**IBM Cognos Analytics on Cloud Pack for Data**

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A close-up of a person's face

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**IBM Cognos Analytics on Cloud Pack for Data**

**Pallavi Kakkar**

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# **Unit 1: Overview of dashboards in IBM Cloud Pak for Data**

## Overview of Cloud Pak for Data

With Cloud Pak for Data, you can collect, organize, and analyze data. You can collaborate with other team members on analytics projects to create visualizations and machine learning models with data from your enterprise. Cloud Pak for Data enables you to create, manage, and deploy data models, and to visualize and analyze that data.

## What is an Analytics dashboard?

An analytics dashboard is an easy-to-use drag and drop tool for data analysts that contains one type of visualization (graph, chart, plot, and so forth). Data analysts do not need to understand coding or SQL to explore the data and gain insights. The results can be easily shared with other users both within your organization and externally through a URL link.

## Dashboards in Cloud Pak for Data

There are two types of dashboards in IBM Cloud Pak for Data. Both types are accessed through a service.

* The Analytics Dashboard
* The Dashboard through the IBM Cognos Analytics Service

### The Analytics Dashboard

The Cloud Pak for Data Analytics Dashboard is an important means of visualization of data. The Analytics Dashboard is often referred to as the Embedded Dashboard. This dashboard is not to be confused with the Cognos Analytics Dashboard that you can access through the Cognos Analytics service. Though they share many features and some of the same engine code, their capabilities differ somewhat, mostly because the Cognos Analytics service Dashboard is surrounded by all the IBM Cognos tools, which enable a richer, more robust dashboard - although it comes with the overhead of the IBM Cognos Analytics service installation.

### The Dashboard through the IBM Cognos Analytics Service

This dashboard has a broader range of acceptable data sources than the Analytics Dashboard does. You can use any viable Cognos data source as a source for the data for this type dashboard.

Additionally, you develop this dashboard in a full-featured, Cognos Analytics environment. The Cognos environment lets you can take advantage of all the other data features of Cognos, such as data modules, Cognos Reporting, stories, and explorations.

## Services and their status

You can tell if a service has been enabled by looking at its tile on the Services page. To access the Services page, click the Services icon at the top in IBM Cloud Pak for Data.

### The Analytics Dashboard service

The Analytics Dashboard service used to communicate insights discovered in your data is not available by default. An administrator must install this service on the IBM Cloud Pak for Data platform. To determine whether the service is installed, open the Services catalog and check whether the service is enabled.

Graphical user interface, text, application

Description automatically generated

This image shows the Analytics Dashboard service in a state of not yet installed. Notice that it is not a premium service, it just has not been enabled yet.

The Cognos Analytics service

The IBM Cognos Analytics dashboard is available through the IBM Cognos Analtics service, which is not available by default. An administrator must install this service on the IBM Cloud Pak for Data platform, and you must be given access to the service.

Graphical user interface, text, application

Description automatically generated

This image shows the Cognos Analytics service tile from the Cloud Pak for Data Services page. In this instance, the Cognos Analytics service has been installed (enabled). Notice that it is a premium service.

# **Unit 2: Identify basic dashboard concepts**

## Projects: Containers of the dashboards

In Cloud Pak for Data, you do not just simply create a dashboard out of the blue. If you want to analyze data, it is best to create a project. An analytics project is a collection of assets that you use to achieve a particular data analysis goal. Projects are the means whereby you acquire your data. Once you have added data to the project you can create a dashboard within the project that uses the data. When you create a project, you can create an empty project, or a project from a sample or file, such as a Git repository.

After you create a project, you add project collaborators to share knowledge and resources and to help each other complete jobs. Collaborators must be users who have an existing Cloud Pak for Data account. If you need to add a collaborator who does not have an account, ask your Cloud Pak for Data administrator to add that user.

The project holds the assets you will work with. Assets include objects such as:

* notebooks
* RStudio files
* models
* scripts
* and data assets (local files, data sources, and remote data sets)

## Add data to the project

After you create a project, you add data assets to it so that you can work with data. All the collaborators in the project are automatically authorized to access the data in the project.

In IBM Cloud Pak for Data, you can connect to the different data sources in your enterprise so that everyone can find the data that they need quickly and easily.

You can add these types of data assets to projects:

* Local files
* Database connections
* Data from a connection
* Folder assets from a file system Catalog assets
* Files from object storage

There are two ways for your Analytics project to access and use data. One is by adding a data source. The other is by uploading a data asset.

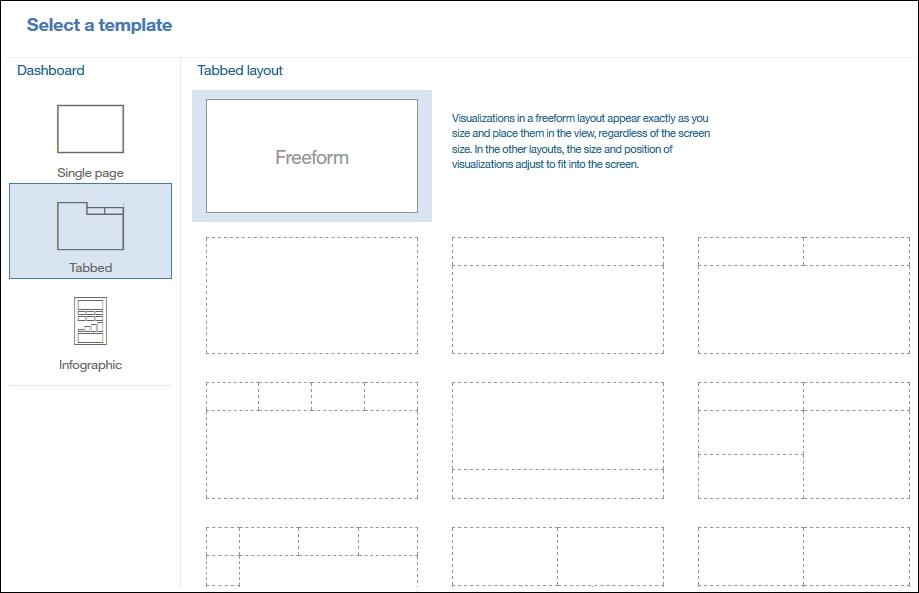
A data source in an analytics project is a connection that provides a secure mechanism to store and manage credentials for a database. A data source also makes it easier when you need to change your password because the password is updated in a single, secure location, rather than in every file where the database is referenced.

You can add a file as a data asset from your local system to your project. You can upload and load local data assets such as CSV files into your project. Uploaded files are listed as data assets on the Assets page of your project. You can see a preview of the data when you click the data asset name. You can remove the data asset by choosing the Remove option from the action menu next to the asset name. Choose the Refine option to refine the data with Data Refinery.

When you add a local data asset to a project, any collaborator in that project can load data from it; for example, they can load the data into a DataFrame in a notebook.

## Select a Template

When you create a dashboard, you select a template. Templates contain predefined designs and grid lines for easy arrangement and alignment of the visualizations.



This image shows some of the alignments and grid options available to the dashboard author upon creation of a dashboard.

When you select your template, you can choose a single page template, a tabbed template to create a dashboard with multiple tabs, or 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.

Once you add a source to the dashboard, you can preview a limited number of rows in the source by using the Data Tray in the center pane of the dashboard. The Data Tray is also very useful for adding and removing filters, viewing calculated columns, and changing the data that appears in a visualization.

## Dashboard edit mode

The dashboard sidebar contains view selection icons for Sources, Visualizations, and Widgets. Whatever option you select will appear in a slide-out pane. If the sidebar is not visible, you must click the Widget Connections icon, which resembles a diagonal line segment with rounded endpoints. Once you are in edit mode, you will see three options on the left sidebar.

Use the Sources pane to select data source connections. The data source connection must exist and have been added as a data asset on the Assets page of the project. In this pane, you will find any local file uploaded data sets. You must select them to add them to the Sources tab on the left. If you do not understand, do not be concerned. You will perform this operation in the upcoming Activity.

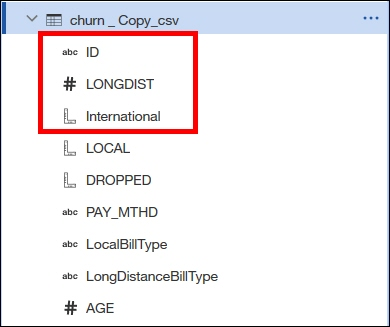
The Visualizations pane contains the many different types of graphs that you can use to visualize the data from the selected data source connection. You will drill down into your source connection and select the data segments that you want to visualize.

The Widgets pane contain widgets such as text, media, web pages, images, and shapes that you can add to the dashboard. You cannot use custom widgets to extend the set of shapes to use on a dashboard.

## The data Usage property

A data set column can be used in three different ways. It can be:

* an Identifier, such as a primary or foreign key. This value has usually numeric data type.
* an Attribute, which can be of any data type.  
  a Measure, which is usually numeric data type and used for metrics in analytics.



It is important to note that the icons that precede the column name in the Sources tab do not tell you solely about usage. Instead, they show a combination of the usage and the data type. For instance, in this graphic, notice the icons that precede the column name. Columns preceded by a ruler/measure icon, such as International, are treated as measures. Columns preceded by an abc icon, such as ID, are of data type string, but their exact usage cannot be determined. They could be identifiers, as in this case, or they could simply be attributes. Columns preceded by a hash tag icon, such as LONGDIST or AGE, are numeric, but again, they could be attributes or identifiers.

Upon import, a best guess is made by IBM Cloud Pak for Data to determine the data type and usage of each column. However, to precisely determine the data type and usage for any column, you should access the properties of that column. Additionally, if the tool did not determine your exact intention for a column, you can modify the properties of a column to designate how its data should be interpreted.

## Activity: Create a basic Analytics dashboard

This activity demonstrates the IBM Cloud Pak for Data platform capabilities to access data assets for analytical exploration using dashboard visualizations.

In this activity you will accomplish the following:

* Create an empty project in IBM Cloud Pak for Data
* Import a Data set
* Create a dashboard and add a source
* Add objects to the dashboard

**Create a project in Cloud Pak for Data**

You will begin on the Cloud Pak for Data Welcome screen.

* Click the **Navigation Menu** icon at the top left to display the Navigation Menu.
* From the **Navigation Menu**, click **Projects**, and then click **New Project**.
* On the **Create a project** screen, click **Create an empty project**.
* Under **Name**, type **Dashboarding1** as the Project name, and then click **Create**.

**Import and preview a Data Set.**

* At the Top , Click **Add to Project** **,** and on the pop-up , click **Connection**.
* On Add Connection screen, Select **DB2 Warehouse**
* In the **Name** text area , type **DB2 DW for Dashboard**.
* In the Database text area, type **BLUDB**, Hostname **10.191.195.39** and port **32732** .
* Uncheck the SSL connection checkbox.
* Enter User credentials and test the connection.

**Create a new dashboard and add a source.**

* At the top, click **Add to project**, and on the pop-up, click **Dashboard.**
* In the **Name** text area, type **Demo\_Dashboard**
* Click **Create**.
* You will use the Freeform layout. Click **OK**.
* To the right of **Selected sources** on the left pane, click the plus icon to **Add a source.**
* From the **Select connection source** screen, on the left, click **Connections**.
* Click **DB2 DW for Dashboard** and then **CP4D> BOOKS.**

**Add objects to the dashboard.**

Now, you want to create a simple, quick dashboard to show the total income of all the churners by gender.

* Click on **BOOKS** to explore the contents
* On the left of **BOOKS**, click the > to expand the columns of that data source
* You can preview the values of the data source. On the middle-bottom of the screen, click the **data tray icon** (looks like a table) to expand the preview. Click the icon again to collapse the preview.
* Back on the data source pane, to view the properties of a column, there is an ellipses here to the right of each column, when you hover your mouse pointer over it.
* Select the **BOOK\_ID** column and click on ellipses , select **Properties** , Set Usage property from **“Attribute”** to **“Identifier”** .
* Select the **PUBLISHER\_ID** and **RATING** column. In the actual tool, you would use Ctrl+click to do multiple selects of more than one columns.
* The simulation will perform the drag and drop of those columns onto the dashboard to create the visualization. A default visualization is created, in this case a column chart. If we hover our mouse cursor over each of the columns in the chart, we can see the actual values for each Rating.

# **Unit 3: Customize and modify a dashboard**

## Access a previously created project and dashboard

Although you can access a previously created dashboard directly from the Navigation menu by clicking Analytics dashboard, it is best when learning the product to go through your project. That enforces a sense of hierarchy within ICPD. So, it is recommended at first that you first access Projects from the Navigation menu, then access the project that contains your dashboard, and then the dashboard itself.

When you first access an existing dashboard, you will see the display mode of the dashboard. You will need to click the Edit button (the pencil icon) to put the dashboard into Edit mode so you can work on it.

## Widget Connections

In edit mode, you can click the Widget Connections icon to expose the left pane. The Widget Connections contains three options:

### Sources

This option enables selecting a data source connection. The data source connection must exist and have been added as a data asset on the Assets page of the project, see also Known limitations and unsupported features. The following data sources are supported:

* CSV files
* Connection to Db2 Warehouse on Cloud
* Connection to Compose for PostgreSQL
* Connection to Microsoft SQL Server on Cloud
* Data from a Db2 Warehouse on Cloud, Compose for PostgreSQL, or a Microsoft SQL Server on Cloud connection.

### Visualizations

This option opens many different types of graphs that you can use to visualize the data from the selected data source connection. Drill down into your source connection and select the data segments you want to visualize.

### Widgets

This option enables adding widgets such as text, media, web pages, images, and shapes to the dashboard. You cannot use custom widgets to extend the set of shapes to use on a dashboard.

## Add additional columns to an existing chart

You can add columns to the existing chart by simply dragging them and dropping them on the chart. It is important to know that when you drop an additional attribute, measure, or identifier onto a chart, the chart type may change to accommodate the new data item.

Adding columns to a chart implies that you have an understanding of the data set you are using. You should take the necessary steps to familiarize yourself with the data to ensure that your dashboard makes sense. For example, if you add sales target values to a chart that contains analytics data for traffic accidents as related to automobile manufacturer's recalls, you may see unpredictable results that make no sense, and you may tie up the system resources by causing the system to make timely joins of unrelated data.

Modify the visualization type and its properties

You can use many different types of graphs to visualize the data from the selected data source. You can visualize the same data in different ways, depending on what you are attempting to emphasize in your visualization. Often once you have a visualization in place, you will desire to change the way the data in that particular visualization is viewed. For example, you may create a column chart comparing sales data by region. The chart itself adequately displays which region had the greatest sales and the least sales for a particular time period, but it may not be very helpful in visualizing the proportion of regional sales to global sales. Therefore, you decide that you want to view the same data using a pie chart so that the consumers of your dashboard at a glance can more easily see the regions, not only compared to each other, but as a percentage of all sales as a whole.

Modifying the visualization type is easy, just click a button, and then select the new visualization type. However, you still may have to adjust the visualization to relate the existing data values to the components of your new visualization type. Some of this adjustment can be done by clicking and dragging the column values to the new objects they are related to. For example, you may have to designate what data that will appear as x-axis values, and what data will appear as y-axis values. Other adjustments must be made by modifying the visualization's properties. For example, if you change a heat map chart to a column chart, you may have to select a new color scheme and modify the location chart's legend to identify what color bars are representing what data.

## Add multiple charts to an existing dashboard

When you add an additional chart to an existing dashboard, the probability is high that you will be using the same data, or data that is highly related to the data represented by the chart that already exists in the dashboard. Therefore, the most efficient way to create a second chart is to start from what you already have in place, and then customize it. That means you

can duplicate your chart, and position the duplicate where you want it to appear in the dashboard tab. At that point, you can relate the chart objects to different data values, or use the method described in the previous subtopic to change the new chart's visualization type for a fresh, new look.

## Add custom calculations to dashboards

Calculations that are based on columns can help you define the relationships between items of interest. For example, create calculations such as variance and variance percentage in a cost-benefit analysis to help you compare costs to revenues and actual sales to projected sales. When you create a calculation, it is added as a column in the data tray. You can add this calculation to all visualizations.

There are two types of calculations: stand-alone calculations and embedded calculations.

* Stand-alone calculations are made using fields from different tables. The default aggregation rule is Calculated, which forces the order of operations as follows:
  + Aggregate the individual measures.
  + Apply the Calculation formula.

Stand-alone calculations appear in the data tree outside the tables, as they may reference fields from many tables. Stand-alone calculations must be created from the data tree.

* Embedded calculations are made using only items from within the same table. The default aggregation rule is Total, which forces the order of operations as follows:
  + Apply Calculation formula.
  + Aggregate the individual measures.

Embedded calculations appear in the data tree inside their home table, as a column. Embedded calculations must be created from the grid, but they can be edited from the data tree or grid.

To create a custom calculation, you will use the calculation editor to define your own expression. The calculation editor contains various functions, operators, and summary algorithms to facilitate you as you build your expression. You will select from the available data values, operators, functions, and summaries to build a calculation expression. It will be clear how this works as you perform the activities for this topic.

## Explore dashboard filtering methods

Filters let you focus on one area of your data or 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. Dashboard filtering may done in many ways. You can filter the data in a single visualization by a variety of techniques that basically translate to excluding the column from the data. You may do this by using the data tray or by adding a local filter.

Additionally, since by default, all visualizations on a dashboard are connected, so if you select one or more data points in one visualization, you will see those data points highlighted in all related visualizations in the current tab of the dashboard. Visualizations are related if they use the same data asset. 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.

## Activity: Customize and modify an existing dashboard

This activity demonstrates how to customize and modify an existing Analytics dashboard. You are starting with an existing dashboard, already open and ready for you to edit.

In this activity you will accomplish the following:

* Add a Tab to an existing dashboard
* Add a custom calculation
* Add a Text widget title
* Add a second visualization to the dashboard
* Add local and tab filters to the dashboard

**Add a Tab to an existing dashboard.**

* At the top of the dashboard, click **Edit.**
* Next to Tab 1, click the Add a new tab icon (plus sign), and then click Use to use the Freeform template.

A blank canvas appears.

* Click Sources to expand the Sources pane on the left, click BOOKS, and then expand BOOKS data set.

**Add a custom calculation.**

* At the very top of the Source pane, to the right of CustomerChurnDash.csv, click More (the ellipsis), and then click **Create calculation**.

The Calculation editor dialog appears. From this dialog you can create calculated columns to add to your data set.

* In the Name box of the dialog, type Rating\_Range.
* In the Expression box, type following expression.

CASE

when RATING >1 and RATING<2 then 1

when RATING >=2 and RATING<3 then 2

when RATING >=3 and RATING<4 then 3

when RATING >=4 and RATING<5 then 4

when RATING >=5 and RATING<6 then 5

ELSE 0

END

* In the Expression box, to the right, click Validate. You are notified that the expression is valid.
* Click OK to close the Calculation editor.

Notice that your new calculation has been added to the source list on the left.

**Add a text widget title.**

* Click the **Widgets** icon on the left of the screen.
* Drag the Text widget to the top center of the canvas and click inside it to open it for editing.
* Type **Number of books based on Ratings**, and then resize and reposition the box to be centered and so that the text is readable and does not wrap.

Notice that increasing or decreasing the length and width of the text widget box lets you control the font size within the widget. This auto-sizing feature of the dashboard facilitates the speed to development so that you can quickly and visually control the relative font sizes without taking three of four steps to choose a font, size, color, and so forth.

**Add a second visualization to the dashboard.**

Remember, the dashboard contains a visualization on Tab 1, and you want to add a second visualization, now on Tab 2.

* On the left, click the Visualization icon to display the different types of visualizations you can add to the tab.
* Drag the Pie chart icon to the center of the canvas and position it under your title.

The pie chart opens in expanded view so you can edit it. You want to divide the pie chart into Rating\_Range and BOOK\_ID (count) pie slices.

* From the Sources pane on the left, drag Rating\_Range to the Segments section of the chart view.
* From the Sources pane, drag BOOK\_ID to the Size slot on the chart view.

Notice that the pie chart display is updated to reflect this new measure.

**Add local and tab filters to the dashboard.**

* From the Sources pane, drag the **Published\_Date** column to the Local filters slot on the expanded chart view.

The Filter dialog box opens.

* Select a Date Range and click OK.

Notice that the counts on the pie chart are adjusted accordingly. This live refresh during the development cycle in edit mode is helpful for dashboard authors.

* Click Collapse at the top right of the chart to collapse the chart view.
* From the Sources pane, drag PUBLISHER\_ID to the ALL tabs filter box at the top right of the canvas.
* Click the PUBLISHER\_ID filter you just added, not the ellipsis, but the name PUBLISHER\_ID.
* From the drop-down list, in Find box type 10 and select all the Publisher ID stating from 100 to 110 , and then click OK.

Notice that the pie chart and column chart refreshes to reflect this modification.

* Click Save to save the dashboard.

You modified and customized an existing dashboard and added multiple visualizations to it. You filtered out unwanted data to give the new visualization meaning, and you learned how to create a pie chart.

# **Unit 4: Dashboards in the Cognos Analytics service**

## Service overview

Your Cloud Pak for Data web client includes a Services catalog. You can use the services to extend the functionality of Cloud Pak for Data. From the Cloud Pak for Data browser window, you can access the Services catalog by clicking the Services icon at the top right.

Some services are provided free of charge, while other services must be purchased. The priced services are designated as Premium in the Services catalog.

The Service installation process flow is as follows:

* You will download the appropriate .bin file for your add-on to your Linux installation.
* At this point, your Service in the catalog will still show as Premium.
* You will execute the .bin file which will create a .tar file. You will extract the components of your service, which will create a deploy.sh file. You will run the deploy script, which will put your service in the correct IBM directory of your Linux system.

At this point, your service in the catalog will show as Available.

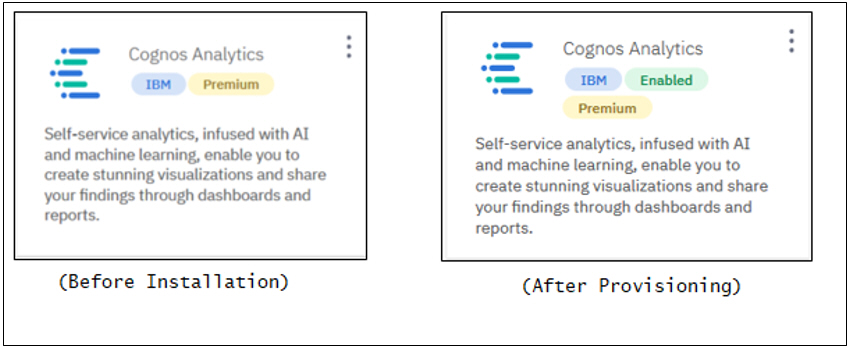
* From your services listing, you will provision your instance with the service.

At this point, your service in the catalog will show as Enabled.

Detailed instructions and specific directory locations for the tasks listed above vary with each individual add-on. See the add-on installation instructions for your specific service.

## Service status

The following graphic shows the status of services in the catalog. The first image shows the status before installation, which does not say, "Enabled." The second image shows the status after provisioning, which says, "Enabled."

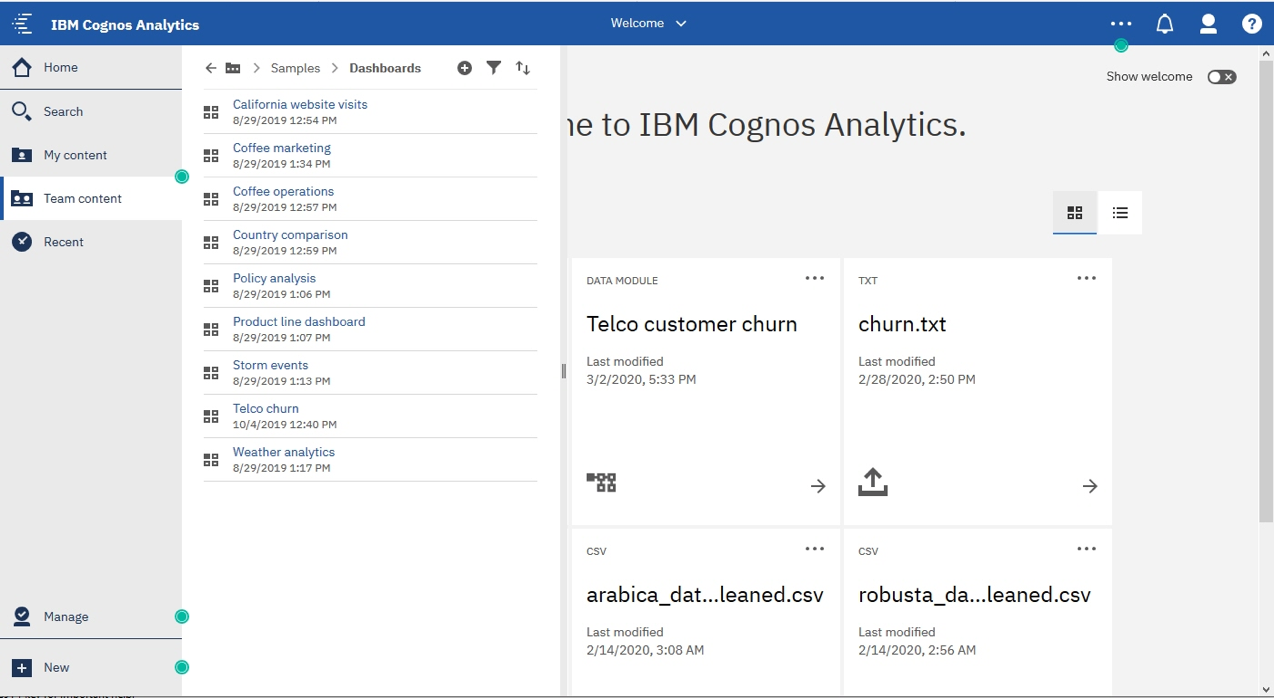


## Navigate Cognos Analytics dashboarding

IBM Cognos Analytics delivers smarter self-service dashboard creation and consumption. The user interface presents a guided experience with built-in intelligence delivering smarter self- service to amplify and act on insight in everyday actions with the confidence and security needed by today's business. IBM Cognos Analytics includes built in intuitive decision making that dramatically accelerates dashboard creation, design, consumption, and an interface designed for line of business users to do further exploration or develop their own dashboards on business data.

IBM Cognos Analytics provides self-service dashboard creation with customizable visualizations and collaboration using compelling dashboards and infographics to quickly operationalize business led insights. It is an intuitive and interactive platform that minimizes the complexity of the user interface while maintaining past functionality.

The following graphic introduces the different functions of the user interface with respect to creating dashboards. Some functions are only available with administration rights.



When opening an existing dashboard, you can utilize My content, Team content, or Recent to access the dashboard you wish to view.

## Edit mode versus Preview mode

The mode that you work in determines the functions and menu items that are available in the Dashboarding capability. In edit mode, you can modify your view. In preview mode, you can see and test your preview with a limited ability to modify it. Click the Edit button on the Application bar to toggle between modes.

You can toggle between Preview and Edit modes by clicking the Edit icon as you will see during the activities.

## Differences

### Preview Mode

This is the default mode when you open a saved dashboard. Use Preview mode to see what your dashboard view looks like when it displays or runs. You can sort, change filtering, and see interactivity of visualizations. You can change the type of existing visualizations but you cannot add new visualizations or other objects to the view. You must be in preview mode to play embedded videos that are on YouTube and to navigate embedded web pages.

Graphical user interface, application, Teams

Description automatically generated

This image demonstrates an open dashboard in Preview mode. The Edit icon is active and the More icon (3 dot ellipsis) is displayed. Once you click the Edit

button, you go into Edit mode as shown in the following image.

### Edit mode

This is the default mode when you create a new view. Use Edit mode to add and change visualizations and other objects in your view. You can sort, filter, and interact with visualizations.

Graphical user interface, application

Description automatically generated

This image shows the effect of going into Edit mode. The Edit icon appears selected, and the More icon is now the Properties icon and the View widget connections icon is displayed.

When you open an existing dashboard, it is important to remember that you are opening a view of it. With the dashboard view open, you can interact with the dashboard by clicking on any data point on a visualization to change its focus. Data items in other visualizations are updated automatically based on the data item that you click. You can respond to prompts, or click the Edit mode button to edit the dashboard. In Edit mode the Properties button replaces the More button on the Application bar.

## Edit a dashboard

Once you are in Edit mode, you can assemble a view that contains visualizations, such as a graph, chart, plot, table, map, or any other visual representation of data. You can customize a dashboard or visualization by changing its visual properties, modifying data properties, and adding media, web pages, images, shapes, and text.

In Edit mode, you can change the themes and style of the dashboard, and edit other properties. You can also add objects to your dashboard like images, videos, and logos. You can filter focus your visualizations by changing filter options. You can clear and invert the filters as well. You will perform these tasks in the demo for this topic.

* visualization type
  + You can change the visualization type or change the columns that are used in the visualization.
* Data Focus
  + You can use filters to focus on one area of your data or to see the impact of one column.
* Calculated Data
  + You can use calculations to answer questions that cannot be answered by the source columns.
* Tab Replication
  + You can duplicate an entire tab.
* Object Grouping in Tab
  + Objects are grouped by default on a dashboard tab. This means that when data changes or receives focus in one visualization, the other visualizations are all affected to present the data in a unified manner. For example, if you show sales by content on your dashboard tab, and you select North America in one visualization, all the other visualizations are refreshed to show only data for North America. In other words, what you do to one visualization, affects all the other visualizations on the tab. You can ungroup the objects on a tab.

## Activity: Work with an existing dashboard

This activity demonstrates how to work with an existing dashboard by exploring the user interface and how to customize a dashboard in Edit mode. Since this is the first Cognos Analytics service dashboard you are viewing, you will access the dashboard through the service, from the Cloud Pak for Data side.

**Scenario Text:**

Imagine that as a Sales manager for your company, you want to use a dashboard to determine the revenue generated by the Products and Retailers in 2016 by the Web-related order methods. You will need to open the Product line dashboard, customize the focus of the Revenue by Order Method tree map to exclude the Telephone and Sales Visit order methods and include the Web-related order methods, Web and E-mail. You will then to focus on the revenue generated by these order method types for the year 2016.

**Instruction Text:**

You will need to navigate the Team content to Dashboards and open the Product line dashboard. You will then need to open the Order method type filter for the Revenue by ORDER METHOD tree map, select the Web filter and E-mail, and then deselect the Telephone and Sales Visit filters. Next, use the data player to focus on the year 2016. Finally, examine how to reset the dashboard.

In this activity you will accomplish the following:

* Access the Services environment
* Open an existing dashboard
* Interact with the dashboard
* Filter the dashboard
* Explore the Edit mode options

Access the Services environment

You will begin on the Services screen in IBM Cloud Pak for Data.

* Under **All categories**, select **Analytics.**
* Locate the **Cognos Analytics** service, click the **More** button (three vertical dots), and then click **My instances**.
* On the **My Instances** page, next to the **cognos-analytics-app**, click the **open and close list of options** ellipsis, and then click **Open**.

The Cognos Analytics environment opens.

You can also access the My instances page directly from the Navigation menu in Cloud Pak for Data, but for the explorative purposes of this demonstration, it is important that you understand that you can access the service through the Services panel.

Open an existing dashboard

* In the pane on the left, click **Team Content > Samples > By feature> core > Dashboards**.
* Click **Product line dashboard** to open it.
  + The dashboard opens.

Interact with the dashboard.

Notice that you have charts and a Data player at the top, combined with some charts and a tree map below. The purpose of this dashboard is to display the company revenue sliced by different dimensions.

* On the **Data player** at the top, click Play.  
  The data player should play through the years once. Notice how the visualizations update as the player stops upon each year.
* On the **Data player**, click **Pause** to stop the cycle.

Filter the dashboard using the filter on the tree map.

* Locate the **Revenue by Order Method** tree map.
* Click the blue **Widget filters** icon found on the upper right corner, underneath the title bar.
* From the context menu, click the **Order method type** link.
* On the **Filter** window, click **Sales visit** and **Telephone** and to deselect them since they are not web-related.

**Web** and **E-mail** are still selected. These selections have narrowed our revenue filter down to web-related order methods.

* Click **OK.**

Next, use the Data player as a filter so that only 2016 data appears on this tab of the dashboard.

* On the **Data player**, click **2016**.
* On the **Application** bar, click **More**, and then notice the options.
* Click **Reset dashboard**, and then click **OK** on the **Reset dashboard** dialog window.

Notice that all the filters and selections in the dashboard have been reset to their original state.

Explore the Edit mode options.

* On the **Application bar**, click the **Edit or preview** icon (the one that resembles a pencil).

Notice that the dashboard canvas goes into Edit mode displaying all the dashboard development tools.

* Click **Edit or preview** icon again to toggle the dashboard back to Preview mode.

# **Unit 5: Create a basic dashboard**

## Create a new dashboard

You can use IBM Cognos Analytics dashboards to communicate your insights and analysis. A dashboard is a type of view that helps you to monitor events or activities at a glance. It provides key insights and analysis about your data on one or more pages or screens. You assemble this view that contains visualizations such as graphs, charts, plots, tables, maps, or any other visual representation of data. You can personalize your view by changing the theme. Choose from a set of themes that provide a predefined presentation style. You can also customize specific properties such as fill and border color, and opacity.

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.

## Select a dashboard template and layout

To start assembling a dashboard, you will use the New option from the side panel, and then select the Dashboard option. When you do, you will see the templates available to the Cognos Analytics dashboard. There are two template layouts to choose from, The graphic below on the left shows the two layouts.

## Cognos Analytics Dashboard layout options

To start assembling a dashboard, you will use the New option from the side panel, and then select the Dashboard option. When you do, you will the templates available to the Cognos Analytics dashboard. There are two templates to choose from: Tabbed and Infographic.

Graphical user interface, application, Word, PowerPoint

Description automatically generated

## Cloud Pak for Data Dashboard layout options

Notice the difference in the Cognos Analytics layout options on the left, and the IBM Cloud Pak for Data dashboard layout options below. Cloud Pak for Data dashboards have three options: Single page, Tabbed, and Infographic.

Graphical user interface, application

Description automatically generated

## Cognos Analytics Dashboard template types

### Tabbed

Tabbed templates separate your visualizations into categories or hierarchies. For example, you can create separate tabs for sales by country, region, and total sales. Initially, you will have only one tab, but you can add tabs as you please.

### Infographic

Infographic templates convey information using multiple graphics on a single, scrollable page.

## Add data sources and visualizations

You can use data from more than one source in your dashboard. While you can use data from multiple data sets in a view, the data that is used in a visualization must be from one data set. Data sources can only be added from data modules or uploaded files such as csv files. Pivot tables, crosstabs, and published packages are not supported.  Once a source has been added to the dashboard, columns can be dragged on to the dashboard canvas to create or update visualizations.

Visualizations are visual representations of data that help you to convey information and insights, and facilitate analysis. Graphs, charts, plots, tables, and maps are examples of visualizations. There are over thirty different visualizations available for dashboards, each with options and properties that produce over a hundred different looks.

When a single data item value is added to the dashboard canvas a summary value is displayed. When you drag multiple data items onto the canvas, IBM Cognos Analytics automatically selects a visualization from a list of recommended visualizations. As you add or remove columns from the visualization, the visualization is updated to display the changes.

The list of recommended visualization types has the following properties:

* It contains all visualization types that use the same number and type of data items. For example, for one category column and two data columns, the recommended visualization types are line and column, bar, column, line, and heat.
* The visualization types are listed in order of priority. For example, for one category column and two data columns, the highest priority visualization type is line and column.

Each visualization type has specific requirements for displaying data. It depends on the number of categories, values, and other criteria, such as scale, x/y axis, and region. For example, a bar chart requires one category column and one value or measure column. To view a comprehensive list of which criteria produce which visualization, please consult the product documentation.

## Visualization options: Cognos Analytics versus Cloud Pak for Data

Dashboard visualization options differ slightly between Cognos Analytics dashboards you develop in the Cognos Analytics service and the Analytics dashboards you create and edit in Cloud Pak for Data.

### Cognos Analytics Dashboard visualization options

This graphic shows the visualization options available in Cognos Analytics service dashboards. Notice that the Cognos Analytics dashboard gives you the ability to create Custom visualizations in addition to the typical System visualizations.

Graphical user interface, application

Description automatically generated

### IBM Cloud Pack for Data Dashboard visualization options

This graphic shows the options available in Cloud Pak for Data dashboards. Notice that there are fewer visualization options in the Analytics Dashboard for Cloud Pak, and there is no Custom Dashboard option.

Graphical user interface, application, Word

Description automatically generated

## Save and view a Cognos Analytics dashboard

To save a new dashboard, click the save icon from the Application tray, navigate to the appropriate location, give your dashboard a meaningful name, and then save it. You can save your dashboard to My content or in an appropriate location in the Team content, if the dashboard is ready to be shared with your colleagues and you have the appropriate rights.

You can also save an opened dashboard under a different name in order to create a customized dashboard. Just click the down arrow next to the Save icon and then choose Save as, navigate to the appropriate location, give it a meaningful name and then save it.

**Details about the content save locations**

### My Content

This location is for creating and saving content that is still in process and not ready to be shared with the entire team.

Graphical user interface, application

Description automatically generated

This image shows the My content Save as option.

### Team Content

This location is for sharing content to the entire team. This area promotes collaboration, community, and cooperation. Allowing the sharing of data analysis and decision making.

Graphical user interface, application

Description automatically generated

This image shows the Team content Save as location.

To view a saved dashboard, start from the Welcome screen for IBM Cognos Analytics. Navigate to the location of the dashboard, click the More button associated with the dashboard you wish to view, and then select the Open option. You can also open it by clicking directly on the dashboard title.

Dashboards found in My content area, have been saved by you, while dashboards found in the Team content area have been shared to the entire team. When you open a saved dashboard, it opens in the Preview mode by default, allowing you to interact with the dashboard, but not to customize it.

## Activity: Create a basic dashboard

This activity demonstrates how to create, save, and view a basic dashboard using the Cognos Analytics service.

**Scenario:**

As the sales manager of your company, you need to create a simple dashboard that shows a Tree map of the revenue generated by all Product lines by type and product. You will also want to see the revenue generated by all retailer types as a column chart. Finally you would like to be able to review the data by year and order method type. You would like to focus the dashboard on the data for 2016 and the Web order method type.

**Instruction overview:**

You will need to create a new single page, 2x2 dashboard, using the sample data module data source found at Team content > Samples > data. Add visualizations containing Product line, Product type, Product, and revenue to the top left cell, Retailer type and revenue to the top right cell, a data player using Year to filter to the bottom left cell, and a data player using Order method type to filter to the bottom right cell. You will save the dashboard as Sales Manager dashboard to My content, and then open it to so as to focus on the year 2016, the Web order method type.

Start on the Welcome screen of IBM Cognos Analytics service on Cloud Pak for Data.

* Create a new Cognos Analytics dashboard.
  + From the Cognos Analytics **Welcome** screen, click **New**.
  + Click **Dashboard**.
  + Under **Layout**, ensure that **Tabbed** is selected.
  + Under **Tabbed layout**, click the **2x2 layout** template.
  + Click **OK**.
  + Click **Dismiss**.
* Populate the new dashboard.
  + To the right of **Selected source**s, click **Add a source** (plus sign).
  + Navigate to **Team content** > **Samples > By Feature >Core>Data**.
  + Click **Sample data module**, and then click **Add**.
  + On the **Side** panel, expand **Sample File Go Sales**, and then Ctrl-click **Product line**, **Product type**, **Product** and **Revenue** to select them all at once.
  + Drag the selected data items to the top left cell and drop on the **Drop here to maximize** drop zone.

Cognos Analytics attempts to determine which visualization you need based on the data you choose. In this case, it picked a crosstab. We will change it to be a Tree map.

* Change the visualization type and reconfigure the visualization.
* At the top right of the crosstab visualization, click the **Expand** button.
* Next to **Crosstab**, click the down arrow, and if the Tree map visualization is not visible, expand **All visualizations**.
* Select **Tree map**, and then click the **Collapse** button at the top, right of the visualization.

Notice that the Tree map is rather sparse. We need to arrange the attribute values so that they make more sense. We will nest our product attributes.

* From the **Repeat column** slot, drag **Product type** up to the **Area hierarchy**slot and nest it under **Product line**.
* From the Repeat row slot, drag **Product** up to the **Area hierarchy** slot and nest it underneath **Product type**.
* Collapse the visualization.

* Add a second visualization for Revenue by Retailer type.
  + On the **Side** panel, from the **Sources** tab, Ctrl-click **Retailer type** and **Revenue**.
  + Drag the selected data items to the top right cell and drop on the **Drop here to maximize** drop zone. A bar chart appears in the drop zone.

Based on the data selected, Cognos decided to create a simple bar chart, which is perfect for the requirement.

* Add a third visualization, a data player, to use as a filter.
* On the **Side** panel, click the **Visualization** tab, drag a **Data player** to the bottom left cell and drop it on the **Drop here to maximize** drop zone.

The data player appears in expanded mode, ready for us to populate it with data. Since you want to use this data player as a filter for the other visualizations, so the only column you will add to it is Year.

* From the **Sources** tab drag **Year** to the data players **Axis label** slot.
* Click the data player **Collapse** button.
* Add a fourth visualization, a data player, to use as a filter.
* On the **Side** panel, from the **Visualization** tab, drag a **Data player** to the bottom right cell and drop it on the **Drop here to maximize** drop zone.
* On the **Side** panel, from the **Sources** tab drag **Order method type** to the data players **Axis label** slot.
* Click the data player **Collapse** button.
* Save the new dashboard.
* From the **Application** bar, click the **Save** icon.
* Click **My Content**.
* Name the dashboard **Sales Manager Dashboard**.
* Click **Save**.
* On the **Application** bar, click the down arrow to the right of the dashboard title, **Sales Manager dashboard**.
* Click the **Remove** button (the "X") to the right of the **Sales Manager Dashboard** title to close it.

This will return you to the **Welcome** page.

* View and interact with the saved dashboard.
* On the **Side** panel, click **My content**.
* Click **Sales Manager Dashboard**.

Notice that the dashboard opens in Preview mode, not Edit mode. Take a look at the appearance of the charts before we begin interacting with the Data player filters.

You want to filter the data for 2016, as per the original requirements.

* On the **Year** data player, click **2016**.

Notice how the charts at the top are updated to reflect the selected year.

* On the **Order method type** data player, click **Web**.

Notice that all visualizations are updated to display only Web orders for 2016. We have completed our assignment.

# **Unit 6: Advanced dashboarding**

## Create a tabbed dashboard

There are two types of dashboards: Tabbed, and Infographic. A tabbed dashboard separates visualizations into categories or hierarchies. Tabbed dashboard layouts have many, predefined templates to choose from. Some templates provide delineation, controlled placements, and adaptive sizing based on the viewing device.

An Infographic dashboard conveys information with pictures in the form of one long, scrollable page. The Infographics dashboard has a different set of templates that provide a variety of placement options. This type dashboard is presented intentionally in one long page that is, by design, to be scrolled through.

## Identify sources

Once you have selected your template and layout for a new dashboard, the empty canvas opens and you can add your source to the Selected sources panel. Dashboards sources can be modules and uploaded files, such as spreadsheets and .csv files.

If the source you want does not appear in the list, you must add it into Cognos Analytics. You will need to upload a file that contains the necessary columns that you want to use. Click the Upload files button in the side panel and then navigate to an appropriate file, for example, a spread sheet file or comma delimited file. IBM Cognos Analytics analyzes the file, retrieves it, and then saves it to your My content folder.

## Add data items and visualizations

Once you have your source or sources loaded, you can begin to assemble a tabbed dashboard by adding data items, visualizations, and other objects to the canvas. Add additional tabs by clicking the Add new tab button. You can also duplicate a tab by clicking it, and then selecting the Duplicate icon from the context toolbar. You should identify each tab with a unique and meaningful name.

Using the Search option in the Sources tab, lets you quickly find data items that you want to add to the dashboard.

## Add source data through search

The following image demonstrates how a user might utilize the search option in the Source tab. Notice how partially typing an object name, in this case *retai*, brings up the matches from the data source: Retailer type, Retailer country, and Retailer.

Graphical user interface, text, application

Description automatically generated

## Add objects using the Assistant

IBM Cognos Analytics dashboards include 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.

There are two interfaces for the Assistant, the Full assistant panel and the Compact assistant panel.

The Full assistant panel is made up of three sections: toolbar, output, and input field. The toolbar allows you to run actions, 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, allows you to enter text-based conversational input.

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, you must click the **Open in full view** link in the compact panel or the Assistant icon.

Visualizations that appear in the Assistant panel are condensed and may exclude some information. You can view the complete visualization details in the dashboard. From the Assistant, you can drag visualizations onto an Exploration or Dashboard canvas. You will perform this operation in the activity for this topic.

## Additional ways to build visualizations

As seen previously, you also can build a visualization by choosing data items from the sources tab. If you Ctrl+click and drag data items to the canvas all at one time, the dashboard will generate and populate an appropriate visualization. You can also use the Assistant to find and add a visualization to your dashboard based on a typed-in question or statement. Cognos Analytics will create an appropriate visualization by analyzing the data in the data set to answer the question or intent of the statement.

A third way to create a visualization, is by choosing a visualization type, and then adding columns to it. The empty visualization is displayed on the canvas and shows the missing data items. The visualization displays data only when all of its required data items are defined.

Add objects using the Assistant Complete

The following illustration demonstrates the third way of creating a visualization. The top image shows that first, a pie chart was selected as the visualization type, and the Year column was dragged to the Segments slot and the Revenue column was dragged to the Size slot. The bottom image shows the resulting revenue by year pie chart, complete with data and legend.

Graphical user interface, chart, application, pie chart

Description automatically generated

## Add an active visualization

There are, currently, over 30 different visualizations that can be added to a dashboard, including one active visualization that can be used as a dynamic prompt. This visualization is called a Data player. A Data player can set a single value that will filter all other visualizations affected by its value. The Data player can also be set to run (or play) through each data point in a continuous loop, filtering on each data point in succession. As you can see in the graphic, there is a Play button on the left that will allow the Data player to run in a continuous loop, or you can select one of the data points for a static filter.

## Customize and filter dashboard objects

There are many ways to customize your dashboard objects. The following is a list of some of the customizations that you can perform:

* You can change the visualization type. Take care when doing this because the new visualization may not be compatible with the data you have selected for the visualization. You must define all required data items before data can be displayed.
* You can change the aggregation type of numerical columns. You may want to change the aggregation type of numerical columns to something other than the default assigned by IBM Cognos Analytics when imported. For example, if a numeric column is aggregated by summing the values, you may want to see an average of the values instead.
* You can resize and rotate a dashboard object to emphasize or draw attention to the object.
* You can replace or switch columns. Updating visualizations with new columns or switching the order around may present a new perspective.
* You can set filters so that they affect one or multiple visualizations in your view. You can filter and highlight data by selecting a data point, or by filtering on one or all visualizations
* You can modify the properties. Use the Properties pane to change relevant object properties.

## Filter capabilities

### 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.

### 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.

### 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*.

### Keeping or excluding 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.

### Disconnecting visualization 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.

### Filtering Data in 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.

### Filtering Data in All Tab

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 tabsfilter are applied to the This tab filter. For example, you add the Year column to both filters. You filterAll 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 theAll tabs and This tab filter areas.

### Clearing and removing filters

You can quickly clear the values that you've filtered on and select new values for a dashboard or story.

You can delete filters from dashboards, stories, or from a visualization.

## Dashboard visual properties

You can change the properties of visualizations and other objects such as media, web pages, images, shapes, and text. The General style properties that are common to visualizations and other objects include fill color, border color, and opacity. The detailed properties vary by the visualization type and object type.

### Legends

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.

You can show or hide the legend on a chart, and specify the position of the legend on the chart.

### 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.

You can create custom color palettes while you work on the canvas.

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.

### 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.

Always display the minimum and maximum values on the axes, regardless of applied filters.

### Labels

You can add labels to the visualization itself so that you can easily see the data for each data point.

To improve the visibility of labels, you can change label visibility in some visualizations, by adding a shadow or changing the contrast.

You can change the orientation of the labels on the horizontal axis in some visualizations.

### Additional formatting for visual properties

In addition to the properties that you can change listed above, you can also perform the following operations on the designated properties:

* Connect data points with smooth lines
* Change the size and color of bubbles in a bubble visualization
* Change the orientation of a word cloud
* Show/hide background grid lines in some visualizations
* Show/hide padding (blank space) in some visualizations
* Format text in a crosstab or table to customize the font family, text color, font size, styles, and alignment

## Customize the dashboard for presentation

You can add a title to a visualization. Titles let your dashboard consumers know what they are looking at high level, so that the details they see in the visualization make sense at the lower level.

You can add images, shapes, and texts to your view to reinforce your analysis and improve the look and feel of the dashboard. You can also add action to your view by embedding media and web pages in it. Images may be JPEG, JPG, GIF, and PNG. Audio and video media format may be URLs, MP4, MP3, AAC, and M4A.

## Modify data properties

You can change the properties of visualizations and other objects such as media, web pages, images, shapes, and text. The General style properties that are common to visualizations and other objects include fill color, border color, and opacity. The detailed properties vary by the visualization type and object type.

### Change 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.

### Edit Column headings

You can make column headings more descriptive and meaningful to you. The new column headings appear only in the current asset. To change the column headings for all assets, change them in the data asset.

### Modify the data format

From the Sources pane, you can select a different data format type and specify its properties.

### Enable data caching

You can enable data caching to improve performance. Data caching is especially useful when multiple users access the same saved dashboard or story at the same time.

When you open an older dashboard in the Cognos Analytics, the data caching feature will not work until you save the dashboard.

## Share the dashboard

During the dashboard design and development process, you should be saving the dashboard to the My content folder. This folder is reserved for the current signed in user and is not seen by others on the team. Once the dashboard has been completed, it can be shared to the team. It is recommended that you copy it from the My content folder and place it in the Team content folder. This leaves a copy in the My content folder, where you can still modify and update it.

If you choose to move the dashboard to the Team content folder, instead of copying it to that location, you do not have a copy any longer in the original location. When you move or copy it to the Team content folder, it must be placed into a subfolder of the Team content folder. It cannot reside in the primary Team content folder. This lets the administrator control access to that dashboard by controlling access to the folder.

Specific rights must be granted in order to Copy or Move to the Team content folder. Typically, a user with the Consumer role is not granted these rights.

# **Unit 7: Create data modules**

You can create a data module in order to combine multiple sources and different types of sources into a single data source for reports, dashboards, stories, explorations, notebooks, data sets, and other data modules.

## What is a data module?

A data module is a data source that can be used to create reports, dashboards, stories, explorations, notebooks, data sets, and other data modules. It can be based on other data modules, data servers, uploaded files, data sets, and packages. You can combine multiple sources and different types of sources into one data module. Data modules can be shared with other users.

The source data is brought into the data module as tables. For example, if you add a Microsoft Excel workbook that contains three worksheets to your data module, each worksheet appears as a table. You choose the tables you want to include in your data module.

Each table includes columns. These columns either represent dimensions that describe the data (such as countries, products, or departments) or they represent measures, which are numeric data values (such as revenue, headcount, or inventory). You can add, delete, rename and modify columns as necessary to ensure your users have the information they need.

Graphical user interface, application, table

Description automatically generated

Combine different data sources into a single data module

## Sources for data modules

When you create a new data module, or update an existing module, you can choose five possible input source types. Expand each source type below to find out more.

### Data Modules

Data modules that are saved in **Team content** or **My content** can be used as sources for other data modules. The tables remain linked to the source data module, which is indicated by the linked table icon, and they are read-only. As long as the tables remain linked, any changes in the source module are reflected in the new data module. If you break the link, you can edit the tables. However, the source module changes are no longer reflected in the new module.

### Data Servers

Data servers represent databases (such as IBM Db2, Microsoft SQL Server, and Oracle) for which connections exist in Cognos Analytics.

The connections must already be created in **Manage** > **Data server connections** or **Manage** > **Administration console**.

### Uploaded Files

### Uploaded files are Microsoft Excel (.xlsx and .xls) spreadsheets and text (.csv) files that contain comma-separated, tab-separated, semi colon-separated, or pipe-separated values.

Files that are already uploaded to Cognos Analytics are stored in **Team content** or **My content**. You can also upload files after you start creating your data module by using the upload file facility in the **Select sources** dialog box.

You can use relational, dynamic query mode packages as sources for data modules. Packages are created in IBM Cognos Framework Manager and contain dimensions, query subjects, query items, and other data. Packages are located in **Team content** or **My content**.

### Packages

When you use a package as your source, you can't select individual query subjects. You must drag the entire package into your data module. Only when you create relationships that involve query subjects in the package, you can view the structure of the package.

**Note:** Query subjects and query items in packages are equivalent to tables and columns in data modules.

### Data sets

Data sets contain data that is extracted from a package or a data module. Data sets are stored in **Team content** or **My content**. If the data in the data set changes, the change is reflected in the data module.

## Create a data module: high-level steps

1. Before you begin, **prepare the sources that you plan** to use to create a data module. For example, ensure that the appropriate data server connections have been created and made available to you.
2. From the **Welcome** page, select **New > Data module**, and then select the data source that you want to work with.
3. If all selected sources **contain one table each**, the basic data module is created, and you can proceed to **step 5**.
4. If any of the selected sources, such as a multi-tab spreadsheet or a data server, **contain multiple tables**, you have two options:

* Manually select the tables that you want to include in the data module.
* Select one or more keywords from a Word Cloud containing keywords from the underlying data sources. A data module proposal is generated for you. You can accept the proposal, or click Previous to try different keywords.

The data module is created based on the chosen tables.

1. **Examine and modify the data module as needed** (for example, add or delete columns and examine the relationships between the tables on the diagram view).
2. **Create a test report** from your data module by clicking Try It.
3. **Save the data module** to My content or to a folder within Team content.

## Modify and refine a data module

The initial data module that you create might contain data that is not required for your reporting purposes. Your goal is to create a data module that contains only the data that meets your reporting requirements and that is properly formatted and presented.

For example, you can delete some tables from your initial data module, or add different tables. You can also apply different data formatting, filter and group the data, and change the metadata properties.

The following are some examples of how you can refine your data module:

* Add or delete tables
* Edit or create new relationships between tables
* Change column properties
* Create basic and custom calculations
* Define filters
* Group data
* Format data
* Cleanse the text data
* Hide tables and columns

## Create relationship joins

A relationship joins logically related tables that the users want to combine in a single query. Cognos Analytics automatically detects relationships between tables in a data module by using the autojoin algorithm.

You can modify or delete relationships, or create new ones so that the data module properly represents the logical structure of your business. Verify that the relationships that you require exist in the data module, the cardinality is set correctly, and referential integrity is enforced.

The diagram is the most convenient place to view all data module relationships, and quickly discover the disconnected tables. You can use the diagram to create, examine, and edit the relationships.

## Customize data modules using filters and calculations

### Create filters

A filter specifies the conditions that rows must meet to be retrieved from a table. For example, you may only want sales records that had revenue greater than 10,000.

The filter is based on a specific column in a table, but it affects the whole table. Also, only rows that meet the filter criteria are retrieved from other tables.

You can create filters at the table level, which allows you to add multiple filters at once, or at the column level.

You can view, edit, and remove filters after they are created.

### Create calculations

Calculations allow you to provide information that is not directly available in the source columns.

You can create basic arithmetic calculations for columns with numeric data types, and concatenate text values for columns with the text data type.

For example, you can create a column called Revenue by multiplying values for Quantity and Unit price. You can create a column called Name by combining two columns, such as First name and Last name.

The expression for these calculations is predefined and you only need to select it.

All calculations are added to the data module as selectable columns that can be used in reports, dashboards, explorations, and other Cognos Analytics content.

## Group data and create navigation paths

### Group data

You can organize the column data into custom groups so that the data is easier to read and analyze.

You can create two types of custom groups depending on the data type of the column:

* columns with numeric data
* columns with text data

For example, in the Employee code column you can group employees into ranges, such as 0-100, 101-200, 200+. In the Manager column, you can group managers according to their rank, such as First line manager, Senior manager, and so on.

### Create navigation paths

A navigation path is a collection of non-measure columns that business users might associate for data exploration.

When a data module contains navigation paths, the dashboard users can drill up and down to change the focus of their analysis by moving between levels of information. The users can drill down from column to column in the navigation path by either following the order of columns in the navigation path, or by choosing any column in the path to view.

You can create a navigation path with columns that are logically related, such as year, month, quarter, and week. You can also create a navigation path with columns that are not logically related, such as product, customer, and city.

### Share a data module

There are different ways you can share data modules with other users. One way is to provide users with a URL that opens the content directly, instead of having to browse to the content object from the IBM Cognos Analytics welcome screen.

If your server requires user authentication, the user must sign in before the content is displayed.

In addition, IBM Cognos Analytics is integrated with the Slack application, allowing you to send messages and content to other Slack users. From within IBM Cognos Analytics, you can post a message to a Slack channel or directly to another Slack user, along with a link to a piece of analytic content. If your content is open, you can send an annotated image of the content via Slack.

Graphical user interface, text, application

Description automatically generated

Share a data module by providing a direct link.

## Activity: Create a data module

### Instruction text:

In this activity you will accomplish the following:

* Create a data module
* Model the data
* Define relationships

### Create a Data module

* From the Welcome page, select **New > Data module**.
* Navigate to **Team content > Demo\_Data** and select the following files:
* **Samples\_Sales\_Data.xlsx**
* **Retailers.xls**
* Choose to manually select the following tables:
* From the **Samples\_Sales\_Data** file, only include the Page1\_1 table
* From the **Retailers** file, include the **Retailers** table.
* Refresh to preview the Retailer details table and ensure it includes phone numbers.
* Click **OK.**
* Click **Dismiss.**

### Model the data

* Select the Page1\_1 table, and then make the following changes to it:
  + Rename the table from **Page1\_1** to **Sales** **metrics**
  + Remove the **Postal code** and **Short postal code** columns
  + Create the **Variance** calculated column as follows:
    - In the left pane, click **Revenue**, Ctrl+click **Planned revenue**, right-click Planned revenue, and then click **Create calculation**
    - Name: **Variance**
    - Calculation: Revenue – **(minus)** Planned revenue
* In the left pane, collapse **Sales metrics**, expand **Retailers**, and then click **Retailers** to preview it and ensure it contains the data you want

### Define relationships

* View the relationships between the tables graphically
* Create a relationship between the tables as follows:
  + Create a relationship from the **Retailers** table
  + Join the **Retailers** table to the **Sales metrics** table
  + Map **Retailer Name** to **Retailer**
  + Match the selected columns, and then refresh the preview
  + Click **OK**

The two tables are now joined on Retailer. You have created a data module combining data from two different data sources.

# **Unit 8: Introduction to reporting**

## Identify the basics of IBM Cognos Analytics - Reporting

*IBM Cognos Analytics - Reporting* is a Web-based report authoring tool that professional report authors and developers use to build sophisticated reports. With Reporting, you can create any reports that your organization requires, such as invoices, statements, and weekly sales and inventory reports.

The key word in the identification of the Reporting tool is sophisticated. Reporting can also be used as an ad hoc query and analysis tool and can run the simplest of queries, however, you may find it more expeditious to use dashboards for the simple queries, depending on your need.

The image below is a very sophisticated report that shows property and crop weather damage in dollars for the U.S. by month for the year 2015. You can select the month from the filter at the top. The Word Cloud visualization at the bottom left shows the largest property damage producing weather events. The packed bubble chart on the bottom right shows the largest crop damage producing weather events. Both of the bottom charts are color coded to show in which region of the country that those weather events occurred.

Graphical user interface, website

Description automatically generated

## Examine the user interface

You can create a report or modify an existing report. Existing reports can be used as the basis for new reports.

The following graphic depicts the user interface of the reporting application with labels 1 through 6 in different regions of the user interface.

Graphical user interface, application, table, Excel

Description automatically generated

Reference the user interface in the screen graphic above with numeric labels to learn more

### **Side Panel**

From the **side panel**, you can create and open reports, dashboards, and data modules, and upload personal data files. You can also navigate through the different areas of a report (such as the pages that it contains).

### **Content Pane**

From the **content pane**, you can build reports by adding objects and data. There are three tabs on the content pane. The Sources tab lets you insert items (such as query items and calculations) from the package selected for the report. The Data Items tab lets you insert data items into your report that already exist in your query. And the Toolbox tab lets you add controls, prompts, graphics, and data containers to your report. Toolbox items are organized into different groups.

Add items that you use often to the PINNED group. When you create a blank report, items in the PINNED group appear in the Add circular menu. To add a toolbox item to the PINNED group, right-click the item and click Add to Pinned Toolbox Items. To remove an item from the PINNED group, right-click the item and click Remove from Pinned Toolbox Items.

### **On-demand toolbar**

When you select a report object in the work area, you can use the on-demand toolbar to modify it (for example, to suppress zeros in a list object).

### **Work Area**

The data, charts, visualizations, and so forth reside in the **work area**.

### **Properties Pane**

The **Properties pane** lists the properties that you can set for an object in a report or for the entire report. When you specify a value for a property, press Enter, click another property, or save the report to ensure that the value is saved.

### **Show properties button**

Click the **Show properties** button to show the Properties pane for a selected object. If the properties are visible, clicking this button hides the properties. The properties are contained in a slide-out panel.

## Create a report

Reporting contains several report templates to structure your reports. You will select a template in the Reporting activities you perform in this course.

Creating a report gives you a chance to pick a layout presentation for the report screen. Combined with a theme, you can quickly pick a layout that includes a set of colors that are attractive.

Once the report layout has been selected, for each section in the layout, there is an Add button. When clicked, this button provides the options to create:

* List reports, which are useful for presenting tabular list information
* Crosstab reports, which are useful for comparative analysis
* Chart reports, which are useful for graphically showing comparisons, relationships, and trends
* Text items, which are useful for labeling report objects in a meaningful way
* Blocks, which are useful for extending the layout
* Tables, which are useful for formatting data in a repeated fashion

## Generate the report

You can view the results of the designed report by running the report in the Web browser.

Similar to dashboards, there are different report working modes. While working in Page design mode, you will only see metadata, such as column or row labels. You will not see actual data values in the report. While working in Page preview mode, you will see sample data as you create the report. To see the final report results, you must run the report. The results appear in a separate Web browser tab.

You can navigate through the report using the Page Up, Page Down, Top, and Bottom links at the bottom of the report.

You can return to Reporting to alter your report by clicking on the reporting tab containing your work area, or by closing the tab.

You can distribute reports by email and through the Web, or you can save them on your desktop. You would first render the report in the format that is most suitable for your needs, such as PDF or delimited text (CSV).

Reports can run in limited interactivity or full interactivity mode. You specify the interactivity mode by setting the report property Run with full interactivity.

When a report is set to run with limited interactivity, the report runs in the IBM Cognos Analytics Viewer. Report consumers can drill up, drill down, and drill through.

## Activity: Create a report in IBM Cognos Analytics - Reporting

You will be working with fictitious customer churn data from a fictitious telco company. The business scenario is that you want to see how many customers churned because they had better offers from a competitor of our company.

You will start on the IBM Cognos Analytics Welcome screen.

* Create a new, blank report.
  + From the side panel on the left, click **New > Report**.
  + Click **Dismiss** on the What's New warning.
  + Select the **Blank** template.
  + Click **OK**.
* Specify the data for your report.
  + Under **Insertable objects**, click **Select sources**.
  + Navigate to **Team content > Samples** > **By industry** > **Telecommunications> Data >Telco customer churn**.
  + Click **Open**.
* Set the Page preview mode so you can see updates as you make them.
  + On the **Application bar**, click **Page design** drop-down menu.
  + Click **Page preview**.
* Add a list object to the report.
  + Click **Add** in the center of the screen.
  + Click **List**, and then click **OK** to accept the default query name.
* Add data to the list from the **Insertable objects** pane.
  + On the side panel, on the **Source** tab, expand the **Telco Customer Churn > Location** folder.
  + Drag **Customer ID** to the list object.
  + Drag and nest **Country** attribute to the right of the list object to nest it.
  + Right-click and insert **City**.
  + Expand the **Demographics** folder, and then insert **Gender**.
  + Expand the **Status** folder, add **Churn Value**, and then **Churn Reason**.
* Modify the report so that City appears before Country.
  + In the work area, click the data for **City** (not the header) to select the column body.

Next, you want to filter the report to show only records of customers who left for a better offer.

* Filter on the Churn Reason.
  + Click the **Churn Reason** column header.
  + From the toolbar, click **Filters**, and then click **Create Custom Filter**.
  + Click **Competitor made better offer**, and then click **OK.**

Notice that only the competitor offer records are remaining.

Next, summarize the report to get a count on the customers who churned because of a better competitor offer.

* Summarize the report to get a count on the churn by competitor offer reason.
  + Click **Churn Value** column header, and from the toolbar click Summarize, and then click **Total**.
* Run the report to see the final report.
  + Click **Run options**, and then click **Run HTML**.
  + Under the report, click **Bottom** to jump to the last page of the report.

Notice the **Overall - Total** row shows a count of 311. You successfully counted the number of customers who left because they had a better offer from a competitor.

# **Unit 9: Create list reports**

## Identify list reports

You can use list reports to:

* present tabular information
* show detailed information from your database

The following graphic depicts a very simple list report in tabular style.

Table

Description automatically generated

Group data in a list

You can group on one or more columns depending on how you want to see your data.

The list report should preferably follow a 1:n cardinality from left to right in order to properly display the grouping. To group related information together, select a column and click Group/Ungroup on the toolbar.

Grouping a column in a list generates an "order by" clause in the generated SQL, so your data is returned grouped and automatically sorted ascending.

The image below depicts a list report grouped by Country and City. The 1:n cardinality is apparent in that 1 Country maps to n Cities.

Table

Description automatically generated

## Sort data

You can sort items in reports (including lists and crosstabs) to quickly view the most important data.

Depending on whether you use relational or dimensional data, and the type of data item you select, Reporting provides different sorting options.

You can modify an item used to sort a grouped item, add or remove a sort item, and determine the sort order.

To modify the layout sorting in a list report, click a column that can be sorted, in the toolbar that appears, click the Sort button, and then click Edit Layout Sorting. You can also select the list object itself and then, in the Properties pane, modify the Grouping & sorting property.

The item used to sort specific grouped items in a report or to sort ungrouped items in a report does not need to be on the report page but does need to be in the query.

## Format list columns

You can emphasize certain data to make your reports easier to read and understand.

 You can format list report columns at different levels depending on your requirements:

* lowest level: format the cells on a list column
* higher level: format both cells and the title in a list column
* highest level: format both the cells and titles in all columns in the list

## Include list headers and footers

You can add headers and footers to a list report to provide additional information about the contents of the report.

List headers and footers can be placed:

* at the top or bottom of a list on each page
* at the top of the first page or bottom of the last page
* before or after a group of details

Choose where to place headers and footers based on your requirements.

## Aggregate data

You can aggregate fact data to show trends or summaries. By default, a summary is automatically added to a report.

You can show minimum, maximum, average, total, count, or calculated data. You can also show multiple aggregates at the same time.

The Rollup Aggregate Function specifies the type of aggregation to apply to summarize values. These values appear at the higher levels of lists and crosstabs. The default setting is Automatic. The setting of Automatic indicates that the aggregation applied is based on the data type of the query item. Therefore, an integer data type with rollup aggregation set to automatic provides total aggregation. The report shown here illustrates rollup aggregation set to Total.

The Aggregate function specifies the type of aggregation to apply to individual values which appear as detail rows in lists or crosstabs.

The following image shows the Revenue aggregated by Product line. Notice that the details row values add up to the summary row value.

Table

Description automatically generated

# **Unit 10: Create crosstab reports**

## Create a crosstab

A crosstab is a tabular display of data with data items appearing on rows and columns, and is useful for analyzing and comparing summary data. Crosstabs also allow you to display more information on a page than a list.

Crosstab edge cells have four drop zones: one on each side, one at the top of the cell, and one at the bottom of the cell.

Use the crosstab drop zones to add items as parents, peers, or children of other items in the crosstab.

Using crosstab drop zones, you can quickly create crosstabs using drag-and-drop functionality.

Add query items to rows and columns, and measures to the body of the crosstab.

The example in the graphic below, shows that measures are also query items. In the simplest crosstab, a single measure will appear at the intersection of the row and column edge items. Measures can also appear on the edges. This technique is often used with multiple measures.

Table

Description automatically generated

## Add measures to a crosstab

You can add measures to either the row or column edges of a crosstab report.

You can add a default measure that is used in cells where the measure is not defined on the row or column edge.

Any data item that can be aggregated can be added to the body of the crosstab as the measure. The measure defines the data in the report, such as revenue, quantity, or profit margin.

The crosstab fact cells contain the measure values. Default measure is a property of the crosstab object. If the measures of the crosstab cannot be determined by what is being rendered on the edges, then the default measure will be rendered.

In crosstabs, you can show values as a percentage of a summary instead of the actual values. For example, you can show the revenue that was generated by each product line as a percentage of the total revenue.

The following graphic shows the Default measure, the defined measure for a crosstab node, and where the measure values appear in the crosstab object.

Table

Description automatically generated

## Data sources for crosstabs

Because crosstabs use rows and columns to define the basic structure and determine cell values, they are better suited to dimensional reporting.

Relational models have a basic metadata structure that looks like tables and columns in a database.

Dimensionally Modeled Relational (DMR) models are built from relational data sources, but are modeled with a dimensional structure (like OLAP) consisting of measures and dimensions.

Best practices to keep in mind when using crosstab report objects are:

* Crosstabs are, by design, a dimensional reporting object.
* Insert the query items you wish to view in the rows and columns to focus the report rather than using filters.
* Filters in a crosstab may cause unpredictable results and should be used only when necessary.
* Crosstabs can be used in relational data reporting, but take care to maintain predictable results.

Shape, arrow

Description automatically generated

This image shows a database cylinder object that is translated to a structure that represents a dimensional model.

## Crosstab peers

Crosstab drop zones let you create a wide variety of crosstab layouts to meet your business requirements.

To add a second item as a peer below an existing item, drop the new item below the bottom instance of the item on the row edge. To add a second item as a peer above the existing item, drop the new item above either instance of the item on the row edge.

To add a second item as a peer to the right of the existing item, drop the new item to the right of the far right instance of the item on the column edge. To add a second item as a peer to the left of the existing item, drop the new item to the left of either instance of the item on the column edge.

The image below depicts the process of adding a peer to a crosstab. The top image shows the Region query item is dragged into a peer drop zone under the Product line row. Then the bottom image shows the resulting peer rows.

Graphical user interface

Description automatically generated with medium confidence

## Activity: Create a crosstab report

Business Scenario: You are a report author for your company. You have been assigned the task of creating a report that shows the sales revenue figures of the five product lines your company offers, for each year, for all possible order methods. You want to also see average yearly revenue figures for each order method/product line combination.

To do this, you will create a basic crosstab report, add the data, and create an average. You will have to perform basic operations on the crosstab, such as sorting and swapping rows and columns.

* Create a blank report and add a crosstab object.
  + In the bottom left corner, click New.
  + Click **Report**, click **Blank**, and then click OK.
  + In the work area in the center of the screen, click the Add icon.
  + Click **Crosstab**, and then click **OK**.
* Specify the data source.
  + Click **Select sources**, browse to **Team content** > **Samples** > **Data**.
  + Click **Sample data module**, and then click **Open**.
* Add a query item to the rows and columns.
  + In the left pane, expand the **Sample File Go Sales**.
  + Drag the **Product line** query item to the **Rows** section of the crosstab.
  + From the left pane, drag the **Order method type** query item to the **Columns** section of the crosstab.
* Add a measure to the crosstab.
  + From the left pane, drag the **Revenue** query item to the **Measures** section of the crosstab.
* Run the report to view the data in the crosstab.
  + On the toolbar, click the **Run options** button.
  + Click **Run HTML**.
  + View the report data, and when finished, close the rendered report browser tab.
* Add Year to the columns of the crosstab.
  + From the left pane, drag the **Year** query item to the **Columns**, nesting it under **Order method type**.
* Sort on Year.
  + Click the **Year** column title.
  + From the toolbar that appears, click the **Sort** button, and then click **Ascending**.  
    Next, you will run the report to check out the report in its current state.
* Run the report to view the nested and sorted data.
  + On the toolbar, click the **Run options** button.
* Click **Run HTML**.  
    
  Notice that the year levels are repeated for every order method type. Because of this fact, the entire report is too wide, horizontally, which means you have to continually use horizontal scrolling to see the data. You want to swap the rows and columns to make the report easier to read.  
    
  To do this swap, we must select the entire crosstab report, using the Crosstab selection control, and then use the toolbar to do the swap.
* Swap rows and columns in the crosstab.
  + Close the rendered report tab.
  + On the toolbar that appears, click the **Swap Rows and Columns** button.  
      
    Once again, you need to run the report to see what else must be done.
* Run the report to view the swapped rows and columns.
  + On the toolbar, click the **Run options** button.
  + Click **Run HTML**.  
      
    At this point, the report is almost done. The only thing left to do is to average the Revenue by order method type, for the four years of data.
* Add the Average aggregation to the crosstab.
  + On the crosstab, click the report body for the measure (the <#1234#> cells).
  + From the toolbar, click **Summarize**.
  + Click **Average**.
* Run the report.
  + On the toolbar, click the **Run options** button.
  + Click **Run HTML**.
  + At the bottom of the screen, click **Page down** to examine the remainder of the report.

Notice that the Revenue has been averaged within for each Order Method type over the four year periods.

# **Unit 11: Present data graphically**

## Graphical visualization objects

You use visualization objects to configure your visualizations based on your report data. Most often, you will simply drag a query item or column from the Source pane to a particular slot in the expanded visualization for reports or dashboards.

The following graphic shows the most common visualization objects as they appear in your report output in IBM Cognos Analytics - Reporting.

Below the graphic, you will see the key to the graphic components, along with a short description of each object.

Chart, bar chart

Description automatically generated

## Visualization objects

### **Columns, lines, and area**

Visualizations use graphical elements such as columns, horizontal bars, points, bubbles, lines, and areas as visual representations of data points. In this instance (number 1 above), the image shows grid lines.

### **Legend**

A legend is a key to the patterns or colors that are assigned to the data series or categories in a visualization.

### **X -axis Labels**

Axes are lines that provide references for measurement or comparison. X axes run horizontally.

### **Title**

The title of the visualization. Some visualizations have properties or slots for Title. Others can be created by using Text Items.

### **Y- axis titles**

Axes are lines that provide references for measurement or comparison. Y axes run vertically.

### **Categories**

Categories are groups of related data from the data series that are plotted on the x-axis. Categories of multiple data series are shown together using clustered and stacked data markers.

Related to categories is a data series. It is a group of related data points that are plotted in a visualization. Each series has a unique color or pattern and is described in the legend. You can plot one or more data series in a visualization; pie visualizations have only one data series.

## Degree of difficulty

The more robust and powerful a visualization is, the more knowledge and configuration it takes to create. There are slots or properties that you may not be used to using. Knowledge of these nuances around the visualizations can empower you like never before, but you must take the time and make the effort to learn about them.

Chart, bubble chart

Description automatically generated

Chart, funnel chart

Description automatically generated

## Drill through access

Another advanced concept that enhances the graphical presentation of data is the drill through access. Using drill through access, you can move from one report to another within a session while maintaining your focus on the same piece of data. For example, you select a product in a sales report and move to an inventory report about that product.

Drill through access helps you to build analytical applications that are bigger than a single report. Drill through applications are a network of linked reports that users can navigate, retaining their context and focus, to explore and analyze information.

Drill through access works by defining the target report or object and then using information from the source report to filter the target. IBM Cognos Analytics can match data from the source to metadata in the target report, or you can define parameters in the target for greater control.

In the dimensional reporting style, you can also enable drilling up and drilling down, particularly in the dimension object hierarchy structure. For more information about drilling up and drilling down, see the product documentation. The full set of documentation for using IBM Cognos Analytics is available in the [IBM Cognos Analytics Knowledge Center](https://www.ibm.com/support/knowledgecenter/SSEP7J_11.1.0).

## Custom visualizations

You can add custom visualizations to your IBM Cognos Analytics report. Various samples and links to code samples for custom visualizations are included with the IBM Cognos Analytics product.

Creating custom visualizations requires a knowledge of JavaScript Object Notation (json) and the Java programming language. For additional information, custom visualization samples, and code samples, see the product documentation. The full set of documentation for using IBM Cognos Analytics is available in the [IBM Cognos Analytics Knowledge Center](https://www.ibm.com/support/knowledgecenter/SSEP7J_11.1.0).

Graphical user interface, text, application, email

Description automatically generated

The above graphic is a code sample behind an IBM Cognos custom visualization.

## Custom color palettes

You can use the chart palette to control the colors or patterns used in the columns, lines, data markers or areas in a chart. For example, if "Telephone" is the first in a data series of order methods, and you want it to appear in blue, use the palette to make the first item in the series blue.

You can customize the color palette for area, bar, bubble, gauge, Pareto, pie, and scatter charts and apply background effects to chart objects or change the colors of specific chart elements.

You can create a conditional palette to color data items in your chart in different ways depending on a condition. For example, in a column chart that shows revenue per month, you want to make the columns for the months that have a revenue greater than $1,000,000 green, or less than $10,000 red.

For additional information on customizing the color palette, see the product documentation. The full set of documentation for using IBM Cognos Analytics is available in the [IBM Cognos Analytics Knowledge Center](https://www.ibm.com/support/knowledgecenter/SSEP7J_11.1.0).

Graphical user interface, chart, bar chart, treemap chart

Description automatically generated

The above graphic shows the creation of a categorical color palette, used for visualizations that support discrete colors, like a bar or pie chart.