



Working with 11.2 Data Modules - Intermediate Workshop

Workshop Guide

CA 11.2.3 / September 2022

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1 Introduction

With Cognos Analytics, users are not restricted to existing enterprise data sources. The data blending and modeling capabilities in Cognos Analytics allows the business user to include external data sources without requiring assistance from IT. This does not replace IT; it simply augments the user experience to allow the user to work with personal data sets and analyze that data in conjunction with the enterprise data.

Users can import external data from files on premise, data sources and cloud data sources into Cognos Analytics. Multiple data sources may be shaped, blended, cleansed, and joined together to create a custom, reusable, and shareable data module for use in dashboards and reports.

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

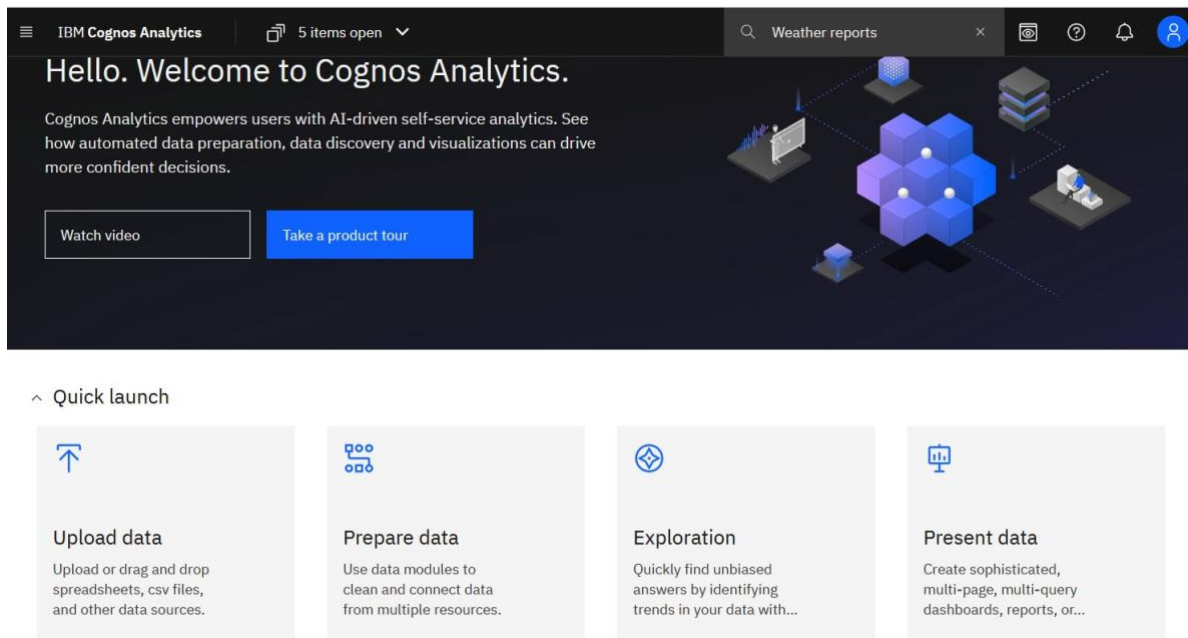
- Upload data files
- Create a data module
- Create joins
- Customize
- Test

2 Get Started with your Cognos Analytics Tutorial

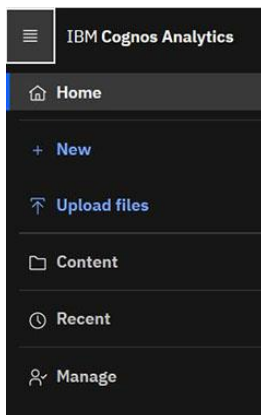
2.1 Cognos Analytics User Interface

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

__1. The welcome page provides quick access to the product functionalities, content, samples, and learning materials. This is the perfect place to start exploring Cognos Analytics.



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



For additional information see [Welcome Page](#) in the online IBM Documentation.

2.2 Business Use Case for this Workshop

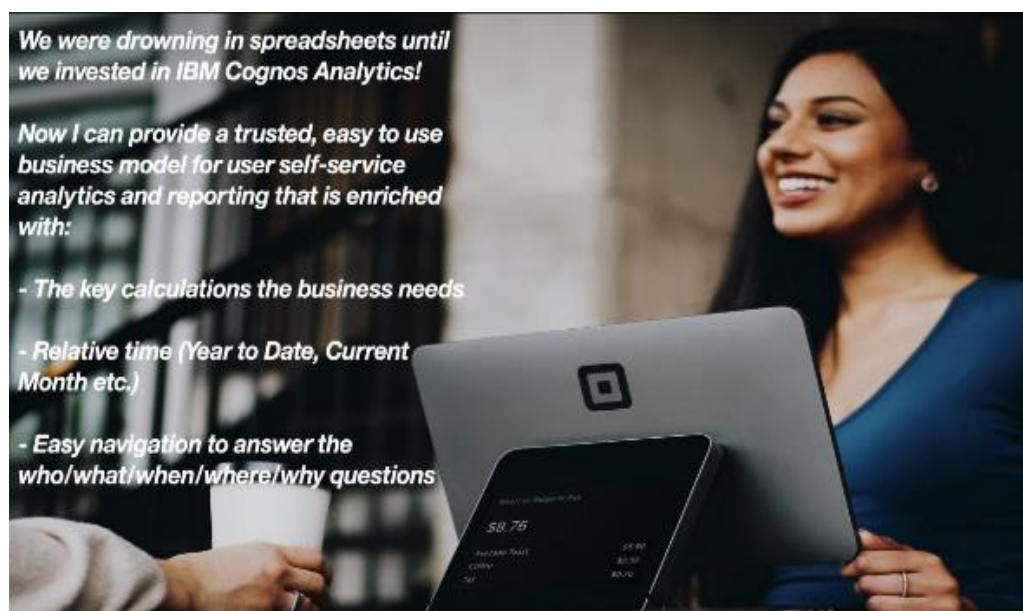
We are going to analyze the sales performance of a fictitious Coffee Shop enterprise. Each month, the Coffee Shop systems generate a selection of data that can be used by a range of different staff members to achieve their performance analysis goals. In this module, we're going to show you how you can combine different data sources such as spreadsheets, databases, and other existing data modules (including Framework Manager packages) in IBM Cognos' web-based data modelling capability. This modeling process is needed as the foundation for the metadata creation of the data module that will be linked to create dashboards, reports, explorations, and stories. Data modelling in Cognos Analytics requires no scripting and is accessible to business users. Any user or data consumer with a business foundation of the company's data structures within the organization will be able to create these data modules.

Typical data needs for a Regional Manager at a coffee shop

The Regional Manager needs to analyze product sales and performance for the corresponding region. We need to provide a trusted, easy to use business model for user self-service analytics and reporting that is enriched with:

- The key calculations the business needs
- Relative time (Year to Date, Current Month etc.)
- Easy navigation to answer the who/what/when/where/why questions (Descriptive Analytics)
- Navigation paths
- Business user friendly names that the consumers understand while creating content.

With Cognos Analytics' data module capabilities, you can blend data from multiple disparate systems such as uploaded files, databases, etc. You'll start with uploading the data files, so you may build out a data module to have a single source of integrated data to work with for analysis.



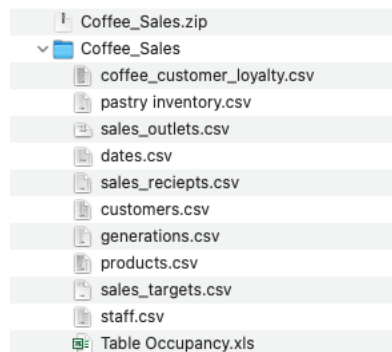
3 Building a Data Module

3.1 Uploading External Data Files

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

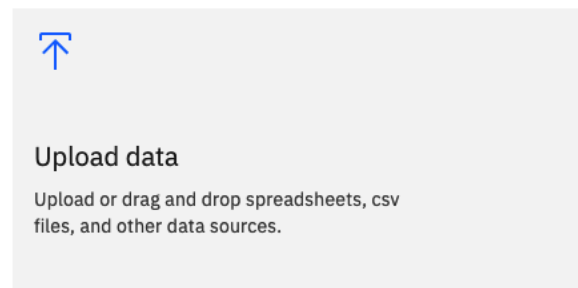
*For this exercise you wish to combine existing data sources (.csv, .xlsx) all available in the [Coffee Sales Workshop](#) in the IBM Accelerator Catalog. This *Coffee_Sales.zip* file contains all the files of data which we want to analyze using Cognos Analytics. You can start by simply dragging the file into Cognos Analytics' welcome page and immediately launching a new data module.*

- __1. The files you will use for this workshop can be downloaded from the IBM Accelerator Catalog: [Coffee_Sales.zip](#)

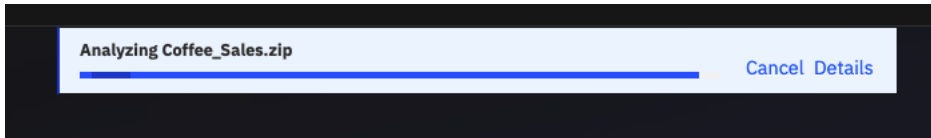


- __2. To upload a file, click the **Upload** data tile in the **Quick** launch section of the Welcome page. Navigate to the file you downloaded above named *Coffe_Sales.zip* and click **Open**.

^ Quick launch



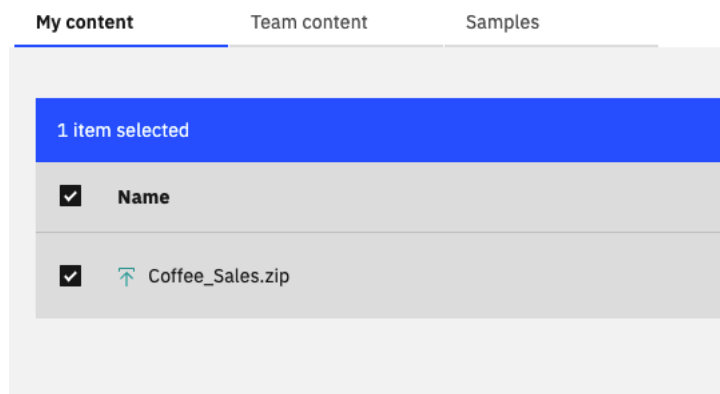
- __3. As the file uploads, notice that under the Switcher, a series of **status bars** will be visible as the upload process reads and analyzes the data being brought in.



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

- __5. The uploaded file will now show in the **Recent** tab on the Welcome page. The zip file upload processes all files included in the compressed archive, so you don't have to manually upload each of them. The file is also available within the **My content** tab, which you can access from the **Open menu** by selecting **Content**.

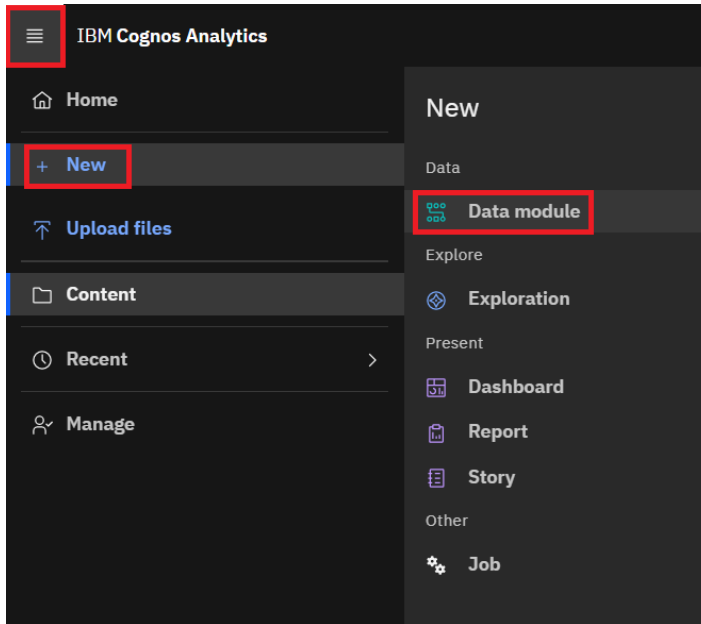
Content



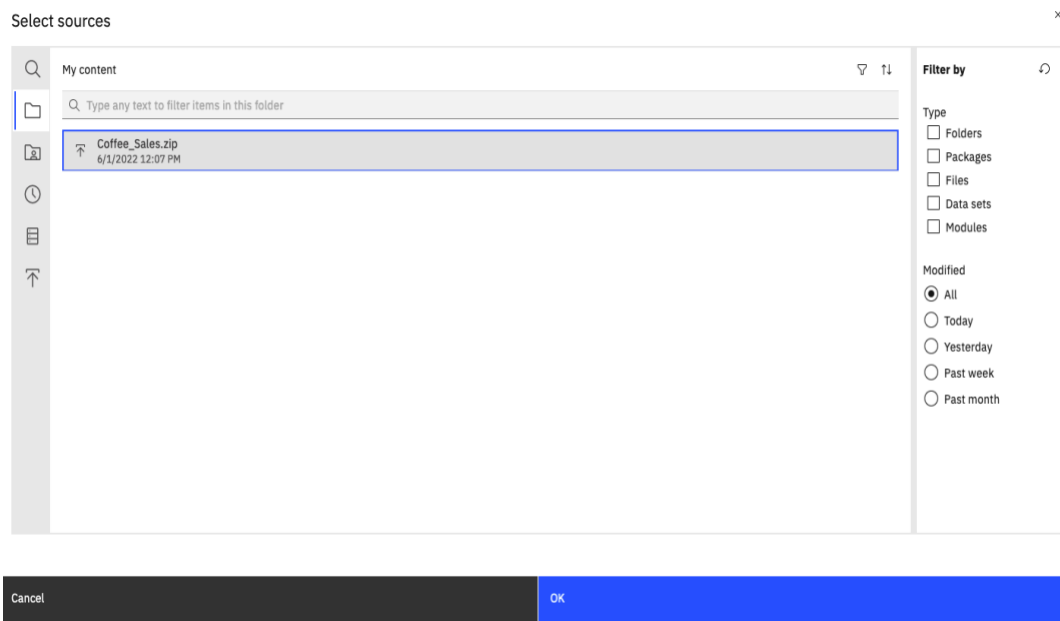
Note: If you were using any spreadsheets with multiple tabs these would all be uploaded as separate tables. If you wanted to create an automatic data module with the zip file, Cognos Analytics also can use its built-in smarts to automatically join the files in the zip file, giving me a great starting point for my new metadata module. If you select a join, you can see which columns it has matched and how it has joined them.

3.2 Working with Data Sources

__1. From the **Open** menu, click **New**, then **Data module**.



__2. The **Select sources** dialog will appear. From here you may use search and filtering options to sort or locate different source types and recently accessed files to select content to include in the data module. Select the **Coffee_Sales.zip** file you just uploaded from **My content** and click **OK**.



- ___3. The Add tables menu will appear, you can add tables manually or use our **Discover related tables**, this option infuses AI into the data modeling process by recommending potential joins and creating them for you automatically. Click the **Discover related tables** option and then **Next**

Add tables

×

Specify how to add tables to your data module.



Select tables

Select the tables that you want to include in your data module, and create the data module manually.



Discover related tables




Engage the system to recommend related tables for your data module and create the data module for you.

Cancel

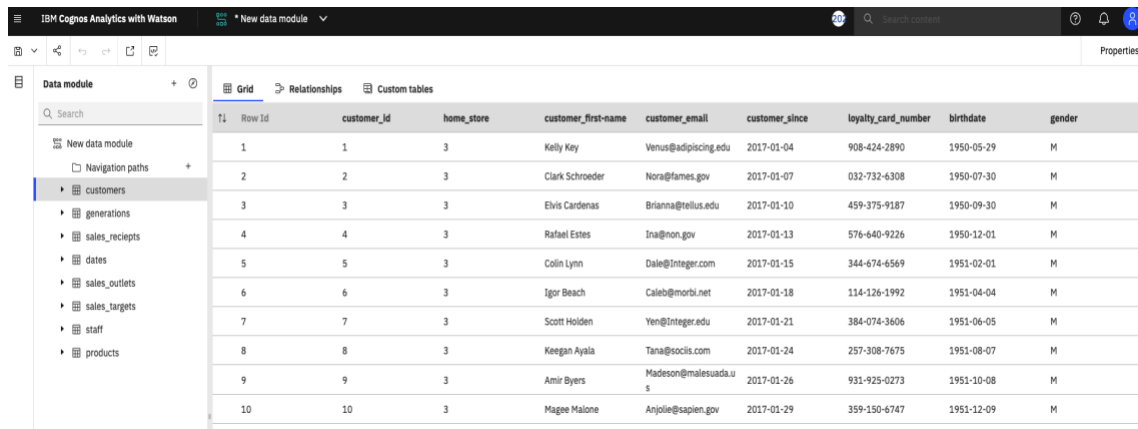
Next

- ___4. Under Discover related tables, select **customer** and **product** (or simply type 'product customer' in the search option, as shown below: Then click **Next**

__6. The new generated model will open with the **Data module** panel on the left, and the canvas on the right. At the top left of the canvas, you will see that there are three tabbed views available:

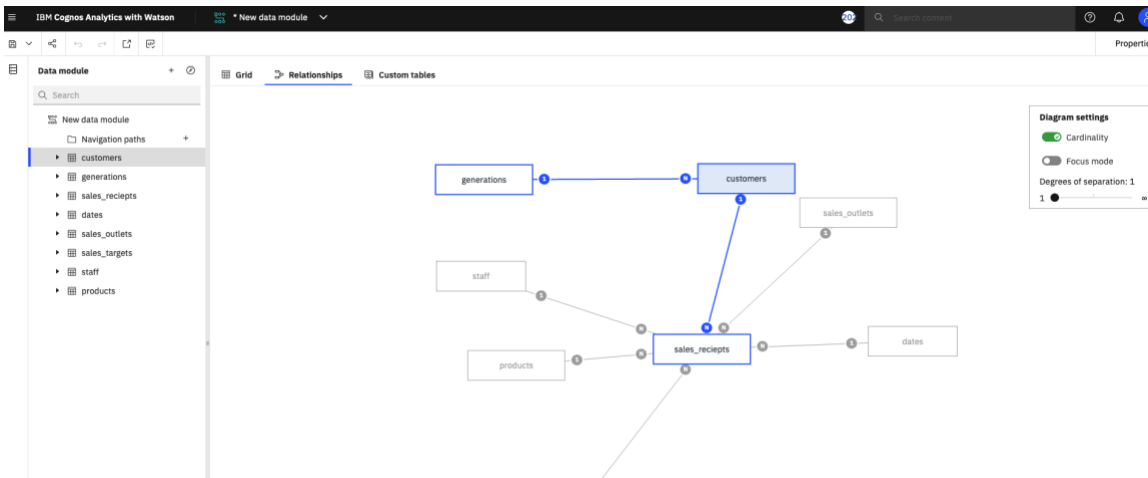
-  **Grid** shows the data values.
-  **Relationships** provides a visual representation of how the tables are related.
-  **Custom tables** provide a visual breakdown of how the different views and tables were created and their individual components.

__7. By default, Cognos Analytics opens with the **Grid** view of the data. Click on **customers** to preview the data.

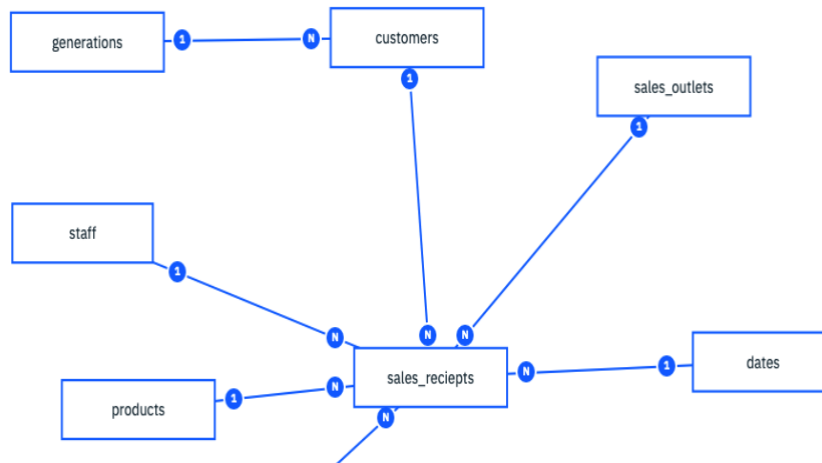


Row Id	customer_id	home_store	customer_first-name	customer_email	customer_since	loyalty_card_number	birthdate	gender
1	1	3	Kelly Key	Venus@adpiscng.edu	2017-01-04	908-424-2890	1950-05-29	M
2	2	3	Clark Schroeder	Nora@fames.gov	2017-01-07	032-732-6308	1950-07-30	M
3	3	3	Elvis Cardenas	Brianna@tellus.edu	2017-01-10	459-375-9187	1950-09-30	M
4	4	3	Rafael Estes	Ina@non.gov	2017-01-13	576-640-9226	1950-12-01	M
5	5	3	Colin Lynn	Dale@Integer.com	2017-01-15	344-674-6569	1951-02-01	M
6	6	3	Igor Beach	Caleb@morbi.net	2017-01-18	114-126-1992	1951-04-04	M
7	7	3	Scott Holden	Yen@Integer.edu	2017-01-21	384-074-3606	1951-06-05	M
8	8	3	Keegan Ayala	Tana@soclis.com	2017-01-24	257-308-7675	1951-08-07	M
9	9	3	Amir Byers	Madeson@malesuada.us	2017-01-26	931-925-0273	1951-10-08	M
10	10	3	Magee Malone	Anjolie@sapien.gov	2017-01-29	359-150-6747	1951-12-09	M

__8. Click the **Relationships** view. You will now see a diagram showing each of the data files brought into the data module. Notice that **customers** is highlighted as it is the one that is currently in focus.

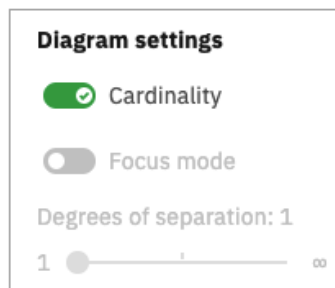


__9. You may click on each table and move it around the screen to modify the layout to your preference. Click on the **tables** and **drag** them into the configuration shown below.



To move the entire diagram at once, you may click in the white space and drag while holding down the left mouse button. You may also zoom in/out on the diagram using the Zoom buttons on the lower right corner of the canvas.

- ___10. On the top right of the canvas is the **Diagram settings** box. This box will remain available to show **Cardinality**, **Focus mode** for a set of tables and **Degrees of separation**

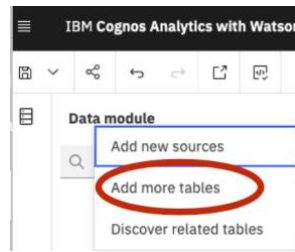
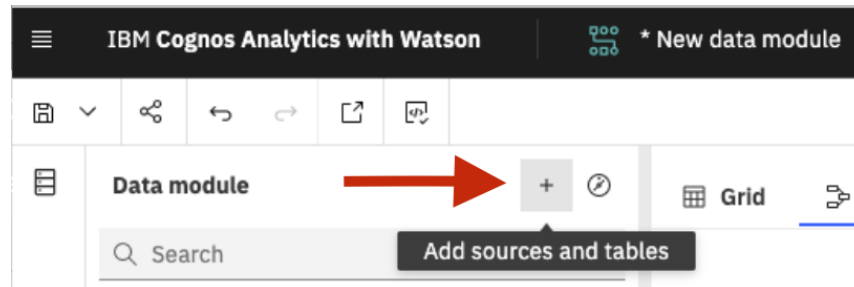


- ___11. Click on the down arrow next to the **Save** icon on the main toolbar. Select **Save As**. Click the **My content** tab. Type "Coffee Sales Data Module" in the **Name** textbox. Click **Save**.

3.3 Working with Joins

The automatic Discover related table process was a great starting point, but we need to add additional tables to the data module.

1. In the upper left section, next to the data module header, **click** the + ‘add sources and tables’ menu. Then click **Add more tables**



2. The **select tables** menu appears, you can see the 7 tables that were already included in the module, and the remaining 4 that can still be added from our Coffee_Sales.zip uploaded file.

▶ Table Occ...ccupancy	<input type="checkbox"/>
▶ coffee_cus...r_loyalty	<input type="checkbox"/>
▶ customers	<input checked="" type="checkbox"/>
▶ dates	<input checked="" type="checkbox"/>
▶ generations	<input checked="" type="checkbox"/>
▶ pastry inventory	<input type="checkbox"/>
▶ products	<input checked="" type="checkbox"/>
▶ sales_outlets	<input checked="" type="checkbox"/>
▶ sales_reciepts	<input checked="" type="checkbox"/>
▶ sales_targets	<input type="checkbox"/>
▶ staff	<input checked="" type="checkbox"/>

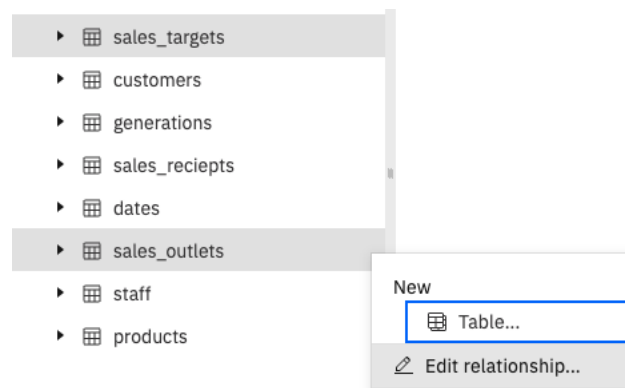
3. Select the remaining 4 tables: Table Occupancy – Table Occupancy, coffee_customer_loyalty, sales_targets and pastry inventory and click **OK**. The tables are

now added to the Data module.

*Users may start creating a relationship manually by selecting any single table, right-clicking (you can also select the ellipsis to the right hand side of the table name) and selecting **Relationship...** from the context menu.*

*The **Create relationship** dialog will appear. The window is organized to step you through the join definition. The window shows each table in the join and columns/fields available for the join.*

- ___4. **Let's verify the join** between **sales_outlets** and **sales_target**. Select the sales_outlets and the sales_target tables from the tables list. Click on the **ellipsis (...)** on the right-hand side of either table. A new menu will appear, select Edit Relationship...



The edit relationship window will open.

- ___5. For this exercise, we are working with **sales_target** on the left and **sales_outlets** on the right. If this is not the case, use the **switch left and right tables** icon to place your tables in the right order. The selected tables should look like this:

Table 1: sales_targets

Row Id	sales_outlet_id	year_month	beans_goal
1	3	Apr-19	720
2	4	Apr-19	720
3	5	Apr-19	1000
4	6	Apr-19	720
5	7	Apr-19	720

Table 2: sales_outlets

Row Id	sales_outlet_id	sales_outlet_type	store_square_feet	store_address
1	2	warehouse		
2	3	retail		
3	4	retail		
4	5	retail		
5	6	retail		

Match selected columns

Inner join, 1-to-many
No filtering

Cancel OK

6. In the **Edit relationship** window, you can select the Matched columns to confirm the join is between the common column **sales_outlet_id**.

Defined matches ⓘ

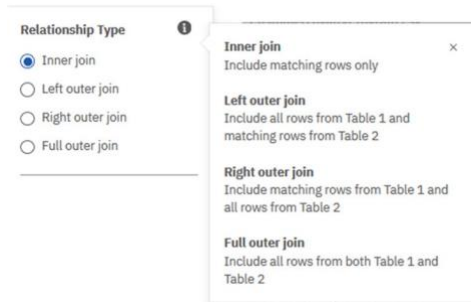
sales_outlet_id = sales_outlet_id

Matched columns (1)

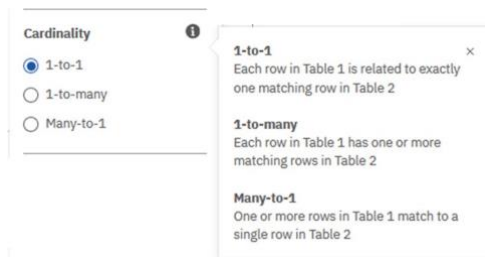
7. Click the **Refresh** button to update the viewer to show the joined tables. Use the scroll bar to see all the fields.

store_longitude	store_latitude	manager	Neighborhood	County	Country	sales_outlet_id
-80.380669	25.784731	6	Doral	Miami Dade	United States	3
-80.15473	26.11878	11	Fort Lauderdale	Broward	United States	4
-80.140556	25.782721	16	Miami Beach	Miami Dade	United States	5
-80.2421	25.7287	21	Coconut Grove	Miami Dade	United States	6
-80.3235	26.1493	26	Sunrise	Broward	United States	7

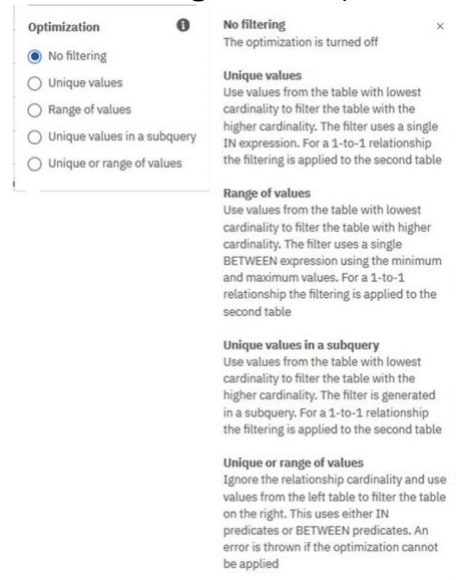
8. The **Join settings** in the lower left corner show the rules (logic) setup for the join behavior. Click on the **Join settings** to open the join definitions.
9. There are many ways to join data between files. The goal of the join is to ensure that the relationship between the two files creates a unique record. For **Relationship type**, this join is set too **Inner Join**. This will include *matching rows only* between the two files, meaning it will only return records that exist in both files. Make no changes to the relationship type.



10. **Cardinality** refers to number of occurrences of the data item in each of the data sets. For this join, each of these tables is a master list of outlets and names respectively, so each record is unique. Click on the radio button next to **1-to-1** to change the cardinality.



11. **Optimization** provides automated filtering options based on the values between the tables. Make no changes to the optimization.



__12. Your join settings should now appear as follows:

Relationship Type ⓘ

Inner join

Left outer join

Right outer join

Full outer join

Cardinality ⓘ

1-to-1

1-to-many

Many-to-1

Optimization ⓘ

No filtering

Unique values

Range of values

Unique values in a subquery

Unique or range of values

Inner join, 1-to-1
No filtering

__13. Click **Refresh** to update the preview of the joined data.

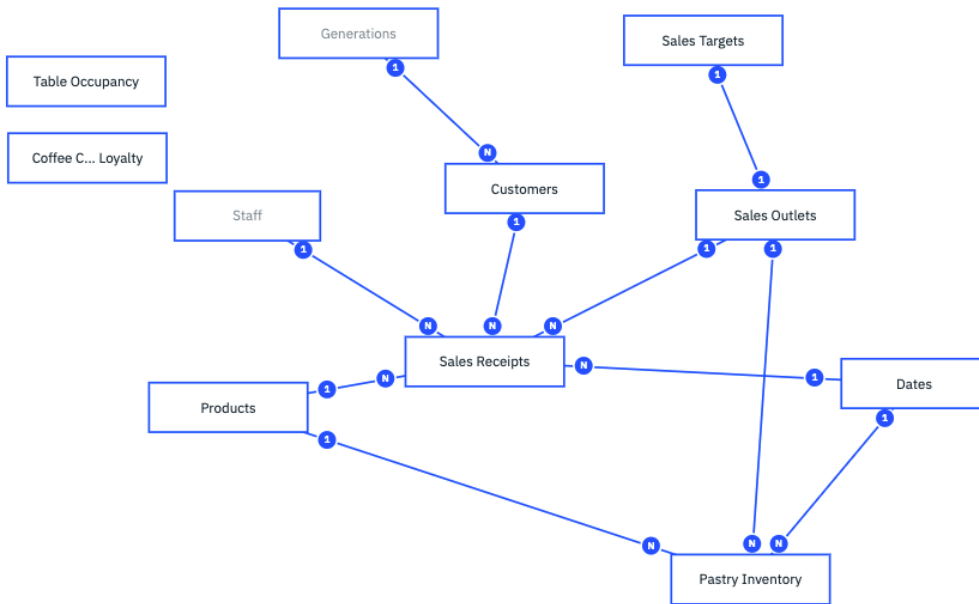
__14. Click **OK**.

*If multiple joins are needed to create a unique record, the user may add joins by repeating the process above and selecting the data items to join on and selecting **Match selected columns** to complete the join.*

__15. You can now see a 1-to-1 relationship is created between the two files.



__16. Your resulting complete diagram should now appear as follows:

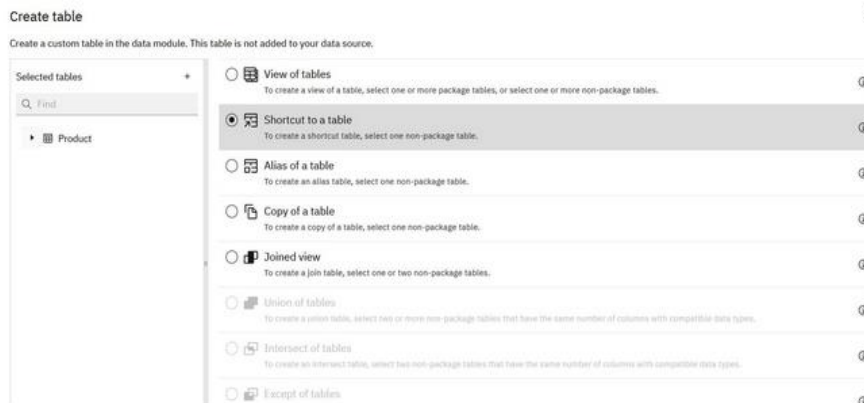


__19. **Save** the data module.

3.4 Working with Views, aliases, and shortcuts

You can create additional views, aliases, and shortcuts to extend the scope of your data model. This simplifies the modeling process without having to import the same table multiple times and by adding extra flexibility for modelers

New in Cognos Analytics 11.2.3: Alias and shortcut are new types of **custom tables** that data modules support. When you create a custom table, new options Shortcut to a table and Alias of a table are available.



Custom table types:

View of tables:

This option is available when one or more tables are selected. This is the only option that is available for package tables. The columns in the base tables are referenced in the view. The column properties in the view are independent from the base table. After the view is created, you can select or deselect columns to include in it.

Shortcut to a table:

This option is available when one table is selected. The shortcut is a reference to the selected table, and it retains the selected table relationships. The column properties in the shortcut are dependent on the selected table and are read-only. You can add calculations to the shortcut table.

Alias of a table

This option is available when one table is selected. The alias is a reference to the selected table, but it does not retain the selected table relationships. The column properties in the alias are dependent on the selected table and are read-only. You can add calculations and embedded filters to the alias table.

Copy of a table

This option is available when one table is selected. You can copy all columns from the table, or

only the columns that you select. The new table is disassociated from the base table so changes in one table aren't reflected in the other table. When you copy a non-custom table, the result is a non-custom table. When you copy a custom table, the result is a custom table.

Joined view

This option is available when two tables are selected. You can select or deselect columns to include in your new table. Proceed to create a join between the two tables.

Union of tables

This option is available when two or more tables are selected. All selected tables have the same number of columns. The columns are in the same order, and their data types are compatible. The new table includes all rows from all selected tables.

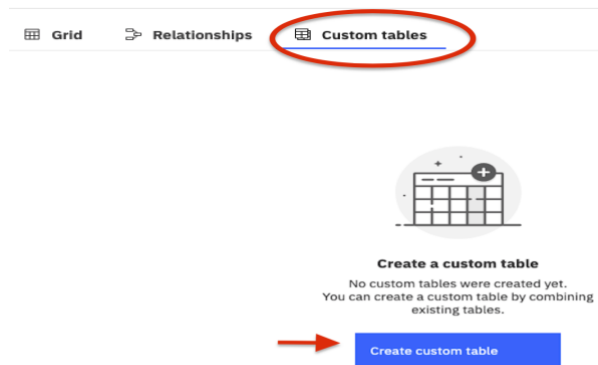
Intersect of tables

This option is available when two tables are selected. Both tables have the same number of columns. The columns are in the same order, and their data types match. The new table includes only rows that are shared between the two tables.

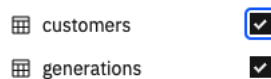
Except of tables

This option is available when two tables are selected. Both tables have the same number of columns. The columns are in the same order, and their data types match. The new table includes only rows that exist in the first table.

__1. Create a view between **customers** and **generations** tables so they can be merged in a single combined entity (view). In the **Custom tables** menu select Create **custom table**



__2. Click the **select tables** blue button, select **customers** and **generations** and then click **Next**



__3. Name the new view: **customer demographics**. By default, all columns in both tables are selected, you can include or exclude any of the columns as needed.

__4. Select all columns from the customers table, and generation column from the generations table

__5. Click **refresh** to display the view. The results show appear as follows: Then Click **Finish**

Create a view of tables

New table name:

Select Items

Q Find

- customers
- generations

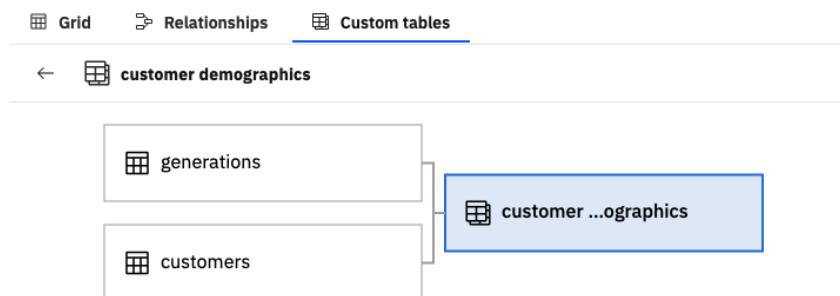
Invert Clear all

Row Id	customer_id	home_store	customer_first-name	customer_email	customer_since	log
1	1	3	Kelly Key	Venus@adipiscing.edu	2017-01-04	90
2	2	3	Clark Schroeder	Nora@fames.gov	2017-01-07	03
3	3	3	Elvis Cardenas	Brianna@tellus.edu	2017-01-10	45
4	4	3	Rafael Estes	Ina@non.gov	2017-01-13	57
5	5	3	Colin Lynn	Dale@Integer.com	2017-01-15	34
6	6	3	Igor Beach	Caleb@morbi.net	2017-01-18	11
7	7	3	Scott Holden	Yen@Integer.edu	2017-01-21	38
8	8	3	Keegan Ayala	Tana@sociis.com	2017-01-24	25
9	9	3	Amir Byers	Madeson@malesuada.us	2017-01-26	93
10	10	3	Magee Malone	Anjoie@sapien.gov	2017-01-29	35
11	11	3	Dolan Petty	Kim@conwallis.edu	2017-02-01	54
12	12	3	Wang Hebert	Hollee@lorem.net	2017-02-04	60
13	13	3	Wayne David	Slade@sapien.edu	2017-02-06	43

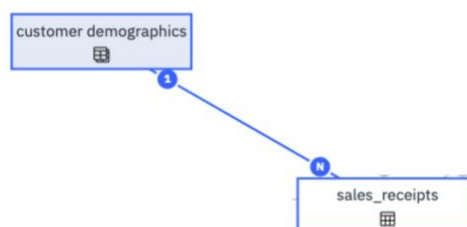
(13) columns selected.

Previous Cancel Finish

The custom tables diagram is displayed after you finalize the view creation, it can be modified by right-clicking on it and then selecting **Edit table view**

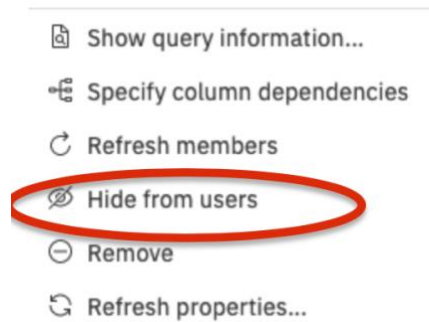


__6. Once you create the **customer demographics** view, it needs to be joined to **sales_receipts** table by the **customer_id** column. Create a new join (cardinality: one to many) between **customer demographics** and **sales_receipts**. The new join should look like this:

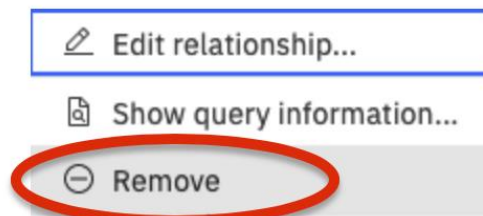


3.5 Hiding Tables from the user's view

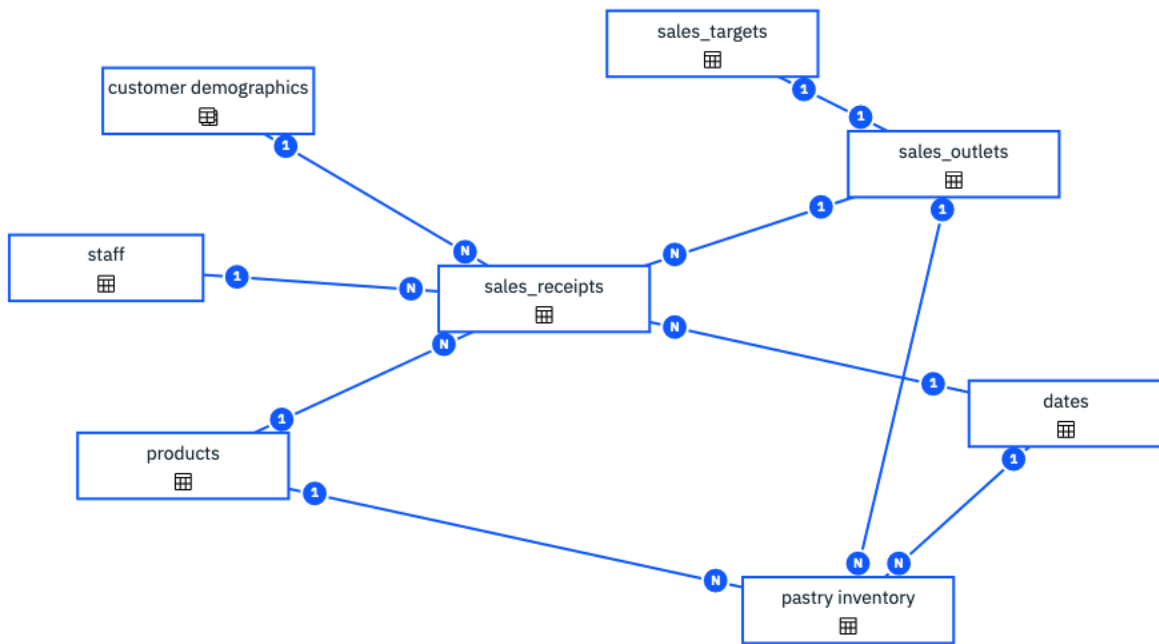
__1. You can now **hide** the source tables used to create the **customer demographics** view. To hide a table from the user's view, you can right click the tables **customers** and **generations** and select **Hide from users**.



__2. The join between **customers** and **sales_receipts** is no longer needed. Any user interaction between sales_receipts and the customer demographic data will be joined via the customer demographics view. Remove the relationship between customers and **sales_receipts**. Right-click the relationship and click **Remove**.



The new combined relationship diagram looks like this:



__3. **Save** the data module.

3.6 Working with multiple fact tables – Column Dependencies

You can define column dependencies to ensure that the fact data is aggregated correctly based on the keys or attributes of those keys that are used in the query. The column dependency groups are related to each other in a hierarchy group in an order from coarse to fine granularity. You do not need to specify column dependencies for all tables. Do it only when double-counting would take place. Your decision to specify column dependencies affects other Cognos Analytics components, such as reports or dashboards.

Note: Column dependencies are not inherited for custom tables. Any table object is considered independent, and if necessary, requires its own explicitly defined column dependencies to prevent double counting. Column dependency is an equivalent of determinants in Framework Manager. However, column dependency provides more flexibility because you can specify more than one hierarchy per table, view, query subject, or data set.

In the data model, select the **sales_targets** table click grid. You can see how this data is aggregated at the month level while the **sales_receipts** table is aggregated at the day level. Column dependencies are needed for queries that combine both fact tables.

___1. First, let’s create a join between **dates** and **sales_targets**, select both tables (in that order) in the Relationship diagram or in the Data module left pane, **right-click** them and select **New Relationship**

The two joining columns are month and year. The columns names don’t need to match; first, from **dates** select **Month_ID** then select **month** from **sales_target** and click **Match selected columns**; Repeat this same step between **Year_ID** from **dates** and **year** from **sales_target**; then click **Refresh** to update the joined data sets. The results should appear as follows:

Match selected columns

Week_ID	Week_Desc	Month_Name	Quarter_ID	Quarter_Name	Month_ID	Year_ID
14	Week 14	April	2	Q2	4	2021
14	Week 14	April	2	Q2	4	2021
14	Week 14	April	2	Q2	4	2021
14	Week 14	April	2	Q2	4	2021
14	Week 14	April	2	Q2	4	2021

Inner join, 1-to-many
No filtering

Matched columns (2)

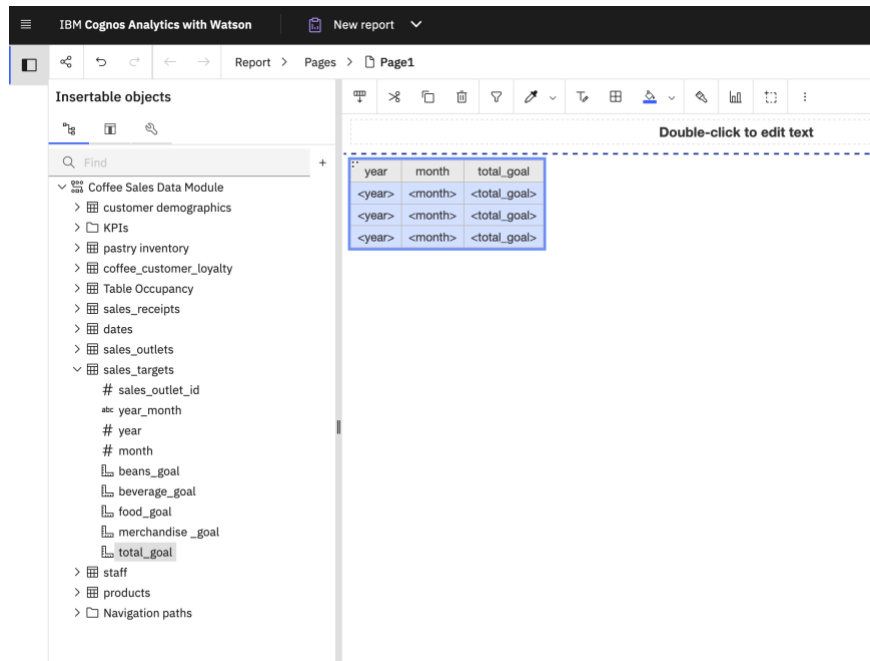
Cancel OK

Click **OK** to save the join

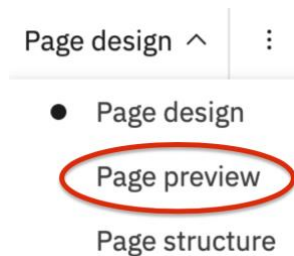
__2. Verify the double counting issue by testing the data. First display the results from a single table query. **Click Try this data module in Reporting**



Create a simple list that shows: Year, month and total_goal from sales_targets as follows:



Then click **Page preview** in the upper right corner to display the results of the data



Notice the correct output values for April and May for total_goal

year	month	total_goal
2021	4	159,500
2021	5	153,950

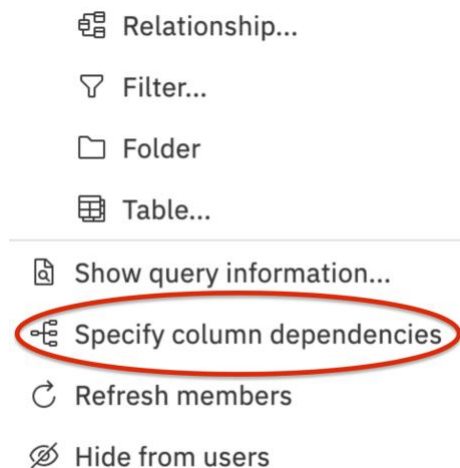
__3. Verify the issue by adding into the testing list: **Month_Name** from the **dates** table and **unit_price** from the **sales_receipts** table, this generates a multi-fact query between 3 tables (dates, sales_receipts and sales_targets). The results are correct for **unit_price** (as average), but incorrect for **total_goal**.

year	month	total_goal	Month_Name	unit_price
2021	5	4,618,500	May	
2021	4	4,785,000	April	\$3.38

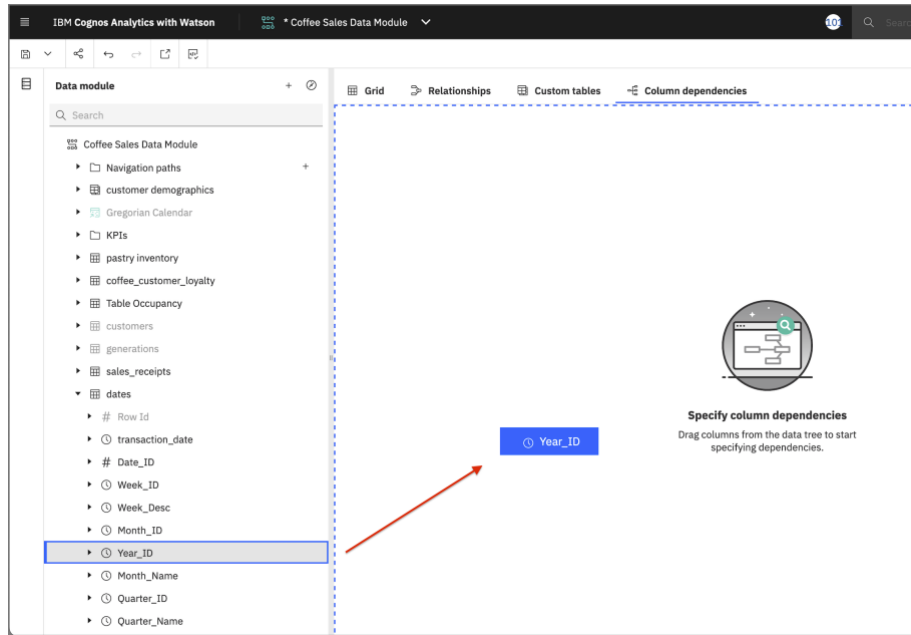
This happens because total_goal is double counted for every day-level record from the dates and sales_receipts tables. The **sales_targets** data rolls up at the month level and the **sales_receipts** table rolls up to at the day level. Column dependencies reflect granularity by representing hierarchies or groups of data in a table and are used to ensure correct aggregation of this repeated data.

Close the testing report browser window

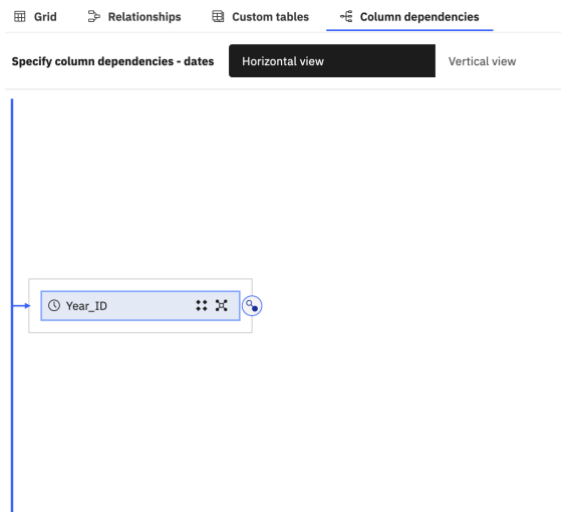
__4. Let's fix this issue by adding column dependencies for the **dates** table. In the data module, **Right-click** the **dates** table and select **Specify column dependencies**



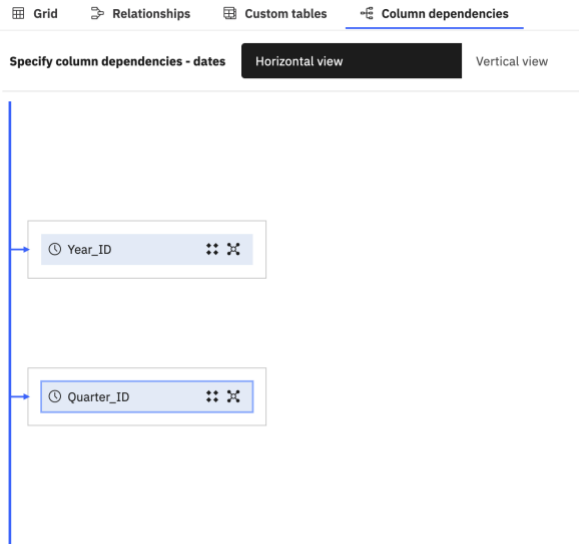
__5. We need to create a column dependencies hierarchy for the dates table to establish the proper rollups for Year, Quarter, Month, Week and Day. In the **Column dependencies** menu, drag and drop **Year_ID** from the **dates** table into the canvas and release it, as follows:




The resulting output will look like this:



___6. Repeat the previous step and drag and drop **Quarter_ID** from the **dates** table into the canvas' white area, the result should look as follows:

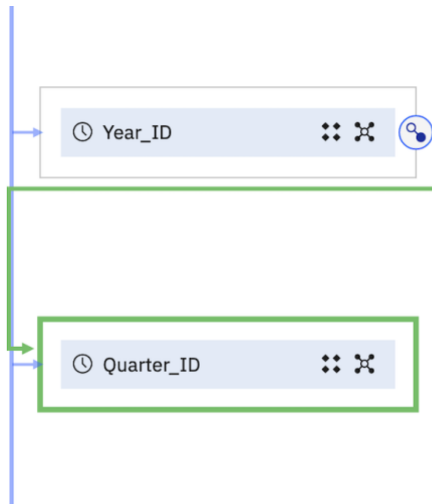


If the lines look different or you don't see the same results, you can click **Undo**  and try it again.

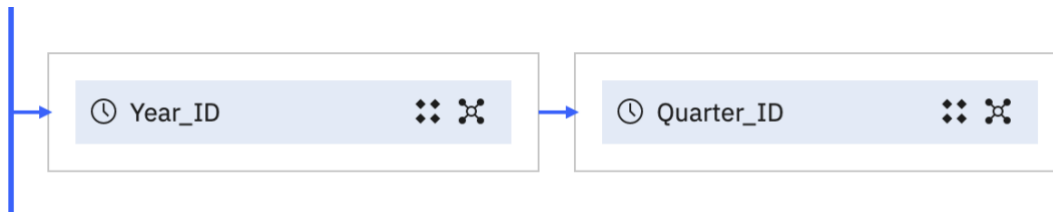
___7. To properly link and set the hierarchy as a parent-child relationship, we will use the link connector available at the right-hand side of the **Year_ID** box. You enable it by selecting the square area of the box




Once the link connector becomes available, **drag** a line from this connector to the beginning of the **Quarter_ID** box, then release the mouse cursor when the **Quarter_ID** box is marked in green, as follows:

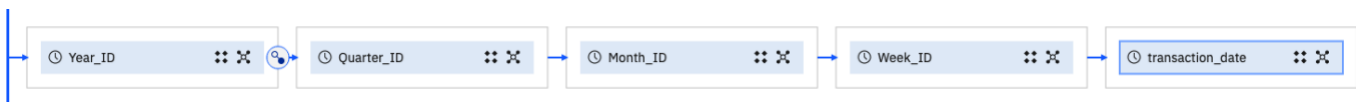


After the cursor is released, the parent-child relationship of the hierarchy is established and will look like this:























If the lines look different or you don't see the same results, you can click **Undo**  and try it again.

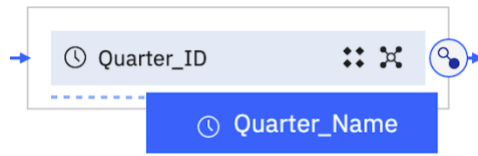
__8. Add **Month_ID**, **Week_ID** and **transaction_date** into the canvas's white area (so the columns become available for the hierarchy setup). Repeat (3 times) the previous step to set links from **Quarter_ID** to **Month_ID**, from **Month_ID** to **Week_ID** and from **Week_ID** to **transaction_date**. The completed hierarchy should look like follows:



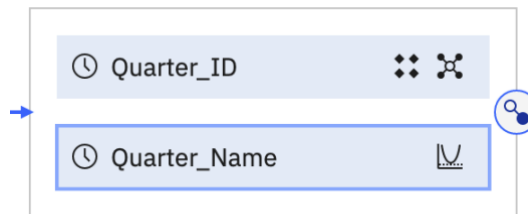
The remaining columns (not yet selected) in the **dates** table will show up a warning message to its left indicating the following: *Warning for Date_ID column: MSR-VRF-2193 Column "Date_ID" is not in a column dependency group. If it is used in a query, no column dependency will be applied for the query.* To fix this warning, we need to add the columns to their respective hierarchy level to set up the proper dependencies.

-  ▾  dates
-  ▶ # Row Id
-  ▶  transaction_date
-  ▶ # Date_ID
-  ▶  Week_ID
-  ▶  Week_Desc
-  ▶  Month_ID
-  ▶  Year_ID
-  ▶  Month_Name
-  ▶  Quarter_ID
-  ▶  Quarter_Name

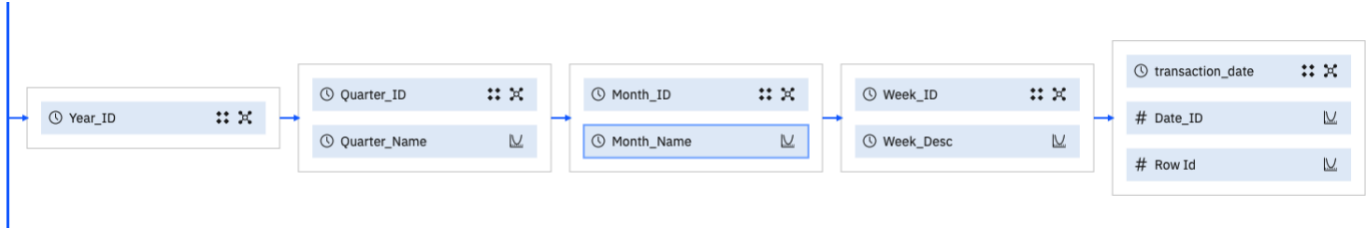
__9. Drag and drop **Quarter_Name** underneath **Quarter_ID** (inside the box), release the mouse once you see the blue dotted line underneath **Quarter_ID**. As follows:



After the column is dropped, the Quarter level in the hierarchy will look like this:



__10. Repeat the previous step to add the remaining columns (Row Id, Date_ID, Week_Desc, Month_Name) into the corresponding levels of the hierarchy. The finalized hierarchy of column dependencies should look like this:



Save the data module

__11. Repeat the testing process shown in Steps __2. and __3. Verify the that the List query now displays the correct results for total_goal aggregated at the **month** level. The testing values are:

year	month	Month_Name	total_goal	unit_price
2021	5	May	153,950	
2021	4	April	159,500	\$3.38

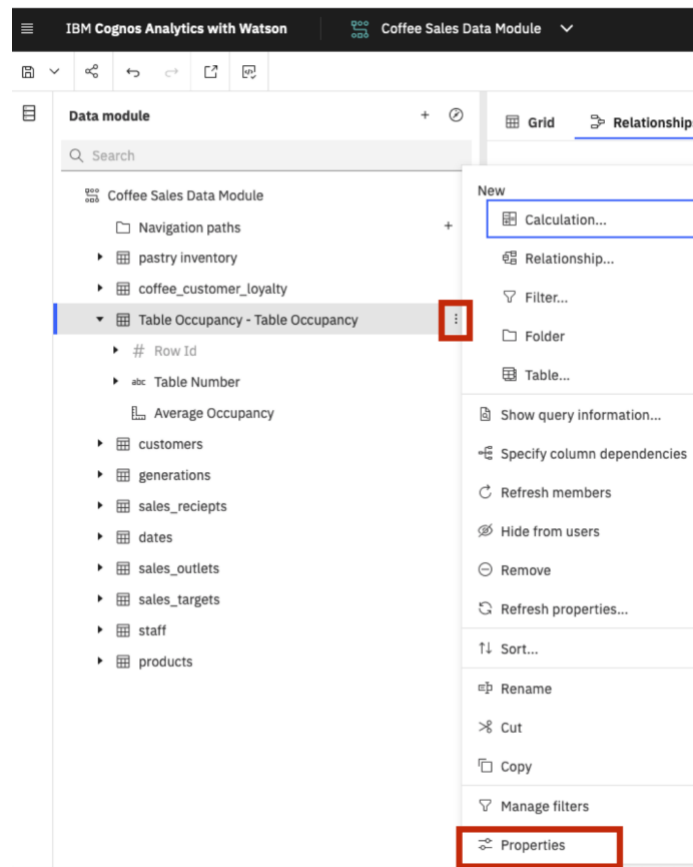
You have successfully created column dependencies in this data module.

4 Customizing the Data Module

4.1 Working with Table Properties

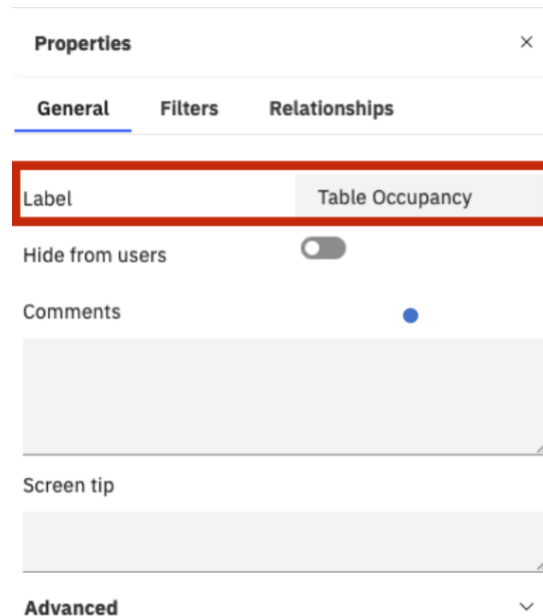
You can modify the properties of the data tables for better usability for your business users working with the data module: table names, comments and screen tips, data usage types, etc.

1. Click the **Table Occupancy – Table Occupancy** table (uploaded from an Excel spreadsheet). Click the vertical **ellipsis (...)** to the far right of the table name to open the options. Select **Properties**.



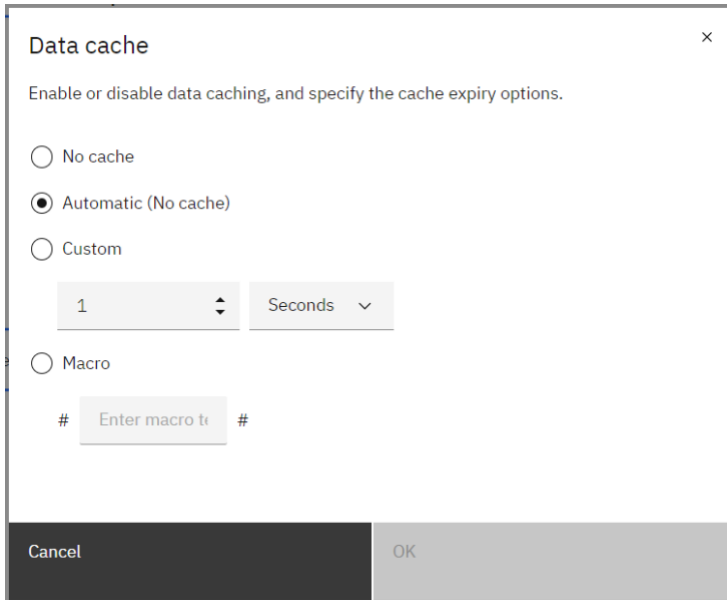
You can see in the context menu that we could also create relationships from this interface, as well as many more actions which are covered later in the workshop.

- __2. The **Properties** panel opens to the **General** tab. From here you can change the label, choose to show/hide the table to users, and add comments and screen tips for the table. Change the **Label** to “*Table Occupancy*” and click **Enter** (or return if you are on a Mac)

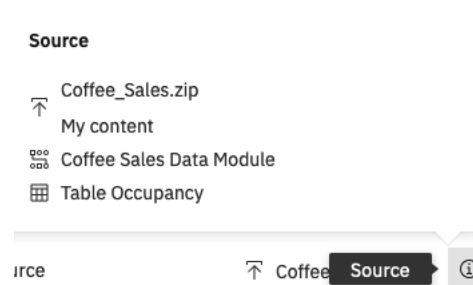


- __3. Enter **Comments** or a **Screen tip** if you desire.
- __4. Click the down arrow next to **Advanced** to show the list of advanced features for this table. This section shows you the table identifier, allows you to set the table usage and data cache, and shows the data source for the table (in this case the original uploaded file’s name), folder containing the data file, and the name of the table created in the data module.
- __5. The **Usage** property allows you to set the usage for the table:
- **Automatic.** Specifies that the query engine will detect if the query subject is a dimension or a fact.
 - **Bridge.** Specifies that the query subject refers to a bridge table.
 - **Summary.** Specifies that the query subject will be treated as a summary query.

- __6. **Data cache.** You may use the data cache rules to enable or disable data caching and specify the cache expiry options.

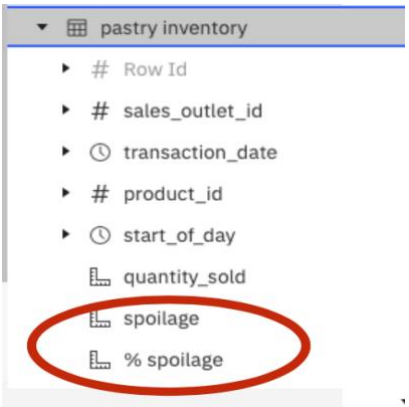


- __7. The **Source** property provides the user with lineage information.



For the purposes of this workshop, you will make no changes to the Properties settings at this time. You will work more with Properties later in the workshop.

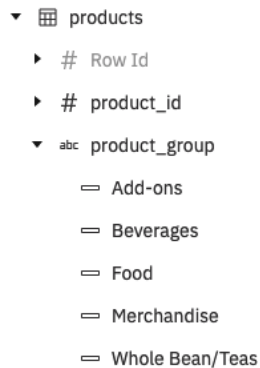
- __8. Close the **Properties** panel by clicking the **X** icon in the upper right corner of the panel.
- __9. Repeat these steps 1. and 2. Above to **Rename** table sales_reciepts, as the file name is misspelled, the new file name should be **sales_receipts**.
- __10. Also, **rename** columns **waste**, **% waste** under the **pastry inventory** table, the new names are **spoilage** and **% spoilage**



__11. **Save** the data module.

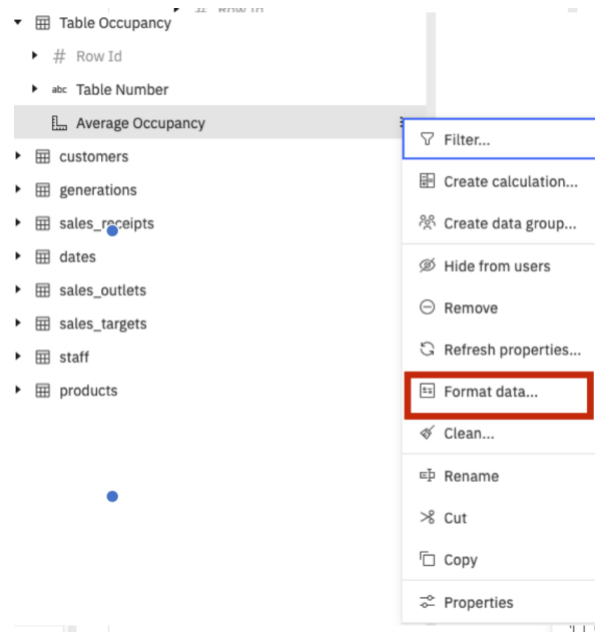
4.2 Working with Data Properties

1. As you look at the data items listed, you will notice many of the data items have Expand arrows next to them. This allows the user to open the metadata tree to see individual values or members. From the **products** table, click on the **Expand** arrow next to **product_group**. Click again to collapse the member tree.

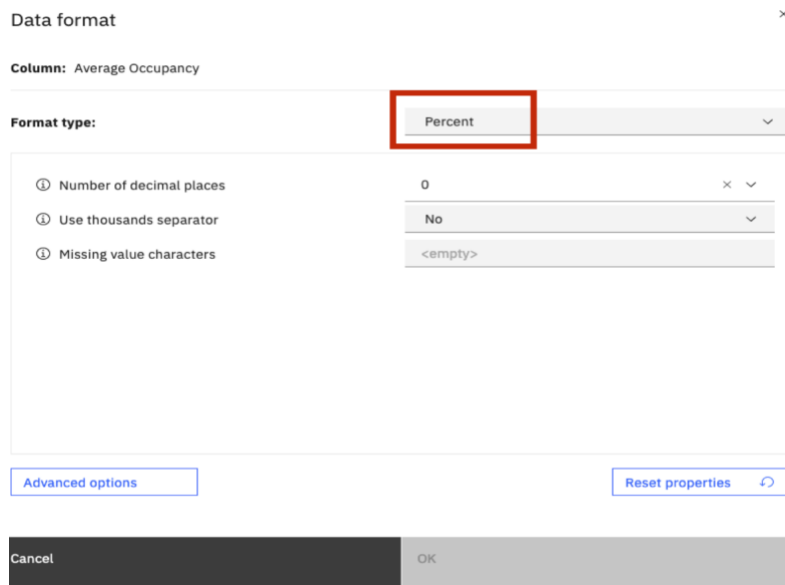


2. **Hidden fields.** Notice that **Row Id** is greyed out. This indicates the item will be hidden from the report author's view, for example when they use this data module to create a dashboard.
3. **Usage Type.** The icons next to the field names indicate the data type setting.
 - **# Numeric fields.** The hashtag icon next to an item indicates it's a numeric field used as an identifier.
 - **abc Alpha-numeric fields.** This icon next to an item indicates it's an alpha-numeric field used as an identifier or attribute.
 - **Location.** The pin icon indicates the field is a location dimension which may be used for geospatial mapping.
 - **Measures.** The ruler icon next to an item indicates it's a measure.
 - **Time.** The clock icon indicates the field is a time dimension.

4. Similar to the context menu options you saw earlier for tables; data items also have many options. Expand the **Table Occupancy** table. Click the ellipsis icon to the right of **Average Occupancy** and select **Format data...**

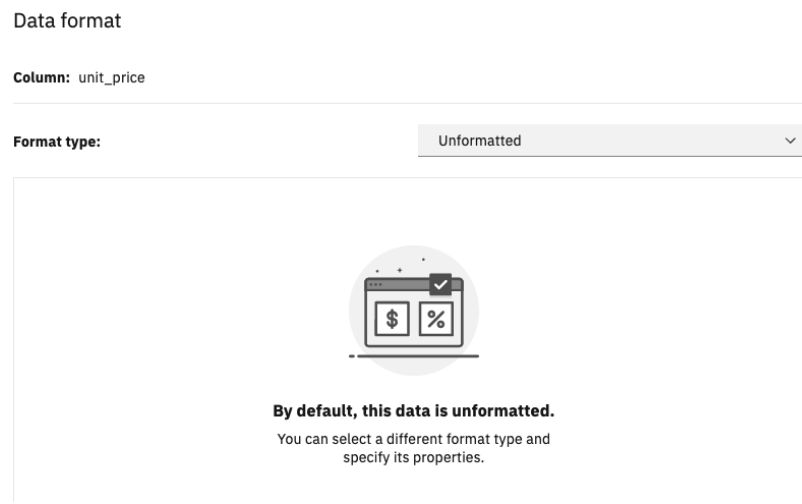


5. The **Data format** dialog opens. Click the down arrow next to **Format type**. Verify that the value is **Percent**. This setting was assigned automatically based on Cognos Analytics having recognized a data format previously set in the uploaded file. A list of additional formatting settings for percent are presented. Users are also able to assign a value for missing value characters.



6. For this workshop, we will not make any changes to the **percent** settings. Click **Cancel**. This will maintain the default format of a leading currency symbol and two decimal places.


- __7. Under the table **sales_receipts**, repeat these steps to verify that **unit_price** and **line_item_amount** are set to **Currency**. Originally, these 2 items are set to **Unformatted**



Data format ×

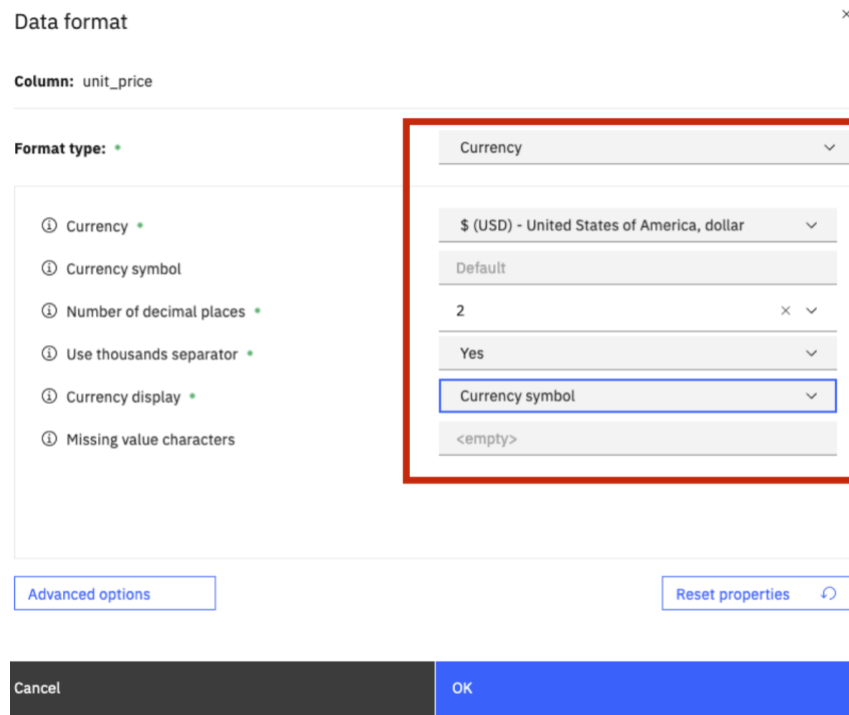
Column: unit_price

Format type: Unformatted ▾



By default, this data is unformatted.
You can select a different format type and specify its properties.

- __8. **Change** the format type to **Currency** and make sure the additional format options are set. Click **OK**. Do the same for **line_item_amount**



Data format ×

Column: unit_price

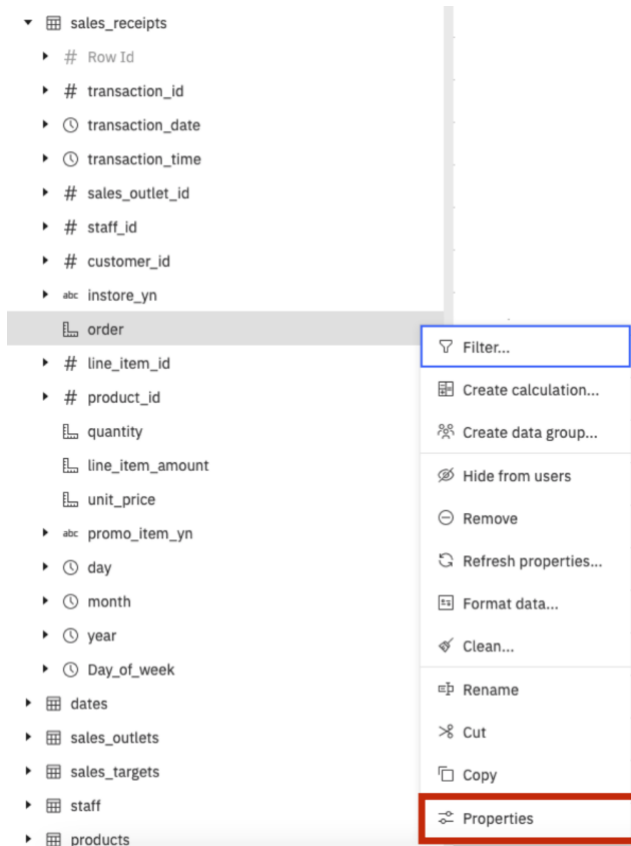
Format type: Currency ▾

- ① Currency •
- ① Currency symbol
- ① Number of decimal places •
- ① Use thousands separator •
- ① Currency display •
- ① Missing value characters

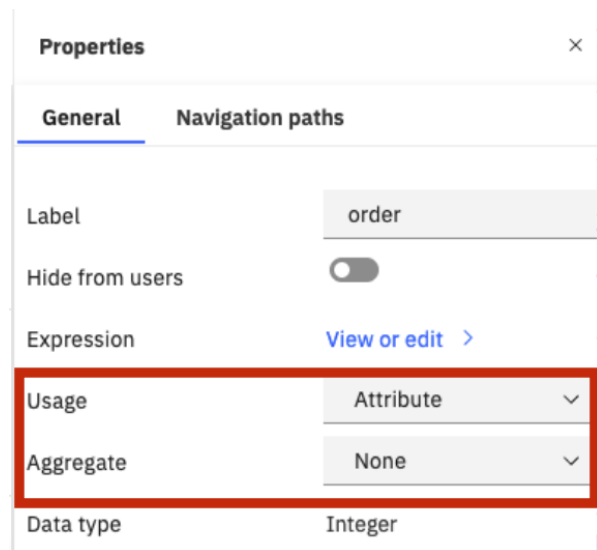
Advanced options Reset properties ↻

Cancel OK

- __9. **Change** the **usage** property of column **order** under the **sales_receipts** table. Click the vertical ellipsis (...) next to the **order** column and select properties.



__10. Under **Properties**, set the **Usage** to **Attribute** and the **Aggregate** option to **None**. Despite being an integer, order numbers shouldn't be rolled up as a metric. **Order** should be set as an attribute.

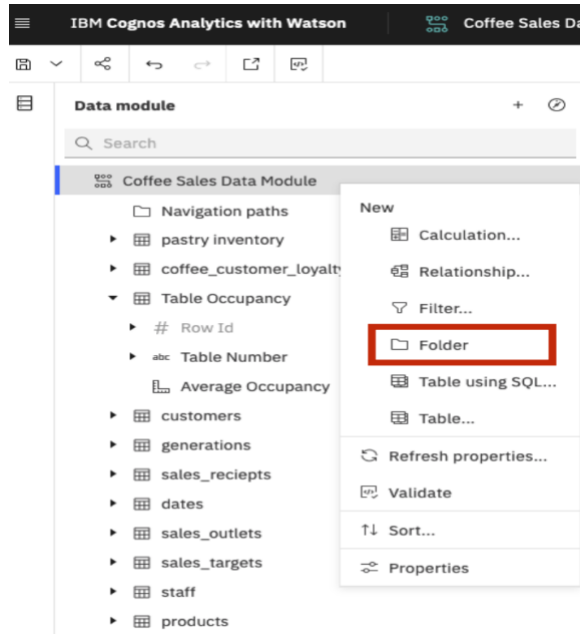


__11. **Save** the data module.

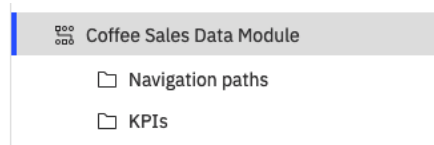
4.3 Working with Folders

The **Coffee and Sales Data Module** contains a lot of great information regarding customer data, location, stores, demographics, and purchase history. You want to add a folder to include key additional calculations.

1. Right-click the **Coffee Sales Data Module**. In the context menu, under **New**, select **Folder**.



2. Name the folder “KPIs”.



You can use drag and drop to reorder the tables and folders to display them in your preferred order

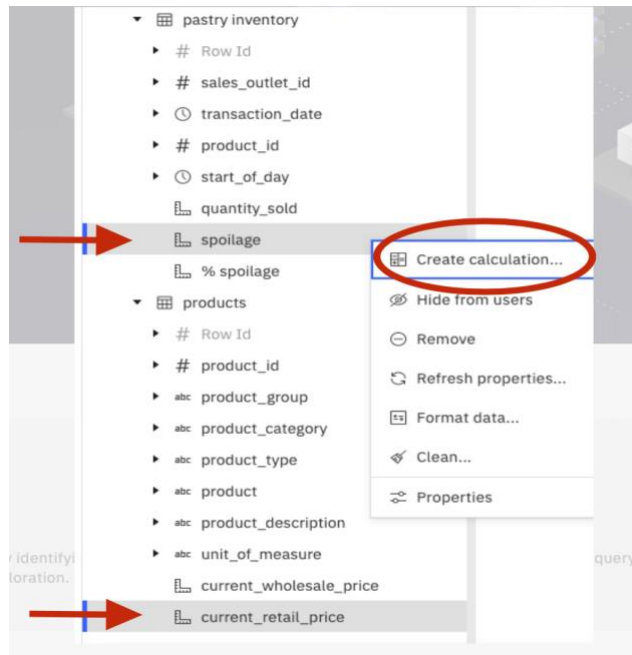
3. **Save** the data module.

4.4 Create a Calculation

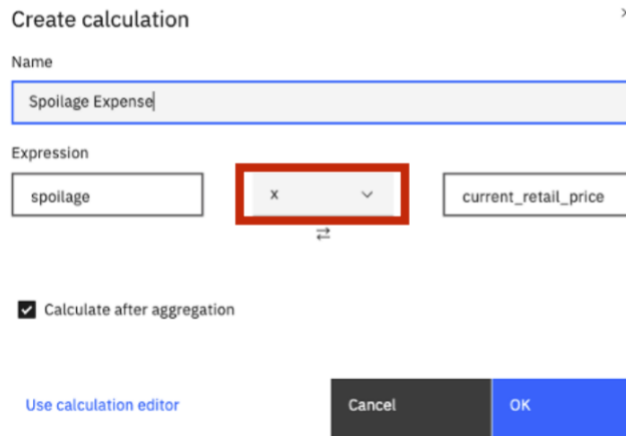
You can add key calculations in different ways and leverage several functions in the formulas as required; for example, you can multiply the number of units wasted (spoilage) by their retail cost, a weighting to reflect the cost to the Coffee Shop. You can also preview the calculation results to check if the values are correct.

By adding this calculation to the data module, it will be **reusable** anywhere in the analysis. Users will not need to rebuild the calculation themselves each time is needed in their dashboards, reports, etc.

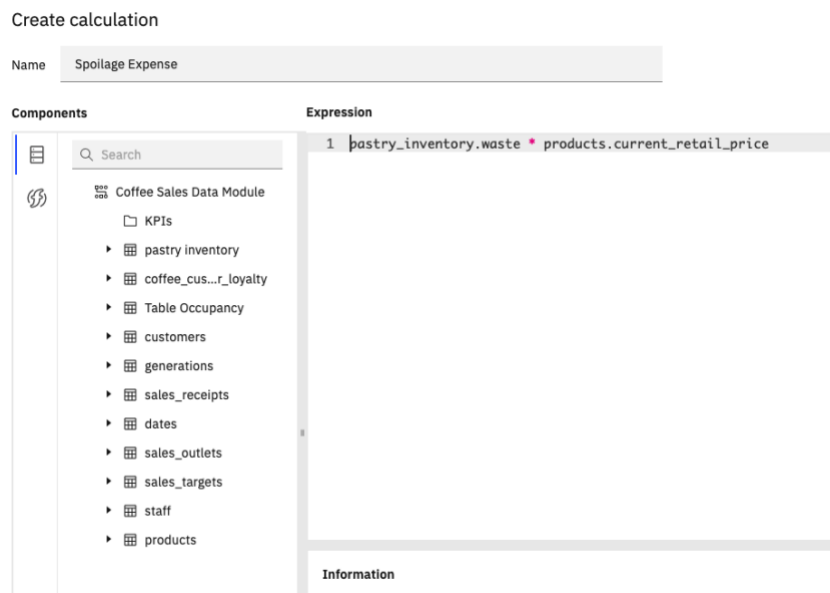
1. Cognos Analytics provides both simple and complex calculation capabilities. You will start with a simple calculation. Create **Spoilage * Current Retail Price** Calculation, name it: **Spoilage Expense**, you can accomplish this by selecting both columns (via CTRL click) and then selecting Right Click/ Create Calculation. **current_retail_price** is available under the products table as follows



2. The **Create calculation** dialog appears. This dialog box allows the user to create a simple calculation. Users can select two fields and select from the basic operators for addition, subtraction, multiplication, division, percentage, and percentage change calculations. Type **Spoilage Expense** in the name textbox. Use the pull-down arrow to select the **multiplication** operator.






- ___3. At this point, Cognos Analytics will create the underlying calculation. However, users can create more complex calculations using the Calculation Editor. Click **Use calculation editor** in the lower left corner to open the full calculation dialog box. You can now see the expression that Cognos Analytics created for you from the previous dialog box.

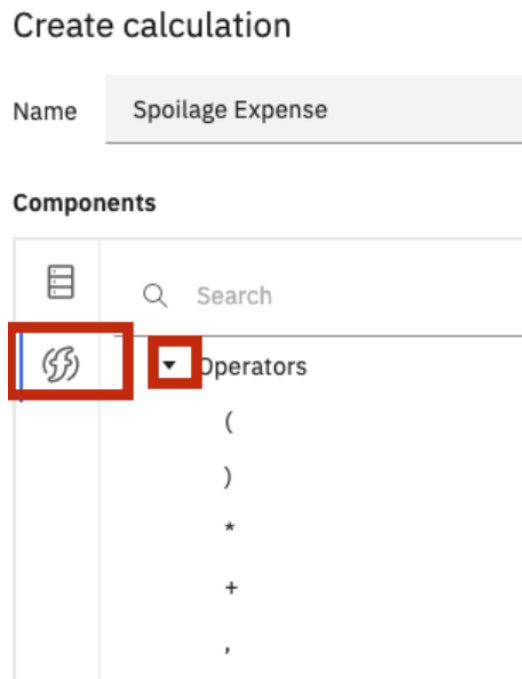


- ___4. The Calculation Editor provides many capabilities in a toolbar to make it easy for you to create, document, evaluate and test your expressions

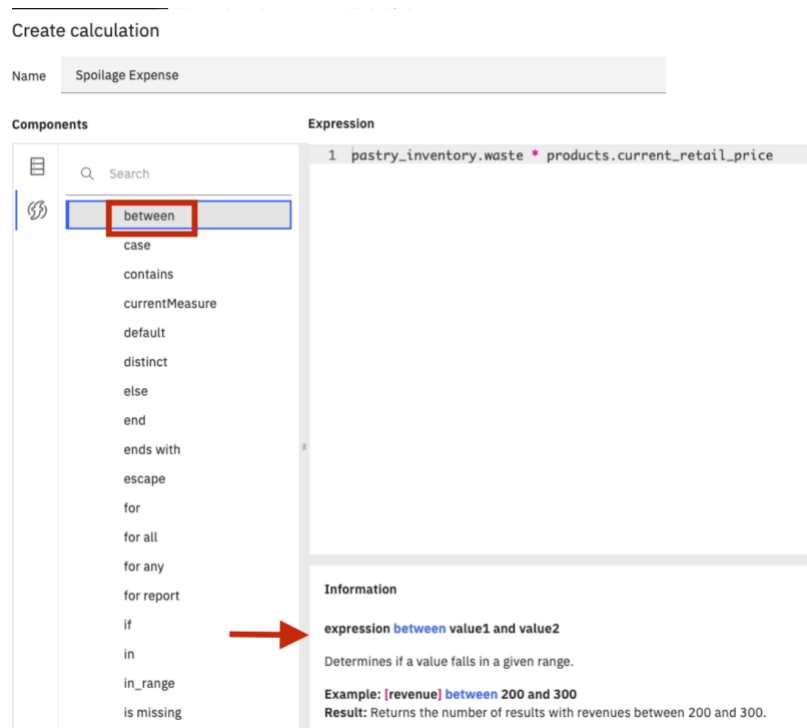
- **Information.** Provides the user with additional context and assistance.
- **Preview.** Provides a sample rendering of the calculation results along with the Execution time to run. Click **Preview**. Results appear in the lower right window.
- **Validate.** Validation allows users to test their calculation to ensure no errors occur. Click **Validation**. Results appear in the lower right window.

-  **Comment.** Allows users to insert comments within the calculation itself; to make notations throughout the expression. Click **Comment**. Notice that the calculation is greyed out and preceded with the familiar “//” used in SQL. Click **Comments again** to uncomment the calculation.
-  **Prettify.** Restructures the calculation expression into a more readable format for users. E.g., When a CASE WHEN expression is in one long block of text that wraps across lines, prettify will clean it up and break it out into shorter segments with each condition clause on a separate line.
-  **High Contrast Mode.** This mode reverses the color scheme in the expression editor. This provides black background with light text some users prefer. Click **High Contrast**. Click **again** if you wish to restore the original background.
- **Font.** The default font size for the expression editor is 14. Users may increase or decrease the font size used.

__5. Click the **Functions** tab on the far-left navigation panel and click the **arrow** to expand **Operators**. Here, you are presented with the full scope of mathematical operators and commands to create complex calculations.



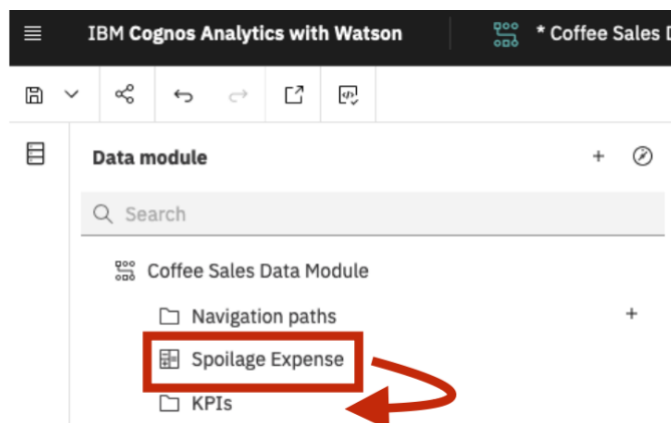
__6. Scroll through the list and select various operators. View the syntax for the operator in the bottom right window.



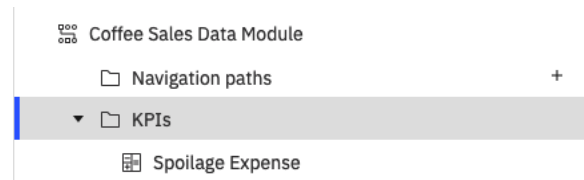
- _7. You can also use the **Search** to find functions. On the **Functions** tab, type “average” into the **Search** field. Click on **average** in the results list to view the function’s syntax.

- _8. Click **OK** to save the calculation and return to the data module

- _9. **Move** the recently created **Spoilage Expense** calculation to the Folder called **KPIs**. You can move it by dragging and dropping the calculation on top of the Folder **KPIs**



__10. The **KPIs** folder should look like this:

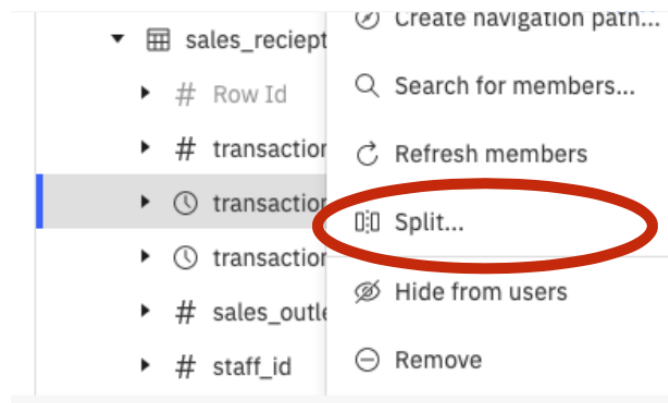


__11. **Save** the data module.

4.5 Self-service data preparation

If you need to do some more granular data transformations for any column, you have several built-in self-service data preparation options that will help you in this process. For example, you can split the date column into its component parts and add 'day of the week'. You don't need to use a calculation to do this –Cognos Analytics has the functionality built in!

__1. **Split** Column **transaction_date**: Under the **sales_receipts** table, **right click** the column **transaction_date** and select **Split**



__2. Then **select** Year 2021, Month 4, Day 19 to create 3 different split columns and select *Include the day of the week* check box. Your selection should look like this:

Split column - transaction_date


Select the items that will be used to create new columns.

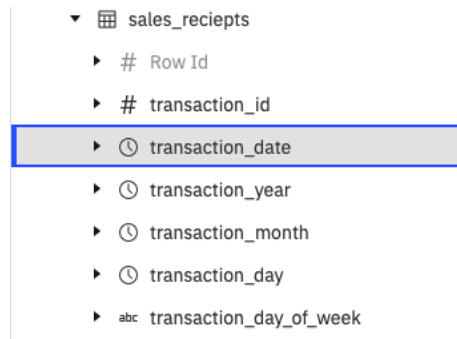
Year **Month** **Day**

2021 4 19 Include the day of the week

Preview

transaction_date	Year	Month	Day	Day of the week
2021-04-19	2021	4	19	Monday
2021-04-24	2021	4	24	Saturday
2021-04-08	2021	4	8	Thursday
2021-04-13	2021	4	13	Tuesday
2021-04-06	2021	4	6	Tuesday
2021-04-12	2021	4	12	Monday
2021-04-02	2021	4	2	Friday
2021-04-09	2021	4	9	Friday
2021-04-28	2021	4	28	Wednesday
2021-04-22	2021	4	22	Thursday

- __3. Then select **Next**, you can modify the new split columns and rename them accordingly by clicking the Edit pencil button . Use the following new names for the 4 new columns: **transaction_year**, **transaction_month**, **transaction_day**, **transaction_day_of_week**, then click **OK**. The new columns are created automatically under the **transaction_date** column:



- __4. You can also do the same with the **time** column –you might want to analyze which hours of the day are the busiest, so you can think about planning promotions and staff shift patterns around these. **Split** column **transaction_time**. Under the table **sales_receipts** Right -click column **transaction_time**, select **Split**, then select Hour 18, to split the column By Hour, click **Next**, and rename the column to: **transaction_hour**

Split column - transaction_time

Select the items that will be used to create new columns.

Hour	Minute	Second	Millisecond
18	53	13	0

Preview

transaction_time	Hour
18:53:13	18
11:03:34	11
06:41:44	6
13:52:48	13
13:55:47	13
14:19:11	14
19:06:21	19
12:42:49	12
14:16:31	14
08:33:58	8

__5. The new column will appear under **transaction_time** as follows:

▶ ⌚ transaction_time
▶ ⌚ transaction_hour

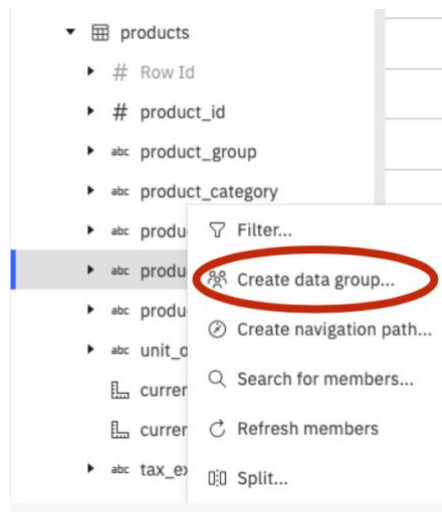
__6. **Save** the data module.

4.6 Create a Custom Data Group

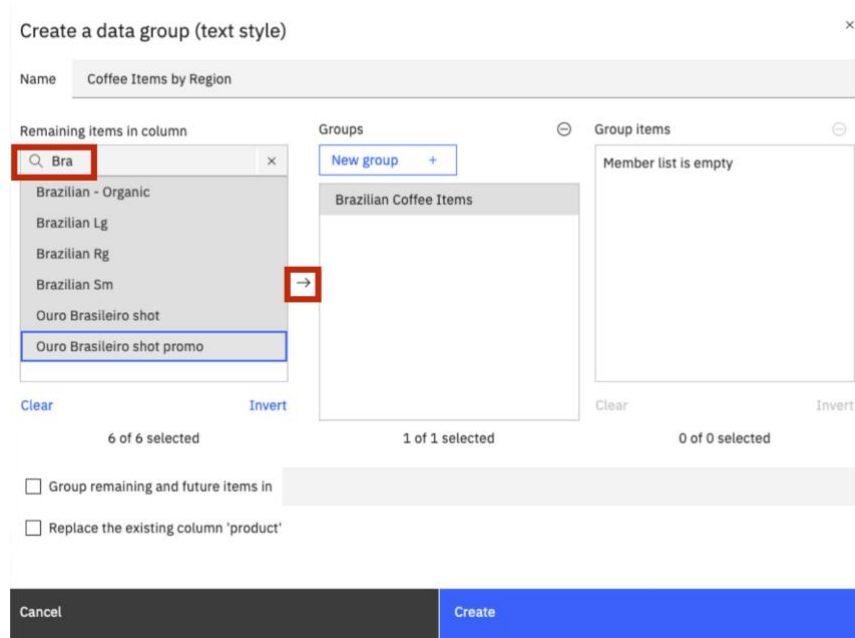
Often, users need to organize data into groups for analysis, sometimes referred to as “binning” or “buckets”. In this exercise we will create custom data groups to identify the place of origin of our coffee products and do further analysis by region.

- ___1. You will create a data group to make analyzing our product sales easier. These are the categories to be created:
 - Brazilian Coffee Items: Items with ‘BRA’ wording in name
 - Colombian Coffee Items: Items with ‘Colombian’ wording in name
 - Ethiopian Coffee Items: Items with ‘Ethiopia’ wording in name
 - Jamaican Coffee Items: Items with ‘Jamaican’ wording in name
 - All Other Items: 70 remaining items will go to this group

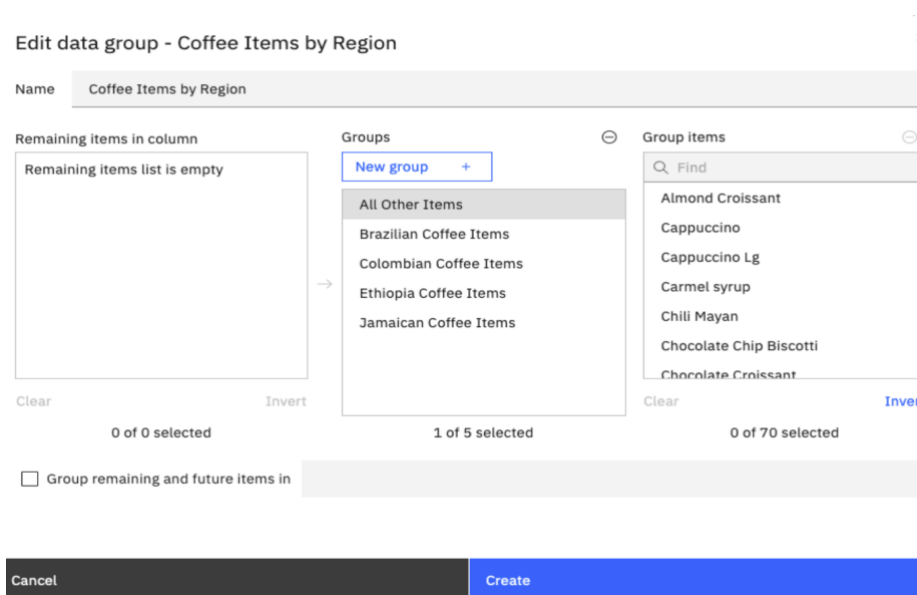
- ___2. Create **data group** called: **Coffee Items by Region**. Under the table **products** right click the column named **product** and select **Create data group**



- ___3. Name the data group: **Coffee Items by Region**, then click **New group**, under the new group type **Brazilian Coffee Items** to change the name; in the Find section type 'Bra', this will list all product items that have the phrase 'Bra' in the name, select all 6 items and click the right arrow to add them to the new group:

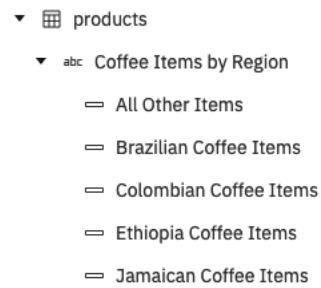


- ___4. Repeat Step 3 to create new groups for **Colombian Coffee Items**, add the 4 listed items; **Ethiopian Coffee Items**, add the 4 listed items; **Jamaican Coffee Items**, add the 4 listed items; **All other Items**, add the 70 remaining items. The groups should look like this:



- ___5. Click **Create**

__6. The new data group is created in the **products** table:



__7. When you created the data group, Cognos Analytics generated a custom calculation in the form of a CASE statement, based on the values you defined for the data group. This can be viewed in the **Properties** section of the Data Group Column, under **Expression**. Click **Close**.

__8. **Save** the Data Module.

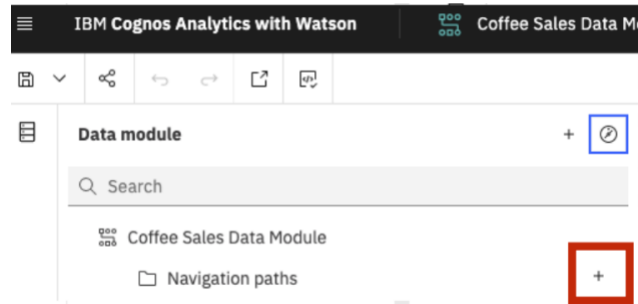
4.7 Create a Navigation Path

A navigation path is a collection of non-measure columns that business users leverage for data exploration. Navigation paths can now be defined in a data module or dashboard to help users easily explore and drill down to see their underlying data. These can be “natural” navigation paths that follow a defined hierarchy, or they can be defined to allow users to navigate and drill down in any order that makes sense for their analysis.

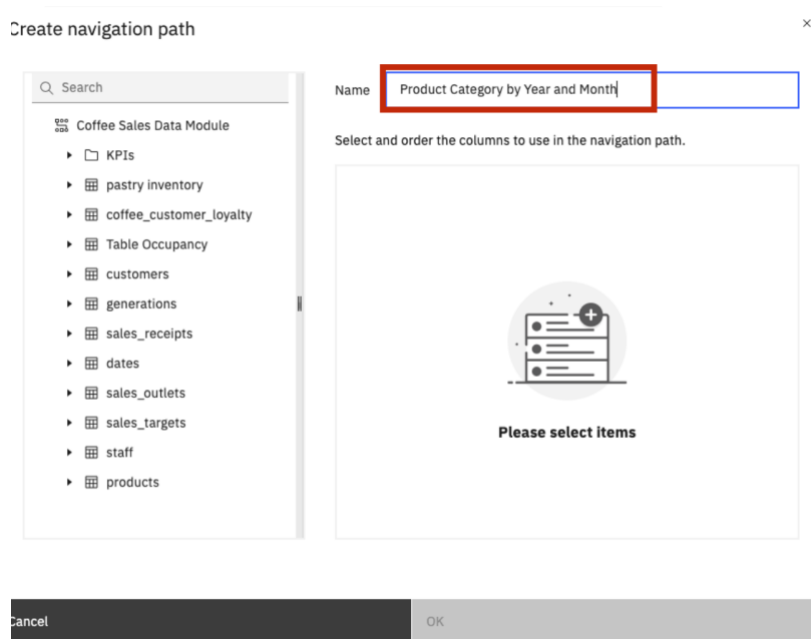
*In traditional BI and OLAP technologies, a drill down action requires a pre-defined hierarchical data structure so that you can navigate the drill down i.e., Year to Month to Day. **Navigation paths** are much more flexible and can accommodate a drill down path that aligns with the thought process users go through to analyze their business.*

For your analysis, you need to explore sales by Year, Month and Product Category, so you will create a navigation path that allows you to drill down in your data on that path.

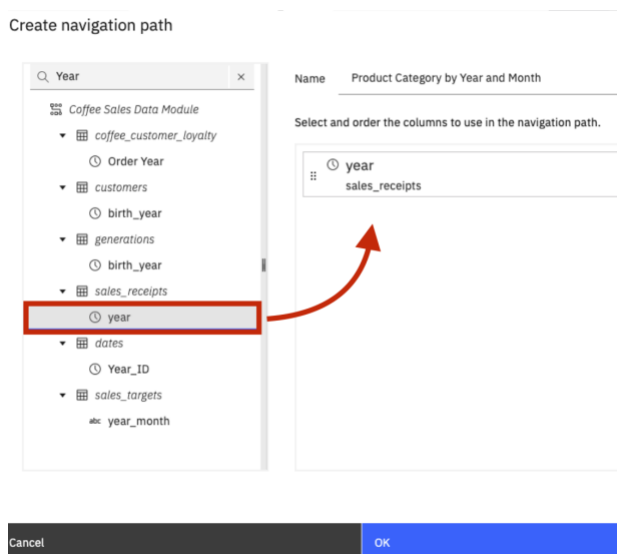
- __1. You are interested in analyzing Product Category performance by Year and month
- __2. From the **Navigation paths** folder select **Create navigation path... +**



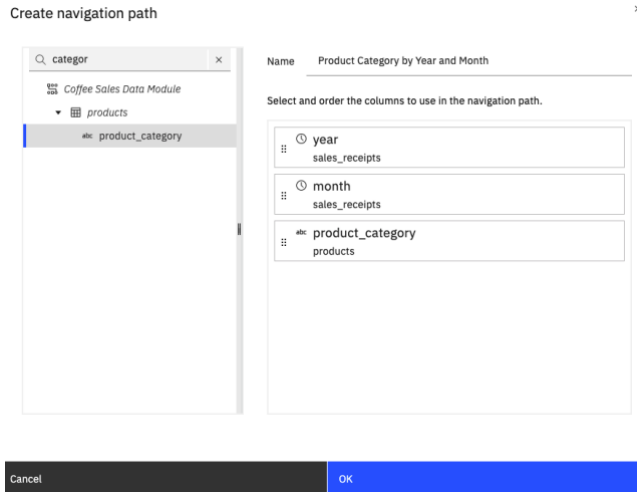
- __3. Type “Product Category by Year and Month” in the **Name** textbox.



4. In the **Search** textbox, type “Year”. Click and drag **year** under **sales_receipts**.



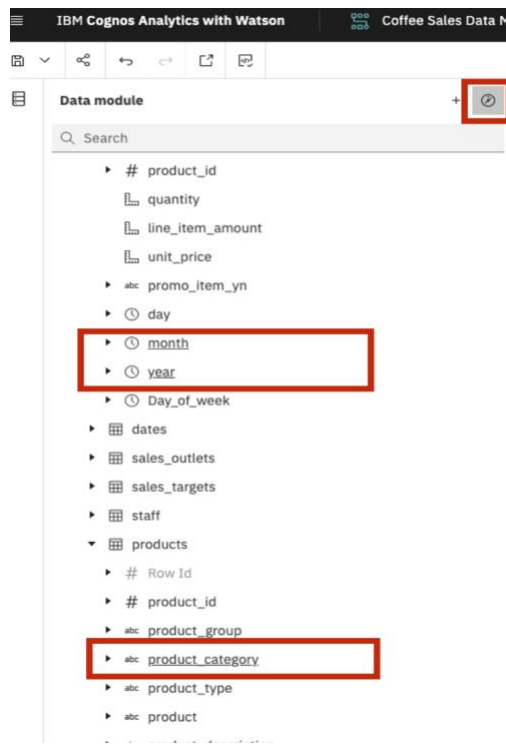
5. **Clear** the search text and **repeat** the previous step to add **month** from **sales_receipts** and **product_category** from **products**. Your navigation path should now appear as follows:



__6. Click **OK**.

The same column may be added to multiple navigation paths.

__7. To identify your navigation path members in the **Data module** panel, click the **Identify navigation path members** icon at the top right corner of the Data Module panel. Each data item used in a navigation group is now underlined to identify its membership.



__8. **Save** the data module.

4.8 Relative Time Analysis

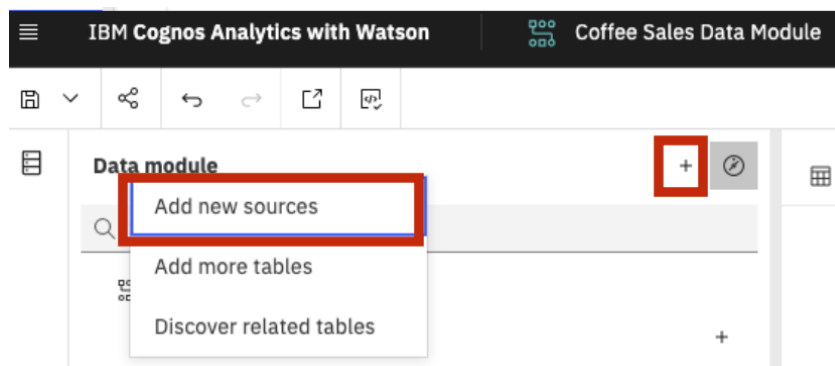
With the relative dates feature, you can analyze measures filtered by date periods that are relative to a particular date. Examples of relative date filters include current quarter, last quarter, quarter-to-date, or month-to-date.

When using relative dates, you can create reports and dashboards that show date-filtered results in different visualizations, crosstabs, and so on. By default, the date-filtered measures in the data use today's date as the reference date in the analysis.

There are two components to the relative date functionality in Cognos Analytics, relative date filters and relative date measures. They are both easy to configure and use. To set them up you need the following:

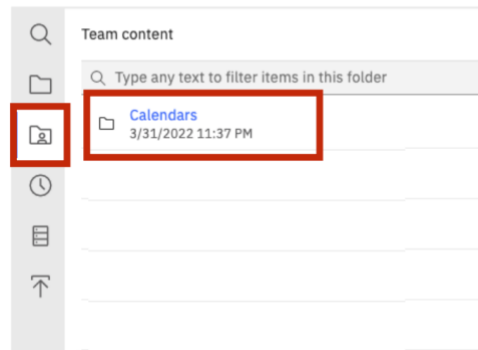
1. *The ability to use data modules*
 2. *Access to the 'Calendars' folder that is available within Cognos Analytics' samples*
 3. *Data that includes a 'date' or 'date/time' data type column*
 4. *The ability to use the linked module feature of Cognos Analytics*
-

1. You are interested in analyzing relative time for **quantity sold** and **line_item_amount** and want to use the provided Gregorian calendar sample starting January 1st for your calendar year, in order to create relative time built-in calculations in the module.
2. From the Data Module upper left section, click **Add Data Sources and Tables** and select **Add new sources**

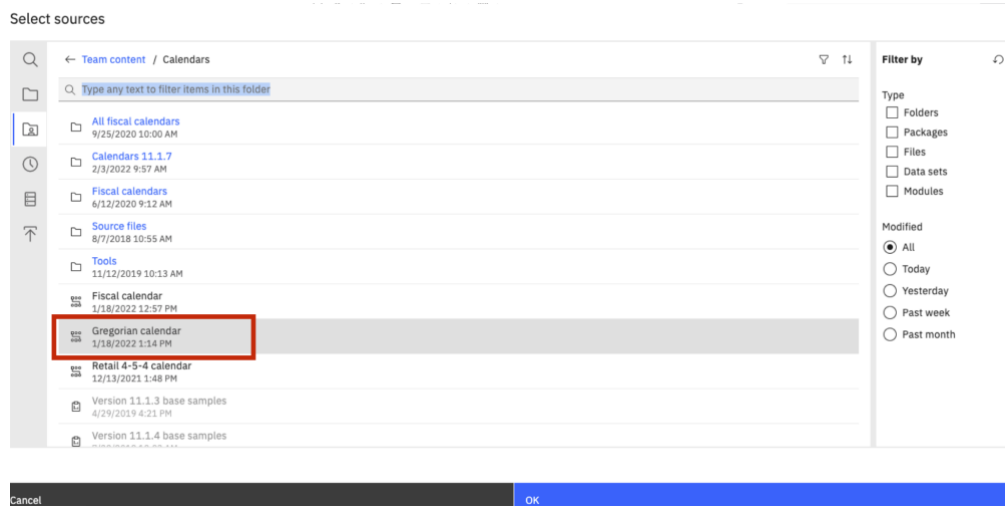


3. In the select sources menu, click **Team Content** on the left to select the folders available, scroll until you find the **Calendars** folder and **select** it.

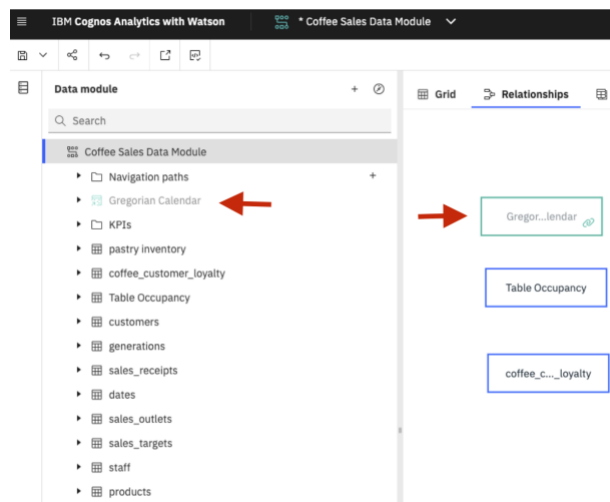
Select sources



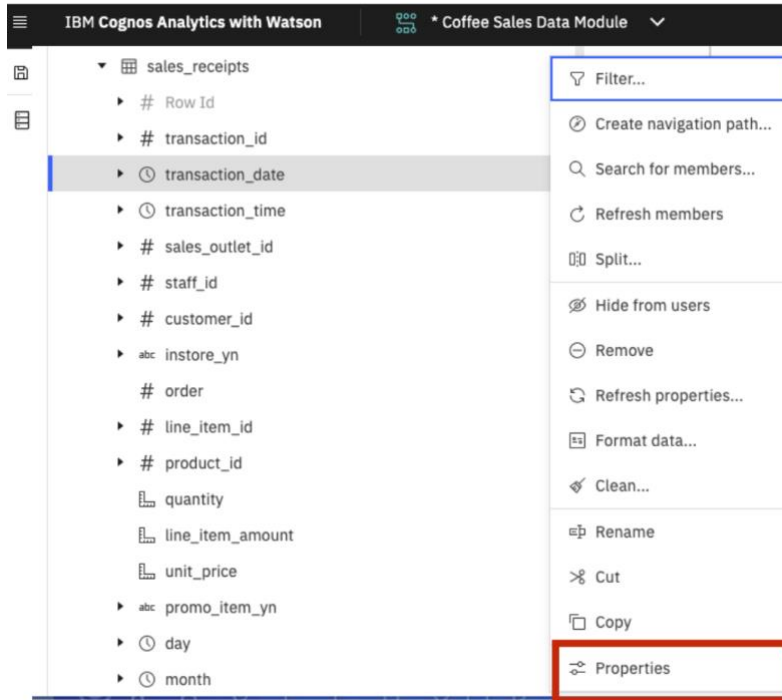
4. The sample Calendar data modules appear; samples include Fiscal Calendar, Gregorian Calendar, Retail 4-5-5 calendar, etc. We will use the Gregorian calendar module sample. **Select** Gregorian calendar. Click **OK**



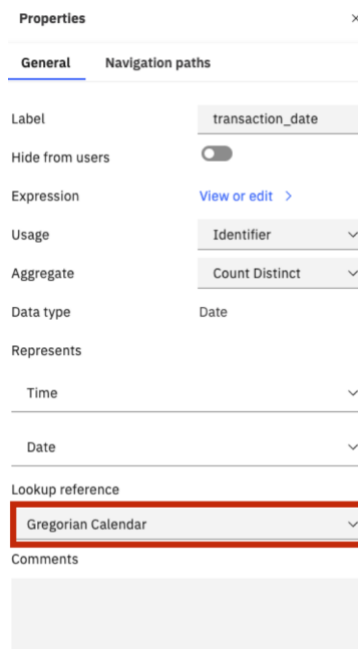
5. The Gregorian Calendar Data module is added to the source table section and to the Relationships diagram. It is displayed and highlighted in a teal color format



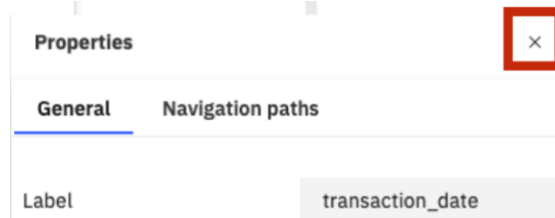
- ___6. In order to set up **Relative Time**, you need to choose a date column that stores your period data. In our case, we can use the **transaction_date** column available under the **sales_receipts** table as it stores the history data of sales. **Right click** the column **transaction_date** and select Properties



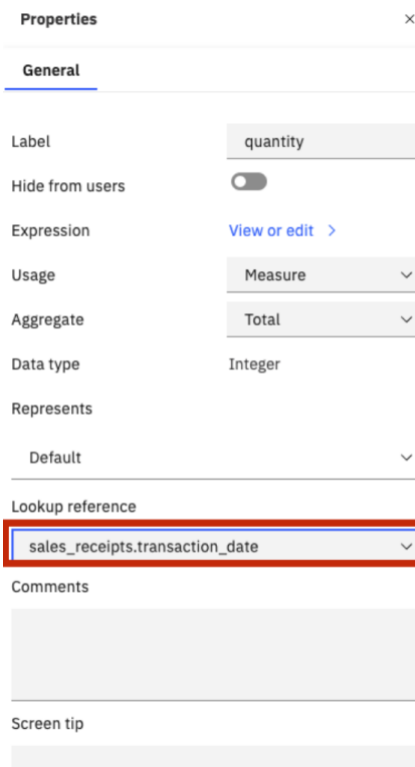
- ___7. Under **Properties**, set the Lookup Reference to **Gregorian Calendar**. This will link the 2 data modules and join them by **transaction_date** (as a lookup reference). Click outside the properties menu to change the focus of the **properties** menu



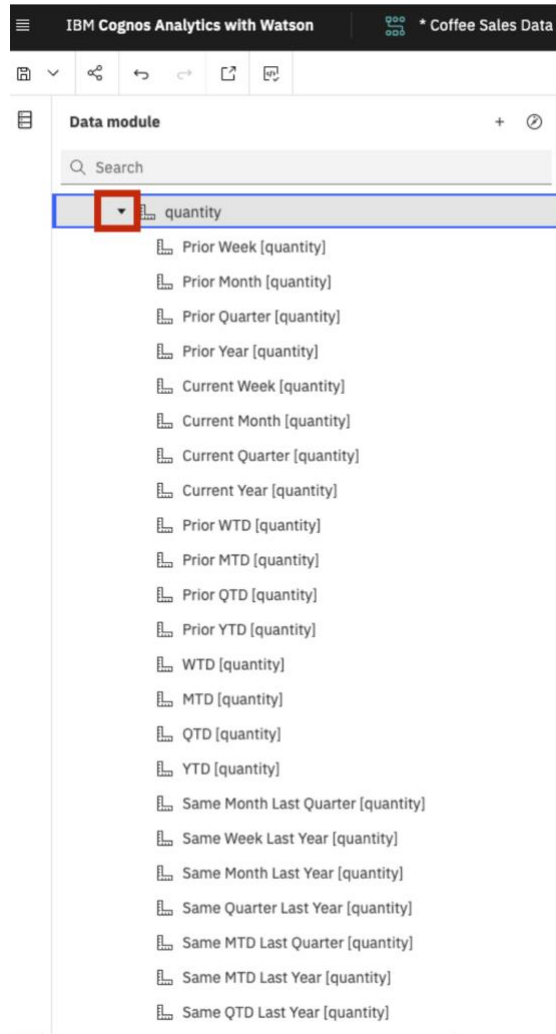
- ___8. To **close** the properties tab, you can click the **X** button.



- __9. To link the relative time setting to our desired measures, you set the Lookup reference to the properties of the columns. Under the table **sales_receipts**, **right click** the column **quantity** and select **properties**. **Set the Lookup reference to sales_receipts.transaction_date**



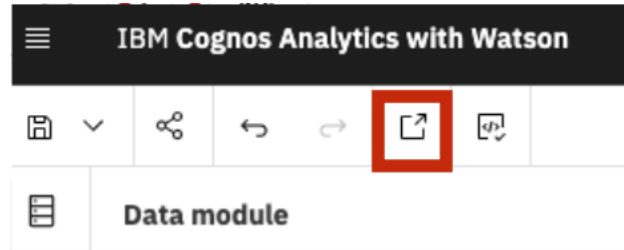
- __10. **Repeat** Step 9 to set the Lookup reference of column **line_item_amount**.
- __11. **Click** the drop-down button to expand the **quantity** column, now you can see all the built-in Relative time calculations created by Cognos Analytics. Review **line_item_amount** as well.



__12. **Save** the data Module.

5 Testing the Data Module

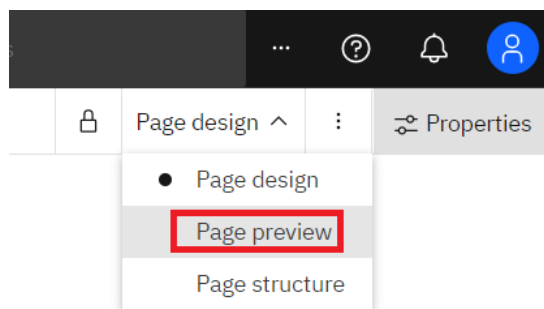
1. Now that you have your data module, it's time to test it out before creating new content for your analysis. Click on the **Try this data module in Reporting** icon in the main toolbar.



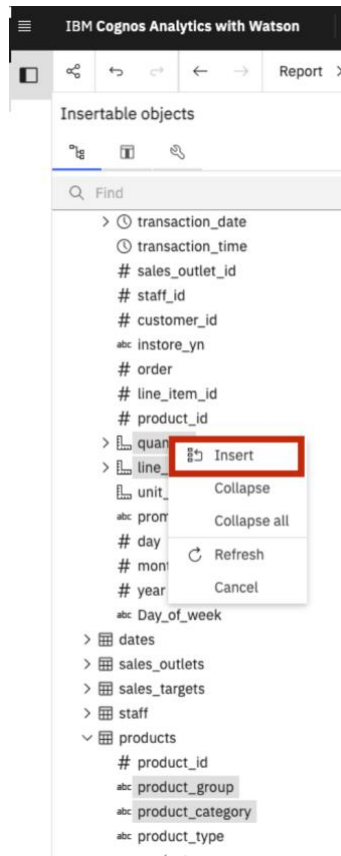
2. Cognos Analytics will open a new browser tab that will allow for the creation of a list report to validate the data module.

If a new browser tab is not created, be aware of pop-up blockers in your browser. If they are enabled, you will need to allow pop-ups for this server.

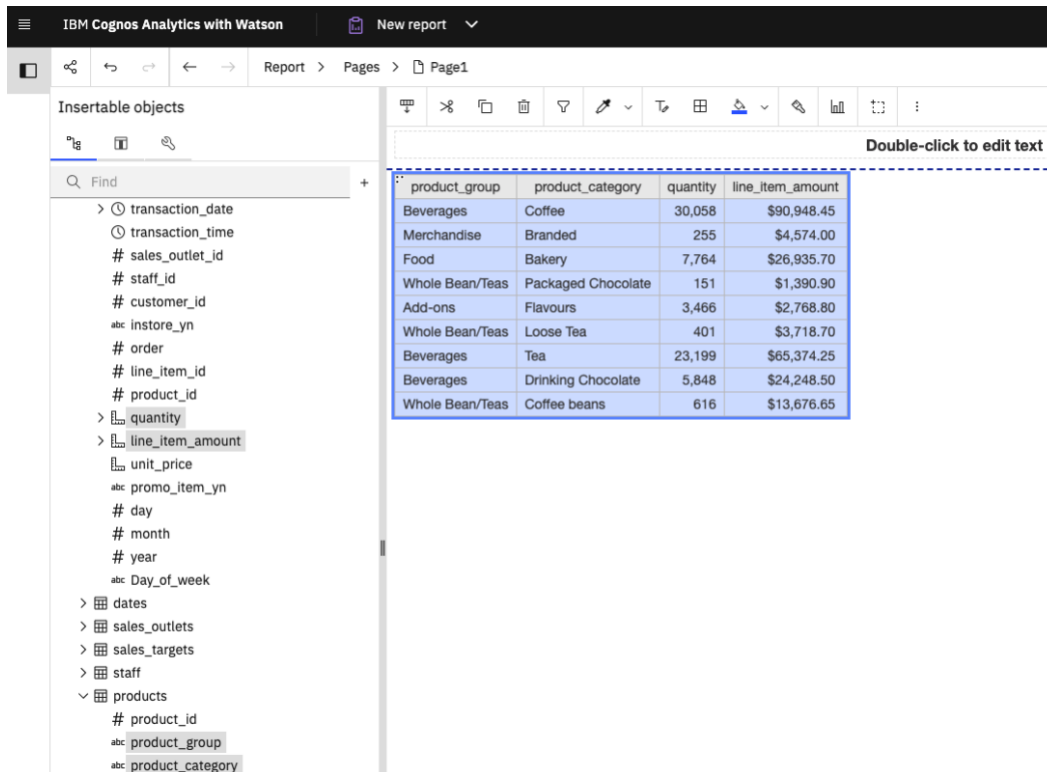
3. To begin, you'll put the report in preview mode so that you can see the data update as you test the data module. Click the down arrow beside the **Change page editor** widget and select **Page preview**.



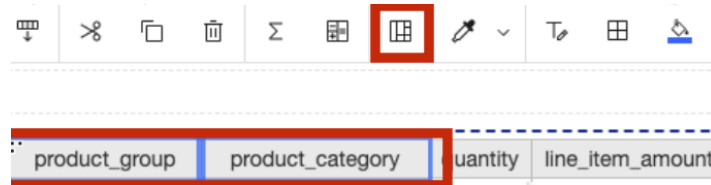
4. To easily build a report and test your data module, you can select a few items from the **Insertable objects** pane and drag them onto the report's canvas. Click on the arrow next to **sales_receipts** to expand it, then expand the **products** table.
5. **Control** select **product_group** and **product_category** from the **products** table. **Control** select columns: **quantity**, **line_item_amount** from the **sales_receipt** table, Right-click the selected columns and select **Insert**



6. The columns are added to the List.



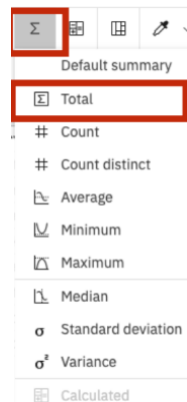
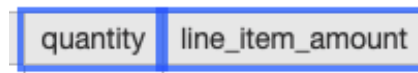
7. You can group columns to organize the data, Shift select the column headers for `product_group` and `product_category` and then click **Group/Ungroup**.



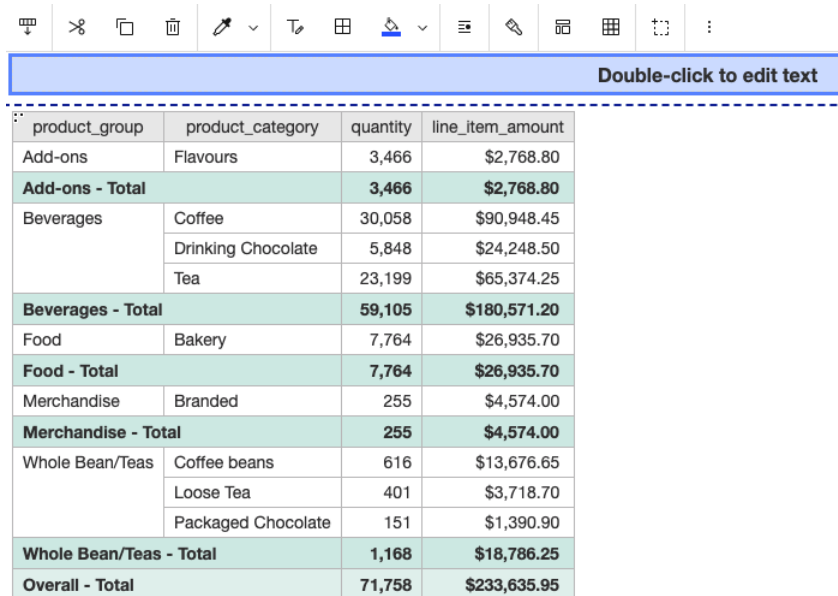
The data is organized as follows

product_group	product_category	quantity	line_item_amount
Add-ons	Flavours	3,466	\$2,768.80
Beverages	Coffee	30,058	\$90,948.45
	Drinking Chocolate	5,848	\$24,248.50
	Tea	23,199	\$65,374.25
Food	Bakery	7,764	\$26,935.70
Merchandise	Branded	255	\$4,574.00
Whole Bean/Teas	Coffee beans	616	\$13,676.65
	Loose Tea	401	\$3,718.70
	Packaged Chocolate	151	\$1,390.90

8. Summaries are also available in this test List. Shift Click on the header for the **quantity and line_item_amount** to select them. Click on the **Summarize** icon in the context toolbar to open the summary options for the column. Select **Total**.



- __9. Notice the **Overall-Total** and the Groups **Subtotals** that are added to the list. This information can be used to validate the accuracy of your data module.



The screenshot shows a data table interface. At the top, there is a toolbar with various icons for editing and viewing. Below the toolbar is a blue header bar with the text "Double-click to edit text". The table below has four columns: "product_group", "product_category", "quantity", and "line_item_amount". The table data is as follows:

product_group	product_category	quantity	line_item_amount
Add-ons	Flavours	3,466	\$2,768.80
Add-ons - Total		3,466	\$2,768.80
Beverages	Coffee	30,058	\$90,948.45
	Drinking Chocolate	5,848	\$24,248.50
	Tea	23,199	\$65,374.25
Beverages - Total		59,105	\$180,571.20
Food	Bakery	7,764	\$26,935.70
Food - Total		7,764	\$26,935.70
Merchandise	Branded	255	\$4,574.00
Merchandise - Total		255	\$4,574.00
Whole Bean/Teas	Coffee beans	616	\$13,676.65
	Loose Tea	401	\$3,718.70
	Packaged Chocolate	151	\$1,390.90
Whole Bean/Teas - Total		1,168	\$18,786.25
Overall - Total		71,758	\$233,635.95

- __10. Next, you can continue validating other joins against columns under other related tables such as **customers**, **dates**, and **staff**. Notice that **Table Occupancy** and **coffee_customer_loyalty** are stand-alone tables, which means that they are not intended to be joined together.
- __11. Your quick test confirms the setup is correct and the data module is behaving as expected.
- __12. Close the test **New Report** tab in the browser to return to the data module.
- __13. **Save** the data module.

Congratulations! You've completed your first data module and tested it. Your data module may be used as the source for your future Dashboards, Reports, Explorations, and Stories.

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