From the **Type** menu, select **Heat**.
  10. From the **Heat weight** menu, select one of the next options:
- | Option               | Description  |
|----------------------|--|
| <b>Equal</b>         | The size of the points is equal.   |
| <b>By color slot</b> | The size of the points is controlled by the measurement in the color slot. |
| <b>By size slot</b>  | The size of the points is controlled by the measurement in the size slot.  |
11. Optionally you can change the heat palette with the **Heat palette** option and change the transparency with the **Transparency** slider.

### Example

The following example shows latitude / longitude data that is combined with heat as type. The size of the points resembles the elevation of the locations.



### Searching and zooming in a map

When you use a map in a dashboard, you can search and automatically zoom into items that are matched on your maps. For example, small regions that are spread over a large area.

### Procedure

1. Click **New** and then click **Dashboard**.
2. Leave the default values in the **Select a template** window and click **OK**.
3. In the left pane, click the **Visualizations** icon , and then click the **Map** icon.

4. In the left pane, click **Sources**, and then click **Add a Source**. Select a data source that contains location data.
5. In the visualization, expand and select **Locations**.
6. In the left pane, expand your data items and drag location data to the **Locations** data slot.
7. In the visualization, click the search icon  and enter a location to search for.
8. To enable or disable the search function, click the **Show properties** icon , and open the **Chart** section > **Enable search control**.

### Example

The following example shows a search for the city of Calgary.



## Setting up drill-through to a report

Using drill-through, you can navigate from a visualization in a dashboard or a story to a related report while retaining the original context of the visualization.

For example, you examine revenue by product line in a visualization in your dashboard. If drill-through is defined for your visualization, you can navigate to a report that shows the revenue by product line for the past four years.

To enable drill-through for a visualization, you create one or more drill-through definitions that link the visualization to related target reports. The drill-through definitions can be shared with all visualizations in the dashboard that use the same source or can be specific to an individual visualization.

When you drill through from a visualization, the dashboard determines the context to be applied for each of the columns in the drill-through definition:

- If a column value is selected in the visualization or in another visualization on the same tab, using the same data source and within the same event group, this value is passed to the drill-through definition.
- If a column has a local filter defined in the visualization, but no selection in any visualization on the same tab, with the same data source and event group, the local filter is passed to the drill-through definition.
- A local filter on another visualization is never passed as part of the context of a drill-through definition.

- If a column has no value selected in any visualization on the same tab, with the same data source and event group, or a local filter of the visualization, the context for a column is the combination of the **All tabs** and **This tab** filters.
- If a measure column is assigned a source in a drill-through target, the value of the column is ignored. When you drill through to the target, you are prompted for a value for the associated prompt.

There are some restrictions on the context passed to a drill-through definition:

- If the prompt of a target report is a range filter and multiple column values are selected in the visualization, only the first value is passed to the target report.
- An exclude filter in a visualization is never passed as context to a drill-through.
- If a dashboard drill-through does not provide the value for a parameter in a target report, the value is obtained from the global parameter with the same name as the parameter, if one exists.

## **Adding a drill-through definition to a report**

A drill-through definition in a visualization links the visualization with a related target report. One visualization can have multiple drill-through definitions.

### **About this task**

When creating drill-through definitions for visualizations with filters, the filter values affect the context that is passed to the target report in the following ways:

- If you use a column with a range filter as a drill-through source, the range is passed to the target report.
- If you use an **Include** condition, all of the values included in the filter are passed to the target report.
- If you use an **Exclude** condition, none of the values in the filter are passed to the target report.

### **Procedure**

1. Select the visualization that you want to work with.
2. In the toolbar, click the **Drill-through** icon.
3. Click **Add a new drill-through**.

If you don't see the **Add a new drill-through** icon, click the **Switch to edit** icon on the app bar first.

4. From the **Team content** folder, browse to the target report that you want to drill through to.
  - a) If the drill-through target report has prompts, use the drop-down lists to associate the columns from your visualization to the prompts in the target report. A filter must have at least one value selected before the associated column is displayed in the list of possible source columns.
  - b) If the drill-through target report does not have prompts, continue to create the drill-through definition. However, the target report will not receive any context from the visualization.
5. Select the check box to add the drill-through definition to all visualizations in your dashboard or story that use the same data source in the same connection.

When you are done, use the switcher on the app bar to return to your dashboard or story.

### **Results**

You can now drill through from your visualization to the target report. To do so, click one or more columns in your visualization and click the **Drill-through** icon in the toolbar.

## **Editing a drill-through definition to a report**

You can modify drill-through definitions in a visualization.

### **About this task**

You can modify the drill-through definition in a visualization in the following ways:

- Change the title of the drill-through definition. By default, the target report name is used as the drill-through definition title.
- Assign different columns from the visualization to the target.
- Add another drill-through definition.
- Delete the drill-through definition.

## Procedure

1. Select the visualization that uses a drill-through definition that you want to edit.
2. Click the **Drill-through**  icon in the toolbar.
3. Click **Manage**.

If you don't see the **Manage** link, click the **Switch to edit**  icon on the app bar first.

4. To edit the drill-through definition title, or to assign different columns from the visualization to the target, click the **Edit**  icon beside the title of the target.
  - a) In the dialog box that appears, to edit the name of the drill-through definition, place your cursor beside the title and click the **Edit**  icon that appears.
  - b) To assign a different column from the visualization to the drill-through target, select a different column from the data column list.
  - c) To add another drill-through target report, click **Add another drill-through definition**.



5. To delete the drill-through definition, click the **Delete**  icon beside the name of its target.
6. Click **OK** and click **Apply**.

## Adding a drill-through definition for one dashboard to another

A drill-through definition in a visualization links a dashboard with another dashboard. One visualization can have multiple drill-through definitions.

### About this task

The target dashboard that you drill through to must use the same data source as the source dashboard. When you drill-through to another dashboard, the content of the visualization in your source dashboard is used to filter the target dashboard.

## Procedure

1. Select the visualization that you want to work with.
2. In the toolbar, click the **Drill-through**  icon.
3. Click **Add a new drill-through definition**.

If you don't see the **Add a new drill-through definition** icon, click the **Switch to edit**  icon on the app bar first.

4. From the **Team content** folder, browse to the target dashboard that you want to drill through to.
5. Select the check box to add the drill-through definition to all visualizations in your dashboard or story that use the same data source in the same connection.

When you are done, use the switcher on the app bar to return to your source dashboard.

### Results

You can now drill through from your visualization to the target dashboard. To do so, click one or more columns in your visualization and click the **Drill-through**  icon in the toolbar.

# Editing a drill-through definition for one dashboard to another

You can modify drill-through definitions in a visualization.

## About this task

You can modify the drill-through definition in a visualization in the following ways:

- Change the title of the drill-through definition. By default, the target dashboard name is used as the drill-through definition title.
- Add another drill-through definition.
- Delete the drill-through definition.

## Procedure

1. Select the visualization that uses a drill-through definition that you want to edit.
2. Click the **Drill-through**  icon in the toolbar.
3. Click **Manage**.

If you don't see the **Manage** link, click the **Switch to edit**  icon on the app bar first.

4. To edit the drill-through definition title, click the **Edit**  icon beside the title of the target dashboard.
  - a) In the dialog box that appears, edit the title of the drill-through definition.
  - b) To add another drill-through target report, click **Add another drill-through definition**.

5. To delete the drill-through definition, click the **Delete**  icon beside the name of its target.
6. Click **OK** and click **Apply**.

## Relative date analysis

The relative date feature makes it easier to do as-of-date analysis. For example, you can quickly add year-to-date or previous month values to a data container, such as a visualization, cross tab, list, and so on.

To do relative date analysis, a modeler must create a data module in which your data references a calendar. You use this data module as a source for relative date analysis in your data container.

Before you can do as-of-date analysis, the following tasks must be completed:

### Administrator

Import the Calendars sample. For information about the Calendars sample, see "Importing the base samples" in the *IBM Cognos Analytics Samples Guide*.

Optionally, create an as-of-date global parameter and share it with users. You can use this parameter to ensure that a data container always reports as of a specific date. Without this parameter, the data container reports as of the current date.

### Modeler

Associate a date column in your data with one of the calendars and associate measures to this date column.

For more information about how to do the previously listed tasks, see *Data Modeling* in IBM Cognos Analytics IBM Knowledge Center .

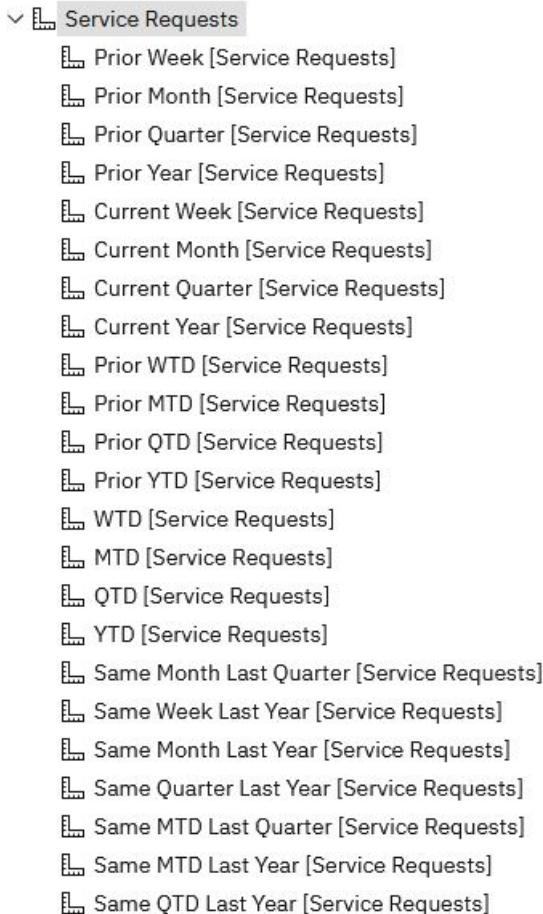
The calendar data modules contain the following filters:

- Prior week 
- Prior month  (not available in the retail calendar)
- Prior quarter
- Prior year
- Current week 

- Current month
- Current quarter
- Current year
- WTD (week to date) **11.1.7**
- MTD (month to date)
- QTD (quarter to date)
- YTD (year to date)
- Prior WTD **11.1.7**
- Prior MTD
- Prior QTD
- Prior YTD
- Same week last year **11.1.7**
- Same month last quarter
- Same month last year
- Same quarter last year
- Same MTD last quarter
- Same MTD last year
- Same QTD last year

You can do relative date analysis in the following ways:

- Include relative date filtered measures in the data container. In the following example, you would select one of the child measures of the Service Requests measure that references a relative date filter:



- Add a relative date filter to a query by using the predefined date filters.

If your administrator defined an as-of-date global parameter for your role, all data containers that contain relative date filters or filtered measures report as of the value of this parameter. You can set the value in

**My parameters** . For more information about global parameters, see "Using customized parameters" in the *IBM Cognos Analytics Reporting Guide*.

## Matching color palettes on multiple visualizations

**11.1.0** When multiple items on the canvas share a category or value, you can use the **Color consistency** setting to automatically adjust the visualization colors to match each other.

### About this task

For new dashboards and stories, the **Color consistency** setting is on by default. For upgraded dashboards, the **Color consistency** setting is off by default because you might have selected specific palettes for different visualizations.

Complete the following steps to enable or disable the setting:

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. For the entire dashboard or story, ensure that nothing else has focus by clicking the background, away from any visualization or object.
3. In the **General** tab, select **Advanced**.
4. Click the **Color consistency** toggle to turn the setting on or off.

## Adding a schematic to a dashboard

You can add schematics to your IBM Cognos Analytics report.

### About this task

Before you can import a schematic, author it first. For more information, see the *Authoring schematics - tutorial* documentation in the *IBM Cognos Analytics Custom Visualizations Developer Guide*.

Schematics are visualizations that can map data directly onto an arbitrary graphic representation. Schematics can, for example be floor plans, seating arrangements, mechanical drawings, or schematic geographical representations.

### Procedure

1. Create a dashboard.
  2. Click **Visualizations**  > **Custom** > **Custom visuals**.
- If there are no custom visuals available, then you can add a custom visual through the **Add a custom visual** button.
3. Select the schematic that you want to use.
  4. A schematics package can contain several different SVGs. The first SVG is displayed. You can select other SVGs from the schematic package from **Properties** > **Schematics** > **SVG reference**.

## Adding points and regions to a schematic in a dashboard

You can enhance IBM Cognos Analytics schematics by using point or region information. Use point and region information by adding a layer on the schematic to display the additional information.

### Procedure

1. Create a dashboard.
2. Click **Visualizations** > **Custom** > **Custom visuals**.  
If there are no custom visuals available, then you can add a custom visual through the **Add a custom visual** button.
3. Select the schematic that you want to use.
4. Click **Sources** and select a data source that you want to use.
5. On the **Fields** pane, click the down arrow and select:
  - **Regions**
  - **Points**
6. In the left pane, expand your data items and drag point or region data to the **Locations** field.
7. Drag a measure to the **Location color** or **Point color** field.

### Example

A schematic example that displays a UK Parliament House of commons SVG. Seat keys are mapped to constituencies.

The **Regions** layer shows a leave or stay. The **Points** layer shows the leave estimate.



## Pinning

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Use pins to set aside insights from your dashboards and stories.

As you work with your data in Cognos Analytics, use pinning to set aside insights from dashboards and stories. You can also set aside other items, such as images. You can quickly add these visualizations and other items to dashboards and stories that you create to share your findings with others.

You can select multiple items in a view, and then add each item to your collection of pins at the same time. You can also group items in a view, and then add the group of items as one pin to your collection of pins.

### Using pins

You can save an object to your pins collection. Your pins collection contains all of the objects that you have pinned, allowing you to quickly find and add them to your dashboard or story.

1. Click on the visualization or object that you want to pin.
2. Click **Pin** , located in the top toolbar.
3. Click **Pins** , located in the left toolbar to view your pins collection.
4. Click on a visualization or object from your pins collection to add it to your dashboard or story.

## Adding visualizations from your collection of pins

You can add a visualization, from your pins, as a widget.

### Procedure

1. Click **Pins** , which is located in the side bar.
2. Drag an item from the **My pins** pane onto the canvas.
3. Move the widget to a location on the canvas.

## Widgets

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You can add widgets such as text, media, web pages, images, and shapes.

### Adding text

Reinforce your analysis by adding text to your dashboards and stories. For example, you can highlight key points that are shown in a visualization and provide background information.

### Procedure

1. Click the **Widgets** icon.  

- If you don't see the **Widgets** icon, click the **Switch to edit** icon first.  

2. If you want to position the widget yourself, drag the **Text** icon to the canvas. If you want the widget to fill the next available pane in the template, click the **Text**  icon.
3. Type in the text box and then click away from it.
4. To format the text, double-click the text and change one or more of the following properties:
  - Font
  - Font color
  - Font size

- Style, such as bold, underline, or italic
  - Alignment
  - Unordered list
  - Ordered list
5. To position the text vertically or diagonally, use your cursor to grab the corner of the text box and rotate the widget.

## Adding images and shapes

Improve the look and feel of your dashboards and stories by adding images and shapes.

### Procedure

1. Click the **Widgets** icon.



If you don't see the **Widgets** icon, click the **Switch to edit** icon.



2. To add an image from the **Widgets** tab, complete the following actions:

- a) If you want to position the image widget yourself, drag the **Image** icon to the canvas. If you want the widget to fill the next available pane in the template, click the **Image** icon.



- b) Enter the URL, and press **Enter** to save it.

Note these requirements for images:

- Use one of the following formats for images: JPEG, JPG, GIF, PNG
- Use HTTP or HTTPS (secure HTTP) format. URLs are validated for format only; you must ensure that the link is valid.

3. If your administrator has customized the **Widgets** panel with additional images:

- a) Select the **Image library** tab.

- b) Click an image to add it to your dashboard.

4. To add a shape, complete one of the following actions:

- If you want to position the shape yourself, drag the shape that you want to the canvas.
- If you want the shape to fill the next available pane in the template, click the icon for the shape.

## Adding web pages

Add action by embedding web pages in your dashboards and stories.

### Procedure

1. Click the **Widgets** icon.



If you don't see the **Widgets** icon, click the **Switch to edit** icon.



2. If you want to position the web page widget yourself, drag the **Web page** icon to the canvas. If you want the widget to fill the next available pane in the template, click the **Web page** icon.



3. Enter the URL, and press **Enter** to save it.

Note these requirements for web pages:

- Specify the URL in HTTPS (secure HTTP) format because of the security requirements of web browsers.
- Check that the target website allows being embedded in another application. For example, you can't embed Twitter.com.

## Adding video or audio

Add action by embedding media, such as video or audio, in your dashboards and stories.

### Procedure

1. Click the **Widgets** icon.



If you don't see the **Widgets** icon, click the **Switch to edit** icon.



2. If you want to position the media widget yourself, drag the **Media** icon to the canvas. If you want the widget to fill the next available pane in the template, click the **Media** icon.



3. Enter the URL, and press **Enter** to save it.

Note these requirements for media:

- Use one of the following formats for media: YouTube URLs, MP4, MP3, AAC, M4A
- Specify the URL in HTTPS (secure HTTP) format because of the security requirements of web browsers.

## Changing web pages, media, and images

To change which web page, media, or image, modify the URL that points to its location.

### Procedure

1. Click the **Switch to edit** icon.



2. Select the web page, media, or image that you want to work with.

3. Click the **Properties** icon.



4. Type or paste the new URL.

## Adding a Notebook widget

If IBM Cognos Analytics for Jupyter Notebook is enabled in IBM Cognos Analytics, you can use the **Notebook** widget to add notebooks to a dashboard or story.

### Procedure

1. Click the **Widgets** icon.

If you don't see the **Widgets** icon, click the **Switch to edit**



icon first.

2. To add a notebook from the **Widgets** tab, complete the following steps:

a) If you want to position the widget yourself, drag the **Notebook** icon to the canvas. If you want the widget to fill the next available pane in the template, click the **Notebook** icon.

b) From the **Notebook** widget, click **Select a notebook**.

- c) Select a notebook and click **Open**.
- d) From the available cells, select one notebook cell to include in your dashboard.

3. To see when a **Notebook** widget was last refreshed, hover your cursor over the time stamp  icon.

4. To hide the time stamp  icon from the **Notebook** widget, complete the following steps:

- a) Click the **Notebook** widget, click the **Properties**  icon, and then click **Selection**.
- b) Click the **Show timestamp** toggle.
- 5. To select a different notebook cell for a **Notebook** widget, select the widget, and click the **Edit widget**  icon from the widget toolbar.

## Filters

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Focus on one area of your data or to see the impact of one column. For example, you can see the impact of the duration of courses on the cost of courses by department and organization.

### Filtering data in one visualization

There are several ways that you can filter the data in a visualization. You can keep or exclude a few data points in the visualization. You can use the data tray to filter the data in several columns and the columns are not required to be in the visualization. You can also add a local filter to filter a column or to define a filter condition.

#### Procedure

1. If you want to keep or exclude a few data points in the visualization, complete the following actions:
  - a) Click the data point that you want to keep or exclude. Use Ctrl+click to select several data points.  
You can select data points in the visualization, on the legend, or in the axis.
  - b) To show only the selected data points, click the **Keep** icon.



All other data points are excluded from the visualization.

- c) To hide the selected data points, click the **Exclude** icon.



2. If you want to filter the data in one or more columns, complete the following actions:

- a) Click the **Open data tray** icon at the bottom of the canvas.

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If you don't see the **Open data tray** icon, click the **Switch to edit** icon.



- b) Click a column heading in the data tray.

- c) Click **Filter**.

- d) Specify what will be filtered on.

- If the column contains numeric data, use the sliders or enter a range of values to filter on.
- If the column is a hierarchy, expand the levels in the hierarchy and select the members or levels that you want. For example, select 2017 and each quarter in 2016.

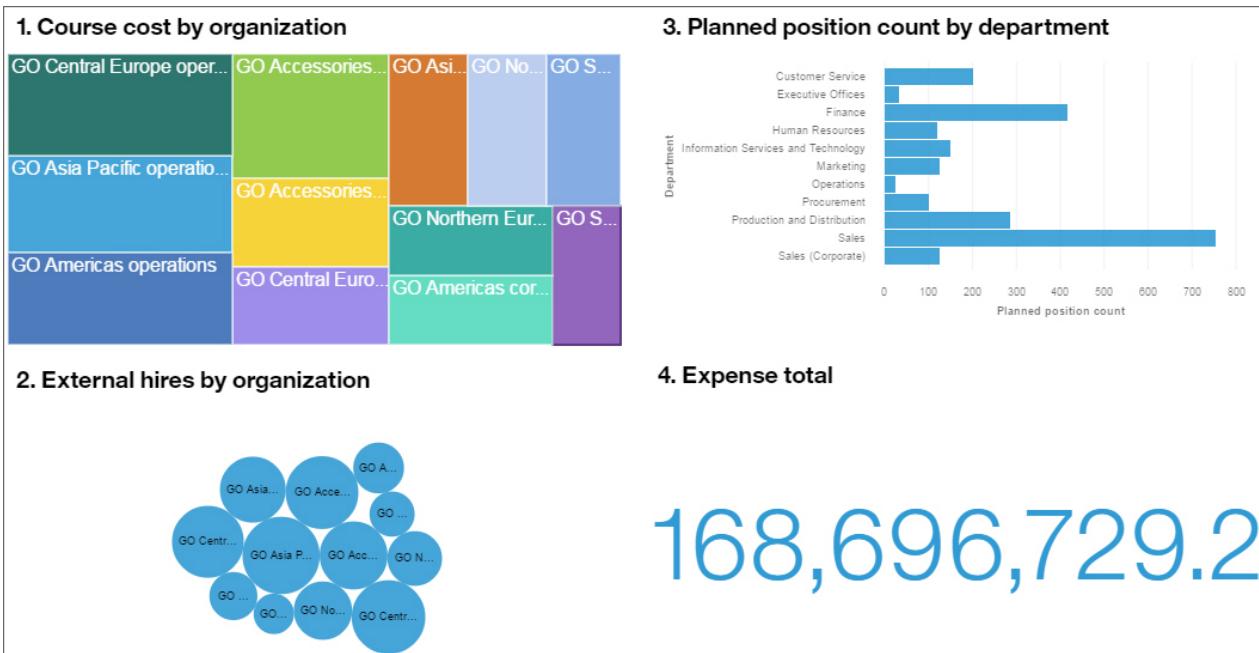
- If the column has the data type of date, time, or timestamp (also known as datetime), select before, after, or between for the dates to include in the filter.
  - If the column contains text, click one or more members to filter on. Or you can add a filter condition. With a filter condition, you have the following options: **Equals**, **Contains**, **Begins with**, **Ends with**, **Does not equal**, **Does not contain**, **Does not begin with**, and **Does not end with**.
- e) If you want to select many values, select the ones that you don't want and click **Invert**.
- f) To apply the filter, click **OK**.
3. If you want to define a filter condition or filter a column in a visualization, complete the following actions:
- Open a visualization.
-  If you don't see this icon, click the **Switch to edit** icon.
-  b) Click the **Sources** icon and expand the data asset that you want to use.
-  c) Drag a column into the **Local filters** box.
- d) Select the members that you want to use in the filter or add a filter condition.
- If you decide to add a filter condition, you have the following options: **Equals**, **Contains**, **Begins with**, **Ends with**, **Does not equal**, **Does not contain**, **Does not begin with**, and **Does not end with**.
- e) If you want to select many values, select the ones that you don't want and click **Invert**.
- f) To apply the filter, click **OK**.
4. Close the visualization.
- 

## Highlighting data points across visualizations

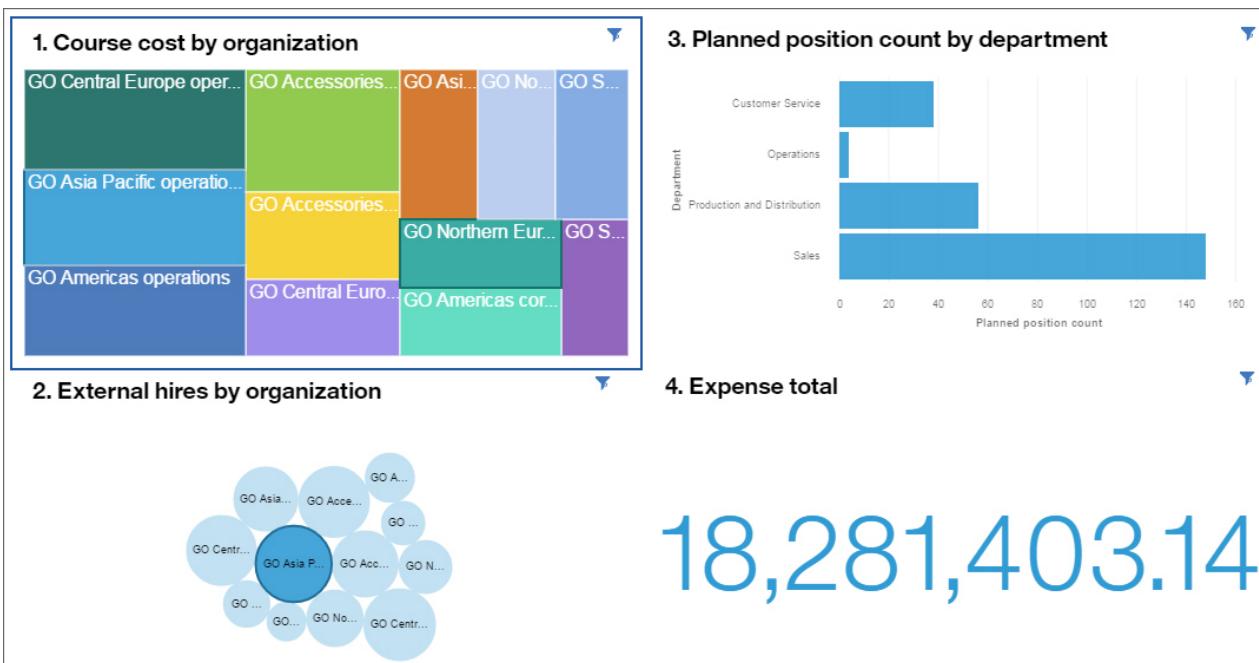
You can select one or more data points in one visualization and see these data points highlighted in all related visualizations in the current tab of the dashboard or story. Visualizations are related if they use the same data asset. Visualizations that use different data sets are also connected if there are matching column names in the different data sources. If a visualization doesn't contain the data points, its data is filtered for the selected data points. A data point can be an element in the visualization, such as a bar or bubble, or an axis label, or a column or member in the legend.

### About this task

For example, you have several visualizations on the same tab. The first one shows the breakdown of course costs by organization. The second one shows how many external people were hired in each organization. The third one shows how many positions each department plans to add. The fourth one shows the total for the expenses.



You select the "GO Asia Pacific operations" box in the first visualization. "GO Asia Pacific operations" is immediately highlighted in the second visualization. The data in the third and fourth visualizations are filtered to show only the departments in the "GO Asia Pacific operations" organization and a filter icon is added to these visualizations.



## Procedure

1. Click the data point that you want to highlight. To select multiple data points, touch and hold (Ctrl +click) each additional data point.

The data points are highlighted in each visualization that contains them. Other related visualizations that do not contain the data points are filtered and a filter icon is added to the visualizations. To see info about the current filter, click the **Filter** icon in the visualization.



If a column is in the **Repeat (row)** or the **Repeat (column)** data slot for a tree map visualization, you cannot select one of its members and see it highlighted in all related visualizations. For example, a tree map includes the Year column in the **Repeat (row)** data slot and a bar visualization includes the Year column in one of the axes. You can highlight a specific year by selecting it in the bar visualization and that year will be highlighted in the tree map but you cannot select a year in the tree map.

2. To remove the highlighting, click in the background of the visualization.

## Adding a filter widget

You can add a column to the canvas and use it as a widget for filtering data. This type of filter is known as a *context filter*.

### Procedure

1. In the **Data** pane, expand the data asset to see its contents.



If you don't see the list of data assets, click the **Switch to edit** icon.



2. Drag the column that you want to use as the filter widget to the canvas of the dashboard or story.

You can also add a column from the **This tab** filter area as a filter widget. Click the **Menu** icon and click **Add to canvas**.

\*\*\*

3. Filter the data in the visualizations.

- If the column contains distinct values, select the values that you want to use in the filter widget.
- If the column is a hierarchy, expand the levels in the hierarchy and select the members or levels that you want. For example, select 2017 and each quarter in 2016.
- If the column has the data type of date, time, or timestamp (also known as datetime), select before, after, or between for the dates to include in the filter.

## Keeping or excluding data points in a visualization

You can keep or exclude specific data points in a visualization. For example, an outlier makes it hard to see the other data points in the visualization.

### Procedure

1. Select the discovery that you want to work with.

2. Right-click a data point in the visualization or in the legend. Use Ctrl+click to select several data points.

3. To display only the selected data points, click **Keep**.

The filter is applied to that visualization only. All other data points are excluded from the visualization.

4. To hide the selected data points, click **Exclude**.

The filter is applied to that visualization only.

5. To remove the **Keep** or **Exclude** filter, right-click the column on the axis and click **Select items**. For example, if you excluded one year, you right-click the Year column on the axis.

## Disconnecting visualizations and filter widgets

By default, visualizations and filter widgets communicate with each other. When you highlight a data point in one visualization or filter widget, you filter the data in all other visualizations or filter widgets that use

the same data. Sometimes you want to keep one or more visualizations not change when you highlight a data point elsewhere.

Visualizations that use different data sources also communicate with each other if there are matching column names in multiple sources. For example, if **Year** from one data source is included in a visualization and **Year** from another data source is included in another visualization, the two visualizations are connected by default through the matching **Year** column.

You can see what's connected, create new connections, disable connections, and create new groups of connections. To view and modify widget connections, there must be at least two visualizations or filter widgets on the canvas.

## Procedure

1. **11.1.6** On the toolbar, click the **View widget connections** icon. 

Matching numbers on the visualizations and filter widgets mean that they are connected to each other. The visualizations and filter widget must come from the same source to be connected.

2. Click a visualization or filter widget with a number shown in the middle.
3. To disconnect a visualization or filter widget from all others on the canvas, click the **Break all links** icon. 
4. To create a new connection, click the **Create new connection** icon. 
5. To add a visualization or filter widget to an existing group of connections, click the **Add to an existing connection** icon and select the connection. 
6. To stop working with the widget connections, click the **View widget connections** icon again. 

## Filtering data in the current tab

You can filter the data that appears in all visualizations that use the selected data asset in the current tab of the dashboard or story.

If you add the same column to the **All tabs** filter and to the **This tab** filter, the members that you pick in the **All tabs** filter are applied to the **This tab** filter. For example, you add the Year column to both filters. You filter **All tabs** to show 2015, 2016, and 2017. The **This tab** filter will show only these years and you can filter the years further.

You cannot drag a column between the **All tabs** and **This tab** filter areas.

## Procedure

1. In the **Sources** pane, expand the data asset to see its contents. 

If you don't see the list of data assets, click the **Switch to edit** icon. 

2. Drag one or more columns to the **This tab** filter area. You can change the order of columns that have been added to the filter.

**Tip:** Any selections made in the current tab are cleared when applying any filter in the **This Tab** filter area by selecting a subset of values.

3. To define the filter, click the column in the **This tab** filter area.

- If the column contains distinct values, select the member or members that you want to filter on.
- If the column contains continuous values, use the slider to select a range of values to filter on. You can also click the start or end points of the range and enter a number.
- If the column is a hierarchy, expand the levels in the hierarchy and select the members or levels that you want. For example, select 2017 and each quarter in 2016.

- If the column has the data type of date, time, or timestamp (also known as datetime), select before, after, or between for the dates to include in the filter.

4. Click **OK**.

## Filtering data in all tabs

You can add a filter to apply to all visualizations that use the selected data asset in all tabs of your dashboard. Infographics don't have multiple tabs.

If you add the same column to the **All tabs** filter and to the **This tab** filter, the members that you pick in the **All tabs** filter are applied to the **This tab** filter. For example, you add the Year column to both filters. You filter **All tabs** to show 2015, 2016, and 2017. The **This tab** filter will show only these years and you can filter the years further.

You cannot drag a column between the **All tabs** and **This tab** filter areas.

### Procedure

1. In the **Sources** pane, expand the data asset to see its contents.



If you don't see the list of data assets, click the **Switch to edit** icon.



2. Drag one or more columns to the **All tabs** filter area. You can change the order of columns that have been added to the filter.

**Tip:** Any selections made in all tabs are cleared when applying any filter in the **All Tabs** filter area by selecting a subset of values.

3. To define the filter, click the column in the **All tabs** filter area.

- If the column contains distinct values, select the member or members that you want to filter on.
- If the column contains continuous values, use the slider to select a range of values to filter on. You can also click the start or end points of the range and enter a number.
- If the column is a hierarchy, expand the levels in the hierarchy and select the members or levels that you want. For example, select 2017 and each quarter in 2016.
- If the column has the data type of date, time, or timestamp (also known as datetime), select before, after, or between for the dates to include in the filter.

4. Click **OK**.

## Clearing filters

You can quickly clear the values that you've filtered on and select new values for a dashboard or story.

### Procedure

1. To clear the values that you filtered on in the **This tab** filter area, click the **Menu** icon in the **This tab** filter area and click **Clear all filters**.



If you don't see the **Menu** icon, click the **Switch to edit** icon.



2. To clear the values that you filtered on in the **All tabs** filter area, click the **Menu** icon in the **All tabs** filter area and click **Clear all filters**.



3. To clear the values that you selected in a filter widget, click the **Menu** icon in the filter widget and click **Clear all**. Then click **Apply**.

...

## Removing filters

You can delete filters from dashboards, stories, or from a visualization.

### Procedure

1. To remove filters from the **This tab** filter area, complete one of the following actions:
  - To remove one column from the filter area, click the **Menu** icon for that column and click **Delete filter**.  
• ...  
• To remove all columns, click the **Menu** icon in the **This tab** filter area and click **Delete all filters**.
2. To remove filters from the **All tabs** filter area, complete one of the following actions:
  - To remove one column from the filter area, click the **Menu** icon for that column and click **Delete filter**.  
• ...  
• To remove all columns, click the **Menu** icon in the **All tabs** filter area and click **Delete all filters**.
3. To remove the filter from one visualization, complete the following actions:
  - a) Click the **Filter** icon in the visualization.  

  - b) Click the **Delete filter** icon.  

4. To remove the filter from the data tray, complete the following actions:
  - a) Click the **Filter** icon next to the column heading in the data tray.  

  - b) Click **Filter**.
  - c) Click **Clear all**.
  - d) Click **OK**.

## Sorting

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You can sort data in ascending or descending order. You can sort the data in either the x-axis or y-axis, depending on what type of data is in an axis. You can also create a custom sort order.

### Sorting in numerical order

Understand how different items are ranked by sorting the data from the lowest number to the highest or from the highest number to the lowest. For example, you want to see the profit margin for each product line from the least profitable to the most profitable.

### Procedure

1. Touch and hold, or right-click, the axis label of the column that you want to sort.  
You can sort the data in either the x-axis or y-axis, depending on what type of data is in an axis.
2. Click the **Sort** icon.  

3. Select how you want to sort the data:

- **Sort ascending**
- **Sort descending**

4. To return to the default sort order, select **Auto (none)**.

## Sorting in alphabetical order

Organize the data by sorting it into alphabetical order. For example, you want to see employees in alphabetical order. Only columns that are categorical can be sorted by label. Numeric columns, such as revenue, are sorted by value.

### Procedure

1. Touch and hold, or right-click, the axis label of the column that you want to sort.  
You can sort the data in either the x-axis or y-axis, depending on what type of data is in an axis.

2. Click the **Sort** icon.



3. Select how you want to sort the data:

- **Sort ascending**
- **Sort descending**

4. To return to the default sort order, select **Auto (none)**.

## Custom sorting

Create a custom sort order that is not governed by the data and does not require a calculation.

### Before you begin

If any of the following apply to your data, you might not see all the items in the list you assemble for a custom sort:

- The data in a visualization might get clipped and can affect your custom sort.
- There is an applied filter that removes an item in your list.
- An item in your list no longer exists in the data.

#### Tip:

If you select too many items in your custom sort, performance can be degraded.

#### Note:

When you copy and paste a visualization from a dashboard to a report, custom sorting is not applied to the visualization in the report.

### Procedure

1. Open a visualization.

2. Click the **Field**

3. From the column that you want to custom sort click the menu

You can sort the data in either the x-axis or y-axis, depending on what type of data is in an axis.

4. Click **Sort > Custom**.

5. From the **Create custom sort** window, complete the following steps:

a) Select items to sort and create a custom sort order.

b) From the **Sort remaining items by** list, select how you want the remaining items that are not in your custom sort order list to be displayed.

c) Click **Apply**.

## Results

Your custom sort order is displayed in the visualization.

## What to do next

If you want to remove a custom sort, Ctrl+click the axis label, click the sort icon, and select an option other than **Custom** from the list. For example, select **Sort ascending**.

# Formatting

---

You can customize a dashboard, story, or visualization by changing its visual properties.

## Working with the legend

A legend is a key to the items in the visualization. The legend appears if there's a column in the **Color** data slot or **Size by** data slot.

### About this task

If there are too many items in the legend to be displayed an ellipsis is displayed.

### Procedure

1. Click the visualization, then click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Select the visualization which properties you want to change.
3. Click the **Visualization** tab.
4. To change the location of the legend, select a location from the **Legend position** box.
5. To hide the legend, clear the **Show legend** check box.

You can resize the legend by dragging the splitter that appears when you hover over the legend.



## Changing colors

You can change colors in the entire dashboard or story, in a visualization, or in widgets that you added to a dashboard or story.

- For the dashboard or story, you can change the visual theme, the color palette, and the background color.
- For visualizations, you can change the color palette, the color used in the elements (such as bars, bubbles, or lines), the fill color, and the border color. You can also make the visualizations more transparent or opaque.
- For shape and text widgets, you can make the widget more transparent or opaque, change the fill color, and change the border color.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, Click the **Switch to edit** icon.

2. For the entire dashboard or story, ensure that nothing else has focus by clicking the background, away from any visualization or object and complete one or more of the following actions in the **General** tab:

What to change	Actions
The theme of the entire dashboard or story	Click <b>Color and theme</b> , and under <b>Visual theme</b> select a different theme.
The background color of the entire dashboard or story	Click <b>Color and theme</b> , and under <b>Background color</b> select a new color. Optionally, click <b>Select custom color</b> and use the color picker to create your own background color.

3. For visualizations, click the visualization that you want to work with and complete one or more of the following actions:

What to change	Actions
The color palette used in a visualization	In the <b>Visualization</b> tab, click <b>Color &gt; Change color palette</b> and select a new palette. Optionally, click <b>Change heat palette</b> to change the heat scale order. For more information on color palettes, see “ <a href="#">Creating a color palette</a> ” on page 116.
The color of the elements of a visualization (such as bars, bubbles, or lines) if the visualization does not use the <b>Color</b> data slot	In the <b>Visualizations</b> tab, click <b>Color &gt; click Element color</b> and select a new color.
How transparent or opaque a visualization is	In the <b>General</b> tab, move the <b>Opacity</b> slider.
The fill color for a visualization	In the <b>General</b> tab, click <b>Fill color</b> and select a new color. Optionally, click <b>Select custom color</b> to create your own color with the <b>Color picker</b> .
The border color for a visualization	In the <b>General</b> tab, click <b>Border color</b> and select a new color. Optionally, click <b>Select custom color</b> to create your own color with the <b>Color picker</b> .

4. For shape and text widgets that you added to the dashboard or story, select the widget that you want to work with and complete one or more of the following actions in the **General > Appearance** tab:

What to change	Actions
How transparent or opaque a shape or text is	Move the <b>Opacity</b> slider.
The fill color for a shape or text	Click <b>Fill color</b> and select a new color. Optionally, click <b>Select custom color</b> to create your own color with the <b>Color picker</b> .
The border color for a shape or text	Click <b>Border color</b> and select a new color. Optionally, click <b>Select custom color</b> to create your own color with the <b>Color picker</b> .

# Creating a color palette

As a report, dashboard, or story author, you can create custom color palettes while you work on the canvas.

## About this task

You can create the following types of color palettes:

### Categories

Used for visualizations that support discrete colors, like a bar or pie chart.

### Continuous

Used for visualizations that support color transitions, like a map or a heat map.

Some visualizations support both types of color palettes. For example, if you drop a measure on to the color slot of a bar chart, you can add a color gradient to the bars for that measure. The following visualizations support both types of color palettes:

- Bar, floating bar, stacked bar
- Floating column, stacked column
- Bubble, packed bubble, hierarchical packed bubble
- Marimekko
- Radial
- Scatter plot
- Tree map

Color palettes are grouped into the following categories:

### Custom

Created by a user (report, dashboard, or story author). Available only to the user who created them.

### Global

Created by the system administrator. A global palette is available to all users but only an administrator can modify it. A user can duplicate a global palette and then modify the duplicated version. For more information about global palettes, see *Creating a global color palette* in the *Managing User Guide*.

### System

Default palettes available in IBM Cognos Analytics. A system palette can't be changed but a user can duplicate it and then modify the duplicated version.

## Procedure

1. Make sure that a visualization is selected on the canvas.
2. Do one of the following things, depending on your role:

Role	Action
<b>Report author</b>	Click <b>Show properties</b> . Under <b>COLOR PALETTE</b> , click the 3 dots icon for a property. Click <b>Change custom palette</b>  .
<b>Dashboard or story author</b>	Click <b>Properties</b> . The visualization can have one or both of a categorical color palette or a continuous color palette. Click <b>Change custom palette</b>  .

If you're working on a visualization that uses discrete colors, like a bar or pie chart, then the **Create categorical color palette** window opens. If you're working on a visualization that uses color transitions, like a map or a heat map, then the **Create continuous color palette** window opens.

3. Enter a name for your palette.
4. Click the **Grid** or **Wheel** tab.

In the **Grid** tab, you can select colors from a grid of color swatches. In the **Wheel** tab, you can select a color by doing one of the following things:

- Clicking the color wheel
- Typing the color in HSB (hue, saturation, brightness) or RGB (red, green, blue) notation
- Typing the color in hex code

5. Under **Color guide**, click **Automatic** or **Custom**.

**Categorical color palette**

Contains a set of swatches. In **Automatic**, when you select a color from the grid or wheel, all swatches in the palette are filled with colors that are related to the color you selected, starting from the currently selected swatch. In **Custom**, you must select each swatch and then select a color for it.

**Continuous color palette**

Contains one continuous swatch. In **Custom**, when you select a color from the grid or wheel, the swatch is filled with the color you selected. The color gradually increases in intensity from one end of the swatch to the other. **Automatic** is not available for a continuous color palette.

6. To undo a selection, click **Remove swatch** .
7. To add more swatches to the palette, click **Add swatch** .
8. To reverse the colors in the palette, click **Reverse palette** .
9. Click **Save** when you are finished.

## Results

The color palette appears under **Custom**. You can now apply it to visualizations.

## Matching color palettes on multiple visualizations

When multiple items on the canvas share a category or value, use the **Color consistency** advanced setting to automatically adjust the visualization colors to match each other.

### Procedure

1. Open a dashboard.
2. On the app bar, click the **Properties**  icon.  
If you don't see the **Properties** icon, click the **Switch to edit**  icon.
3. Click **Advanced**.
4. Click the **Color consistency** toggle to enable or disable the setting.

## Changing the axis

You can change the axis by rotating the axis labels, adjusting the scale of the axes to include or exclude zero, and showing or hiding the names of columns that appear in the axis titles.

### Procedure

1. Click the **Properties** icon.  
  
If you don't see the **Properties** icon, click the **Switch to edit** icon.  

2. On the **Visualizations** tab open the **Axis** section.
3. Complete one or more of the following actions:

Goal	Actions
Set the item axis label orientation	Select an option from the <b>Item axis label orientation</b> menu: <ul style="list-style-type: none"> <li>Automatic</li> <li>Horizontal</li> <li>Vertical</li> <li>Rotate 45 degree</li> <li>Stagger</li> </ul>
Exclude the zero from the axis scale.	Clear the <b>Show zero origin</b> check box.
Maintain the axis scale	Use the option <b>Maintain axis scale</b> when you want to maintain the axis scale the same if you for example apply a filter.
Hide the column headings in both axes.	Clear the <b>Show axis titles</b> check box.
Hide the column heading in the axis that shows measures, such as revenue, quantity sold, or profit.	Clear the <b>Show value axis title</b> check box.
Hide the column heading in the axis that shows items, such as years, products, or customers.	Clear the <b>Show item axis title</b> check box.
Specify the title of the item axis.	Type a title in the <b>Item axis title</b> field.
Specify the title of the value axis.	Type a title in the <b>Value axis title</b> field.
Swap the axis.	Use the option <b>Transpose</b> .

## Improving the visibility of labels

You can change the visibility of the labels in some visualizations, by adding a shadow or changing the contrast.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Chart**.

3. Complete one or more of the following actions:

Goal	Actions
Increase the contrast of the labels	Select the <b>Contrast label color</b> check box.
Add a shadow to the labels	Select the <b>Label shadow</b> check box.

## Adding labels in the visualization

You can add labels to the visualization itself so that you can easily see the data for each data point.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Chart**.
3. Ensure that the **Show value labels** check box is selected.
4. From the **Value label format** box, select **Value**, **Percentage of category**, or **Percentage of color**.

## Changing the label orientation

You can change the orientation of the labels on the horizontal axis in some visualizations.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Axis**.
3. Select an orientation from the **Item axis label orientation** menu.

Orientation	Meaning
Automatic	The best label orientation is determined for you, based on available space.
Horizontal	The label orientation is horizontal.
Vertical	The label orientation is vertical.
Rotate 45 degrees	The label orientation is rotated 45 degrees clockwise.
Stagger	The labels are arranged of two lines in a horizontal way.

## Changing the label format for pie visualizations

You can change the format of the labels in pie visualizations.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Chart**.
3. Select a format from the **Item label format** menu.

Format	Meaning
Item	The item label is displayed.
Value	The item value is displayed.

Format	Meaning
Both	Both the item label and the value are displayed.

## Changing the value label location

You can change the orientation of the labels on the horizontal axis in some visualizations.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Chart**.

3. Select a location from the **Value label location** menu.

Value label location	Meaning
Inside base	The label location is on the inside next to the base.
Outside end	The label location is on the outside of the base.
Center	The label location is in the center.
Inside end	The label location is on the inside end.

For pie visualizations the following locations are available:

Value label location	Meaning
Callout	The label location is on the outside of the slices with a callout.
Center	The label location is in the center of the slice.
Center horizontally	The label location is horizontally in the center of the slice.
Outside	The label location is on the outside of the slice.

## Connecting data points with smooth lines

You can show data points connected by smooth curves in an area, line and column, or line visualization.

### Procedure

1. Select the area, line and column, or line visualization that you want to work with.

2. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. To connect the data points by smooth curves, select the **Smooth lines** check box.

## Set the interpolation between data points in a visualization

You can set how data points interpolate in an area, line and column, or line visualization.

### Procedure

1. Select the area, line and column, or line visualization that you want to work with.
2. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



3. To set the way how the data points connect in your chart, select an option from the **Interpolation** menu:

Option	Description
<b>Basis</b>	Interpolates with a curve that uses the data points as control points for the curve. The curve does not touch the points.
<b>Cardinal</b>	Interpolates with a curve that uses the datapoints as points for the curve. The curve runs through all of the points (default for smooth).
<b>Linear</b>	Connects all points with a set of straight lines.
<b>Step</b>	Creates a discrete step up between successive points, where the vertical line starts at the midpoint between the two points.
<b>Step before</b>	Creates a discrete step up between successive points, where the vertical line starts at the first point.
<b>Step after</b>	Creates a discrete step up between successive points, where the vertical line starts at the last point.

## Using a different symbol

You can change which symbol is used in a line and column visualization or a line visualization.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Chart**.
3. If you need to show symbols, select the **Show markers** check box.
4. From the **Marker shape** box, select a different symbol for the marker.

## Changing the size or color of bubbles

A bubble visualization shows relationships among columns that contain numeric values. The bubbles appear in different sizes and colors based on the values in specified columns.

### Procedure

1. To make the bubbles different sizes based on a column, add a column to the **Size** data slot.
2. To change the color of the bubbles, add a column to the **Color** data slot or change which column is used.

## Changing the orientation of a word cloud

The word cloud visualization can be shown horizontal, vertical, angled, both horizontal and vertical, or any.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Chart**.
3. Select the orientation that you want from the **Word orientation** box.

## Showing or hiding grid lines

You can show or hide the grid lines that appear in the background of some visualizations.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Chart**.
3. To hide the grid lines, clear the **Show grid lines** check box. To show them, select the **Show grid lines** check box.

## Showing or hiding padding

You can show or hide the empty space that appears between parts of the data points in some visualizations. This is called padding.

### Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. Click the **Visualization** tab and then click **Chart**.
3. To disable the padding clear the **Disable padding** check box.

## Working with objects

You can work with objects, such as visualizations and widgets, that are on the canvas.

### Procedure

1. Select the object that you want to work with.

If you don't see icons for the object, click the **Switch to edit** icon.



2. Complete one or more of the following actions:

Goal	Actions
Group objects	Select several objects and click the <b>Group</b> icon. 
Align objects	Select an object and click the <b>Align</b> icon. 
Ungroup objects	Select the group and click the <b>Ungroup</b> icon. 
Layer objects	To place the object behind other objects, click the <b>Send to back</b> icon.  To place the object on top of the other objects, click the <b>Bring to front</b> icon. 
Move objects	Click and hold the <b>Move</b> icon and drag the object to its new location. 
Duplicate objects	Click the <b>Duplicate</b> icon and then move the object to a new location. 
Resize objects	Drag one of the squares on the border of the object.
Delete objects	Click the <b>Delete</b> icon. 

## Changing the layout of an object in a dashboard

You can specify a horizontal and vertical alignment for an object in a report to determine where they appear.

You can also specify the position and its degree of rotation of objects.

**Note:** It depends on the object whether you can change its layout.

## Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. On the **General** tab, open **Layout**.
3. In the **Layout** section, set one of the following:
  - Alignment
  - Position
  - Size
  - Rotation

## Formatting text in a crosstab or table

You can format the text in a crosstab or table to customize the font family, text color, font size, styles, and alignment.

### About this task

Complete the following steps to apply text formatting to your crosstab or table.

## Procedure

1. Ctrl+click a cell in the crosstab or table.
2. In the toolbar, click the **Format text** icon .
3. Change one or more of the following properties:
  - Font family
  - Text color
  - Font size
  - Style, such as bold, underline, or italic
  - Alignment

## Apply wrap text to header rows and columns

Allow long words in header rows and columns to break and wrap onto the next line. Wrap text is turned off by default.

## Procedure

1. Ctrl+click a header row or column in a crosstab or table.
2. In the toolbar, click the **Format text** icon .



3. Click the **Wrap text** icon .

## Undocking the toolbar

When you select a visualization on your dashboard, the toolbar appears at the top of the dashboard and is docked there by default. You can undock the toolbar so that it is displayed with your selected visualization.

### About this task

After you dock or undock a toolbar and save the dashboard, your toolbar preference is saved for you.

### Procedure

1. Select a visualization.
2. On the toolbar at the top of your dashboard, click the undock toolbar icon  to move the toolbar to a selected visualization.  
With the toolbar undocked, you can select any visualization on the dashboard to display its toolbar.
3. Click the dock toolbar icon  to move the toolbar back to the top of your dashboard.

## Data properties

---

You can adjust the appearance of data in an asset, such as how it is aggregated or what the column headings are. If you want these changes to affect all assets, you must make them in the data asset itself.

### Changing how data is aggregated

You can change how numeric data is summarized or aggregated. IBM Cognos Analytics assigns a default aggregation type to numerical columns when a data asset is imported. For example, the default aggregation for a column called "Age" is average. The default aggregation for column called "Revenue" is sum. When you use a column in a visualization, the default aggregation is used.

### Procedure

1. Click the **Sources** icon.



If you don't see the **Sources** icon, click the **Switch to edit** icon.



2. In the **Data** pane, click the **Menu** icon for the column that you want to modify, and click **Properties**.



3. Click **Aggregate**, and choose another method:

#### Total

The total value for the selected column.

#### Average

The average value of the selected column.

#### Minimum

The lowest value in the column.

#### Maximum

The highest value in the column.

#### Count

How many rows are in the selected column. Blanks are not included in the count but duplicates are included. For example, if a city appears in 10 rows, it is counted each time that it appears.

## Count distinct

How many unique rows are in the selected column. Duplicate rows are counted once. For example, if a city appears in 10 rows, it is counted only the first time that it appears.

# Modifying the data format

**11.1.0** From the **Sources** pane, you can select a different data format type and specify its properties.

## About this task

The default data format type is inherited from the data source.

## Procedure

1. Click the **Sources** icon.



If you don't see the **Sources** icon, click the **Switch to edit** icon.



2. In the **Data** pane, click the **Menu** icon for the column that you want to modify, and click **Properties**.



3. Click **Data format**.
4. Select an option from the **Format type** list.
5. Select an option from each list that appears for the format type that you chose.
6. Click **OK**.

# Enabling caching

You can enable data caching on the server side or browser side to improve performance.

## Before you begin

To set up caching in a data module, see the *Setting up data caching* documentation in the *IBM Cognos Analytics Data Modeling Guide*.

## About this task

Server caching is useful when multiple users access the same saved dashboard or story at the same time. Browser caching reduces server processing time to 0 for individual users.

**Note:** Browser caching is not available in Cognos Analytics reports.

## Procedure

1. Click the **Properties** icon.



If you don't see the **Properties** icon, click the **Switch to edit** icon.



2. For the entire dashboard or story, ensure that nothing else has focus by clicking the background, away from any visualization or object.
3. Expand **Advanced** and select an option from the **Data cache** menu.

#### **Automatic**

This is the default option. It reflects the data cache setting as it was specified by the modeler in a Framework Manager package or in a data module. This type of data caching is referred to as server-side caching. Browser data caching is disabled.

#### **On**

This option enables data caching in the browser. The data cache option that was set by the modeler in the package or data module is automatically disabled.

When browser caching is enabled, the client application stores the query results in the browser. When the same query is requested again, the client doesn't send the request to the server.

Instead, the client retrieves the results locally. This reduces the server processing time to 0. No network traffic is generated, and no server processing is needed.

The data is cached and reused every time when you edit the dashboard, and your edits don't require more data to be retrieved from a data server. For example, a simple filter that is applied locally uses only existing, cached data. This option also improves performance when multiple users access the same saved dashboard or story.

**Note:** When the property **Refresh automatically** is enabled on a visualization, data is not cached for that visualization.

#### **No cache**

This option overrides the data cache option in the data module or package that was set by the modeler. Browser caching is disabled. The query for data is sent to the server each time you make a change to a dashboard or story. Fresh data is always returned.

## **Troubleshooting data caching**

When you open an older dashboard in the current release of IBM Cognos Analytics, the data caching feature will not work until you save the dashboard.

## **Forecasting**

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Use forecasting in IBM Cognos Analytics to discover and model trend, seasonality, and time dependence in data.

You can forecast in IBM Cognos Analytics by using automated tools that model time-dependent data. Automated model selection and tuning makes forecasting easy to use, even if you are not familiar with time series modeling.

Forecasts and their confidence bounds are displayed in visualizations as a continuation of historic data. You can also view the statistical details for generated models if you want to see the technical background.

Specifying time series in forecasts often requires data manipulation. Cognos Analytics supports a wide range of time series without the need for manipulation, ranging from standard date and time types, to nested periodic and cyclical time fields. When data is recognized as a time series, data preparation is automated. Appropriate trend and seasonal periods are detected, and models are selected from a set of nine different model types.

You can forecast in line, bar, and column visualizations. Forecasting allows analysis of hundreds of time series per visualization. Forecasts and confidence bounds are computed for each time series, and displayed in the visualization as extensions of the current data. You can inspect each time series separately, and tailor the forecast and results to your own data and requirements.

If you are familiar with forecasting models, you can view the selected model type, estimated model parameters, standard accuracy measures, and processing summary information.

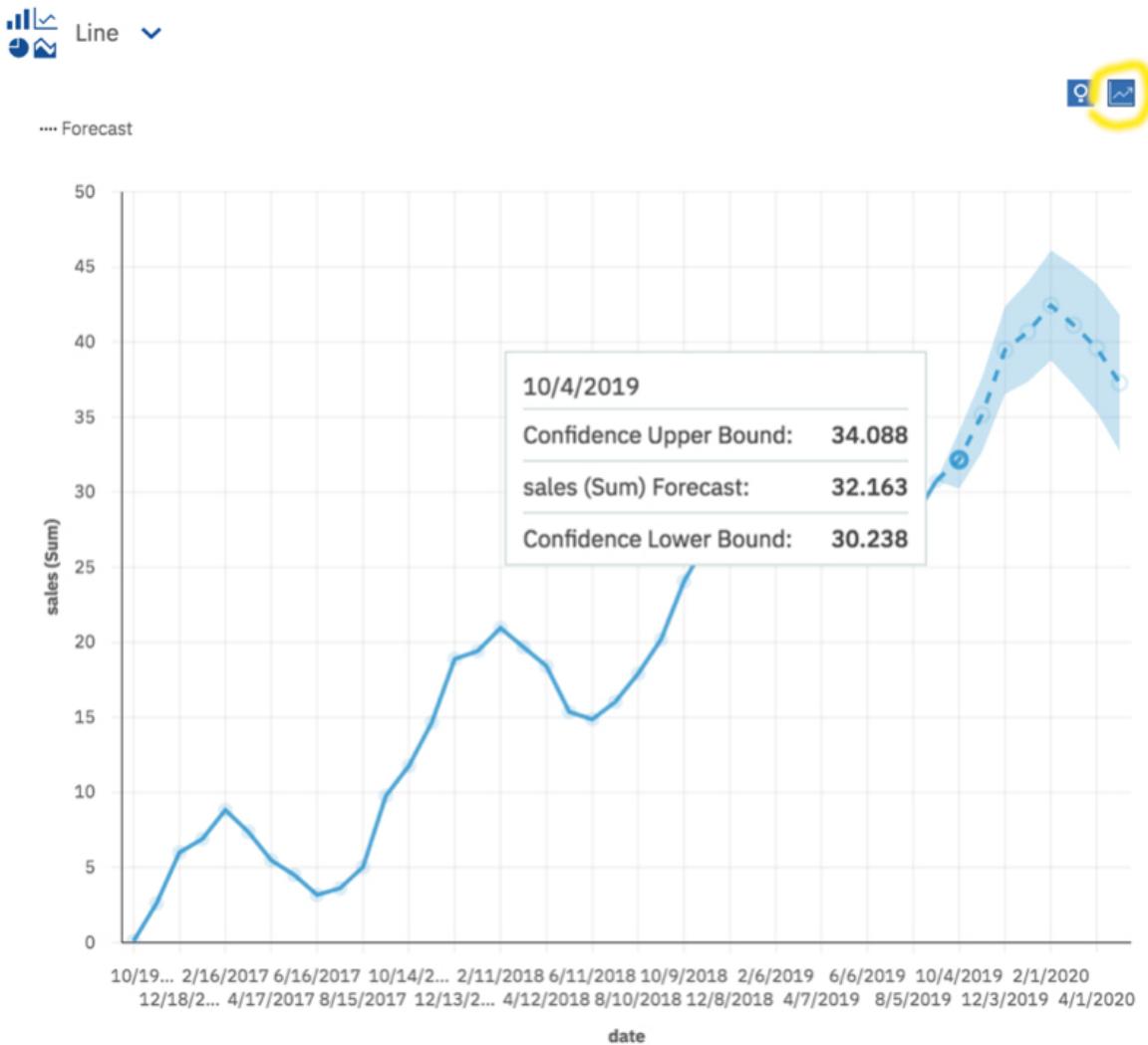
## Forecasting features

Forecasting provides time series data modeling and forecasts based on data in visualizations.

To use forecasting, the visualization must be either a line, bar, or column visualization, the data must be supported for forecasting, and forecasting must be enabled. When forecasting is enabled, a **Forecast**

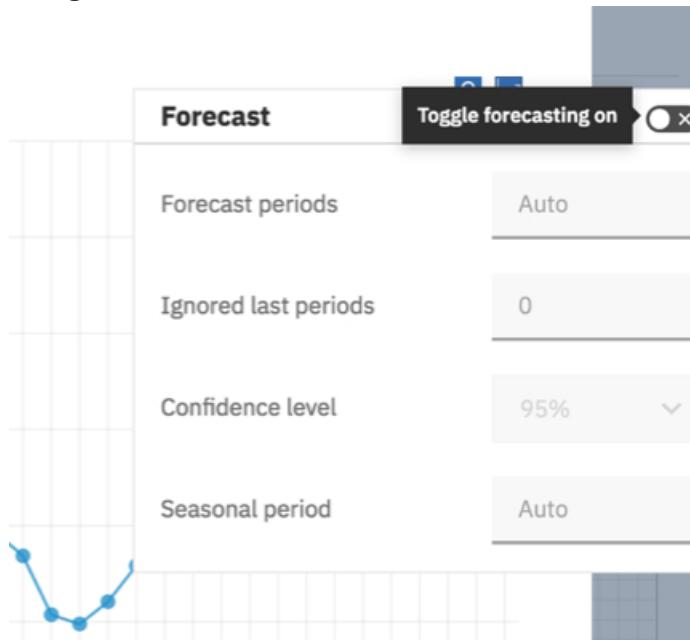
dialog box  is available in the upper right corner of a visualization, where you can modify model and forecast settings, and confidence bounds. Appropriate time series models for the visualization are estimated, and forecasts are displayed in the visualization. You can also see the time series model specification and data processing summary in the data tray.

The following example shows forecasting values and confidence bounds in a visualization.



## Forecasting options

You can modify your forecasts by setting a number of period and confidence level options in the **Forecast** dialog box .



A period is the smallest time interval between neighboring points in the data.

The following options are available.

### Forecast periods

The number of steps to forecast ahead.

The default value is **Auto**, which is 20% of the length of the historical data. Any missing values at the end of a particular series will also be forecast, but they will not count towards the specified number of forecast periods.

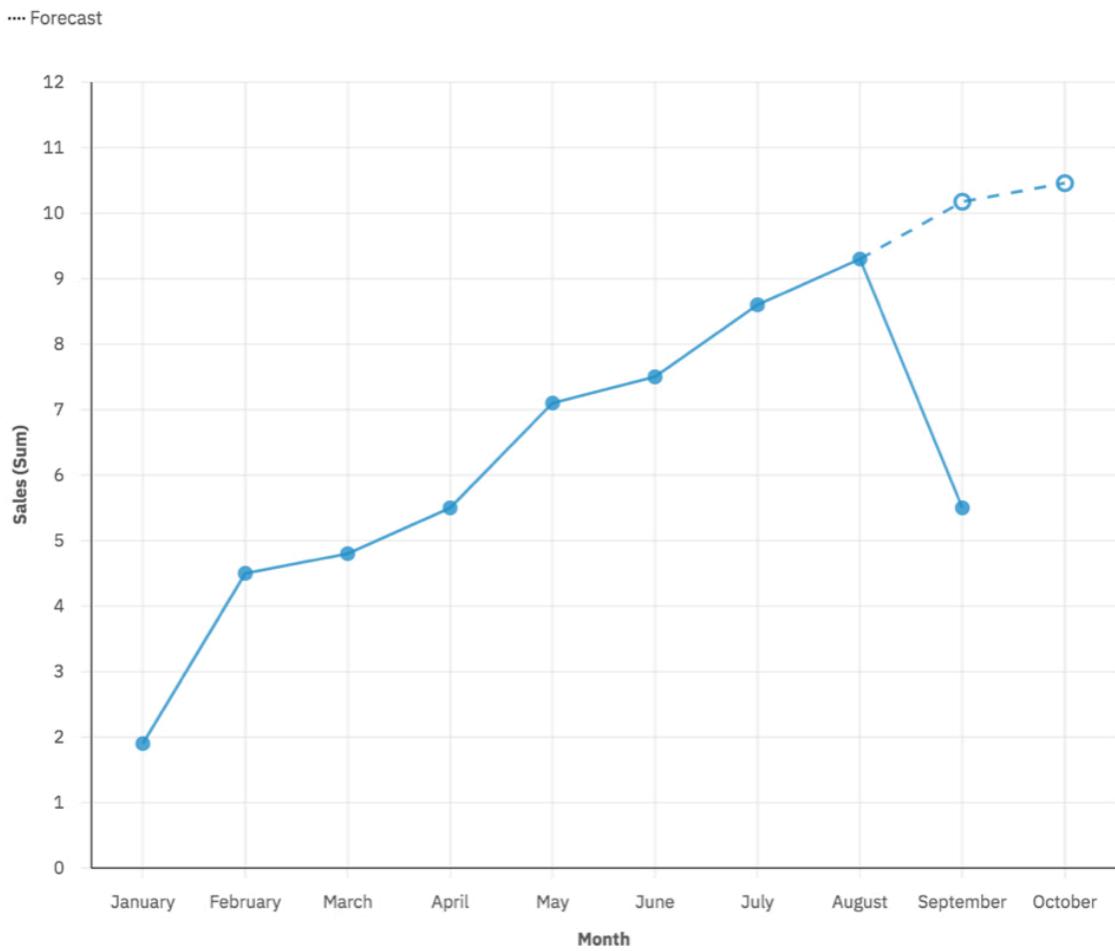
### Ignored last periods

Ignores a specified number of data points at the end of a time series when building the model and computing the forecasts. Any missing values at the end of a non-ignored portion of a series will also be forecast. Ignored last periods value must be specified as a non-negative integer, such as: 0, 1, 2, 3.

The default value is 0. If there are no missing values, then all of the historical data is used in model generation and the first forecast point is after the last historical data point. 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.

The following visualization shows a forecast that ignores September's results by setting **Ignored last periods** to 1.



### 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.

You can select three different confidence levels: 90%, 95%, and 99%. The default is 95% and the lower and upper bound define the range at which you can be 95% confident that the true value lies within that range.

### 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.

You can specify seasonality by entering a non-negative integer, such as: 0, 1, 2, 3 as the seasonal period.

To specify a non-seasonal model, set the **Seasonal period** to 0 or 1. A model with user specified seasonality is displayed only if the seasonal model is more accurate than all of the non-seasonal models.

### Insights

When visualizations have both Insights and Forecasts enabled and available, the Insights dialog box appears next to the Forecast dialog box. Each feature provides an independent set of analytic results. For more information, see [“Insights in visualizations” on page 145](#).

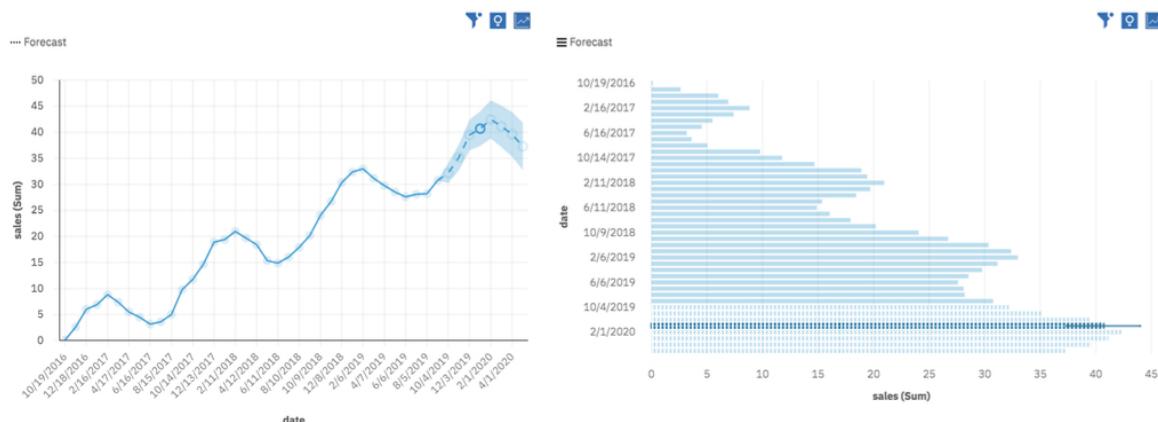
## Visualization types that support forecasting

Forecasting is supported in line, bar, and column visualizations.

The following table compares the forecasting display features for each visualization.

Forecasting features	Line chart	Bar chart	Column chart
Forecast points	Open circle	Striped bar	Striped column
Confidence interval display	Shaded region	Solid line	Solid line
Activate confidence interval	Click any point	Click a forecast bar	Click a forecast column
Number of confidence intervals displayed	All	1	1

The following image shows a forecast on line and bar visualizations with activated bar intervals.



## Insights and forecasting

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. Insights work alongside forecasting in supported visualizations. Insights provide a separate set of analytic results, and the results are for historical values only. For more information, see [“Insights in visualizations” on page 145](#).

## Forecasting data

Data that is suitable for forecasting has measure values that correspond to regularly spaced time points. You specify time and measures in visualizations by dragging time fields and measure fields into visualization slots. Optionally, you can also specify group fields that split the measure values by categories.

The following table is a summary of the field types and matching visualization slots that are supported in forecasting:

Slot	Time fields (required)	Measure fields (required)	Group fields (optional)
Line chart slot	x-axis	y-axis	Color
Bar chart slot	Bars	Length	Color

Slot	Time fields (required)	Measure fields (required)	Group fields (optional)
Column chart slot	Bars	Length	Color

No other visualizations or visualization slots are supported, with the exception of the **Local filters** slot

## Time fields in forecasting data

A time field is identified by a time icon in front of the field label in the **Data** pane.

You can specify time field properties by using the following properties: **Data type** or **Represents Time**.

### Data type

A field is recognized as a time field if it has one of the following data types: Date, Time, or Timestamp. Data type is inherited from the data source and cannot be changed.

Date, Time, and Timestamp data types are designed to support the full range of date and time formats that are covered by the ISO 8601 basic and extended formats. The following table shows the supported data types together with an example of format and a data example for each.

Data type	Format example	Data example
Date	yyyy-mm-dd	2019-07-01
Time	hh:mm:ss	12:34:56
Timestamp	yyyy-mm-dd'T'hh:mm:ss	2019-07-01T12:34:56

### Represents Time

A field is recognized as a time field if the data property **Represents** is set to **Time**. Text and Integer fields that contain time data are also recognized as time fields. Time fields are defined automatically during data import or enrichment. The possible definitions are Date, Year, Quarter, Season, Month, Week, Day, Hour, Minute, or Second.

If time fields are not recognized automatically, you can specify them as time fields. Ensure that the field values are in one of the supported formats, otherwise you might receive an **Unsupported date format** error.

### Nested time fields

You can drag multiple time fields into the same visualization slot to specify a nested time field. For example, a field that represents Week can be dragged into the slot along with a field that represents Day to create a forecast by Days of the Week.



Nested fields in the slot must be in time hierarchy order. For example, Week must be placed above Day.

Nested fields cannot skip levels in the time hierarchy that would result in ambiguity. The following table describes acceptable hierarchies.

Time field	Acceptable lower fields
Year	Quarter, Month, Week, Day

Time field	Acceptable lower fields
Quarter	Month
Month	Day
Week	Day
Day (of Year, Month, or Week)	Hour, Time
Hour	Minute
Minute	Second

If **Year** is absent in the time hierarchy, then the system defaults to the current year. This can cause issues due to differences between leap and non-leap years. Consider providing the **Year** in such instances.

## Chronological data order

Specified time fields define a chronological order for the time points in the visualization. They are used to sort the points on the visualization in chronological order when forecasting is enabled. The chronological order includes the historical points, along with the new forecasted points. Any other sorting criteria that are specified for the visualization is ignored when forecasting is enabled.

Any invalid time labels are moved to the beginning of the sequence and excluded from building the model and computing the forecast.

## Time interval detection

Time interval detection is possible when the data is ordered chronologically. The time interval is the size of the smallest interval between any two adjacent time points, such as “2 weeks”. If varying time intervals are detected, they must all be integer multiples of the smallest interval. Otherwise, the data is deemed irregular and cannot be forecast. Missing time points that arise as a result of multiple intervals are filled in for the detected interval. Corresponding measure values are set to missing. If the number of missing values is larger than 33% of the series length, a **Too many missing values** error is reported.

## Measure fields

One or more fields of any type can be specified as measure fields for forecasting analysis by adding them to a corresponding visualization slot. Each measure field is analyzed separately. Multiple time series can also be specified by adding a field to the **Color** slot, splitting the measure values by the categories of the specified field.

All measure field values that correspond to the same time point are summarized by using one of the following summarization levels: **Sum**, **Minimum**, **Maximum**, **Average**, **Count**, and **Count distinct**. The field must be numeric to support **Sum**, **Minimum**, **Maximum**, or **Average** summarization. All possible data types and summarization levels are supported for forecasting. However consider the following points:

- Small number of different measure values can result in unexpected or uninformative forecasts. For example, when **Count distinct** summary is used.
- Zero measure values can unduly influence results, especially when they represent missing measurements.

## Interpolating missing values

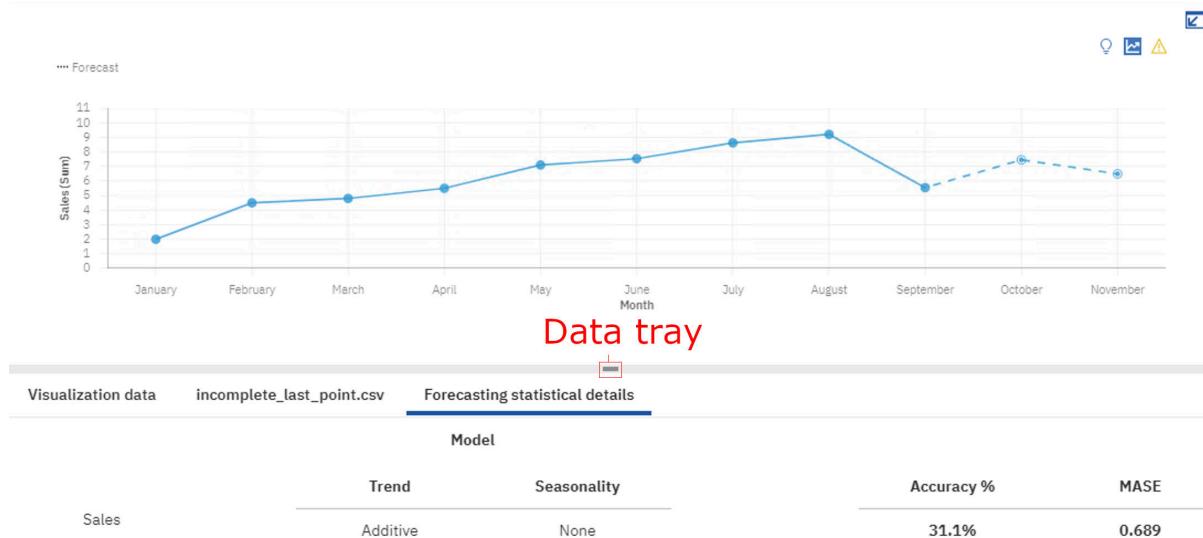
Missing values are computed and filled in by the **Linear Interpolation** algorithm. The computation is based on the nearest neighbors in a chronologically ordered time series with detected time interval. The new value is  $(\text{previous value} + \text{next value}) / 2$ . For example, with the values [3, 6, missing, 12], the interpolated value to replace the missing value is  $(6 + 12) / 2$  or 9. The interpolation algorithm can also handle contiguous missing values.

Data points with missing values at the first or the last historical time points are excluded from the series before building a model. Missing values at the last historical time points get forecasted as well.

## Forecasting statistical details

A forecasting run generates forecasts and forecasting statistical details. Forecasting statistical details are located in the data tray at the bottom of each visualization. There is a single row of statistical details for each time series in the visualization. Forecasting details are generated as long as the time points are evenly spaced.

Forecast information contains forecast **Status** for the given time series. When the status is **Success**, the other fields provide details on the model and data used for forecast. When the status is **Failure**, some of the other fields, including the **Notes**, provide details regarding the cause of the failure. Summaries of any failures are always provided in the visualization warnings.



**Model** information specifies the **Trend** and **Seasonality** type that is selected for estimating the time series data when successful. The following table lists the different available types.

Trend component	Seasonal component		
	N NONE	A ADDITIVE	M MULTIPLICATIVE
N NONE	(N, N)	(N, A)	(N, M)
A ADDITIVE	(A, N)	(A, A)	(A, M)
Ad ADDITIVE_DAMPED	(Ad, N)	(Ad, A)	(Ad, M)

## Accuracy measures

Model accuracy measures Mean Absolute Error (MAE), Mean Absolute Scaled Error (MASE), Accuracy Percent, Root Mean Squared Error (RMSE), Mean Absolute Percent Error (MAPE), and Akaike Information Criterion (AIC) are based on the time series data that is used to generate the model. All accuracy

measures are based on the historical data. Accuracy measures can also be used as an indicator of the forecast accuracy, but they do not carry over to future values.

#### **Mean Absolute Error (MAE)**

Computed as the average absolute difference between the values fitted by the model (one-step ahead in-sample forecast), and the observed historical data.

#### **Mean Absolute Scaled Error (MASE)**

The error measure that is used for model accuracy. It is the MAE divided by the MAE of the naïve model. The naïve model is one that predicts the value at time point  $t$  as the previous historical value. Scaling by this error means that you can evaluate how good the model is compared to the naïve model. If the MASE is greater than 1, then the model is worse than the naïve model. The lower the MASE, the better the model is compared to the naïve model.

#### **Accuracy Percent (Accuracy %)**

The primary indicator of the model accuracy based on the fitted values. It is specified as the reduction percentage of mean absolute error relative to the naïve model. It is computed by subtracting MASE from 1 and expressing it as percentage. If MASE is greater than or equal to 1, the accuracy is set to 0% because the model does not improve upon the naïve model. Higher accuracy indicates lower model error relative to the naïve model.

#### **Mean Squared Error (MSE)**

The sum of squared difference between the values that are fitted by the model, and observed values that are divided by the number of historical points, minus the number of parameters in the model. The number of parameters in the model is subtracted from the number of historical points to be consistent with an unbiased model variance estimate.

#### **Root Mean Squared Error (RMSE)**

The square root of the MSE. It is on the same scale as the observed data values.

#### **Mean Absolute Percent Error (MAPE)**

The average absolute percent difference between the values that are fitted by the model and the observed data values.

#### **Akaike Information Criterion (AIC)**

A model selection measure. The AIC penalizes models with many parameters, and so attempts to choose the best model with a preference towards simpler models. The AIC is the sum of the logarithm of non-adjusted MSE multiplied by the number of historical points and the number of model parameters and initial smoothing states that are multiplied by 2.

## **Parameters**

Detected Seasonal period and estimates for other parameters that are used in the selected exponential smoothing model are available.

#### **Seasonal period**

The number of time steps in a seasonal period used in the exponential smoothing model.

#### **Alpha**

The smoothing factor for level states in the exponential smoothing model. Small values of alpha increase the amount of smoothing, that is, more history is considered when the alpha is small. Large values of alpha reduce the amount of smoothing, which means that more weight is placed on the more recent observations. When the alpha is 1, all the weight is placed on the current observation.

#### **Beta**

The smoothing factor for trend states in the exponential smoothing model. This parameter behaves similar to alpha, but is for trend instead of level states.

#### **Gamma**

The smoothing factor for seasonality states in the exponential smoothing model. Serves the similar role as alpha, but for the seasonal component of the model.

## **Phi**

The damping coefficient in the exponential smoothing model. Long forecasts can lead to unrealistic results, and it is useful to have a damping factor to dampen the trend over time and produce more conservative forecasts.

## **Diagnostics**

Information includes Missing count, Series length, Ignored periods, Trend strength, Seasonality strength, and Date/time interval.

### **Missing count**

Indicates the number of data rows that have either missing values or missing time points and are positioned between the first and the last valid series value. Invalid time points, as well as points with missing values at the first or the last historical time points are not included.

### **Series length**

Indicates the number of data points used for time series modeling. Only the points between the first and the last valid series value are included.

### **Ignored periods**

An integer, m, that ignores the last m data points of the series when building the exponential smoothing model and computing the forecasts. Any missing values at the end of a non-ignored portion of a series will also be forecast. The default value for this parameter is 0, which means that all of the historical data is used in model generation when there are no missing values. A maximum potential of 100 points can be ignored. Ignored periods excludes the data points when building a model, so forecasting might fail due to factors such as minimum data length requirements and missing value proportion that exceeds 33%.

### **Trend strength**

Compare the original model, M, with the same model, but with the trend component removed. The trend strength of M is the difference in accuracy between model M and model M with the trend component removed.

### **Seasonality strength**

Compare the original model, M, and the same model with the seasonal component removed. The seasonality strength of M is the difference in accuracy between model M and model M with the seasonal component removed.

### **Date / time interval**

The Date / time interval represents the detected time interval of the chronologically sorted data. The time interval is identified as the smallest difference between neighboring points in the data when sorted in the chronological order.

## **Forecasting models**

Exponential smoothing models are a popular class of time series models.

Exponential smoothing models are applicable to a single set of values that are recorded over equal time increments only. However, they support data properties that are frequently found in business applications such as trend, seasonality, and time dependence. All specified model features are estimated based on available observed data. An estimated model can then be used to forecast future values and provide upper and lower confidence bounds for the forecast values.

Each model type is suited for modeling a different combination of properties that are found in the data. The model type that can provide the best match to the observed data is selected for modeling the observed data and is used to forecast any future values.

## **Model estimation algorithms**

Models are specified by the smoothing equations that include the model parameters and initial smoothing states. Model parameters are estimated with values that minimize the model error.

## Smoothing equations

Exponential smoothing models derive their name from the smoothing equations that specify the model. They provide formulas for computing smoothing states for each observed point by using the current observed value and the previous smoothing states. Smoothing equations provide weighted averages of the current value and the previous states in the time series. Weight for the current value or state is given by a model parameter between 0 and 1, while the weights for previous values are exponentially decreasing.

### Level smoothing equations

All model types compute a level state for each time series point by using the corresponding level smoothing equation. Level states for the model without trend and seasonal components are computed as the weighted average of the time series value at the current point and the level state at the previous point. The weight that is associated with the current value is a parameter, **alpha**, with its value restricted between 0 and 1. For other models, previous trend and seasonal states are also included in the level smoothing equation.

### Trend smoothing equations

Model types with additive or damped additive trend compute a trend state for each time series point by using the corresponding trend smoothing equation. The trend state for the current point is based on the difference of level states at the current and the previous point, and on the trend state at the previous point. The weight that is associated with the difference of level states at the current and previous point is a parameter that is named **beta** with its value restricted between 0 and 1. An extra parameter, **phi**, is added to the damped trend smoothing equations. **Phi** multiplies the trend state contribution from the preceding point and its value is also restricted between 0 and 1. The purpose of this parameter is to estimate the degree of trend damping from one point to the next.

### Seasonal smoothing equations

Model types that support additive or multiplicative seasonality compute a seasonal state for each time series point. The seasonal states are computed by using seasonal smoothing equations. The seasonal state for the current point includes the difference of the time series value and the current level state for additive seasonality or ratio of the two same values for multiplicative seasonality. The weight that is associated with this term is a parameter, **gamma**, with its value restricted between 0 and 1. The rest of the contribution comes from the corresponding seasonal state in the previous seasonal period. Notice that the seasonal period has a fixed length, and while the seasonal state can change for each point, only matching seasonal indices from different periods are considered together in the seasonal smoothing equations.

### Initial smoothing states

Values must be specified for level, trend, and seasonality states for points that precede the time series. The values are needed for the smoothing equations. To compute the various states at the first point of the time series requires state values at the corresponding previous points.

### Model parameters

Each smoothing equation uses corresponding model parameters:

#### **alpha**

Controls the level states.

#### **beta**

Controls the trend states.

#### **gamma**

Controls seasonal indices across seasonal periods.

## **phi**

An extra parameter that is used for specifying the damped trend.

All four parameters have values between 0 and 1. Higher values of **alpha**, **beta**, and **gamma** mean that more recent observations have higher weight, while lower values mean higher weights for older observations. A higher value of **phi** corresponds to a higher degree of dampening the forecast trend.

## **Model estimation**

Model parameters in the smoothing equations are estimated based on the time series data. Parameters cannot be estimated directly by using a formula. They are estimated by an iterative process that searches for parameter values that minimize the model error. The model error is computed as Mean Absolute Scaled Error (MASE). The iterations stop when no further reduction in the model error can be achieved. Corresponding parameter values together with the initial smoothing states fully specify the estimated model. They are used to compute the model states for all other data points and generate the model forecasts by using a corresponding forecast equation.

## **Forecasting algorithms**

A number of algorithms are used in forecasting.

### **One-step ahead**

Every model supports one-step ahead forecasts based on the corresponding forecast equation. One-step ahead forecasts are needed to compute model errors during the model estimation process.

One-step ahead forecasts are computed sequentially for each data point by using computed level and trend states for the current point, and seasonal states for the last seasonal period.

Forecast error is computed by subtracting forecast value at the previous point from the observed value at the current point. Overall model error, which is used for estimating the model, is computed as an average value of absolute forecast errors. Smaller errors correspond to a better model fit. Accuracy measures displayed in **Forecasting statistical details** provide several model summaries of the one-step ahead forecast errors.

### **k-step ahead**

k-step ahead forecasts are used to make predictions for any number of future values following the observed time series data. They are based on the same forecast equations as the one-step ahead forecasts for the specified model.

The number of forecast values that are generated is 20% of the length of historical data series by default. You can specify an exact number of values to be forecast in the **Forecast** dialog box. Any missing values at the end of a particular series will also be forecast, but they will not count towards the specified number of forecast periods.

## **Confidence bounds**

Confidence bounds provide the level of uncertainty that is associated with each forecast value. The bounds typically become wider further into the future, because more distant forecasts are less reliable. Confidence bounds provide relevant insights into the future behavior of the observed time series.

Computation of confidence bounds is based on the overall variance of forecast errors that are estimated on the observed data and a factor that depends on the specified model and on the number of steps from the last observed point.

## Automated model selection in forecasts

Multiple model types are used to create candidate models for each time series in a forecast. All nine available model types are normally used, except when a seasonal component is absent. There are only three model types available that do not account for seasonality in the data.

The default value, **Auto**, for the Seasonal period option detects seasonal period by comparing multiple models, each with a different candidate seasonal period.

Multiple models are compared by using a model error and the number of model parameters. For example, when model errors are equal for two models, the model with fewer parameters is preferred. The latter model provides a more condensed representation of the observed data and also tends to generate more reliable forecasts.

## Principles of advanced data analytics

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IBM Cognos Analytics is a business intelligence tool for managing and analyzing data. It includes self-service features for users to prepare, explore, and share data. Cognos Analytics includes predictive, descriptive, and exploratory techniques, also known as numeric intelligence. Cognos Analytics uses many statistical tests to analyze your data.

It is important to understand the definitions of these tests as they apply to Cognos Analytics.

Numeric algorithms are used as part of the workflow to provide features to the user that communicate information about the numeric properties and relationships in their data.

### Business oriented

Unlike traditional statistical software, where the target audience is an experienced data analyst, the algorithms of Cognos Analytics are aimed at users who are familiar with, but not an expert in data analysis. This means that when Cognos Analytics considers tradeoffs, usefulness is chosen over complexity.

### Trustworthy

Business data is lot more complicated than text-book examples that are used in statistical courses or in web searches and examples. Cognos Analytics uses algorithms that are robust and that are able to cope with a range of varieties of unusual data. Cognos Analytics does this because although the algorithms that are more brittle are able to get slightly better results than robust algorithms, they require you to make sure that they are applicable and build correct data transformations for the results to be meaningful. A minor drop in accuracy is worth the safety that is provided by an algorithm, which does not give wrong results when the data is not as it is supposed to be.

### Intelligent

Almost all algorithms require decisions to be made about them; levels of confidence, which combinations of fields to explore, data transformations. The details of these decisions can be found in the descriptions.

Cognos Analytics chooses appropriate values automatically, by examining properties of the data. As a user you might not discover all the decisions that are made.

### Summary

In Cognos Analytics, the numeric algorithms and procedures are designed to produce trustworthy results automatically. To get the best possible prediction, classification or analysis, a professional statistician analyzes the data by using IBM SPSS Statistics or IBM SPSS Modeler. The goal of Cognos Analytics is to provide qualitative insights that help you to understand your data and its relationships, and to do so automatically for a wide variety of types of data. Cognos Analytics aims at providing results similar to a professional statistician without getting in the way of the business user.

## Data preparation

Data preparation is a pre-analysis step that is used by most data analytic algorithms to ensure that the data is suitable for analytic use.

### Overview

Data preparation is critical in IBM Cognos Analytics. Only prepared data is entered into analysis for key drivers, decision trees, and relationships that are displayed in the advanced analytics visualizations: Spiral, Driver analysis, Decision tree, Sunburst, and Explore relationships. Data is not automatically prepared for other visualizations and their corresponding insights.

### Algorithms

All applied algorithms are based on values of a single field at a time. Missing values are removed or handled for each field, all numeric predictor driver fields are binned. All categorical fields are adjusted for large number of categories and outliers are handled in the target field. While all data preparation influences the analysis results, corresponding data preparation summaries are not currently reported to you.

### Details

Data preparation and subsequent key drivers, decision trees and relationships are based on a data sample with approximately 10,000 rows when the original data is larger. Bernoulli random sampling, equal probability without replacement random sampling, is applied to uploaded data and any connected data sources that are supporting random sampling. Otherwise, systematic sampling is used.

## Data preparation for numeric fields

A field is treated as numeric whenever it contains numeric information and its usage property is set to measure.

### Overview

Because numeric data can be varied in their distribution, IBM Cognos Analytics transforms non-target numeric fields into ordinal bins, reducing the dependence of analytic algorithms on the format of numeric data.

### Algorithms

The basic algorithm that is used is equal frequency binning. Numeric data is divided into a fixed number of bins that are attempting to put an equal number of rows of data into each bin. Missing values are placed in their own bin. Cognos Analytics attempts to use knowledge about missing values in predictor fields to build a better model. For example, if a field of data represents when an item was tested, Cognos Analytics uses missing values (which might represent that an item was never tested) to help predict the values of other fields.

### Details

Certain field exclusion criteria apply to numeric fields. A numeric field is excluded from further analysis if it has only a single value, including the missing value. Otherwise, the numeric field is binned and the default number of bins is 5. If a field has no more than 10 unique numeric values, then binning is not attempted, and each unique value is given its own category. If zero occurs in more than 40% of rows, it is always given a separate category. Missing values are placed in their own bin and do not affect the binning procedure.

## Data preparation for categorical fields

A field is treated as categorical whenever its usage property is set to attribute or identifier.

### Overview

The main information that is extracted from categorical fields is observed frequency for each unique category value. Appropriate analytic methods are applied to categorical fields, but their accuracy and performance can be adversely affected when the number of different categories becomes large. The main data preparation step is to start merging categories when their number becomes large.

### Algorithms

The basic algorithm that is used is merging categories. Categories are sorted by their frequency in descending order and the categories beyond default number are merged in a single category. Missing values are treated as a single separate category. In other words, IBM Cognos Analytics uses missing values in a similar way as for the numeric fields. Categorical fields are treated as nominal. Intrinsic order is not assumed among categories.

### Details

Certain field exclusion criteria apply to categorical fields. A categorical field is excluded from further analysis if it has only a single value or the number of unique, non-merged categories exceeds 50% of the number of valid data rows.

Otherwise, the categorical field is merged and the default number of non-merged categories is 49. The rest of the categories are merged into a single extra category. All categories with row count smaller than 3 also get merged. A categorical field is also excluded if the percentage of valid data rows corresponding to the merged category exceeds 25%.

Missing values are treated as a separate category and considered in the merging step as such.

## Data preparation for target fields

Specification of the target field is required for key drivers and decision tree visualizations.

### Overview

Always specify the target field and at least one extra field. Models are trained by using supplied target values and are used to detect predictive relationships and eventually to predict target values given the input field values. Data preparation for the target field differs from the data preparation for the rest of the fields. Missing values in the target are not used for building models, but the rest of the information is preserved and sometimes adjusted to obtain unbiased models.

### Algorithms

The main data preparation step related to target fields is removal of all data rows with missing target value. This happens before any other data preparation steps. While it ensures that only reliable information is used for model building, the number of removed rows can be substantial. The resulting model might have a limited scope in such instances. Numeric target fields are not binned, but the extreme outliers are handled to not adversely affect the later created models. Categorical target fields are treated much like other categorical fields. The only difference is that missing values have been removed for the categorical targets.

### Details

Extreme outliers are detected based on lower and upper boundaries. The upper boundary is constructed by using an upper percentile such that only 2.5% percent of target values are found to have a greater value. The difference between the upper percentile and the median is multiplied by 2.5 and added to the

median to obtain the upper boundary. Similar steps are applied to obtain the lower boundary. The target values that are found beyond the computed boundaries are replaced by the corresponding boundary value in all subsequent analysis.

## One-way key drivers

One-way drivers are a model-based exploratory tool.

### Overview

Given a target field, the tool uses a statistical model to analyze any other available data field and estimates its strength in predicting the target values. Such data fields are called target predictors or drivers. Each potentially relevant data field is analyzed and only the top drivers regarding their predictive strength are displayed. You obtain insights regarding available drivers and their ranking according to their predictive strength for the specified target in the data. One-way driver analysis results are available both in the driver analysis and spiral visualizations. Visual drill-down into each separate driver is enabled for driver analysis visualization in Explore only.

### Algorithms

Analysis for each one-way driver is based on a statistical model that includes the target and a single categorical predictor. The model is applied after the data preparation step for the target field and all potential predictor fields. For example, all numeric predictor fields are binned during the data preparation step and treated as categorical in the analysis. One-way ANOVA is applied for numeric targets and Chi-square test of independence is applied for categorical targets with the chi-square adjustment for sparse data.

For each field in the list of potential drivers, a hypothesis test on whether the field has a significant impact on the target is performed. Only those fields which pass the test and have sufficiently high predictive strength are selected as possible one way key drivers.

### Details

Preliminary analysis based on smarts capabilities reduces the number of potential drivers in some cases. The goal is to remove irrelevant or redundant fields. The list of used drivers is available in the UI and you can add any initially excluded drivers to the analysis. The top 20 resulting drivers with predictive strength higher than 10% are available for display.

Some restrictions are enforced on the size of the data to improve performance and speed. If the data contains more than 250 fields, the least relevant fields are excluded before driver analysis. You can add the excluded fields back into the analysis through the UI as described above. If specified data contains more than 10,000 rows, it might be sampled down to approximately 10,000 rows for purpose of driver analysis. A warning is displayed in such instances: *To improve performance, due to the number of rows in the data source, the analysis is based on a representative sample of the entire data.* The results are expected to closely approximate results that would be obtained by using all the rows in the original data.

## Two-way key drivers

Two-way drivers rely on modeling and ranking pairs of categorical predictors at one time.

### Overview

Given a target field, IBM Cognos Analytics uses a statistical model for analysis of a pair of other data fields and estimates its strength in predicting the target values. Search over different predictor pairs is usually not exhaustive and also some high-ranking pairs can be filtered out from the final results. The goal is to provide an overview and variety of predictor pairs that improve upon predictive strength of a single predictor models that are displayed as one-way drivers. Therefore, the insights obtained from one-way drivers are expanded and the user obtains relevant information on the pairs of fields in the data. Both one way driver and two-way driver analysis results are available in the driver analysis and spiral charts. They

can be viewed separately by selecting a corresponding chart viewing option. Each displayed one-way or two-way driver can be expanded into a new visualization directly from the Driver analysis visualization in Explore.

## Algorithms

Analysis for each two-way driver is based on a statistical model that includes the target and a pair of categorical predictors. The model is applied after data preparation and building all the one-way drivers. The first predictor in the pair is selected from the top 50 one-way drivers and the second is selected from the top 25 one-way drivers. This search strategy ensures that most of the top-ranking predictor pairs would be considered for modeling. The two-way ANOVA (analysis of variance) analysis is applied for numeric targets and Chi-square test of independence is applied for categorical targets with the chi-square adjustment for sparse data.

For each considered pair of fields, a hypothesis test on whether the pair has a significant impact on the target is performed. Only those pairs which pass the test and have sufficiently high predictive strength are selected as possible two-way drivers.

## Details

The restriction of selection of data fields and data rows for one-way drivers apply to the two-way drivers as well. This is expected as potential predictor fields for two-way drivers are selected from the top one-way drivers based on their respective predictive strength. However, the model significance of one-way driver and the minimum predictive strength is not required for their entry into a two-way model. A resulting two-way driver must have its predictive strength higher than 10% and provide more than 10% relative improvement over the predictive strength for each of the contained one-way drivers. Relative improvement is computed as the percentage of the difference between 100% and predictive strength of the nested one-way driver. Resulting two-way drivers that satisfy these criteria are ranked by their predictive strength and the top 20 are made available for display.

## Decision tree

Decision trees are more complex models than the one-way and two-way drivers. They extend the sequence as the combination models. The main difference is that decision trees support discovery of interaction among multiple predictors and therefore deeper insights than the drivers.

## Overview

Given the target field, the algorithm searches across all other data fields and adds them to the model to improve its strength in predicting the target values. The search across different predictors is iterative; after the search adds one predictor, the search continues to add the next predictor that improves the model the most. The goal is to find the best set of predictors and an optimal way of combining them so that an optimal model is computed. The insights that are obtained from decision trees are presented in the form of decision rules where combination of predictors and corresponding values provide a single prediction for the target value. Decision rules are ranked by strength so that you can easily find the rules that are the most relevant and interesting. Decision rules that are generated by the decision tree are mutually exclusive. The decision rules also provide a complete rule set such that a corresponding rule exists for any combination of the predictor values in the data. Also, available is the overall decision tree predictive strength that provides relative improvement over the basic model. The results are available through three different visualizations: sunburst, tree, and decision rules. They each have certain advantages by displaying the decision tree structure and the corresponding decision rules content. Overall decision tree predictive strength is also available in the driver analysis visualization.

## Algorithms

The decision tree model is computed after data preparation and building all the one-way drivers. The first tree predictor is selected as the top one-way driver. Categories of the predictor are merged when the adverse impact on the predictive strength is smaller than a certain threshold. The next step is to find the

best predictor to split each tree node that consists of the merged categories. The process is continued until a stopping rule applies to a tree node. Possible options for stopping are that all categories for every candidate predictor are merged into a single node or that the number of nodes exceeds maximum number of nodes. Categories with fewer than a minimum number of rows are always merged with another category. This means that none of the nodes in the tree can contain fewer than the minimum number of rows. The same procedure is used for continuous and categorical targets, only the impurity function is different.

## Details

### Impurity functions

Impurity function values are used as the main criterion for splitting and merging potential tree nodes. Impurity function total for continuous trees is the sum of squares per node, while Gini impurity measure is used for the categorical targets. Gini impurity total is computed as a sum of squares of count proportions across all target categories per node that is subtracted from one and the results that are multiplied by the number of rows. Improvement in impurity function value is information gain.

When splitting each node IBM Cognos Analytics looks for a predictor field with a largest information gain computed as total impurity across all potential children nodes subtracted from the parent node impurity. Before Cognos Analytics selects the predictor, Cognos Analytics attempts to merge some of the potential children nodes that initially correspond to each predictor category. Information loss is computed by subtracting impurity of non-merged nodes from the impurity of merged nodes. As long as information loss is smaller than a threshold, the nodes are merged. This process helps to create relatively small trees that are easy to visualize and comprehend while still preserving the overall strength of the tree.

### Stopping rules

Candidate nodes are always merged if they are based on fewer than 25 rows. If all categories of a predictor are merged, it cannot be used for splitting a certain node. When none of the predictors can split the specific node, the process stops for the node. The overall process of generating the tree stops when none of the nodes can be split or when the number of generated nodes exceeds 36.

### Variable importance

Variable importance corresponds to a relative tree error reduction when the corresponding predictor is included in the tree. It is computed by comparing the errors of an initial tree and a restricted tree that is generated by the rest of the predictors in the initial tree. The error of the initial tree is subtracted from the error of the restricted tree and the result is divided by the error of the restricted tree. Variables with zero or negative importance are removed from the tree. The tree error is computed as the sum of squares for continuous targets and as classification error for categorical targets.

### Predictive Strength

Predictive strength for tree with continuous target is computed similarly to key drivers. The contents of leaf nodes are considered. Variance contribution for each leaf node is added and divided by the overall variance for the data. This is relative error for the tree. It is subtracted from one to obtain predictive strength that is compatible with the R-squared measure that is used for key drivers.

For categorical targets, Cognos Analytics computes classification accuracy based on the classification error that is added from all the leaf nodes. Relative classification accuracy improvement over the basic model, also known as adjusted count R-square, is reported as the tree predictive strength. It is computed by subtracting the tree error from the basic model error and dividing the result by the basic model error. For example, the classification accuracy of the model can be as high as 95%, but if the majority class appears for 90% of the rows in the data, then the predictive strength of the tree is reported as 50% only. This is parallel to the continuous target case where the basic model is represented by the overall mean value. Predictive strength that is measured by R-squared is based on the tree relative improvement in reducing the overall variance.

Cognos Analytics displays only the trees that have predictive strength larger than 10%. A tree for continuous target is displayed in a driver analysis or spiral visualization if its predictive strength is

higher than the predictive strength of the strongest key driver. Otherwise, it is not displayed in these charts since the key drivers provide all the relevant insights already.

Predictive strength for a decision tree is computed that uses the same data that is used for generating the decision tree. This is known to introduce bias and provide optimistic estimates of the decision tree performance on a similar data from the same data source. Cognos Analytics reduced the discrepancy by tuning the algorithm so that overfitting the training data is minimized.

## Insights in visualizations

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.

### Overview

Insights are controlled by and summarized in the **Insights** box available in every eligible visualization. When you turn on insights, the summary appears in the **Insights** box and related visualization elements are highlighted. Details are provided in the corresponding tooltip message. You can control each available insight separately.

### Algorithms

The type of insights depends on the displayed data by the visualization. Available types of insights are **Average**, **Predictive strength**, **Meaningful Differences**, **Fit line**, and **Most Frequent**. Average provides the mean of the displayed summaries, and most frequent the category or category that appears most often in the data. The rest of the insights depend on more advanced analytics and statistical tests. The goal is to provide reliable information that you can use for an enhanced description of the viewed data and discovery of any relationships that are expected to be found in the population that is represented by this data.

### Details

Insights analysis is always based on the same data rows that are used to create the summaries displayed in the visualization. This means that full data is used for insights unless any filtering is applied to the original data.

Some statistical tests and analytics that are used in insights require not only the data summaries that are displayed in the visualization, but also some additional summarizations. For example, test of meaningful differences across multiple categories of an explanatory field requires counts and variances for each category in addition to the displayed data. These additional summaries are obtained from a database together with the summaries that are needed for the visualization. All summaries are processed by the insights but only the required summaries are available in the visualization. Insights analysis is always based on the same data rows that are used to create the summaries displayed in the visualization.

### Restrictions

If insights are not immediately available in a visualization, one of the following reasons might apply:

- The visualization type itself does not support insights.
- The data in the visualization may have been clipped.
- The combination of summarization level, field type, and field role of a selected field does not match the requirements for any of the available insights.

### Supported visualization types for insights

The following visualization types support insights:

- Area
- Bar
- Bubble

- Column
- Heat map
- Hierarchy bubble
- Line
- Line and column
- Map
- Packed bubble
- Pie
- Point
- Radial
- Scatter
- Stacked bar
- Stacked column
- Tree map
- Word cloud

Small multiple extensions are supported for some insights including the Most Frequent and Meaningful Differences.

### **Summarization levels**

Supported summarization levels are **Count**, **Average**, **Sum**, **Minimum**, and **Maximum**. Any other values such as **Count distinct** might prevent the insights from being suggested. Certain algorithms support only specific summarization levels. Changing the default summarization level to one of the supported values might potentially help with enabling insights.

### **Field types**

Field types can be internally designated as continuous or categorical depending upon the values of the selected field.

<b>Field type</b>	<b>Description</b>
Categorical	A variable that can take on one of a limited, and usually fixed, number of possible values. A categorical variable assigns each individual or other unit of observation to a particular group or nominal category based on some qualitative property. For example, the country a person lives in.
Continuous	A variable that is used to describe numeric values, such as a range of 0-100 or 0.75 - 1.25. A continuous value can be an integer, real number, or date and time.

### **Field roles**

IBM Cognos Analytics assigns a role to each of the field slots in a supported visualization. A field role might be designated as one of the following depending on the slot of the visualization.

<b>Field role</b>	<b>Description</b>
Response	A variable that is predicted and can also be referred to as the target or dependent variable. It is commonly on the Y-axis.
Explanatory	A variable which helps to explain changes in the response and is also referred to as the predictor or independent variable. It is commonly on the X-axis.

Field role	Description
Group	A variable that is treated as explanatory or an optional grouped factor which helps to determine the number of models built in the algorithm. For example, this can correspond to the Color slot of a Column visualization.
Weight	A variable which defines the optional regression weights, which are used to calculate the regression model. For example, this can correspond to the Size slot of a Bubble visualization.
Repeat	A variable which creates small multiples, with the visualization repeated once for each distinct value of the variable. For example, this can correspond to the Repeat (rows) slot of a pie visualization.
Points	A variable which defines the shaping of the data and data points used to calculate the model. For example, this can correspond to the Points slot of a Scatter visualization.

As a general example, in a bar visualization with the following slots, the role mappings in this visualization are defined as:

- Bars (y-axis), explanatory
- Length (x-axis), response
- Color, group

## Insights in visualizations for counts

Insights for counts are available whenever count is displayed for each category of a single categorical field.

They are also available when count is displayed for each combination of categories of a pair of categorical fields in the visualization. In the latter case the pair may be two explanatory fields, as in the rows and columns of a heat map, or one explanatory and one repeat field, as in the bars and repeat (column) of a bar chart.

Insights for counts of combined categories of three categorical fields are supported for one explanatory and the combination of two repeat fields, as in the segments, repeat (column), and repeat (row) of a pie visualization.

## Overview

Use such visualizations when you are interested in comparing the number of items in different categories, or combination of categories.

## Algorithms

IBM Cognos Analytics reports the average count across all categories of the specified response field and applies statistical tests to detect categories where the counts are statistically most different from the average.

Visualizations with two or three categorical fields and counts for each combination of categories are treated differently. Cognos Analytics does not only compare the counts across categories but detects any relationship between the categorical fields. Cognos Analytics treats one field as the response field and the others as the explanatory field.

Cognos Analytics reports the most frequent category in visualizations with one categorical explanatory field, one or two categorical repeat fields, and a count response field.

## Details

### Single categorical field

The first test that is applied is the chi-square test of equal frequencies to establish whether any counts are available that are significantly different from the average. If the test result is significant, Cognos Analytics applies the influence chi-square test for each category separately. Cognos Analytics computes the effect size for categories where the influence test is statistically significant and reports the categories with the largest effect size under the meaningful differences.

### Restrictions

The following table describes the conditions that determine whether insights are suggested for this algorithm.

Response	Explanatory	Group	Weight	Points	Insight
Exactly 1 Summarization level = Count	N/A	N/A	N/A	N/A	Average Meaningful differences

### Two categorical fields

Cognos Analytics treats one categorical field as the response field and the other as the explanatory field. The original count field is used as input to the algorithms.

Chi-square test of independence with the adjustment for sparse data is used to establish whether a relationship exists between the response field and the explanatory field. If the test result is significant, Cognos Analytics computes the predictive strength for this model as adjusted count R-squared, with low-frequency categories filtered. The relationship is declared reliable and the predictive strength is reported if it is greater than 10%.

If the test result above is significant, all combinations of explanatory and response categories are analyzed further by applying the influence chi-square test for each combination. Combinations of explanatory and response categories where the influence test is significant are considered influential. Effect size is computed for each influential combination of categories and the combinations with the largest effect size are reported under meaningful differences.

If the roles of the two categorical fields are explanatory and repeat, the most frequent algorithm is applied. The counts are summed over each distinct category of the explanatory field. The largest sum is reported, together with the number of categories having that sum. Note that the repeat field is not used by this algorithm, but only triggers when the algorithm is applied.

### Restrictions

The following table describes the conditions that determine whether insights are suggested for this algorithm.

Response	Explanatory	Group	Weight	Points	Repeat	Insight
Exactly 1 Summarization level = Count	Exactly 2 Categorical	N/A	N/A	N/A	N/A	Predictive strength Meaningful differences
Exactly 1 Summarization level = Count	Exactly 1 Categorical	N/A	N/A	N/A	Exactly 1 Categorical	Predictive strength Meaningful differences Most frequent

## Three categorical fields

These algorithms are applied only when there is one explanatory field and two repeat fields. The combination of the two repeat fields is treated as if it were a single categorical field, where the categories are the pairs of categories from the two repeat fields.

The predictive strength is calculated exactly as in the two categorical fields case, using the paired repeat fields as the predictor of the explanatory field. The chi-square test of independence with the adjustment for sparse data is used to test significance of the relationship, and the adjusted count R-squared with low-frequency categories filtered is used to find the predictive strength.

The meaningful differences are calculated exactly as in the two categorical fields case, identifying combinations of the explanatory field and the paired repeat fields for which the count is unusual. The influence chi-square test is used to test significance for each combination, and the combinations with the largest effect size are reported.

The most frequent algorithm is applied exactly as in the two categorical fields case, summing the counts over each distinct category of the explanatory field. The largest sum is reported, together with the number of categories having that sum. Note that the repeat fields are not used by this algorithm, but only triggers when the algorithm is applied.

Response	Explanatory	Group	Weight	Points	Repeat	Insight
Exactly 1 Summarization level = Count	Exactly 1 Categorical	N/A	N/A	N/A	Exactly 2 Categorical	Predictive strength Meaningful differences Most frequent

## Differences between Cognos Analytics version 11.1 R2 and R3

For visualizations with two categorical fields, when the response field had a category representing missing data (the "(no value)" category):

- In Cognos Analytics version 11.1 R2 the adjusted count R-squared calculation for predictive strength omitted data values for the missing-data category. In Cognos Analytics version 11.1 R3 the values are included. This may affect the predictive strength reported for heatmaps where the heat data slot has count-aggregated data and the rows and columns are two categorical fields.
- In Cognos Analytics version 11.1 R2 the meaningful differences did not report any unusual cells associated with the missing-data category. In Cognos Analytics version 11.1 R3 the cells are reported. This may affect the meaningful differences shown for heatmaps where the heat data slot has count-aggregated data and the rows and columns are two categorical fields.

## Insights in visualizations for summaries by one or more explanatory fields

Insights for summaries are available when the summarization level is average, sum, minimum, or maximum for a continuous response field. Insights are computed and displayed at each category of a single categorical explanatory field, or each combination of categories of a pair of categorical explanatory fields in the visualization.

### Overview

Use such visualizations when you are interested in comparing values of a response field across different categories, or across combinations of categories of explanatory fields.

### Algorithms

If the summarization level is average, IBM Cognos Analytics detects any relationship between the response field and explanatory fields and computes predictive strength of the corresponding model. If differences of average values across explanatory categories are statistically significant, Cognos Analytics

identifies the most different explanatory categories or combination of categories under the meaningful differences.

When the response summarization level is sum, Cognos Analytics computes the average sum across explanatory categories or combinations of categories. If the differences of sums across categories are statistically significant, Cognos Analytics identifies the most different explanatory categories or combinations of categories under the meaningful differences.

For all applicable charts, the average insight displays the mean summarized response value across all explanatory categories. When the summarization level for the response is average, the weighted mean is computed using the displayed value and the count for each explanatory category.

## Details

### Average by single explanatory field

When the summarization level for the response field is average and a single categorical explanatory field is available, Cognos Analytics applies one-way ANOVA analysis. Cognos Analytics uses F statistic to test whether average values across explanatory categories are equal. If any differences are significant, Cognos Analytics computes the adjusted R-squared as predictive strength of the relationship between the response field and the explanatory field. Reliable relationship and its predictive strength are reported to the user if the predictive strength exceeds 10%.

If the difference among averages is significant, Cognos Analytics conducts an influence t test to detect the categories that are the most different from the overall mean. This involves computing standard error for each category average and comparing the average with the overall mean by using the t test statistic. For categories with significant differences, Cognos Analytics also computes the corresponding effect size and reports the categories with the largest effect size under meaningful differences.

### Restrictions

The following table describes the conditions that determine whether insights are suggested for this algorithm.

Response	Explanatory	Group	Weight	Points	Insight
Exactly 1 Summarization level = Average Continuous	Exactly 1 Categorical	N/A	Optional Any	N/A	Average Predictive strength Meaningful differences

### Average by two explanatory fields

For charts where the summarization level for the response field is average and two categorical explanatory fields are available, Cognos Analytics applies two-way ANOVA analysis. Cognos Analytics uses F statistic to test whether average values across explanatory category combinations are equal. If differences are significant, Cognos Analytics computes adjusted R-squared as predictive strength of the relationship between the response field and the two explanatory fields. Cognos Analytics also computes the adjusted R-squared for one-way models that include a single explanatory field each. If the predictive strength of a two-way model is larger than 10% and its relative predictive strength improvement over corresponding one-way models is more than 10%, Cognos Analytics displays the predictive strength of the two-way model and reports reliable relationship between the response field and the two explanatory fields. Otherwise, if the maximum predictive strength of one-way models exceeds 10%, Cognos Analytics reports reliable relationship between the response and the corresponding single explanatory field together with its predictive strength. If maximum predictive strength of one-way models does not exceed 10%, Cognos Analytics reports no relationship between the response and explanatory fields.

When the difference among averages across all category combinations is significant, Cognos Analytics also conducts an influence t test to detect the category combinations that are the most different from the overall mean. This test is similar to the test that is used for a single explanatory field. The main

difference is that instead of considering categories of a single explanatory field, Cognos Analytics considers category combinations from the two explanatory fields. Category combinations with the largest effect size are reported under meaningful differences.

### Restrictions

The following table describes the conditions that determine whether insights are suggested for this algorithm.

Response	Explanatory	Group	Weight	Points	Insight
Exactly 1 Summarization level = Average Continuous	Exactly 2 Categorical	Optional (treat as Explanatory) Categorical	Optional	N/A	Average Predictive strength Meaningful differences

### Sum by one or two explanatory fields

For charts where the summarization level for the response field is sum and one or two categorical explanatory fields are available, Cognos Analytics applies the sum comparison test. This test detects if any of the sums are different from the average sum value across all explanatory categories or combinations of categories. If this test is significant, Cognos Analytics proceeds by conducting the sum influence test that compares sum for each category or combinations of categories with the average sum. For every significant test, Cognos Analytics also computes corresponding effect size. Categories or combinations of categories with the largest effect sizes are reported under meaningful differences.

### Restrictions

The following table describes the conditions that determine whether insights are suggested for this algorithm.

Response	Explanatory	Group	Weight	Points	Insight
Exactly 1 Summarization level = Sum Continuous	1 or 2 Categorical	Optional (treat as Explanatory) Categorical	N/A	N/A	Average Meaningful differences

### Minimum or maximum by one or two explanatory fields

For summarization levels of minimum or maximum, only the average insight is available. It is computed as the average value of the response minimum or maximum across all explanatory categories or combinations of categories.

### Restrictions

The following table describes the conditions that determine whether insights are suggested for this algorithm.

Response	Explanatory	Group	Weight	Points	Insight
Exactly 1 Summarization level = Min or Max Continuous	1 or 2 Categorical	N/A	N/A	N/A	Average

## Insights in visualizations for two continuous fields

Insights for two continuous fields are available when a visualization involves two continuous fields and an optional categorical group or points field.

### Overview

Use visualizations such as scatter plot for the two continuous fields, possibly sliced by categories of the group field. The main goal is to detect any relationship between the continuous field and include the categorical group field as well. The results contain predictive strength of discovered relationship, the relationship description provided by fit lines, and any points with large discrepancy from the fit lines as meaningful differences.

### Algorithms

IBM Cognos Analytics computes multiple regression models that involve one of the continuous fields as the response, and the other continuous fields as an explanatory field. The optional categorical group field is used as a model factor. In addition to additive model contributions corresponding to the explanatory field, Cognos Analytics considers the square of the explanatory field and any interaction terms that include a factor. A regression model that provides an optimal fit for the data is selected from a number of possible models. The corresponding fit line is derived from a linear or quadratic model. In the case where an optional categorical group field has been supplied, it can produce a different line or quadratic curve for each category of the factor. A factor with up to three categories is currently considered in order not to overload the visualization.

Each point in a visualization represents a number of rows in the data and it is defined by the **Points** field. Corresponding row counts that are based on the response field define frequency weights that are used for building the regression models. Regression weights are used independently of frequency weight when Cognos Analytics computes the regression models.

### Details

#### Two continuous fields

When Cognos Analytics applies multiple linear regression for two continuous fields, one is chosen as the response and the other as an explanatory field in the model. Cognos Analytics considers both linear and quadratic model terms. If the quadratic model is significant based on the F test and its relative predictive strength improvement is more than 10% over the linear model, Cognos Analytics reports its predictive strength and displays the quadratic curve based on the computed model. This curve displays predicted values of the response based on the corresponding values of the explanatory field. Otherwise, linear predictor model is considered. If it is significant and its predictive strength is larger than 10%, Cognos Analytics reports its predictive strength and displays a line representing the predicted values of the response field based on the corresponding explanatory values. If the linear model does not qualify, the mean is reported as the fit line and no relationship is reported between the two continuous fields.

When linear or quadratic relationship is detected, Cognos Analytics also inspects the differences between predicted and observed values of the response field. These differences are called residuals and Cognos Analytics conducts studentized residuals test to detect outliers. Points with large departure from the discovered relationships are displayed under meaningful differences in the corresponding chart.

#### Restrictions

The following table describes the conditions that determine whether insights are suggested for this algorithm.

Response	Explanatory	Group	Weight	Points	Insight
Exactly 1	Exactly 1	N/A	Optional	Optional	Predictive strength

<b>Response</b>	<b>Explanatory</b>	<b>Group</b>	<b>Weight</b>	<b>Points</b>	<b>Insight</b>
Summarization level = any Continuous	Continuous		Continuous	Any	Fit line Meaningful differences

### Categorical group field

When a categorical group field is specified in addition to two continuous fields, it is used as a factor in the multiple linear regression where one of the two continuous fields is chosen as the response field and the other as an explanatory field. Cognos Analytics considers linear and quadratic model terms for continuous explanatory combined with contributions from the factor. If the quadratic model or linear model that include the factor is significant based on the F test and its relative predictive strength improvement is more than 10% over the linear model with continuous explanatory only, Cognos Analytics generates four extra models. These models include all possible interactions of continuous explanatory and factor. A model with the maximum adjusted R-squared that is also significant is selected as the final model. It is used to create a fit line for each category of the categorical predictor. Otherwise, the linear model with continuous explanatory is tested for significance and reported if its predictive strength is greater than 10%. If the linear model does not qualify, no reliable relationship among fields is established and the overall mean is reported as the fit line.

When a reliable relationship is detected, Cognos Analytics also checks for difference between the predicted and observed values of the response field. Cognos Analytics conducts studentized residuals test to detect outliers and display them under meaningful differences in the corresponding chart.

### Restrictions

The following table describes the conditions that determine whether insights are suggested for this algorithm.

<b>Response</b>	<b>Explanatory</b>	<b>Group</b>	<b>Weight</b>	<b>Points</b>	<b>Insight</b>
Exactly 1 Summarization level = any Continuous	Exactly 1 Continuous	Exactly 1 Categorical	Optional Any	Optional Any	Predictive strength Fit line Meaningful differences

### Regression weights field

An optional continuous field can be used to specify regression weights for the model. Regression weight for an available value corresponds to influence of the observation on the computed model parameters.

## Relationships

Relationships visualizations in an exploration are displayed initially when you specify data for exploration.

### Overview

IBM Cognos Analytics provides a quick overview of relationships among pairs of fields that focus on a single field of interest. Visualization comprises multiple tabs, each for a different field of interest. This information is very useful in orienting you regarding a multitude of relevant relationships available in data to be explored further as needed.

### Algorithms

While the initial field of interest is determined based on semantic data analysis, you can specify a different field of interest. Each tab provides a network graph with fields as nodes and links between pairs of nodes that represents the relative strength of the relationship between nodes. While links from the field

of interest dominate the graph, other related pairs of fields with strong relationships are displayed as well. You can adjust a slider to view larger or smaller number of nodes in the network.

## Details

### Data for analysis

Relationships use non-summarized data to compute strength of relationship among all pairs of fields considered. To standardize the measure of relationship strength and make it comparable across all pairs of fields, all numeric fields are binned as the first step. All fields in the data are treated as categorical. The binning that is applied is equal frequency binning generating five bins. More details are available in the section on data preparation for numeric fields.

### Relationship strength

Data for each pair of categorical fields is first tabulated for all combination of field categories that are found in the data. Based on the tabulated data, IBM Cognos Analytics applies the chi-square test of independence to assess whether the fields are independent. If the independence departure is significant, Cognos Analytics computes the effect size based on the chi-square statistic. This is Cramer's V that is widely used as a measure of association between two categorical fields. The values of this measure are in the range 0 - 1 and Cognos Analytics reports the relationship strength value that is expressed as a percentage. The relationships with strength less than 10% are not reported as they are considered too weak to be of practical value.

### Performance limitations

Computing relationship strength between all pairs of fields in the data set is prohibitive for large data. Cognos Analytics limits the number of processed fields to 100 to be able to provide a quick answer. However, these fields are selected by another process and the possible loss of relevant relationships is minimized. If the data contain more than 10,000 rows, Cognos Analytics obtains a random sample of this size for performance reasons. This data size ensures minimal loss in accuracy of the relationship strength estimate.

## Differences between Cognos Analytics and Watson Analytics regarding advanced data analytics

Advanced analytics methods from Watson Analytics have been adapted and improved in IBM Cognos Analytics. As a result, a number of differences can be observed.

### Data preparation

Data preparation is critical in both Cognos Analytics and IBM Watson Analytics as only prepared data is entered into analyses for key drivers and decision trees. Data preparation differs between the two packages in several important aspects.

Difference	Cognos Analytics	Watson Analytics
Missing values	<p>Missing values in the target field are handled the same way in both products; the rows with missing value in the target field are excluded from all subsequent analysis. However, missing values are handled differently for predictor fields.</p> <p>A separate category for categorical predictors.</p> <p>Numerical predictors are always binned and missing values are treated as a separate bin.</p>	<p>Imputed based on the relationship between the target and a predictor.</p> <p>Watson Analytics excludes predictor fields with more than 25% of missing values.</p>

Difference	Cognos Analytics	Watson Analytics
Merging categories	Cognos Analytics orders categories by their occurrence frequency in the data and groups all categories that start with 50 <sup>th</sup> into a single category. All categories with frequency smaller than 3 are merged as well. A requirement is that merged categories represent less than 25% of data rows. Otherwise, the field is not used for analysis. Target categories are also merged.	Categories merging for predictors depends on the target values. Only categories that have sufficiently similar target field values are merged.
Outlier Handling	Outliers in continuous target fields are handled by setting extreme boundary values and replacing the values beyond boundaries with the corresponding boundary values for analysis purposes. This enhances analysis for both key drivers and decision trees as it makes any relationships with the target easier to detect. Outliers that are handled in predictive data preparation are not reported in the visualization.	Automated outlier handling is not available.
Sampling	Cognos Analytics analyzes data sample that contains about 10,000 rows if the original data exceeds this size. A warning is displayed whenever the corresponding analysis is done on a data sample, but the predictive strength of generated key drivers and decision trees is expected to be close to the predictive strength of the models that are obtained on the corresponding full data.	Watson Analytics uses full set of rows in the data to generate key drivers and decision trees. This can cause slow performance.

## Key drivers

Difference	Cognos Analytics	Watson Analytics
Key drivers	Cognos Analytics offers key drivers for both continuous and categorical targets in the spiral and the driver analysis visualization.  While data preparation steps affect both one way and two way key drivers, Cognos Analytics analysis for two-way key drivers differs from Watson Analytics by criteria used to select drivers for display to the user.	Key drivers for both continuous and categorical targets are available in the spiral visualization.
Statistical tests	For categorical targets, Cognos Analytics uses Chi-square test of independence to determine whether two categorical fields are independent.	Watson Analytics uses likelihood ratio test for categorical targets.

Difference	Cognos Analytics	Watson Analytics
Selection criterion	Cognos Analytics requires that the predictive strength of the two-way key driver provides a relative improvement of more than 10% when compared to the predictive strength of the corresponding one-way drivers. Relative improvement of predictive strength is measured by the reduction percentage of the two-way key driver error relative to the minimum error for the two corresponding one-way key drivers. This criterion ensures that only the relevant two-way drivers are surfaced.	Watson Analytics uses two-way interaction as a selection criterion for two-way key drivers. A two-way key driver needs to have an interaction effect size larger than a certain threshold to be selected.
Predictive strength	<p>Predictive strength for spiral and driver analysis with continuous target is computed as adjusted R-squared.</p> <p>The predictive strength for the categorical target is computed as the adjusted count R-squared. It is obtained by computing the model classification accuracy improvement over the constant model and dividing it by the constant model classification error. Constant model always predicts the target mode and its classification accuracy is estimated by the mode frequency. Reliable predictive relationship is reported when the model predictive strength is greater than a default threshold of 10%.</p> <p>As a result, predictive strength for a spiral visualization with a categorical target can be different in Watson Analytics and Cognos Analytics even for comparable target and inputs.</p>	<p>Predictive strength for continuous target is computed as R-squared.</p> <p>The predictive strength for the categorical target is computed as classification accuracy.</p>

## Decision Tree

Difference	Cognos Analytics	Watson Analytics
Decision Tree	In addition to the tree and the decision rules visualizations, Cognos Analytics provides the new sunburst visualization. Differences in generating a decision tree in Cognos Analytics or Watson Analytics depend on the continuous or categorical target. Predictive strength for decision trees is displayed in the spiral and the driver analysis visualization in Cognos Analytics, but only when greater than the predictive strength of the top key driver.	Decision tree and decision rules visualizations are available. Predictive strength of the tree is always available in the spiral visualization.

Difference	Cognos Analytics	Watson Analytics
Continuous target	<p>Decision trees for continuous target are generated based on the sum of squares in both Watson Analytics and Cognos Analytics.</p> <p>Cognos Analytics uses directly the information gain that is related to the effect size for F test in Watson Analytics, when merging and splitting tree nodes. This provides multi-way splits for the decision tree nodes.</p>	<p>Watson Analytics uses the CHAID algorithm and the corresponding F tests when merging and splitting tree nodes. This provides multi-way splits for the decision tree nodes.</p>
Stopping rules	<p>Cognos Analytics limits the number of tree nodes to 36.</p> <p>The minimal number of rows corresponding to the tree nodes is 25.</p> <p>Fields with no predictive strength contribution are removed from Cognos Analytics trees. Cognos Analytics produces smaller trees that are more suitable for visualization and insights while trees of comparable and sometimes higher accuracy than Watson Analytics are generated.</p>	<p>Watson Analytics limits the size of the tree by limiting the number of tree levels to 5.</p> <p>The minimal number of rows corresponding to the tree nodes is 50.</p> <p>Trees in Watson Analytics tend to be more accurate only when they contain a much larger number of nodes.</p>
Variable importance	<p>Variable importance is computed as the relative improvement in predictive strength when the variable is added to the decision tree. Predictors with variable importance at or lower than a threshold are excluded from the decision tree. The threshold is set to zero for most of the trees. The threshold is slightly increased for trees based on smaller number of data rows and having smaller predictive strengths to reduce possible overfitting effects.</p>	<p>Variable importance is computed based on sensitivity of the results when the variable takes different values.</p>
Predictive strength	<p>Predictive strength for decision trees with continuous target is computed as R-squared.</p> <p>The predictive strength for the categorical target is computed as the adjusted count R-squared.</p> <p>The adjusted count R-squared subtracts the tree classification error from the basic classification error that is obtained by always selecting the most frequent target category and divides the result by the basic classification error. It represents relative improvement that is achieved by the decision tree. As a result, predictive strength for decision trees with categorical target can be</p>	<p>Predictive strength for decision trees with continuous target is computed as R-squared.</p> <p>The predictive strength for the categorical target is computed as classification accuracy.</p>

Difference	Cognos Analytics	Watson Analytics
	different in Watson Analytics and Cognos Analytics even for comparable decision trees.	

## User controls

Difference	Cognos Analytics	Watson Analytics
User controls	You specify field as continuous by setting the Usage data properties to Measure, or as categorical (nominal) by setting the Usage to Identifier or Attribute.  Allows excluding and including predictors directly in the corresponding visualizations through edit drivers dialog box.	You specify fields to be used as continuous, nominal, or ordinal by setting appropriate data properties in Refine.  Allows excluding and including predictors in the models through another Refine data property.

## Statistical tests

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IBM Cognos Analytics uses many statistical tests to perform analyses of your data. It is important to understand the definitions of these tests as they apply to Cognos Analytics.

### Analysis of variance (ANOVA)

Analysis of variance, or ANOVA, is a linear modeling method for evaluating the relationship among fields. For key drivers and for insights that are related to a number of charts, ANOVA tests whether the mean target value varies across categories of one input or combinations of categories of two inputs.

To test if the means are different, an ANOVA test compares the explained variance (caused by the input fields) to the unexplained variance (caused by the error source). If the ratio of explained variance to unexplained variance is high, the means are statistically different.

IBM Cognos Analytics can calculate one-way ANOVA tests (with one input) and two-way ANOVA tests (with two inputs). If an input is continuous, the input is binned to create groups whose target means can be compared with the ANOVA test. A one-way ANOVA test is an extension of the t test, but an ANOVA test can compare any number of means. The t test can compare only two means.

Although an ANOVA test reveals a statistical difference between means, it does not indicate which means are different. IBM Cognos Analytics visualization insights feature reports groups that are causing the means to be different as meaningful differences.

### One-way ANOVA

The one-way ANOVA test uses an F value. The following procedure describes how the F value is calculated:

1. Calculate the overall mean for the continuous field.
2. Calculate the mean square for the categorical field (the explained variance).
  - a. Calculate the sum of squares for the categorical field.
    - i) For each category, subtract overall mean from the category's mean.
    - ii) Take the square of each of these results and add them together.
  - b. Divide the sum of squares for the categorical field by the appropriate degrees of freedom.
3. Calculate the mean square for the error source (the unexplained variance).

- a. Calculate the sum of squares for the error source.
    - i) Within each category, subtract the category's mean from each record value.
    - ii) Take the square of each difference and add them together.
  - b. Divide the sum of square for the error source by the appropriate degrees of freedom.
4. Divide the mean square for the categorical field by the mean square for the error source. In other words, calculate the ratio of explained variance to unexplained variance. This is the F value.

The F value is compared to a theoretical F distribution to determine the probability of obtaining the F value by chance.

- This probability is the significance value.
- If the significance value is less than the significance level, the means are significantly different.

Adjusted R<sup>2</sup> is used to estimate model predictive strength. Significance level is set to 5% and the model predictive strength must be greater than 10% to indicate reliable predictive relationship between the target and the input field.

Predictive strength is reported for one-way key drivers and an insight for charts that display an average of numeric measure across categories of a categorical field.

## Two-way ANOVA

Like the one-way ANOVA, the two-way ANOVA test calculates an F value. It is used to test whether means in the full two-way model are significantly different. The procedure is similar to the one-way ANOVA, except that two categorical fields are used as inputs instead of a single categorical field. Means and sum of squares statistics are computed for each combination of categories from the categorical fields.

Adjusted R<sup>2</sup> is also used to estimate model predictive strength. Significance level is set to 5% and the model predictive strength must be greater than 10% for model to be considered. In addition, the two-way model must have at least 10% relative improvement over the predictive strengths of the nested one-way models to indicate reliable predictive relationship between the target and two input fields. Relative improvement is computed as the percentage of the difference between 100% and predictive strength of the nested one-way model.

Predictive strength is reported for two-way key drivers and an insight for charts that display an average of numeric measure across categories of two categorical fields.

## Classification tree

A classification tree is a type of decision tree. It uses Gini impurity measure to classify records in the target field's categories. The predictions are based on combinations of values in the input fields.

A classification tree calculates the predicted target category for each node in the tree. This type of tree is generated when the target field is categorical.

The algorithmic details are too complicated to describe here. You can see the frequency statistics in the tooltips for the nodes in the decision tree visualization. Each node is split into two or more child nodes to reduce the Gini impurity value for the node. Gini impurity is a function that penalizes more even distribution of target values and is based on the target frequency statistics and the number of data rows corresponding to the node. Child nodes corresponding to given predictor categories are merged when the corresponding increase in Gini impurity is tolerable within specified limit. For each node, the predictor that reduces the Gini impurity value the most is selected for splitting the node.

The process of building a decision tree starts with the root node that corresponds to all the rows in data. Any node is split into child nodes until no further improvement in Gini impurity is possible, or the number of data rows corresponding to the node becomes too small. Process also stops if the number of nodes in the decision tree becomes too large.

Predictive strength that is reported for classification tree is the adjusted count R<sup>2</sup>. It is obtained by computing the tree classification accuracy improvement over the constant model and dividing it by the constant model classification error. Constant model always predicts the target mode and its classification

accuracy is estimated by the mode frequency. Reliable predictive classification tree is reported when its predictive strength is greater than a default threshold of 10%.

## Regression tree

A regression tree is a type of decision tree. It uses sum of squares and regression analysis to predict values of the target field. The predictions are based on combinations of values in the input fields.

A regression tree calculates a predicted mean value for each node in the tree. This type of tree is generated when the target field is continuous.

The algorithmic details are too complicated to describe here. You can see some of the statistics in the tooltips for the nodes in the decision tree visualization. Each node is split into two or more child nodes to reduce the sum of squares for the node. Some of squares is a function that penalizes target values distant from the mean. Both mean and standard deviation are displayed for each node. Sum of squares is directly related to the standard deviation and the number of data rows corresponding to the node. Child nodes corresponding to given predictor categories are merged when the increase in sum of squares is tolerable within specified limit. For each node, the predictor that reduces the sum of squares the most is selected for splitting the node.

The process of building a decision tree starts with the root node that corresponds to all the rows in data. Any node is split into child nodes until no further improvement in sum of squares is possible, or the number of rows corresponding to the node becomes too small. Process also stops if the number of nodes in the decision tree becomes too large.

$R^2$  is used to estimate regression tree predictive strength. Reliable predictive regression tree is reported when its predictive strength is greater than 10% threshold.

## Chi-square test of equal frequencies

The chi-square test of equal frequencies checks whether the frequencies (number of values) in each category or group are statistically different from each other.

The following procedure describes how the chi-square value is calculated:

1. Determine the expected frequency. Because the frequency is expected to be the same for each category (equal frequencies), it is the average frequency or count. The average frequency is  $N/R$ , where N is the total frequency and R is the number of categories.
2. For each category, subtract the expected frequency from the actual (observed) frequency.
3. Take the square of each of these results and divide each square by the expected frequency.
4. Add up all the results.

The chi-square value is compared to a theoretical chi-square distribution to determine the probability of obtaining the value by chance.

- This probability is the significance value.
- If the significance value is less than the significance level, the frequencies are significantly different.
- For sparse tables, IBM Cognos Analytics makes an adjustment to the chi-square test which reduces the contribution of cells with a small expected value, which would otherwise have a disproportionately large contribution to the statistic.

The effect size for this test is the unequal frequencies strength.

## Chi-square test of independence

The chi-square test of independence determines whether two categorical fields are independent. If the fields are not independent, they are associated.

The following procedure describes how the chi-square value is calculated:

1. Determine the expected frequency with the assumption that the fields are independent. The expected frequency for each combination of categories is the joint probability for the two fields multiplied by the

total count. The joint probability of two independent fields is the product of the two probabilities for each combination of categories.

For example, consider two fields: gender and favorite color. The total count is 100. There are 40 males, and 20 people whose favorite color is gray. Assuming that gender and color preference are independent, the expected frequency of males whose favorite color is gray is  $(40/100)*(20/100)*100$ , which calculates to 8.

2. For each combination, subtract the expected frequency from the actual (observed) frequency.
3. Take the square of each of these results and divide each square by the expected frequency.
4. Add up all the results.

The chi-square value is compared to a theoretical chi-square distribution to determine the probability of obtaining the value by chance.

- This probability is the significance value.
- If the significance value is less than the significance level, the frequencies are significantly different.
- For sparse tables, IBM Cognos Analytics makes an adjustment to the chi-square test which reduces the contribution of cells with a small expected value, which would otherwise have a disproportionately large contribution to the statistic.

The effect size for this test is Cramér's V.

## Influence test

The influence test is a chi-square test that tests whether the number of records in a group is significantly different from the expected frequency. The group might be a category or combination of categories.

Considering the significance value and effect size, the test identifies influential groups.

The influence test uses the standardized Pearson residual to calculate the chi-square value. The formula for the Pearson residual depends on whether a single category or combination of two categories is considered.

For field summary and single category the formula is  $(O - N/J)^2/(N/J)*(1-1/J)$ . O is the observed, actual frequency. N is the total count and  $1/J$  is the expected probability where J is the number of categories.

For two fields and combination of two categories, it is  $(O - E)^2/E*(1-N_i/N)*(1-N_k/N)$ . E is the expected frequency  $E = N_i * N_k / N$  where  $N_i$  is the count of i-th category for the first field, and  $N_k$  is the count of k-th category for the second field.

The chi-square value is compared to a theoretical chi-square distribution to determine the probability of obtaining the chi-square value by chance.

- This probability is the significance value.
- If the significance value after a Bonferroni adjustment is less than the significance level, the group is judged to be influential. The Bonferroni adjustment is necessary because multiple chi-square tests are conducted, one for each group.

The top group has the greatest difference when compared to the expected frequency. The top high group is the group with frequencies that are greater than the expected frequencies. The top low group is the group with frequencies that are less than the expected frequency.

The effect size is influential target category strength. It is computed as the square root of the chi-square value divided by the total count. Meaningful differences highlight the categories with the highest effect size.

## Influence t test

The influence t test compares mean value of a measure in a group with overall mean value for the measure.

The group might be a category or combination of categories. Considering the significance value and effect size, the test identifies influential groups.

The influence t test uses pooled standard deviation estimate that is obtained by combining the measure variation within all the groups. Pooled standard deviation is in turn divided by the square root of the number of rows in the group to obtain the standard error of the group mean. Corresponding t-statistic is computed as the difference between the group mean and the overall mean that is divided by the group standard error.

The t-statistic value is compared to a theoretical t distribution with degrees of freedom equal to the number of rows that are reduced by the number of groups to determine the probability of obtaining the t-statistic value by chance.

- This probability is the significance value.
- If the significance value after a Bonferroni adjustment is less than the significance level, the group is judged to be influential. The Bonferroni adjustment is necessary because multiple t tests are conducted, one for each group.

The top group has the greatest difference when compared to the expected frequency. The top high group is the group with frequencies that are greater than the expected frequencies. The top low group is the group with frequencies that are less than the expected frequency.

The effect size is influential category strength. It is computed as absolute value of t-statistic divided by the square root of the group count. Meaningful differences highlight the categories with the highest effect size.

## Multiple linear regression

Multiple linear regression model is a versatile statistical model for evaluating relationships between a continuous target and predictors.

Predictors can be continuous, categorical, or derived fields so that non-linear relationships are also supported. The model is linear because it consists of additive terms where each term is a predictor that is multiplied by an estimated coefficient. Constant (intercept) term is also typically added to the model.

Linear regression is used to generate insights for charts that contain at least two continuous fields with one identified as the target and the other as a predictor. In addition, a categorical predictor and two auxiliary continuous fields can be specified in a chart and used to generate appropriate regression model. For each candidate model, IBM Cognos Analytics conducts an F test of model significance.

## Model fitting and testing

Multiple linear model is fitted with the following steps:

1. Construct a design matrix that contain one row per each data row and one column per each parameter in regression model. Columns correspond to predictors or predictor categories.
2. Compute the regression coefficients.
  - a. Multiply the transposed design matrix with itself.
  - b. Multiply the transposed design matrix with the vector of target values.
  - c. Multiply the inverse of matrix from step a with the matrix from step b.

Using the obtained regression coefficients compute predicted target values for each data row. The differences between the predicted and observed target values are called residuals. The model is then tested for significance with the F test as follows.

1. Calculate the mean square for the error source (the unexplained variance).

- a. Calculate the sum of squares for residuals.
    - i) Take the square of each residual and add them together.
  - b. Divide the sum of squares for the error source by the appropriate degrees of freedom.
2. Calculate the mean square for the regression model (the explained variance).
    - a. Calculate the sum of squares for the model.
      - i) For each row, subtract the overall mean from the predicted target value.
      - ii) Take the square of each of these results and add them together.
    - b. Divide the sum of squares for the regression model by the appropriate degrees of freedom.
3. Divide the mean square for the regression model by the mean square for the error source. In other words, calculate the ratio of explained variance to unexplained variance. This ratio is the F value.

The F value is compared to a theoretical F distribution to determine the probability of obtaining the F value by chance.

- This probability is the significance value.
- If the significance value is less than the significance level, the means are significantly different.

Adjusted R<sup>2</sup> is used to estimate the regression model predictive strength. Significance level is set to 5% and the model predictive strength must be greater than 10% to indicate reliable predictive relationship between the target and an input field.

## **Model selection**

Model selection procedure depends on whether a categorical predictor is present or not. When only continuous predictor is specified, the following three models are considered.

1. Constant model that always predicts the overall mean.
2. Linear model with the single predictor added to the constant.
3. Quadratic model where the square predictor is added to the linear model.

Quadratic model is selected if it is significant and it provides relative improvement in predictive strength of at least 10% over the linear model. If selected, the quadratic fit line is reported together with the model predictive strength.

Otherwise, linear model is selected if it satisfies the same conditions when compared to the constant model. If selected, the linear fit line is reported together with the model predictive strength.

In none of the previous models are selected. The overall mean is reported and no predictive relationship is reported between the target and the input.

When a categorical predictor is present, the selection process is more complex because up to eight different models are considered. The selection steps are similar to the previous steps as the most complex model that is significant and provides enough relative improvement over the first nested model is selected.

Predictive strength is reported for selected model as well as appropriate fit lines depending on the model and the number of categories in the categorical predictor that is selected, if any. The number of categories in the categorical predictor is limited to 3 to reduce the number of displayed fit lines.

## **Studentized residual test**

Studentized residual is computed as regression model residual divided by its adjusted standard error.

Residuals are obtained by subtracting the target value that is predicted by the regression model, from observed target value for each data row. Standard error is given by the square root of the mean square for the error source. The adjustment of the standard error consists in multiplying it by the square root of leverage value that is subtracted from one. Leverage value is computed based on the design matrix and design matrix row for the data row. It adjusts the standard deviation by taking into account predictor values.

An outlier test for studentized residuals is conducted by comparing the absolute value of studentized residual with threshold value 3. Studentized residuals are distributed according to t distribution and the probability of being greater than the threshold is less than 1%.

Points with highest ranking studentized residuals above the threshold value are reported as meaningful differences, that is outliers in this case.

## Sum comparison test

The sum comparison test is a chi-square test that tests whether the sum of a specified measure is equal across all categories of the explanatory field.

If the chi-square test value is significant, the sums are not all equal.

The test is constructed under assumption that both means and counts of the measure are equal across different categories. The test uses a chi-square value. The following procedure describes how the chi-square value is calculated:

1. Calculate the overall mean for the measure.
2. Calculate the mean square for the measure error.
  - a. Calculate the sum of squares for the measure error.
    - i) Within each category, subtract the category's mean from each record value.
    - ii) Take the square of each difference and add them together.
  - b. Divide the sum of squares for the error source by the appropriate degrees of freedom.
3. Calculate the squared error for the sum per category.
  - a. Multiply mean square for the measure error by the expected category count.
    - i) Use total count divided by the number of categories as expected count.
  - b. Multiply the squared count error by the square of the overall mean.
    - i) Subtract the expected count from the total count.
    - ii) Multiply the result above by the expected count.
    - iii) Divide the result above by the total count.
    - iv) Multiply the result above by the square of the overall mean.
  - c. Add the two terms above to obtain the squared error for the sum.
4. Compute the chi-square term for each category.
  - a. Compute square of the difference of the average sum and the category sum.
  - b. Divide the result above by the squared error for the sum per category.
5. Sum the chi-square terms from all categories. This sum is the chi-square value.

The chi-square value is compared to a theoretical chi-square distribution with appropriate degrees of freedom to determine the probability of obtaining the chi-square value by chance.

- This probability is the significance value.
- If the significance value is less than the significance level, the means are significantly different.

## Sum influence test

The sum influence test compares sum of a measure in a category with the average sum value for the measure across all categories of explanatory field.

Considering the significance value and effect size, the test identifies influential categories.

The sum influence z-statistic uses the error of the sum per category that is obtained as a square root of the squared error of the sum per category that is described in the sum comparison test. Corresponding z-statistic is specified as the difference between category sum and the average sum that is divided by the error of the sum per category.

The z-statistic value is compared to a theoretical standard normal distribution with mean zero and variance one to determine the probability of obtaining the z-statistic value by chance.

- This probability is the significance value.
- If the significance value after a Bonferroni adjustment is less than the significance level, the category is judged to be influential. The Bonferroni adjustment is necessary because multiple z tests are conducted, one for each category.

The effect size is influential category strength. It is computed as absolute value of z-statistic divided by the square root of the category count. Meaningful differences highlight the categories with the highest effect size.

## Statistical terms

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Many statistical terms appear in IBM Cognos Analytics. It is important to understand the definitions of these terms as they apply to Cognos Analytics.

### Adjusted count R-squared

Adjusted count R-squared is a measure of improvement from the constant model to the fitted model.

It is obtained by computing the model classification accuracy improvement over the constant model and dividing it by the constant model classification error. Constant model always predicts the target mode and its classification accuracy is estimated by the mode frequency. Reliable predictive relationship is reported when the model predictive strength is greater than a default threshold of 10%.

In some calculations of the adjusted count R-squared, data for categories with low total counts are not used in the calculation. This filtering reduces the influence of low-frequency categories.

### Adjusted count R-squared category filter

In some calculations of the adjusted R<sup>2</sup> accuracy, data for categories with low total counts are not used in the calculation.

This filtering reduces the influence of low-frequency categories.

### Adjusted R squared

Adjusted R<sup>2</sup> is a corrected goodness-of-fit (model accuracy) measure for linear models. It identifies the percentage of variance in the target field that is explained by the input or inputs.

R<sup>2</sup> tends to optimistically estimate the fit of the linear regression. It always increases as the number of effects are included in the model. Adjusted R<sup>2</sup> attempts to correct for this overestimation. Adjusted R<sup>2</sup> might decrease if a specific effect does not improve the model.

Adjusted R squared is calculated by dividing the residual mean square error by the total mean square error (which is the sample variance of the target field). The result is then subtracted from 1.

Adjusted R<sup>2</sup> is always less than or equal to R<sup>2</sup>. A value of 1 indicates a model that perfectly predicts values in the target field. A value that is less than or equal to 0 indicates a model that has no predictive value. In the real world, adjusted R<sup>2</sup> lies between these values.

### Categorical

Categorical is a type of measurement level. A categorical field is a field with a limited number of distinct values. The values represent a type or kind.

An example of a categorical field is gender, which has Male and Female values. Another example is car model.

Categorical fields can be further classified as nominal or ordinal fields.

## Chi-square value

The chi-square value is a value on the chi-square distribution. A statistical test generates a chi-square value. The value specifies the probability of obtaining the chi-square value from chance. If the probability is less than the significance level, the test is judged to be statistically significant.

The chi-square distribution is a theoretical distribution. There are many of these distributions, and each of them differs based on the degrees of freedom.

## Chi-square adjustment for sparse data

In some applications of the chi-square statistical test, the calculation of the chi-square value is adjusted by a small factor.

This adjustment gives a more reliable measure of the statistical significance when the data is sparse.

## Continuous

Continuous is a type of measurement level. A continuous field is measured numerically so that distance comparisons between values are appropriate.

Examples of continuous fields include age in years and income in thousands of dollars.

## Cramér's V

Cramér's V is an effect size measurement for the chi-square test of independence. It measures how strongly two categorical fields are associated.

The effect size is calculated in the following manner:

1. Determine which field has the fewest number of categories.
2. Subtract 1 from the number of categories in this field.
3. Multiply the result by the total number of records.
4. Divide the chi-square value by the previous result. The chi-square value is obtained from the chi-square test of independence
5. Take the square root.

*Table 3. Interpretation of effect size*

Effect size (ES)	Interpretation
$ES \leq 0.2$	The result is weak. Although the result is statistically significant, the fields are only weakly associated.
$0.2 < ES \leq 0.6$	The result is moderate. The fields are moderately associated.
$ES > 0.6$	The result is strong. The fields are strongly associated.

## Decision rule

A decision rule is a set of conditions that classify records. The rule predicts an outcome in the target field.

Viewing the decision rules helps you determine which conditions are likely to result in a specific outcome. For example, consider some hypothetical decision rules that could predict churn. These rules might identify classifications based on the ranges for customer age and number of previous claims. From these rules, you might observe that customers who have no or 1 claim and are older than 50 are more likely to churn.

The decision rule corresponds to a branch in a decision tree.

## Departure from overall distribution

Departure from overall distribution is an effect size measurement for the distribution test. It measures the extent to which a conditional distribution does not match the marginal distribution of the target field.

A large effect size suggests that the conditional distribution is very different from the overall target distribution.

The following procedure describes how the effect size is calculated:

1. Subtract 1 from the number of target categories.
2. Multiply this result by the total count in the conditional group.
3. Divide the chi-square value of the distribution test by this result.
4. Take the square root.

*Table 4. Interpretation of effect size*

Effect size (ES)	Interpretation
ES ≤ 0.2	The result is weak. Although the result is statistically significant, the conditional distribution does not differ much from the overall target distribution.
0.2 < ES ≤ 0.6	The result is moderate. The conditional distribution differs a moderate amount from the overall target distribution.
ES > 0.6	The result is strong. The conditional distribution is very different from the overall target distribution.

## F value

The F value is a value on the F distribution. Various statistical tests generate an F value. The value can be used to determine whether the test is statistically significant.

The F value is used in analysis of variance (ANOVA). It is calculated by dividing two mean squares. This calculation determines the ratio of explained variance to unexplained variance.

The F distribution is a theoretical distribution. There are many of these distributions, and each of them differs based on the degrees of freedom.

The F value and the degrees of freedom of the sources of variance are used to determine the probability of the F value. The probability is the significance value for the test.

## Frequency

Frequency is another word for count. It measures the total number of records or the number of records in a specific group. In other words, frequency measures how often a value occurs.

Frequency is often denoted as  $N$ .

## Frequency weights

A numeric field can be used to specify frequency weights. Each record in the data may represent more than a single observations. Corresponding observation counts are frequency weights needed for building the model.

The resulting model is the same as if each record were replicated the number of times specified by the corresponding frequency weight. An additional numeric field defining regression weights can be included for multiple regression models. Regression weights are multiplied by the frequency weights when computing the model parameters.

## Gini impurity measure

Gini impurity is a measure used for generating classification trees. It provides more information on the distribution of data per node than the classification accuracy used for reporting the tree accuracy.

Impurity of a classification tree node is computed using the count of each target category across all records corresponding to the given node. Gini impurity total is computed as a sum of squares of count proportions across all target categories per node subtracted from one, and the result is multiplied by the number of records.

For example, when splitting a tree node, the algorithm searches for a field with the largest improvement in total impurity computed as total impurity across all potential children nodes subtracted from the parent node total impurity.

## Key driver

A key driver is an input field or combination of input fields that has a statistically significant effect on a target field. This effect is more than a mere association because the effect is directed. The input field or fields are influencing the values in the target.

Key drivers are the most important main effects and interaction effects. By identifying key drivers, you can discover which field or combination of fields have the most effect on a target. The values in the input fields are driving the values in the target.

You can use key drivers to take action on your business. For example, you discover that a key driver of customer satisfaction is staff knowledge. This result suggests that more training might improve customer satisfaction.

**Important:** If there are many inputs, IBM Cognos Analytics might find many drivers. Only the top 50 drivers per target are reported as key drivers.

## Modified z score

The modified z score is a standardized score that measures outlier strength or how much a particular score differs from the typical score. Using standard deviation units, it approximates the difference of the score from the median.

The modified z score might be more robust than the standard z score because it relies on the median for calculating the z score. It is less influenced by outliers when compared to the standard z score.

The standard z score is calculated by dividing the difference from the mean by the standard deviation. The modified z score is calculated from the mean absolute deviation (MeanAD) or median absolute deviation (MAD). These values must be multiplied by a constant to approximate the standard deviation.

Depending on the value of MAD, the modified z score is calculated in one of two ways:

### If MAD does equal 0

Subtract the median from the score and divide by  $1.253314 * \text{MeanAD}$ .  $1.253314 * \text{MeanAD}$  approximately equals the standard deviation:  $(X - \text{MED}) / (1.253314 * \text{MeanAD})$ .

### If MAD does not equal 0

Subtract the median from the score and divide by  $1.486 * \text{MAD}$ :  $(X - \text{MED}) / (1.486 * \text{MAD})$ .  $1.486 * \text{MAD}$  approximately equals the standard deviation.

## Normal distribution

The normal distribution is a theoretical distribution of values. It is often called the bell curve because the visual representation of this distribution resembles the shape of a bell. It is theoretical because its frequency distribution is derived from a formula rather than the observation of actual data.

Even though the normal distribution is theoretical, the distributions of many fields in the real world resemble the normal distribution. An example is the traditional bell curve for ranking students. Most students have average grades (the mean), while there are a few with the poorest grades and a few with the highest grades.

The assumption of normality is important for many statistical tests. If the shape of a field's distribution is not bell-shaped, some statistical tests might not be valid.

The normal distribution is symmetric about the mean. That is, the distributions of values to the right and left of the mean are mirror images. 68% of the values in the distribution fall within one standard deviation of the mean (to the left and right). 95% of values fall within two standard deviations, and 99.7% within three.

## Overall distribution

The overall distribution is the distribution of records in the target field before any grouping with the input field or fields.

The overall distribution is essentially the expected distribution. If the inputs have no effect on the target, the input categories and levels (bins) would have the same distribution as the overall distribution. Comparing these distributions (conditional distributions) to the overall distribution can reveal the effect of the input categories or levels. The distribution of records in the target field might change for the categories or levels.

For example, if the input field is gender and the target field is favorite color, the overall distribution is the number of people for each color. This distribution is compared to the conditional distributions, which are the number of men for each color and the number of women for each color.

IBM Cognos Analytics compares conditional distributions to the overall distribution in the following analyses:

- Key drivers for categorical target. The overall distribution is the marginal distribution of the target field. For one input, the comparison shows how the distribution changes for each category or level (bin) in the input field. For two inputs, the comparison shows how the distribution changes for each combination of categories or levels in the input fields.
- Decision trees. The overall distribution is the distribution of the root node, which is also the marginal distribution of the target field. The comparison shows how the distribution changes in each node.

## Regression weights

An optional numeric field can be used to specify regression weights for a multiple regression model.

Regression weight for a given record corresponds to influence of the observation on the computed model parameters. An example of regression weight field is size field in a bubble visualization.

Regression weights are used in addition to, and independently of the frequency weights when estimating the multiple regression model parameters.

## R<sup>2</sup>

R<sup>2</sup> measures how well a regression model fits the actual data. In other words, it is a measure of the overall accuracy of the model. R squared is also known as the coefficient of determination.

In IBM Cognos Analytics, R<sup>2</sup> is used to measure the accuracy of a CHAID regression tree.

R<sup>2</sup> is measured on a scale of 0 to 1. A value of 1 indicates a model that perfectly predicts values in the target field. A value of 0 indicates a model that has no predictive value. In the real world, R<sup>2</sup> lies between these values.

When there is only one input, R squared is same as the Pearson correlation square.

## Significance level

The significance level is the cutoff for judging a result as statistically significant. If the significance value is less than the significance level, the result is judged to be statistically significant. The significance level is also known as the alpha level.

IBM Cognos Analytics uses the significance level 0.05. This number means that a statistically significant result has less than a 5% chance of occurring from chance.

## **Significance value**

The significance value, or p value, is the probability that a result occurred by chance. The significance value is compared to a predetermined cutoff (the significance level) to determine whether a test is statistically significant. If the significance value is less than the significance level (by default, 0.05), the test is judged to be statistically significant.

The significance value does not indicate whether a result is practically significant. Effect size is another measure from a statistical test. It helps determine the practical significance. IBM Cognos Analytics uses both the significance value and the effect size to determine whether a result is important enough to display.

## **Standard error**

The standard error is an estimate of how much the value of a test statistic varies from sample to sample. It is a measure of the uncertainty of the test statistic. Standard error might be abbreviated as std. error.

The standard error is calculated by taking the standard deviation of the sampling distribution for the test statistic. The sampling distribution is the distribution of all possible samples.

Imagine you were conducting a survey and randomly chose 1,000 people for the survey. This group is one sample. You can choose another random sample of 1,000 people, and another sample, and another sample, and so on. You can then calculate the mean for each sample. The distribution of these sample means is the sampling distribution. By calculating the standard deviation of this distribution, you obtain the standard error of the mean. When standard error is written without qualification, it is assumed to be the standard error of the mean.

You can also calculate the standard error of the kurtosis and the standard error of the skewness. To calculate the standard error of the kurtosis, you calculate the kurtosis for each sample and take the standard deviation of the resulting distribution. The standard error of the skewness is similar except that you calculate the skewness of each sample.

## **Statistical distribution**

A statistical distribution, or probability distribution, describes how values are distributed for a field. In other words, the statistical distribution shows which values are common and uncommon.

There are many kinds of statistical distributions, including the bell-shaped normal distribution. We use a statistical distribution to determine how likely a particular value is. For example, if we have a chi-square value, we can use the chi-square distribution to determine how likely this chi-square value is.

## **Statistical significance**

Statistical significance is a judgment of whether a result occurs because of chance. When a result is statistically significant, we mean that it is unlikely that the result occurs because of chance or random fluctuation.

There is a cutoff for determining statistical significance. This cutoff is the significance level. If the probability of a result (the significance value) is less than the cutoff (the significance level), the result is judged to be statistically significant.

Statistical significance does not imply anything about the practical significance of a result. Furthermore, as the number of records increases, more results are statistically significant (less than the significance level) by chance. The effect size can account for these facts. The effect size helps determine whether a result has practical significance and is not influenced by the overall number of records (sample size).

## **Studentized residuals**

Studentized residuals allow comparison of differences between observed and predicted target values in a regression model across different predictor values. They can also be compared against known distributions to assess the residual size.

Residuals for regression models are obtained by subtracting the target value predicted by the model from observed target value for each data record. Studentized residual is computed as the regression residual divided by its adjusted standard error.

Standard error of the residual is given by the square root of the mean square for the error source. The adjustment of the standard error consists in multiplying it by the square root of leverage value subtracted from one. Leverage value is computed based on the design matrix and design matrix row for the given data row. It adjusts the standard deviation by taking into account predictor values. As a result, all studentized residuals have the same standard deviation.

## **t value**

A t value is the result of a statistical test. The value is located on the Student's t distribution that is appropriate for the degrees of freedom. The location specifies the probability of obtaining the t value from chance. If the probability is less than the significance level, the result is judged to be statistically significant

The Student's t distribution is a theoretical distribution. There are many of these distributions, and each of them differs based on the degrees of freedom.

The t value is typically calculated by taking the difference of observed and expected means and dividing the difference by the standard error.



# Chapter 3. Stories

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Stories can help you inform and engage your audience. You can use stories in IBM Cognos Analytics to create scenes that visualize your data and to tell a narrative.

## What is a story?

A story is a type of view. A story is composed of a set of scenes that are displayed in sequence over time. Stories can be used to provide your data with a visual narrative.

## What is a scene?

A scene can be considered as a container for a sequence of objects, such as widgets, data, or animations. The objects in a scene are also placed into a timeline, which dictates when the objects appear in the scene.

## How is a story different from a dashboard?

Stories are similar to dashboards because they also use visualizations to share your insights. Stories differ from dashboards because they provide an over-time narrative and can convey a conclusion or recommendation.

For example, each scene can contain an analysis, insight, or piece of information that is revealed as the viewer plays the scenes in the story. The scenes build upon each other until the final scene, which provides a conclusion or summary.

## What can I use to assemble a story?

You can add the following to your scenes when creating a story:

- Visualizations from your collection of pins
- New visualizations from your data set
- Text, media, web pages, images, and shapes

## What are animations?

Animations are one of the properties that a widget can have. By using animations, you can define how widgets enter and exit your scenes.

## Getting started with your first story

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Stories are an effective way to present and share your data. In this tutorial, you will learn how to create a story, an outline, and how to animate a scene.

While there are no rules for how you can create a story in IBM Cognos Analytics , this tutorial will provide you with a sense of the workflow involved in creating a story. The following is the workflow that this tutorial uses in creating a story:

1. Create a new story
2. Create an outline
3. Populate the scenes
4. Adjust the timeline
5. Add animations

## Creating a new story

To begin, create a new, blank story. A story contains your scenes, widgets, and any data that you want to include in it.

### About this task

Start off by creating a new slideshow story. Slideshows are simple, flexible, and resemble more traditional presentations. When you're familiar with how the slideshows work, you can experiment with other story transition types.

### Procedure

1. Click **New** , which located in the side bar.
2. Click **Story** .
3. Select a **Slideshow** transition style.
4. Click **Create**.

### Results

Your new slideshow-style story is created. The story is where you can add your scenes.

For more information about creating a blank story, see [“Creating a new story from scratch” on page 178](#).

### What to do next

Next, organize your ideas into an outline. You can use scenes to create this outline.

## Creating an outline

You can create a simple outline for your story by using scenes.

### About this task

To keep your points organized, you can create a simple outline for your story by using scenes. For example, your outline can consist of the following points:

- An introduction
- The company business model
- A history of past performances
- A conclusion / future goals

For each of these points, create a scene and name the scene.

### Procedure

1. Click **Scene selector**  to open the scene selector.
2. Click **Add a new scene with default template** .

### Results

The **Scene Selector** bar is now be populated with scenes, outlining your story. You can add or delete scenes later where you see fit.



For more information about using scenes in your story, see “[Working with scenes](#)” on page 187.

## What to do next

After you have an outline for your story, it's time to start populating your scenes with data and widgets.

## Populating your scenes

Populate your scenes by adding widgets to the canvas.

### About this task

After you have created an outline for your story, you can now begin to compose your scenes. The composition of your scene is important. The canvas of your scene should not be too crowded and the placement of the widgets should guide the viewer's eye towards information in a specific order.

At this stage, don't worry about adding entry and exit animations. You want to work on the final composition of your widgets and how they will look on the screen.

### Procedure

1. Click **Edit or preview** and ensure that you are in edit mode.
2. Click **Scene selector** to open the scene selector.
3. From the scene selector, click the scene that you want to populate.
4. Use the left pane to select widgets or visualizations to add to your canvas.
5. Rearrange the widgets and visualizations.
6. When you are done with the composition of the canvas, click the **Full screen** icon to view it in full screen. If your composition looks distorted in full screen, continue to adjust it in the canvas.

## Results

Your scene is populated. Below is an example of a populated scene.

### Sample Outdoors Company



### Tip:

- If you are sharing your story with other people, use the **auto** option for text size. This will ensure that the text scales appropriately for different screen sizes and resolutions.
- Are you having trouble fitting everything into a single scene? That might be a sign that your scene contains more than one major message and that you should split the scene into two or more scenes.

For more information on adding widgets to your scenes, see [“Adding widgets” on page 180](#).

## What to do next

After your scene is composed and you're happy with the layout, you can begin adjusting the timeline to define when your widgets appear.

## Adjusting the timeline

Use the timeline to define when widgets appear on your canvas.

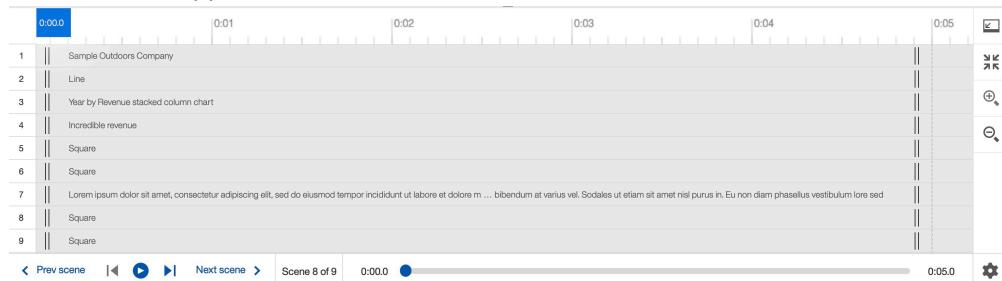
### Before you begin

Presenting all of your data at the same time can be overwhelming to your audience. Consider the order in which the widgets on your canvas appear.

For example, you can define when certain text boxes appear, if you have multiple text boxes. Controlling the time and speed in which objects appear on your canvas helps viewers to focus only on one point at a time.

### About this task

By default, when you add a widget to your canvas, the corresponding timeline object is added to the beginning of the timeline. As the timeline slider moves during playback, objects that the timeline slider moves across appear on the canvas.



Drag the individual objects in the timeline to define when the corresponding widget appear and disappear from the canvas.

### Procedure

1. Click **Edit or preview** and ensure that you are in edit mode.
2. Click **Scene selector** to open the scene selector.
3. From the scene selector, click the scene with the timeline that you want to adjust.
4. Click **Open timeline** .
5. Drag and reposition the objects on the timeline that you want to adjust.

### Results

In the example, groups of widgets are placed on the timeline to appear roughly 2 seconds apart from each other.



During playback, the widgets appear on the canvas according to the position of the timeline slider.

For more information about the timeline, see [“Using the timeline” on page 185](#).

## What to do next

Now that you determined when your widgets appear on the canvas, it's time to use animations to define how they appear.

## Adding animations

Use animations to define how widgets enter and exit your scenes.

### About this task

Animations can be used to make your story more dynamic and memorable. The default widget animation is the fade animation. The fade animation works in most situations. You can change this animation type, but having too many different animation types can be distracting to the viewer.

**Tip:** Generally, you shouldn't have widgets overlap one another when the widgets enter or exit a scene. Based on the animation type that you choose for your widgets, pay attention to the direction in which they enter or exit.

### Procedure

1. Click **Edit or preview** .
2. Click **Scene selector** .
3. Click the scene, which contains the widget that you want to add an animation to.
4. Click **Open timeline** .
5. Click the widget that you want to add an animation to.
6. Click **Open animation properties** .
7. Expand **Entrance** or **Exit**, depending on if you want to add an animation to the beginning or end of your widget.
8. Select the animation type from the **Animation** menu.
9. If applicable, select the direction of the animation from the **Direction** menu.

### Results

For more information on how you can add animations to your widgets, see [“Adding animations” on page 183](#).

For more information on the different types of animations that you can add to your widgets, see [“Animation types” on page 181](#).

## What to do next

Congratulations, you created a story, an outline, populated a scene, adjusted the timeline, and added animations! Continue this process for the rest of your scenes. When you finish, you can define their playback options or share your story.

For more information about playback options, see [“Playback options” on page 189](#).

For more information about sharing your story, see [“Sharing your story” on page 191](#).

## Creating a story

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Stories are effective ways to share a narrative. They can be as simple or as complex as you need them to be. You can create a story from scratch or from an existing dashboard.

### Creating a story from a dashboard

You can take a dashboard and create a story from it.

#### About this task

By default, all scenes are 5 seconds long.

#### Procedure

1. Open a dashboard.
2. Expand the save menu.
3. Select **Save as story**.
4. Select a location.
5. Define a name.
6. Define whether you want to open the story after saving.
7. Click **Save**.

### Creating a new story from scratch

You can create a story from scratch and define the transition style.

#### Procedure

1. Click **New** .
2. Click **Story** .
3. Under **Transition Style**, select one of the following transition styles:

#### Slideshow

Select this transition style to tell a story through a series of slides or scenes.

#### Guided journey

Select this transition style to guide an audience on a journey that starts out as the full picture of the story and then pans and zooms into the details across the canvas.

To learn more about transition styles, see [“Transition styles” on page 179](#).

4. Click the layout that you want to use.
5. Click **Create**.

The template with predefined text widgets and blank visualizations opens. The scene selector  icon at the bottom of the window contains one or more scenes with the default template.

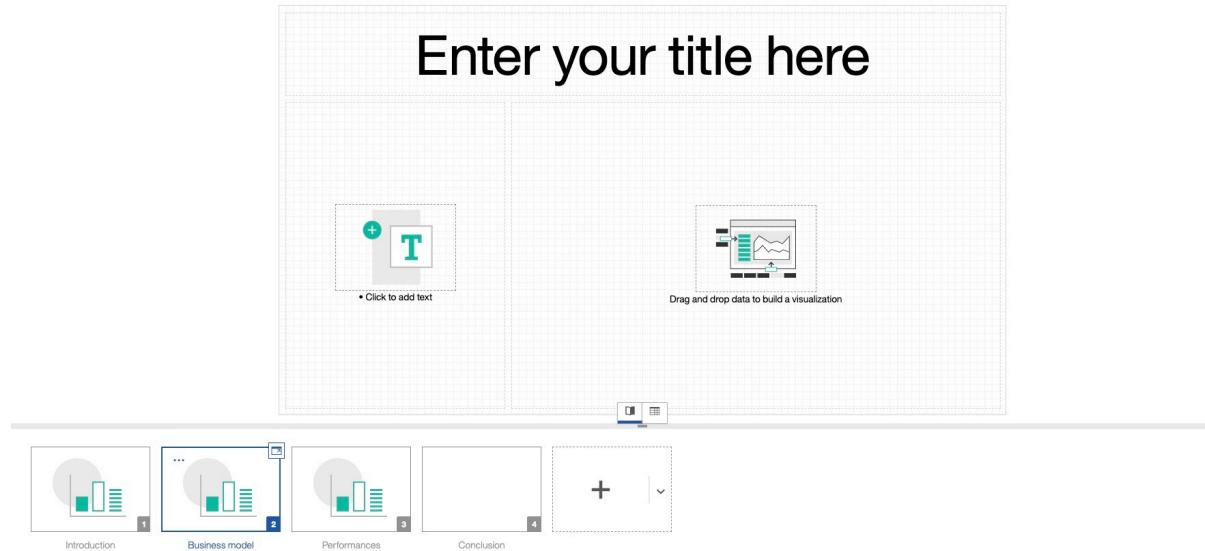
# Transition styles

Transition styles allow for seamless scene transitions and they help to highlight the progression from one scene to another.

You can choose between two different transition styles for your story.

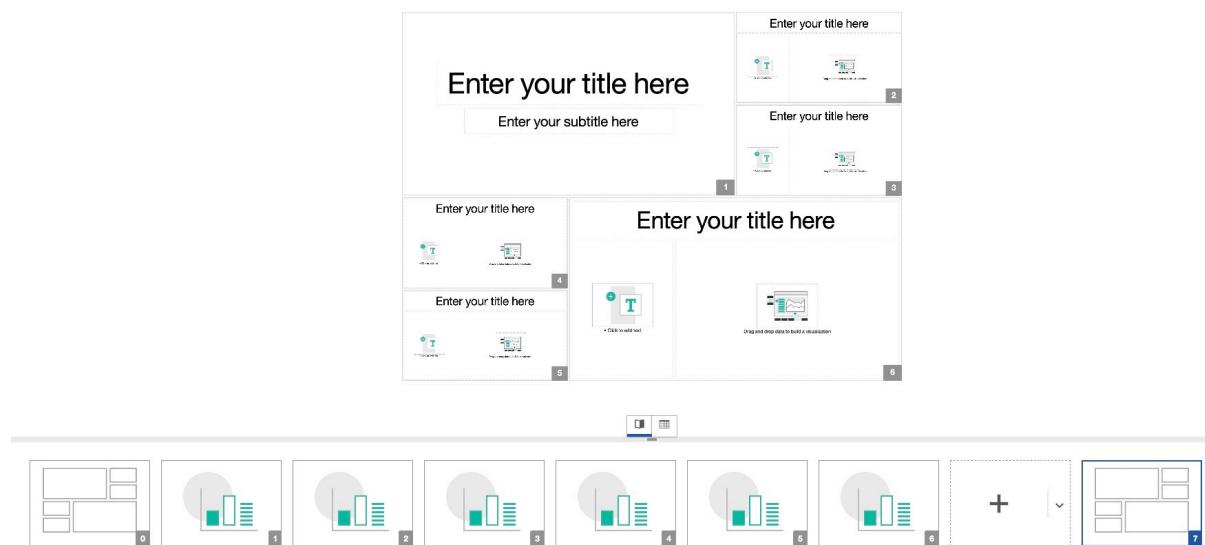
## Slideshow

A slideshow transition style presents each of your story's scenes sequentially. Each scene is presented on a new canvas. Each scene is presented on a new canvas, all managed automatically.



## Guided journey

A guided journey layout is a collection of scenes on a single canvas. When you play a story with a guided journey transition style, the presentation zooms and pans on each individual scene in a sequential order. Each guided journey contains a template for different scene orders and layout. At the beginning and end of the presentation, the viewer is shown an overview of all of the slides.



## Adding widgets

---

Widgets can be added to your canvas to illustrate a scene. You can add text, images, videos, shapes, and data to the canvas of a scene in the form of a widget.

### Adding visualizations from your collection of pins

You can add a visualization, from your pins, as a widget.

#### Procedure

1. Click **Pins** , which is located in the side bar.
2. Drag an item from the **My pins** pane onto the canvas.
3. Move the widget to a location on the canvas.

### Creating a widget from a new visualization

You can create a widget from a new visualization.

#### Procedure

1. Click **Visualizations** , which is located in the side bar.
2. Select a visualization type.
3. Select a source from the **Selected sources** pane.
4. Drag your data into the visualization.
5. Click the **Collapse** icon.
6. Move the widget to a location on the canvas.

### Creating a widget from the data tray

You can create a widget from a column in the data tray.

#### Procedure

1. Click **Data tray** .
2. Drag a column heading from the data tray, onto the canvas.
3. Move the widget to a location on the canvas.

### Creating a single column widget from the source pane

You can create a widget from a column in the source pane.

#### About this task

When you create a widget from a column, Cognos Analytics automatically chooses the visualization type based on the type of column. You can change the visualization type after the widget is added.

#### Procedure

1. Click **Sources** , which is located in the side bar.
2. Add or select a source.
3. Drag a column from the **Sources** pane onto the canvas.
4. Move the widget to a location on the canvas.

## Creating a multi-column widget from the source pane

You can select multiple columns in the source pane to create your widget.

### Procedure

1. Click **Sources** , which is located in the side bar.
2. Add or select a source.
3. Select your columns (Ctrl + click).
4. Drag the columns onto the canvas.
5. Move the widget to a location on the canvas.

## Creating a widget from a new calculation

You can create a widget from a new calculation.

### Procedure

1. Click **Sources** , which is located in the side bar.
2. Add or select a source.
3. Select two measures (Ctrl + click two measures).
4. Click the ellipsis , next to either of the two measures.
5. Click **Create calculation** .
6. Define your calculation.
7. Click **OK**.
8. Drag the new calculation column onto the canvas.
9. Move the widget to a location on the canvas.

## Animation types

---

There are different types of animations for widgets and animation types for specific data widgets. Use animations to define how your widgets enter or exit a scene.

## Widget animations

You can use widget animations to define how a widget enters or exits a scene.

### Fade

You can use the **Fade in/Fade out** animation type to transition a widget in or out with a fading effect.

The fade animation can be applied to a widget as an entrance or exit animation.

For more information about adding animations to your widget, see [“Adding widget animations” on page 183](#)

### Slide

You can use the **Slide in/Slide out** animation type to transition a widget in or out with a sliding effect.

The Slide animation can be applied to a widget as an entrance or exit animation.

For more information about adding animations to your widget, see [“Adding widget animations” on page 183.](#)

## Scale

You can use the **Scale in/Scale out** animation type to transition a widget in or out with a scaling effect.

The Scale animation can be applied to a widget as an entrance or exit animation.

For more information about adding animations to your widget, see [“Adding widget animations” on page 183.](#)

## Shrink and Expand

You can use the **Shrink in/Expand out** animation type to transition a widget in or out with a shrinking or expanding effect.

The Shrink animation can be applied to a widget as an entrance animation. The Expand animation can be applied to a widget as an exit animation.

For more information about adding animations to widgets, see [“Adding widget animations” on page 183.](#)

## Pivot

You can use the **Pivot in/Pivot out** animation type to transition a widget in or out with a pivoting effect.

The Pivot animation can be applied to a widget as an entrance or exit animation.

For more information about adding animations to your widget, see [“Adding widget animations” on page 183.](#)

## Data animations

Certain data widgets feature data animations. Data animations define how the data enters the scene. Data widget animations can be used along with regular widget animations.

### Wipe

You can use the **Wipe** data animation type to transition the data in your widget in with a wipe effect from the side.

The Wipe data animation can be applied to a data widget as a data entrance animation.

The **Entry stragger** setting staggers the data entrance animation as it appears.

The **Entry animation duration** setting defines the time that it takes for the data entrance animation to complete.

For more information about adding animations to your widget, see “[Adding entrance animation to data](#)” on page 184.

## Grow

You can use the **Grow** data animation type to transition the data in your widget with a grow effect. The grow effect starts from the bottom of the data widget.

The Grow data animation can be applied to a data widget as a data entrance animation.

The **Entry stagger** setting staggers the data entrance animation as it appears.

The **Entry animation duration** setting defines the time that it takes for the data entrance animation to complete.

For more information about adding animations to your widget, see “[Adding entrance animation to data](#)” on page 184.

# Adding animations

---

You can apply animations to your widgets to make your story more dynamic and memorable.

## Adding widget animations

Widget animations can enhance your stories by directing and focusing your audience's attention to key information at the right time. You can add widget animations easily in IBM Cognos Analytics using different widget animation types.

### About this task

You can add widget animations to the beginning or the end of a widget in your scene's timeline. These animations are called **Entrance** and **Exit** animations.

#### Note:

- If you are adding an **Entrance** animation to your widget, ensure that the widget is not at the beginning of your scene's timeline. If your widget is at the beginning of your scene's timeline, you can drag the widget to the right, away from the beginning of the scene.
- If you are adding an **Exit** animation to your widget, ensure that the widget is not at the end of your scene's timeline. If your widget is at the end of your scene's timeline, you can add another widget to the scene. Adding a widget at the end of the timeline ensures that the new widget's end duration is later than the one you want to add an animation to.

## Procedure

1. Click **Edit or preview** .
2. Click **Scene selector** .
3. Click the scene, which contains the widget that you want to add an animation to.
4. Click **Open timeline** .
5. Click the widget that you want to add an animation to.
6. Click **Open animation properties**  from the context menu.
7. Depending on if you want to add an animation to the beginning or end of your widget, expand **Entrance** or **Exit**.

8. Select the animation type from the **Animation** menu.
9. If applicable, select the direction of the animation from the **Direction** menu.

## Adding a widget animation using the properties pane

You can add animations to your widget from the properties pane.

### Procedure

1. Click **Edit or preview** .
2. Click **Scene selector** .
3. Click the scene with the widget you want to add an animation to.
4. Click the widget that you want to add an animation to.
5. Click **Properties** .
6. Click the **Animation** tab.
7. From the lists, select animation effects for your widget.

## Adding a widget animation using the timeline

You can add animations to your widget from the timeline.

### Procedure

1. Click **Edit or preview** .
2. Click **Scene selector** .
3. Click the scene with the widget you want to add an animation to.
4. Click the widget that you want to add an animation to.
5. Click **Properties** .
6. Click the **Animation** tab.
7. From the lists, select animation effects for your widget.

## Adding entrance animation to data

**11.1.0** You can add **Data entrance** animation properties to some visualization types.

### About this task

Add the following entrance animation to some types of visualizations.

- Entry animation type
- Entry stagger
- Entry animation duration

You cannot add an entrance animation to a widget that starts at the beginning of the timeline. You also cannot add an exit animation to a widget that ends at the end of the timeline.

**Notice:** Entrance animations are currently not supported on Microsoft Internet Explorer.

### Procedure

1. Click **Edit or preview** .

2. Click **Scene selector** .
3. Click the scene with the widget you want to add an animation to.
4. Click the widget that you want to add an animation to.
5. Click **Properties** .
6. Click the **Animation** tab.
7. Expand **Data entrance**.
8. Select the type of entrance animation from the **Entry animation type** list.
9. Click the **Entry stagger** toggle when you want your data to stagger in at different times when you play your story.
10. Use the **Entry animation duration** field to define how long the entrance animation takes to complete.

## Using the timeline

---

You can use the timeline to define when a widget enters or exits a scene, and to test a scene.

### About this task

By default, all objects and widgets in a scene are visible for the full duration of the scene. To make an object appear or disappear, change the start time or end time that the object is visible anywhere along the timeline. The default duration for a scene is five seconds, which you can change.

### Procedure

1. Open the story and click **Edit or preview** . The scene selector  contains the scenes in the story.
2. Click **Open timeline** .
3. To change the canvas layering order of objects in a scene, click and drag timelines up and down to reorder them. You can also click and drag objects in the timeline from side to side.
4. To change the granularity of the timeline, click **Zoom in** , **Zoom out** , or **Zoom to fit** .
5. Test the scene in any of the following ways:
  - Click **Play** .
  - Slide the timeline scrubber along the timeline to see what the scene looks like at a specific point in time.
6. To close the timeline and return to the scene selector, click **Close timeline** .

## Using the timeline scrubber

You can use the timeline scrubber to define when objects enter and exit your scene.

### About this task

The timeline scrubber is a timer with a red line that indicates a point in time in the scene. You can drag the time scrubber along the timeline to jump to a specific time in the scene.

### Procedure

1. Open the story.
2. Click **Edit or preview** . The scene selector  contains the scenes in the story.
3. Click **Open timeline**  to display the timeline.

4. To change the timing of an object, drag the start and end points of its timeline.

**Tip:** If an object that you know exists in the scene appears to be missing from the scene, it's because the time scrubber is at a point in the scene at which the object is not visible. Slide the time scrubber along the timeline until the object appears.

## Defining when objects enter or exit a scene

You can enter an exact time for when an object enters or exits a scene.

### About this task

You can use the animation properties pane to define an exact time for when an object enters or exits your scene.

### Procedure

1. Click **Edit or preview** .
2. Click **Open timeline**  to display the timeline.
3. From the timeline, click the object that you want to define an exact entrance or exit time for.
4. Click **Open animation properties** .
5. Click the **Animation** tab.
6. Use the **Start at (secs)** field to define an exact entrance time for the object.
7. Use the **End at (secs)** field to define an exact exit time for the object.

## Changing a timeline title for media, web pages, and images

When you are working with the timeline for a scene, you can give useful titles to media, web page, and image objects. This makes it easier to understand which objects you are working with in a timeline.

### Procedure

1. Click **Edit or preview** .
2. Click a media, web page, or image widget on the canvas.
3. Click **Properties** .
4. Under the details for the object, type a title in the title field, then click away from it.

## Highlighting data in the timeline

You can use highlights to bring attention to specific data in your scene or to create navigation markers on your timeline.

### About this task

Highlighting data brings attention to specific details that you want to convey to your audience.

You can define the data that you want to highlight and when you want the highlight to appear. For example, you can add a bar chart widget that displays a highlighted bar and dims all the other bars. You can have multiple highlights for a single visualization and across multiple visualizations.

**Note:** You can highlight data on any data widget, except for the summary data widget.

Highlighting data has the same effect as when you manually click a data item.

**Note:** Other visualizations in the same connection group might get filtered to the selected values if they do not contain the highlighted column.

If you enable the **Navigate markers** option, your highlights appear as navigation markers in the timeline.

## Procedure

1. Click **Edit or preview** . The scene selector  contains the scenes in the story.
2. Click **Open timeline**  from a scene.
3. Click the slider for the visualization you want to highlight data on at the time on the timeline you want the highlight to occur.
4. Click **Add highlight** .
5. Select a data category from the list.
6. Select the specific data to highlight.
7. Click **Play**  to see the effect.
8. Drag the **Highlight**  icon along the timeline, to when you want the data to be highlighted.
9. Click the **Highlight**  icon to edit or delete the highlight.

## Working with scenes

---

A scene is used to divide your story into separate messages or points. You can populate your scenes with text, data, and widgets.

### Adding a title to a scene

Adding a title to your scene can help you to identify, organize, and navigate multiple scenes in a story.

#### Procedure

1. Click the ellipsis  on the scene.
2. Click **Rename scene** .
3. Enter a name for the scene.
4. Click **OK**.

#### Results

A title is added to your scene. You can see the title of your scene, below the scene thumbnail.

### Adding a new default template scene to a story

You can add a new default template scene to a story. The default scene is determined based on the transition style of your story.

#### Procedure

1. Click **Scene selector**  to open the scene selector.
2. Click **Add a new scene with default template** .

#### Results

A new scene is created containing the default template.

## Choosing a template for a new scene

You can choose the template that you want to use for a new scene.

### About this task

In a story, you can quickly define the layout of your scenes by choosing a template.

**Tip:** Some template sections contain multipurpose widget buttons . You can use multipurpose widgets to select a widget type right on the button. You can also drag and drop a supported widget into a section with the multipurpose widget button. Supported widget types include text, image, and visualization widgets.

### Procedure

1. Click **Scene selector**  to open the scene selector.
2. Click the arrow icon, beside **Add a new scene with default template** .
3. Click the template that you want to use for your scene.

### Results

A new scene is created containing your selected template.

## Changing the order of your scenes

You can change the order of the scenes in your story.

### Procedure

1. Click **Scene selector**  to open the scene selector.
2. Drag your scenes into the order that you want.

### Results

The scene is reordered in the scene selector.

## Duplicating a scene

You can duplicate the scenes in your story.

### Procedure

1. Click **Scene selector**  to open the scene selector.
2. Click the ellipsis  on the scene.
3. Click **Duplicate scene** .

### Results

The scene is duplicated in the scene selector.

## Deleting a scene

You can delete a scene in your story.

### Procedure

1. Click **Scene selector**  to open the scene selector.
2. Click the ellipsis  on the scene.
3. Click **Delete scene** .

### Results

The scene is deleted from the scene selector.

## Playback options

---

Use playback options to tailor the playback experience to your needs.

You can use the following playback options in your stories:

- Navigate markers
- Play all scenes
- Loop
- Refresh at start
- Kiosk mode

## Navigate markers

You can use markers to choose when to show the next piece of data or information in your playback, rather than all of the objects and widgets at together.

### About this task

The **Navigate markers** option creates markers on your timeline based on when each widget and highlight appears in the timeline. During playback, the scene pauses at each marker.

### Procedure

1. Open the story.
2. Click **Playback options** .
3. Enable the **Navigate markers** option.

## Play all scenes

The **Play all scenes** option allows for the automatic playback of all scenes once the play button is pressed to the end of the story.

### About this task

Use the playback options to control if your scenes require a presenter to manually play each scene, or if the scenes play through unattended. A presenter must press play to start a story even when **Play all scenes** is enabled.

**Tip:** The **Play all scenes** and the **Loop** options can be used together to create a "kiosk" mode.

## Procedure

1. Open the story.
2. Click **Playback options** .
3. Enable the **Play all scenes** option.
4. If you want to test all the scenes in a story, perform “[Testing a story or a scene](#)” on page 191.

## Loop

During playback, the **Loop** option transitions from the last scene to the first scene.

### About this task

**Tip:** The **Play all scenes** and the **Loop** options can be used together to create a "kiosk" mode.

## Procedure

1. Open the story.
2. Click **Playback options** .
3. Enable the **Loop** option.

## Refresh at start

**11.1.2** You can set your story to refresh the data source each time that the story starts from the beginning.

### About this task

Use the **Refresh at start** option to set whether the data is refreshed each time that your story starts. A story starts when you go to the first scene or switch to preview mode.

**Note:** When the **Refresh at start** option is enabled, if the **Loop** and **Play all scenes** options are also enabled, your story plays in a continuous loop and refreshes the data each time the story restarts.

## Procedure

1. Open the story.
2. Click **Playback options** .
3. Enable the **Refresh at start** option.

## Kiosk mode

Kiosk mode will continuously playback your entire story from start to end.

### About this task

A "Kiosk" mode can be enabled when the **Play all scenes** and the **Loop** options are enabled together.

## Procedure

1. Open the story.
2. Click **Playback options** .
3. Enable the **Loop** and the **Play all scenes** option.

## Results

Playing your story will continuously playback your entire story from start to end.

## Testing a story or a scene

---

After your story or a scene within a story is assembled, you can test it to see how it will look to someone who is viewing it. You also want to ensure that the visualizations appear and disappear at the correct time during the scene.

### About this task

If you're testing a scene within a story, ensure that the scene that you are testing has focus in the window. If you're testing a story, focus can be on any scene in the story.

### Procedure

1. To start testing a story or scene, click **Edit or preview** .
2. Switch to full screen mode by clicking  .
3. Click **Next scene**  and **Previous scene**  to jump from scene to scene.
4. To move through a scene, click **Play** , **Pause** ,  and .

**Tip:** If the control menu at the bottom of the window disappears, click anywhere in the window to re-enable it. When you click in the window, your scene plays. Click in the window again to pause the scene.

## Sharing your story

---

You can share your whole story or link to a specific scene.

### Link

You can share a link to your story. When you share a link, the link opens from the scene that the link was generated from.

1. Click **Share** .
2. Click the **Link** tab.
3. Under the **Link** header, click **Copy** .
4. Send the link to your intended audience.

### Embed code

Use the embed code to embed your story in HTML.

1. Click **Share** .
2. Click the **Link** tab.
3. Under the **Embed code** header, define the width and height that you want to embed the story in.
4. Under the **Link** header, click **Copy** .
5. Send the link to your intended audience.

## Export to PDF

You can export your story to PDF.

1. Click **Share** .
2. Click the **Export** tab.
3. Define the page size that you want to export your story to.
4. Define the orientation that you want to export your story to.
5. Select **Include filters** if you want to include filters in the export to PDF.
6. Click **Export**.

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