



Trillion-Row Spreadsheet Getting Started Guide

Contents

Introduction.....	3
Explore the Trillion-Row Spreadsheet.....	4
Select rows.....	15
Create a computed column.....	22
Perform a tabulation.....	26
Linking.....	38
Link in a table.....	39
Link in a worksheet.....	44
Cross tabulations.....	51
Perform a cross tabulation.....	51
Create a computed column from a cross-tabulated column.....	58
Charts.....	64
Create a bar chart.....	64

Introduction

Inevitably, the first time you sit down in front of any new computing tool, the question arises: "Now what do I do?" Well, if that's how you felt the first time you looked at the 1010data Insights Platform Trillion-Row Spreadsheet interface, you've come to the right place. After all, you're dealing with data. A lot of data. And you can see *all* of it. Most people have never had that experience. Count yourself lucky. With this *Trillion-Row Spreadsheet Getting Started Guide*, you'll learn all the basics that will help you understand how the Insights Platform works and why it's different from other database solutions.

This guide is a collection of tutorials that will help you quickly come up to speed with the core functionality of the Trillion-Row Spreadsheet. As such, the *Getting Started Guide* is not comprehensive. For additional information not covered in this guide, refer to the [1010data Insights Platform User's Guide](#) available from the [1010data Documentation Center](#).

Explore the Trillion-Row Spreadsheet

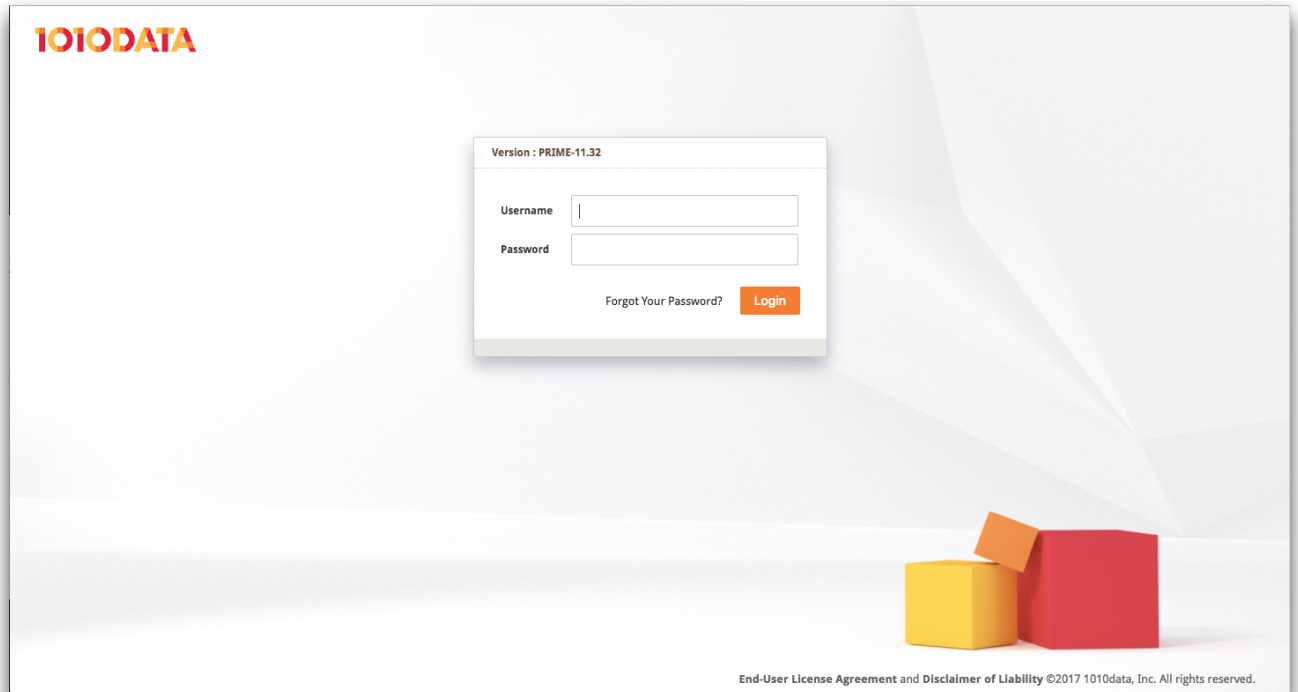
The Trillion-Row Spreadsheet is a browser-based interface that allows you to visually interact with your data. Explore the Trillion-Row Spreadsheet to learn how to use some of the most common user interface elements.

The 1010data Insights Platform gives you several options for interacting with the system and analyzing your data. However, when you first get started, you are likely going to spend most of your time in the Trillion-Row Spreadsheet (TRS). The TRS is a browser-based interface that works similarly to many spreadsheet applications, such as Microsoft Excel. The interface uses many elements with which you may already be familiar, such as folders, navigation icons, and menus.

Throughout this tutorial, the **Sales Item Detail** table (`pub.demo.retail.item`) is used to introduce you to the major elements in the TRS.

To explore the Trillion-Row Spreadsheet:

1. In your Internet browser address bar, enter <https://www2.1010data.com/prime-latest/> and press **Enter**.
Your browser displays the 1010data Insights Platform login page.

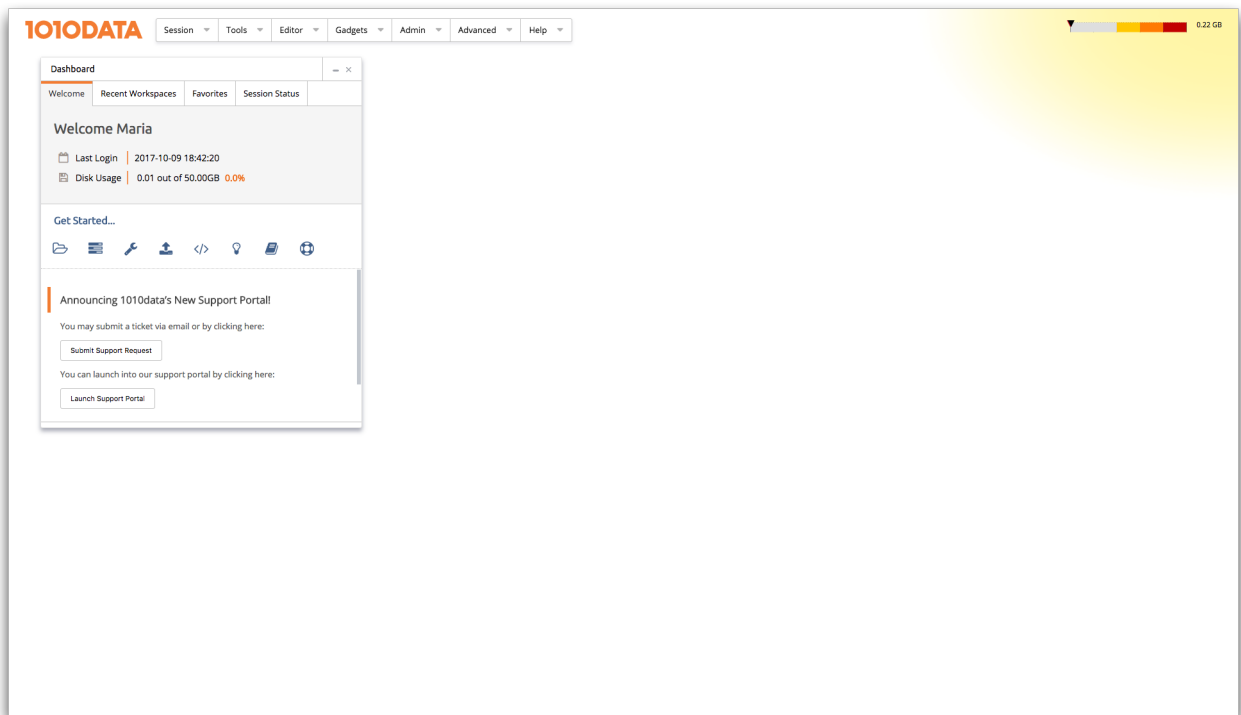


2. Enter your Insights Platform **Username** and **Password**, then click **Login**.

Logging in may take several minutes.

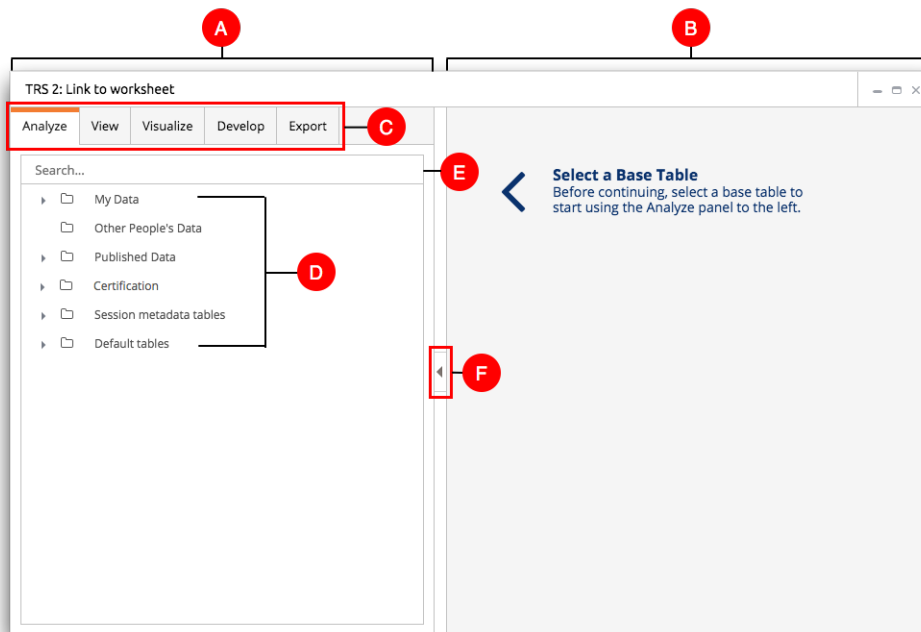
Note: If you cannot remember your password, you can reset it. Click **Forgot your password?** and follow the instructions on the **Password Reset** page.

Your browser displays the Insights Platform workspace.



Each time you open a new workspace, the menu bar and **Dashboard** are displayed on the canvas. The menu allows you to open a **TRS** window and start exploring ad hoc analysis in the Insights Platform.

- From the menu bar, select **Tools > Trillion-Row Spreadsheet**. The Insights Platform displays the **TRS** window.



A. Analysis pane

The analysis pane occupies the left side of the **TRS** window. This pane is used to perform an analysis on your data.

B. Results pane

The results pane is displayed on the right side of the **TRS** window. This pane displays the results of your analysis in spreadsheet format. In addition, this pane also displays charts created in the **Visualize** tab.

C. Tab bar

The Tab bar contains the options used to perform an analysis and other actions on your data.

D. Folders and tables



The folders and tables visible to you are displayed in the **Analyze** tab in the analysis pane. Within this tab, you can open tables, which are organized in folders.


A table is the permanent, unchanging version of the data that is saved on the server. When you open a table in the spreadsheet interface and perform an action or query, it becomes a worksheet. A worksheet is a working copy of the table. In worksheets, you can work with and manipulate your data.

E. Search

The search field in the **Analyze** tab allows you to search for tables, folders, and other objects.

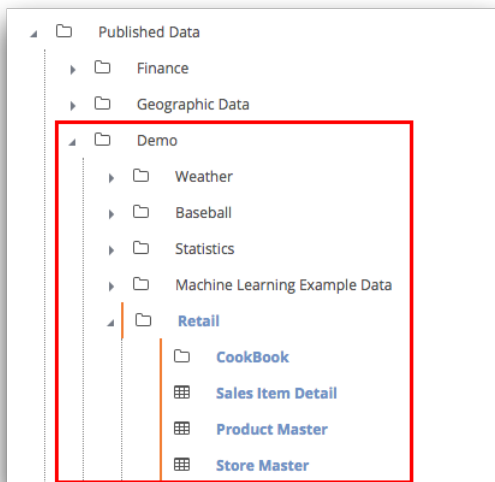
F. Hide/Show

To hide the analysis pane, click the **Hide** () icon on the right side of the pane. This is helpful when you need more space to view your data in the results pane. Click the **Show** () icon to reveal the analysis pane when it is hidden.

- In the **Analyze** tab, locate the **Published Data** folder and click the **Expand** () icon to the left. The **Published Data** folder opens, revealing additional folders.

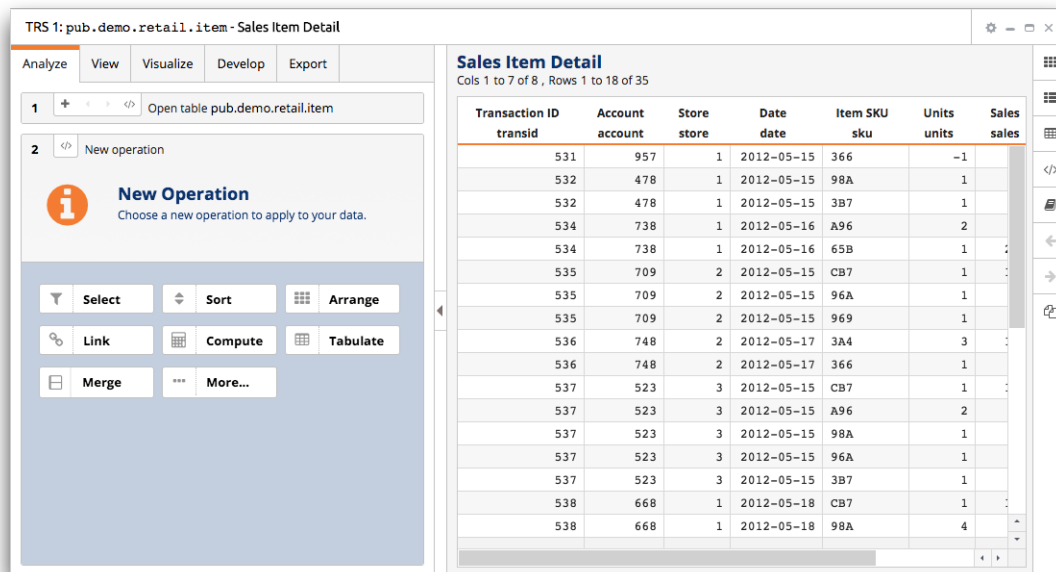
Note: You can also double-click a folder to open it.

- Double-click the **Demo** folder and then double-click the **Retail** folder. The **Retail** folder opens, revealing the tables contained in the folder.



In the image above, the red box outlines the **Demo** folder and its contents. The **Retail** folder is open and in it is a table titled **Sales Item Detail**.

- Click the **Sales Item Detail** table. TRS displays the **New operation** panel in the analysis pane on the left and the **Sales Item Detail** table in the results pane on the right.



This is the basic view of a table in TRS. After a table is opened, the **Analyze** tab displays the analysis timeline. Use the timeline to move backward or forward through the steps of your analysis. The path to the table in which you are currently working is displayed in step 1 of the timeline.

Note: As you work through the tutorials in this guide, you may need to resize the **TRS** window to see the full table.

Next to the **Analyze** tab are additional tabs which are used to interact with your data. The table below provides a description of each tab and its available options.

Table 1: Tab menu

Tabs	Tab description
Analyze	In a new TRS window, this tab displays options for opening common Insight Platform items such as tables and queries. After a table is open, the Analyze tab displays the analysis timeline which provides quick access to perform operations like summaries, tabulations, and cross tabulations.
View	Use this tab to select from among the various ways to view and interact with the data resulting from your analysis.
Visualize	Options for creating charts based on your data analysis are available from this tab.
Develop	This tab allows you to save your query and provides options to further develop your analysis. For example, you can clone the TRS window and explore different scenarios without losing your original query.
Export	You can save the results of your analysis in a variety of file types, such as CSV and Microsoft Excel, from this tab.

- In the heading of the **Cost** column, click the drop-down arrow (▾) and select **Sort Down**.
When you place the cursor on a column header, the sorting drop-down arrow appears.

Sales Item Detail
Cols 2 to 8 of 8 , Rows 1 to 18 of 35

Account	Store	Date	Item SKU	Units	Sales	Cost
account	store	date	sku	units	sales	cost
957	1	2012-05-15	366	-1	-5	-1.84
478	1	2012-05-15	98A	1	0.5	0.25
478	1	2012-05-15	3B7	1	1.1	0.56

TRS sorts the table in descending order based on the **Cost** column and adds the sort operation to step 2 in the analysis timeline.

TRS 1: pub.demo.retail.item - Sales Item Detail

Analyze View Visualize Develop Export

1 + - <> Open table pub.demo.retail.item

2 + - <> **Sort columns**

Change the sort order and direction by dragging columns into the right sorter and selecting a sort direction.

Show with column name

Columns	Order
Transaction ID	Cost
Account	
Store	
Date	
Item SKU	
Units	
Sales	

3 <> New operation

Sales Item Detail
Cols 2 to 8 of 8 , Rows 1 to 18 of 35

Account	Store	Date	Item SKU	Units	Sales	Cost
account	store	date	sku	units	sales	cost
25	2	2012-06-19	65B	1	5	3.35
738	1	2012-05-16	A96	2	6	2.9
523	3	2012-05-15	A96	2	6	2.9
748	2	2012-05-17	366	1	5	1.8
469	3	2012-05-22	3B7	3	3.3	1.68
469	3	2012-05-22	A96	1	4	1.45
876	1	2012-06-03	A96	1	4	1.45
738	1	2012-05-16	65B	1	2.25	1.35
876	1	2012-06-03	3B7	2	2.2	1.12
709	2	2012-05-15	CB7	1	1.65	1.1
523	3	2012-05-15	CB7	1	1.65	1.1
668	1	2012-05-18	CB7	1	1.65	1.1
876	1	2012-06-03	CB7	1	1.65	1.1
709	2	2012-05-15	96A	1	1.1	1
709	2	2012-05-15	969	1	1.1	1
523	3	2012-05-15	96A	1	1.1	1
668	1	2012-05-18	98A	4	2	1

After you perform an operation in either the table or in the timeline, the operation is listed in the timeline.

At this point, the table becomes a worksheet because an action was performed on the table.

Note: Sorting is very system-resource intensive. As a best practice, do not sort your table or worksheet until the data is narrowed down to a manageable size. Instead of sorting, first perform a tabulation or select a narrow range of rows.

Sales Item Detail
Cols 2 to 8 of 8 , Rows 1 to 18 of 35

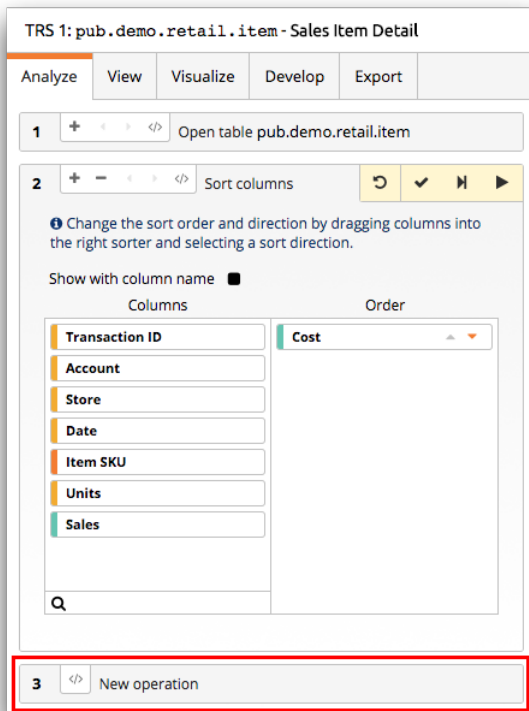
Account account	Store store	Date date	Item SKU sku	Units units	Sales sales	Cost cost
25	2	2012-06-19	65B	1	5	3.35
738	1	2012-05-16	A96	2	6	2.9
523	3	2012-05-15	A96	2	6	2.9
748	2	2012-05-17	366	1	5	1.8
469	3	2012-05-22	3B7	3	3.3	1.68
469	3	2012-05-22	A96	1	4	1.45
876	1	2012-06-03	A96	1	4	1.45
738	1	2012-05-16	65B	1	2.25	1.35
876	1	2012-06-03	3B7	2	2.2	1.12
709	2	2012-05-15	CB7	1	1.65	1.1
523	3	2012-05-15	CB7	1	1.65	1.1
668	1	2012-05-18	CB7	1	1.65	1.1
876	1	2012-06-03	CB7	1	1.65	1.1
709	2	2012-05-15	96A	1	1.1	1
709	2	2012-05-15	969	1	1.1	1
523	3	2012-05-15	96A	1	1.1	1
668	1	2012-05-18	98A	4	2	1

Scroll bars, similar to the ones outlined in red in the image above, appear on the right side of the worksheet if the screen cannot accommodate all of the rows and on the bottom of the worksheet if the screen cannot accommodate all of the columns. The scroll bar in the results pane allows you to navigate through the data in your worksheet.

Note: If a scroll bar is not displayed in your worksheet, all available data is already displayed; no additional rows of data exist.

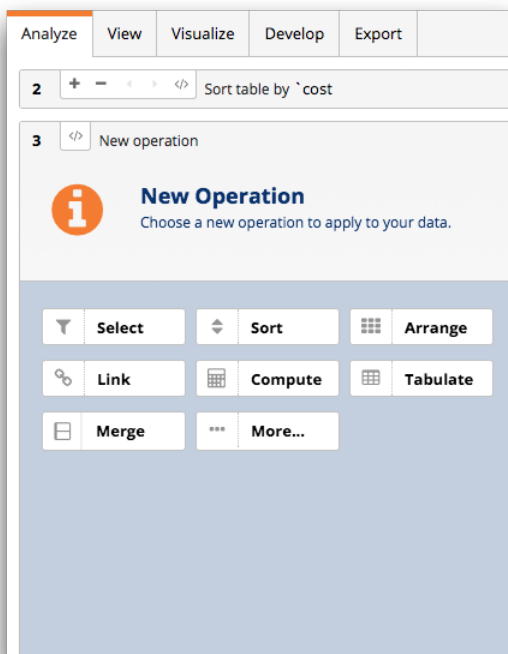
For the purposes of this tutorial, a very small data set was created to illustrate the concepts in this topic. In this case, you can scroll through the data in just a few seconds. However, your tables may contain billions of rows. As you work with the TRS, keep in mind that scrolling may not be the most effective way to get to a particular section of data. For that, a better method is to perform a row selection, which is covered in [Select rows](#) on page 15.

8. In the **Analyze** tab, click **New operation** in step **3** at the bottom of the timeline.



The **New operation** step allows you to add an additional operation to the timeline.

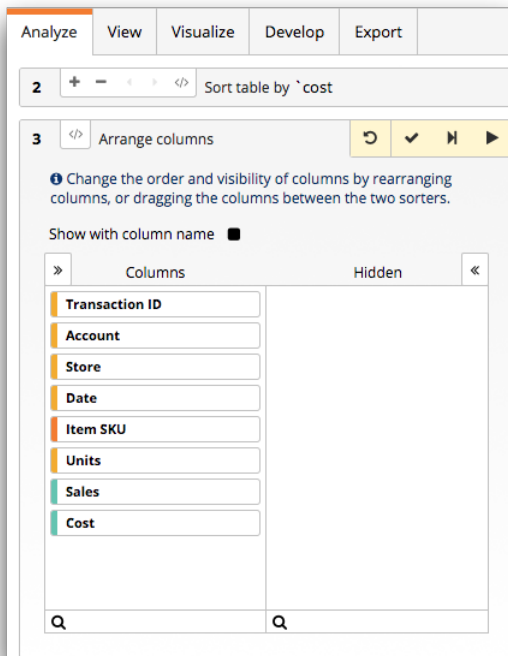
TRS displays the **New operation** panel.



Now that you have another step in which to perform an operation, you can arrange the columns in the worksheet.

9. Click Arrange.

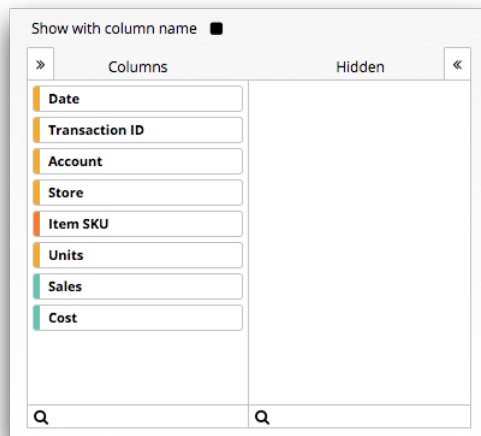
TRS displays the **Arrange columns** panel.



The **Columns** section shows the columns that are currently visible in your worksheet, in the order they are displayed left to right. The **Hidden** section shows any additional columns contained in your worksheet that are not currently displayed. Using this panel, you can rearrange and hide columns in your worksheet.

10. Move the **Date** column so that it is displayed first.

a) In the **Columns** section, drag **Date** so that it is displayed before **Transaction ID** as shown in the image below.



b) Click the **Submit operation** (✓) icon.

The **Date** column moves to the first column in the worksheet.

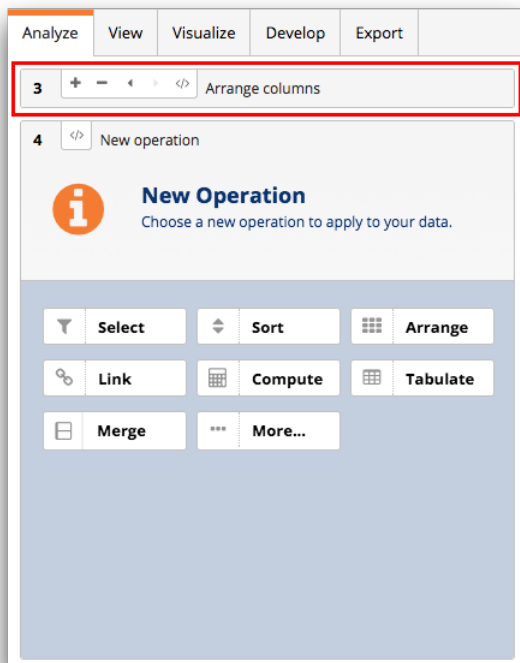
Sales Item Detail
Cols 1 to 7 of 8 , Rows 1 to 18 of 35

Date date	Transaction ID transid	Account account	Store store	Item SKU sku	Units units	Sales sales
2012-06-19	539	25	2	65B	1	
2012-05-16	534	738	1	A96	2	
2012-05-15	537	523	3	A96	2	
2012-05-17	536	748	2	366	1	
2012-05-22	541	469	3	3B7	3	
2012-05-22	541	469	3	A96	1	
2012-06-03	543	876	1	A96	1	
2012-05-16	534	738	1	65B	1	
2012-06-03	543	876	1	3B7	2	
2012-05-15	535	709	2	CB7	1	
2012-05-15	537	523	3	CB7	1	
2012-05-18	538	668	1	CB7	1	
2012-06-03	543	876	1	CB7	1	
2012-05-15	535	709	2	96A	1	
2012-05-15	535	709	2	969	1	
2012-05-15	537	523	3	96A	1	
2012-05-18	538	668	1	98A	4	

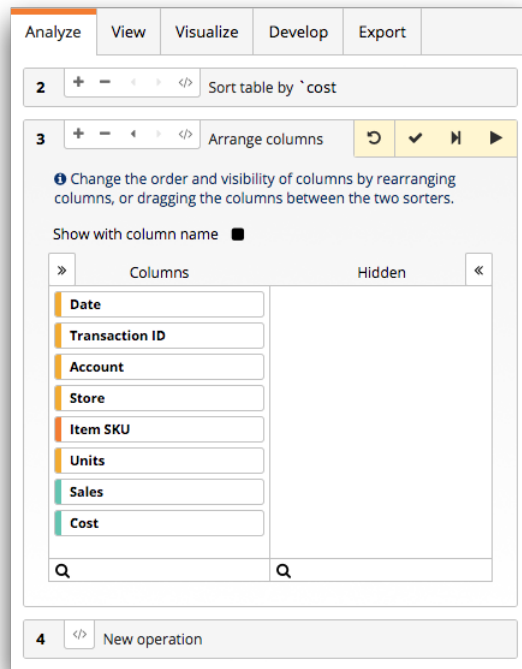
Next, hide the **Cost** column in the worksheet. While you could do this by performing another arrange operation on a new line, you will instead edit the existing **Arrange columns** operation in step 3 of the timeline.

11. Edit the **Arrange columns** operation to also hide the **Cost** column.

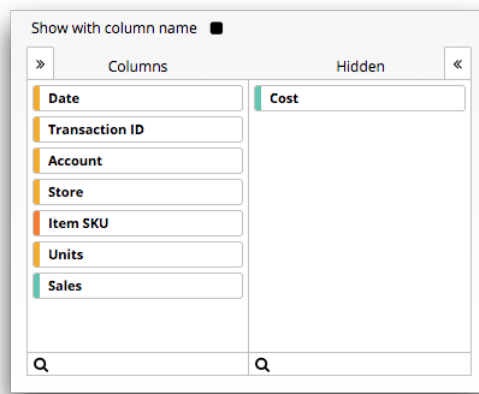
a) In the **Analyze** tab, click the **Arrange columns** operation in step 3.



TRS displays the **Arrange columns** panel.



b) Drag **Cost** to the **Hidden** section.



c) Click the **Submit operation** (✓) icon.

TRS updates the **Arrange columns** operation and hides the **Cost** column in the worksheet.

Sales Item Detail
Cols 2 to 7 of 7 , Rows 1 to 18 of 35

Transaction ID transid	Account account	Store store	Item SKU sku	Units units	Sales sales
539	25	2	65B	1	5
534	738	1	A96	2	6
537	523	3	A96	2	6
536	748	2	366	1	5
541	469	3	3B7	3	3.3
541	469	3	A96	1	4
543	876	1	A96	1	4
534	738	1	65B	1	2.25
543	876	1	3B7	2	2.2
535	709	2	CB7	1	1.65
537	523	3	CB7	1	1.65
538	668	1	CB7	1	1.65
543	876	1	CB7	1	1.65
535	709	2	96A	1	1.1
535	709	2	969	1	1.1
537	523	3	96A	1	1.1
538	668	1	98A	4	2

12. When you are finished with this tutorial, close the **TRS** window.

Take a little time to familiarize yourself with the basic menus and options in the Trillion-Row Spreadsheet. Make sure you are comfortable opening a table, and do not be afraid to customize the table by rearranging columns so that they are in an order that is useful to you. This will make the next few tutorials much easier, and allow you to focus on the new material presented in them. Before you know it, you will be performing custom analyses on your own data.

For more information about the TRS interface, see [Trillion-Row Spreadsheet](#) in the *1010data Insights Platform User's Guide*.

Select rows

Selecting rows is one of the most basic tasks in the 1010data Insights Platform. Use row selection to isolate data that is important to your analysis and create more efficient queries.

Often, the first step to answering an analytical question is to narrow down the data you are working with so you see only the pieces of information that are relevant to your analysis. While there are many ways to do this, the most basic is a row selection.

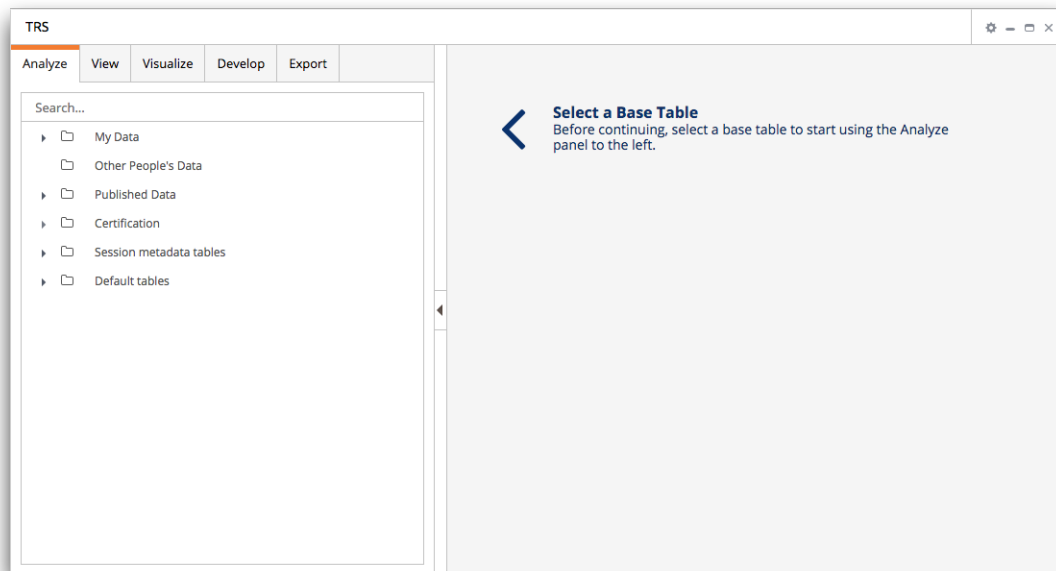
The purpose of row selection is to reduce a large collection of general data to a smaller collection of data specific to the question being asked. For example, a question might be "Which store in our chain had the highest sales in December?" Another could be "What were the highest and lowest sales figures for a single transaction?" In both cases, you start with all of your data to answer a question that only requires a subset of that data.

When you work with very large data sets like those typically found in the Insights Platform, the order in which you perform your operations on the data makes a difference in how fast the system can complete those operations. If you make the largest selection that eliminates the most data first, then the subsequent operations you perform finish faster because the platform does not need to work with as much information. As a best practice, if your data contains columns with date- or time-related information, that is generally the best place to start. However, the largest selection may be something based on something else entirely depending on your data and the analysis you want to perform.

This tutorial explains how to perform a series of row selections in the Trillion-Row Spreadsheet (TRS) to reduce the amount of information in the **Sales Item Detail** data set.

To select rows:

1. From the menu bar, select **Tools > Trillion-Row Spreadsheet**.
The Insights Platform displays the **TRS** window.



2. Open the **Sales Item Detail** table (`pub.demo.retail.item`).

The name of the **Sales Item Detail** table is `pub.demo.retail.item`. The location of the table is reflected in the name. In this case, the table is located in the following folder: **Published Data > Demo > Retail**.

TRS displays the **New operation** panel in the analysis pane on the left and the **Sales Item Detail** table in the results pane on the right.

TRIS 1: pub.demo.retail.item - Sales Item Detail

Analyze View Visualize Develop Export

1 + <> Open table pub.demo.retail.item

2 <> New operation

New Operation
Choose a new operation to apply to your data.

Select Sort Arrange
Link Compute Tabulate
Merge More...

Sales Item Detail
Cols 1 to 7 of 8, Rows 1 to 18 of 35

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales
531	957	1	2012-05-15	366	-1	
532	478	1	2012-05-15	98A	1	
532	478	1	2012-05-15	3B7	1	
534	738	1	2012-05-16	A96	2	
534	738	1	2012-05-16	65B	1	
535	709	2	2012-05-15	CB7	1	
535	709	2	2012-05-15	96A	1	
535	709	2	2012-05-15	969	1	
536	748	2	2012-05-17	3A4	3	
536	748	2	2012-05-17	366	1	
537	523	3	2012-05-15	CB7	1	
537	523	3	2012-05-15	A96	2	
537	523	3	2012-05-15	98A	1	
537	523	3	2012-05-15	96A	1	
537	523	3	2012-05-15	3B7	1	
538	668	1	2012-05-18	CB7	1	
538	668	1	2012-05-18	98A	4	

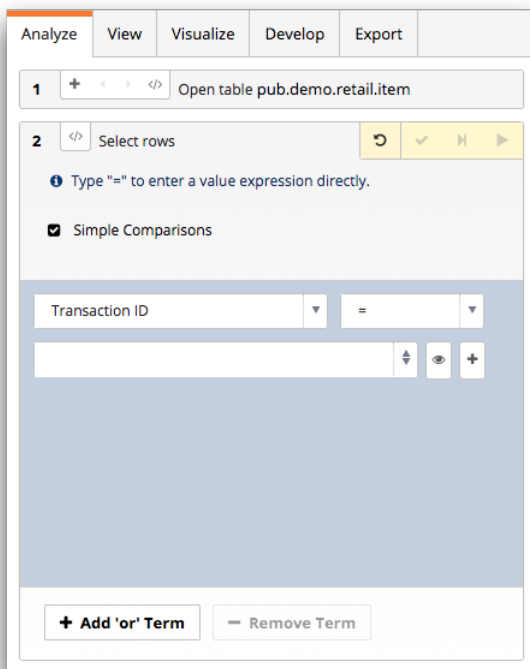
The table contains 35 rows of data, of which only a limited number display in the image below.

Sales Item Detail
Cols 1 to 7 of 8, Rows 1 to 18 of 35

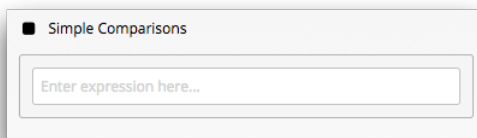
Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales
531	957	1	2012-05-15	366	-1	
532	478	1	2012-05-15	98A	1	
532	478	1	2012-05-15	3B7	1	
534	738	1	2012-05-16	A96	2	
534	738	1	2012-05-16	65B	1	
535	709	2	2012-05-15	CB7	1	
535	709	2	2012-05-15	96A	1	
535	709	2	2012-05-15	969	1	
536	748	2	2012-05-17	3A4	3	
536	748	2	2012-05-17	366	1	
537	523	3	2012-05-15	CB7	1	
537	523	3	2012-05-15	A96	2	
537	523	3	2012-05-15	98A	1	
537	523	3	2012-05-15	96A	1	
537	523	3	2012-05-15	3B7	1	
538	668	1	2012-05-18	CB7	1	
538	668	1	2012-05-18	98A	4	

For the purposes of this tutorial, a smaller data set was created so you can see the changes being made to the data. Even though performing real analyses require much larger data sets, all the principles in this tutorial apply.

- In the **New operation** panel, click **Select**.
TRS displays the **Simple Comparisons** options in the **Select rows** panel.

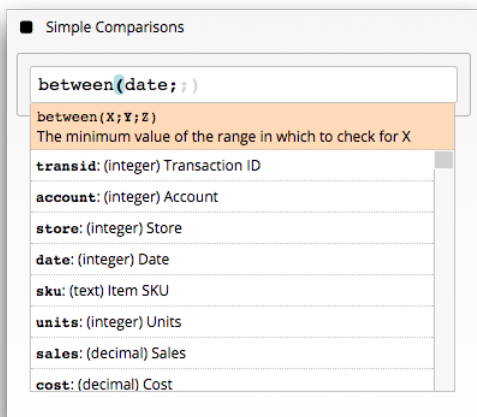


4. Clear the **Simple Comparisons** option. TRS displays the expression field.



When selecting rows in the Insights Platform, you should always make the selection that eliminates the largest amount of data first. This almost always means your first selection should be a date range. To do this, enter an expressing that uses the `between` function to limit the data from May 15, 2012 through May 17, 2012. An expression is a calculation, similar to a formula in Excel, you create to help you analyze your data.

5. In the expression field, enter the following: `between (date;`



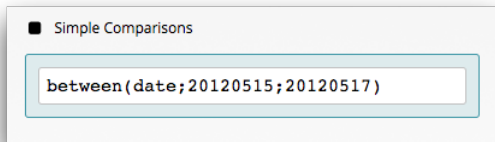
If you click outside the expression field before entering a valid expression, you'll notice that the expression field becomes outlined in red. This indicates that the expression is not valid as entered. In this case, it is not valid because it is not yet complete.

Now that the `between` function for the `date` column is entered, you will specify the beginning and ending dates. Dates are entered in the YYYYMMDD format.

Note: A row selection specified using the `between` function is inclusive, meaning rows with the values entered in the corresponding fields are included in the results.

6. In the expression field, after `between (date; ,` enter the following: `20120515;20120517)`

The expression field should contain the following: `between (date;20120515;20120517)`



Notice that the expression field is now outlined in green. This indicates that the completed expression is valid.

7. Press **Enter**.

TRS displays the results of your selection.

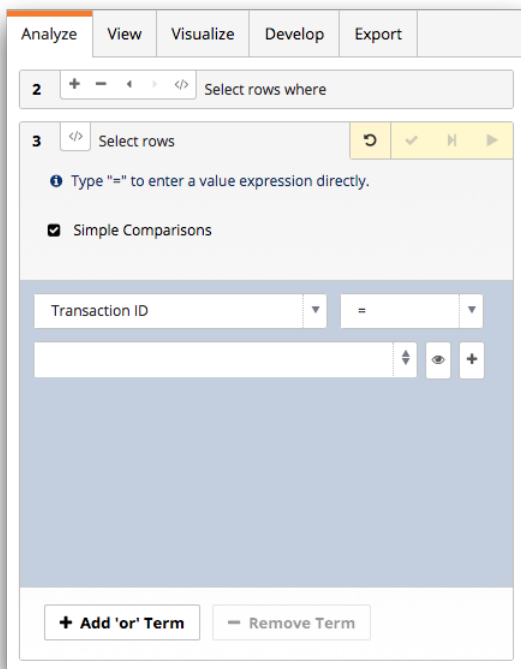
Transaction ID	Account	Store	Date	Item SKU	Units	Sales
transid	account	store	date	sku	units	sales
531	957	1	2012-05-15	366	-1	-
532	478	1	2012-05-15	98A	1	0.
532	478	1	2012-05-15	3B7	1	1.
534	738	1	2012-05-16	A96	2	
534	738	1	2012-05-16	65B	1	2
535	709	2	2012-05-15	CB7	1	1
535	709	2	2012-05-15	96A	1	1.
535	709	2	2012-05-15	969	1	1.
536	748	2	2012-05-17	3A4	3	1
536	748	2	2012-05-17	366	1	
537	523	3	2012-05-15	CB7	1	1
537	523	3	2012-05-15	A96	2	
537	523	3	2012-05-15	98A	1	0.
537	523	3	2012-05-15	96A	1	1.
537	523	3	2012-05-15	3B7	1	1.

Congratulations, you just performed your first row selection in the Insights Portal! As you can see in the image above, the amount of data in the table is reduced by more than half. Also, notice in the analysis timeline, the row selection you just performed displays in step 2 of the timeline.

What if you want to further limit your data to a particular store? To do this, create another row selection and enter additional comparison criteria. In this case, you can enter a store number to limit the data to the rows that identify a specific store.

8. In the **New operation** panel, click **Select**.

TRS displays the **Simple Comparisons** options in the **Select rows** panel.



9. In the **Select rows** panel, do the following:

- From the first drop-down list, select **Store**.
- From the second drop-down list, select the **equal sign (=)** character.
- In the last field, enter 2.

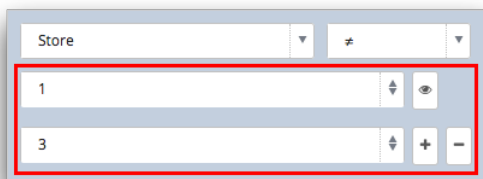
10. Do one of the following:

- Press **Enter**.
- Click anywhere in the panel, outside of the field.



These selections, outlined in red above, indicate that you want to see only rows for store 2. If the second comparison option, the **not equal to (≠)** character, is selected, all of the stores in the worksheet except store 2 are displayed.

If you want to include more than one value (more than a single store in the example above), add additional criteria by clicking the **Add Value (+)** icon and then enter the additional values.



The example above displays results for both store 1 and store 3. Searching for multiple values is useful when working with information like product numbers.

Now that all of the information you need for your results is entered, you can perform the selection.

- Click the **Submit operation** (✓) icon.
TRS displays the results of your selection.

Sales Item Detail
Cols 1 to 7 of 8 , Rows 1 to 5 of 5

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales
535	709	2	2012-05-15	CB7	1	1.6
535	709	2	2012-05-15	96A	1	1.
535	709	2	2012-05-15	969	1	1.
536	748	2	2012-05-17	3A4	3	1.0
536	748	2	2012-05-17	366	1	

In just a few minutes, you narrowed the data down from 35 rows to 5. That is less than one-seventh of the original data. Also, notice that the timeline indicates the selections you already performed (outlined in red below). This can help prevent duplicating effort when making additional selections.

Analyze View Visualize Develop Export

1 + < > </> Open table pub.demo.retail.item

2 + - < > </> Select rows where

3 + - < > </> Select rows where (store<=1 3)

4 </> New operation

New Operation
Choose a new operation to apply to your data.

Select Sort Arrange

Link Compute Tabulate

Merge More...

You can also quickly perform a basic row selection directly from the worksheet by right-clicking any cell and choosing an option that appears in the pop-up menu.

- Right-click the cell in the first row of the **Date** column and point to **Select rows**.
TRS displays a menu of selection options.

Sales Item Detail
Cols 1 to 7 of 8 , Rows 1 to 5 of 5

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales
535	709	2	2012-05-15	CB7	1	1.5
535	709	2	2012-05-15			
535	709	2	2012-05-15			
536	748	2	2012-05-15			
536	748	2	2012-05-15			

Context menu options:

- Copy
- View this row one row at a time
- Select rows...**
- Analyze...
- Sort...

Sub-menu options for 'Select rows...':

- Where **Date** has the value 2012-05-15
- Where **Date** does not have the value 2012-05-15
- Where **Date** has greater value than 2012-05-15
- Where **Date** has smaller value than 2012-05-15
- Up to and including this one
- After this one

By right-clicking a cell in the worksheet, you can choose from several row selection options that pertain to that cell. Take a look at the available options when you right-click an **Account** cell.

- 13.** Right-click the cell in the first row of the **Account** column and point to **Select rows**. TRS displays a menu of selection options.

Sales Item Detail
Cols 1 to 7 of 8 , Rows 1 to 5 of 5

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales
535	709	2	2012-05-15	CB7	1	1.6
535	709	2	2012-05-15	96A	1	1.1
535	709	2	2012-05-15	96A	1	1.1
536	748	2	2012-05-15			
536	748	2	2012-05-15			

Context menu options:

- Copy
- View this row one row at a time
- Select rows...**
- Analyze...
- Sort...

Sub-menu options for 'Select rows...':

- Where **Account** has the value 709
- Where **Account** does not have the value 709
- Where **Account** has greater value than 709
- Where **Account** has smaller value than 709
- Up to and including this one
- After this one

As you can see, when you right-click a cell in the **Account** column, the options are related to **Account** and not **Date**. If you need to perform a simple selection, this is a great way to quickly select rows.

- 14.** When you are finished with this tutorial, close the TRS window.

Row selection is an incredibly powerful tool you can use when working with your data. Using this simple operation, you can eliminate unnecessary data and focus on what's pertinent. Feel free to make up a few row selections of your own and try them out on any of the tables in the **Published > Demo** folder. It will make a big difference as you learn how to work with the TRS, and ultimately, make your analyses faster and more accurate.

For more information about selecting rows, see [Selecting Rows](#) in the *1010data Insights Platform User's Guide*.

Create a computed column

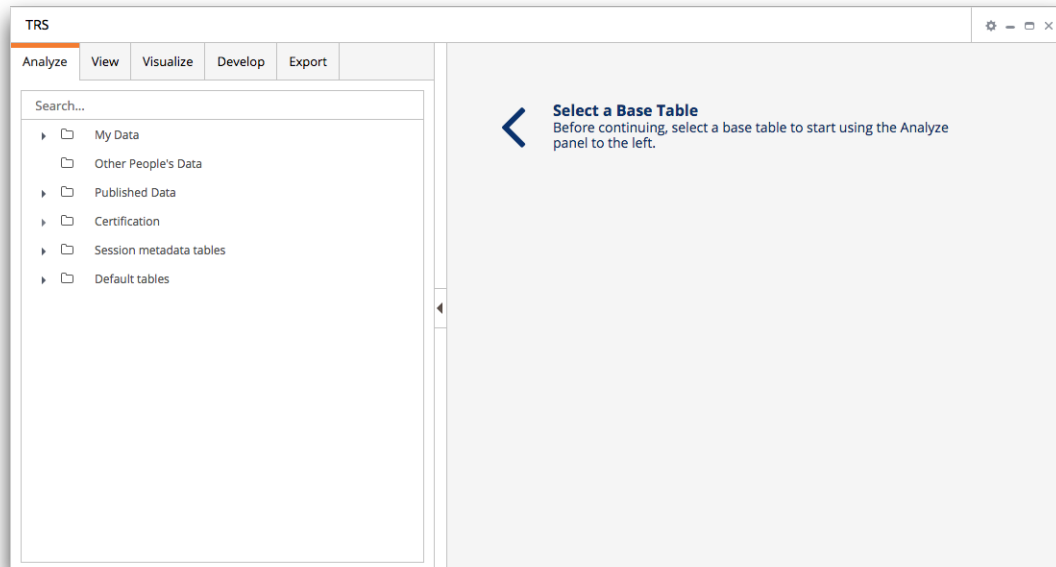
A computed column is one of the most useful analytical tools in the 1010data Insights Platform. Use a computed column to add a column of information to a worksheet typically using the information from one or more existing columns.

Computed columns are columns you create yourself in many cases using information that is already in the table with which you are working. For example, suppose you have a table that contains all the sales data for a chain of stores. This table might have one column called **Sales**, which is the purchase price paid by the customer. It might have another column called **Cost**, which is the cost of the item to the retailer. With a computed column, it is easy to create a third column called **Margin** that contains the difference between the sale price and the cost.

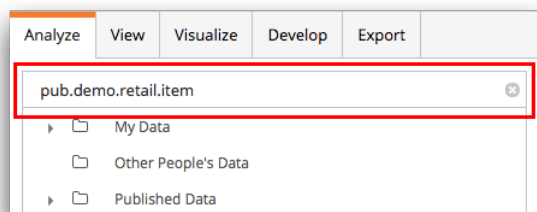
In this tutorial, you will use the **Sales Item Detail** table in the Trillion-Row Spreadsheet (TRS) to find the margin using a computed column.

To create a computed column:

1. From the menu bar, select **Tools > Trillion-Row Spreadsheet**.
The Insights Platform displays the **TRS** window.

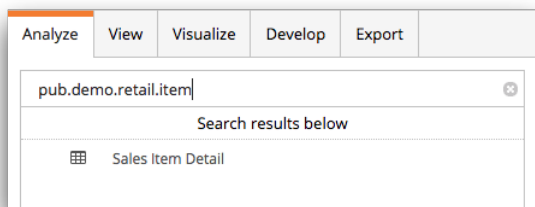


2. Open the **Sales Item Detail** table (`pub.demo.retail.item`) by completing the following:
 - a) In the **Analyze** tab, enter `pub.demo.retail.item` in the **Search** field.



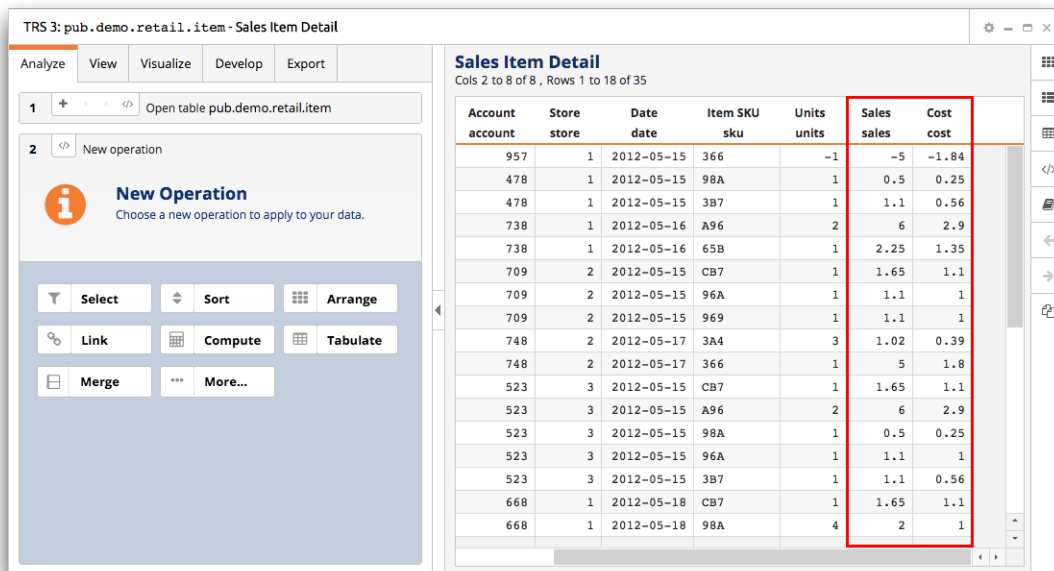
In this example, you were given the table name (`pub.demo.retail.item`). If you did not know the name, you could perform a search by entering the table title (**Sales Item Detail**) instead.

- b) Press **Enter**.
TRS displays the results of your search.



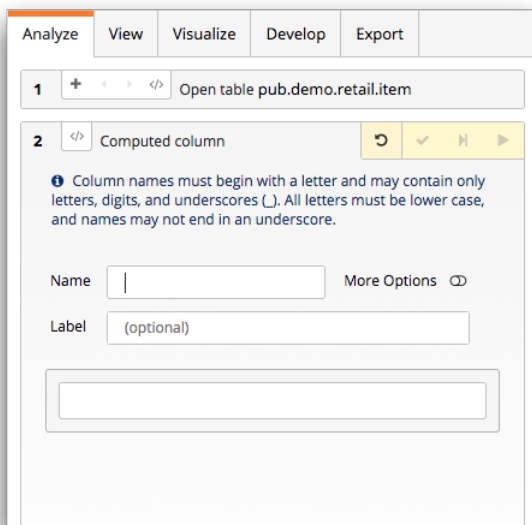
c) Click **Sales Item Detail**.

TRS displays the **New operation** panel in the analysis pane on the left and the **Sales Item Detail** table in the results pane on the right.



In this tutorial, the **Sales** and **Cost** columns, outlined in red above, are used to create the **Margin** computed column.

3. In the **New operation** panel, click **Compute**. TRS displays the **Computed column** panel.



4. Complete the following fields:

NameEnter `margin`.

This is the name the Insights Platform uses to interact with the column. It is also used when writing more advanced expressions and queries. The column name may only contain alphanumeric characters or underscores and must begin with an alphabetic character (e.g., `percent_total_sales`). It may not contain any spaces or other special characters.

This is a required field.

LabelEnter `Margin`.

This is the column heading that displays by default at the top of a column in the user interface. The column label may contain any combination of uppercase and lowercase letters, numbers, spaces, and special characters. If you want to have a multi-line column label, use the backtick character (```) to separate the lines (e.g., "Percentage` Total Sales (%)").

While not required, this field is recommended.

Next, you will enter an expression to find the margin. An expression is a calculation you create to help you analyze your data. In this case, you want to subtract the value in the **Cost** column from the value in the **Sales** column.

5. In the expression field, enter the following: `sales-cost`

The screenshot shows a configuration panel for a computed column. It has three input fields: 'Name' with the value 'margin', 'Label' with the value 'Margin', and a larger 'Expression' field with the value 'sales-cost'. To the right of the 'Name' field is a 'More Options' button with a chevron icon.

Next you will define the format of the computed column. You can configure items such as the display format, column width, and the number of decimal places to display.

6. Click the **More Options** switch.

TRS displays the formatting options.

The screenshot shows the same configuration panel as before, but the 'More Options' switch is now turned on. Below the 'Name' and 'Label' fields, there are three dropdown menus: 'Display Format' set to 'Default', 'Column Width' set to 'Default', and 'Decimal Places' set to 'Default'.

7. Complete the following:

Display FormatSelect **Number: 1,234,567.89**.

This drop-down list instructs the Insights Platform how to display the new number in the computed column. For example, as a date, a number, as text, and so forth.

Column Width

Select **5**.

This option determines how many place values to hold in the column. In other words, the width of the column by the number of characters.

Decimal Places

Select **2**.

This option sets how many numbers are displayed after the decimal point.

In this tutorial, dollar amounts are used. Therefore, two decimal places are usually the appropriate setting. However, you may find that there are situations where you need more or none at all.

8. Click the **Submit operation** (✓) icon.
TRs creates the **Margin** computed column.

Sales Item Detail
Cols 3 to 9 of 9, Rows 1 to 18 of 35

Store store	Date date	Item SKU sku	Units units	Sales sales	Cost cost	Margin margin
1	2012-05-15	366	-1	-5	-1.84	-3.16
1	2012-05-15	98A	1	0.5	0.25	0.25
1	2012-05-15	3B7	1	1.1	0.56	0.54
1	2012-05-16	A96	2	6	2.9	3.1
1	2012-05-16	65B	1	2.25	1.35	0.9
2	2012-05-15	CB7	1	1.65	1.1	0.55
2	2012-05-15	96A	1	1.1	1	0.1
2	2012-05-15	969	1	1.1	1	0.1
2	2012-05-17	3A4	3	1.02	0.39	0.63
2	2012-05-17	366	1	5	1.8	3.2
3	2012-05-15	CB7	1	1.65	1.1	0.55
3	2012-05-15	A96	2	6	2.9	3.1
3	2012-05-15	98A	1	0.5	0.25	0.25
3	2012-05-15	96A	1	1.1	1	0.1
3	2012-05-15	3B7	1	1.1	0.56	0.54
1	2012-05-18	CB7	1	1.65	1.1	0.55
1	2012-05-18	98A	4	2	1	1

9. When you are finished with this tutorial, close the **TRs** window.

You just created a new column in the worksheet with a very small amount of effort. The values in each row are calculated by the equation you entered as the expression, and you can now easily see the margin for every item sold in the entire worksheet. Of course, computed columns are much more powerful than merely subtracting or adding one column from another. With a little practice, you will be able to build columns based on more complicated equations, such as standard deviations and cumulative frequency distributions.

To learn more about computed columns and value expressions, see [Computed Columns](#) in the *1010data Insights Platform User's Guide*.

Perform a tabulation

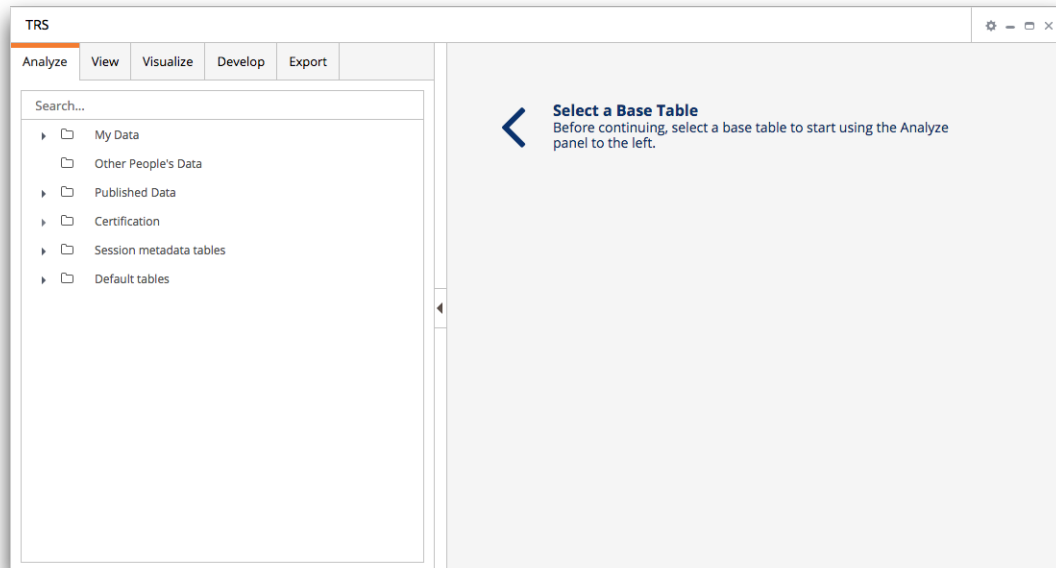
A tabulation groups rows of data together based on the values in one or more columns and performs calculations on data in each of those groups. The summarization results are provided in a small, easy-to-read table.

A tabulation is a great place to start when you want to get a feel for what all those rows of data in your table really mean. Tabulations allow you to calculate various metrics, such as the sum, average, or highest value of a particular column, grouping those calculations based on common values in one or more other columns. For instance, in a table containing weather data, you could calculate the highest temperature during the year for every unique combination of ZIP Code and month in the table.

In this tutorial, you will perform a tabulation on the **Sales Item Detail** table in the Trillion-Row Spreadsheet (TRS) to find the total amount of sales for each of three stores in a chain. You will then perform a separate tabulation to calculate the total sales amount and number of items sold in each transaction. Finally, you will export the tabulation to a Microsoft Excel workbook file.

To perform a tabulation:

1. From the menu bar, select **Tools > Trillion-Row Spreadsheet**.
The Insights Platform displays the **TRS** window.



2. Open the **Sales Item Detail** table (`pub.demo.retail.item`).
TRS displays the **New operation** panel in the analysis pane on the left and the **Sales Item Detail** table in the results pane on the right.

The screenshot shows the TRS interface with the 'Sales Item Detail' table and the 'New Operation' panel. The table has the following columns: Transaction ID, Account, Store, Date, Item SKU, Units, and Sales. The 'New Operation' panel is open, showing a 'New Operation' message and a 'Tabulate' button.

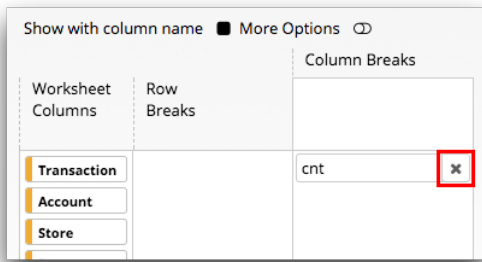
Transaction ID	Account	Store	Date	Item SKU	Units	Sales
531	957	1	2012-05-15	366	-1	
532	478	1	2012-05-15	98A	1	
532	478	1	2012-05-15	3B7	1	
534	738	1	2012-05-16	A96	2	
534	738	1	2012-05-16	65B	1	
535	709	2	2012-05-15	CB7	1	
535	709	2	2012-05-15	96A	1	
535	709	2	2012-05-15	969	1	
536	748	2	2012-05-17	3A4	3	
536	748	2	2012-05-17	366	1	
537	523	3	2012-05-15	CB7	1	
537	523	3	2012-05-15	A96	2	
537	523	3	2012-05-15	98A	1	
537	523	3	2012-05-15	96A	1	
537	523	3	2012-05-15	3B7	1	
538	668	1	2012-05-18	CB7	1	
538	668	1	2012-05-18	98A	4	

3. In the **New operation** panel, click **Tabulate**.
TRs displays the **Tabulation** panel.

The screenshot shows the TRS interface with the 'Tabulation' panel. The panel has a 'Show with column name' checkbox and a 'More Options' button. The 'Column Breaks' section shows a list of columns: Transaction, Account, Store, Date, Item SKU, Units, Sales, and Cost. The 'Transaction' column is selected, and the 'cnt' tabulation function is applied to it. The 'Remove' icon (✕) is visible next to the 'cnt' function.

The **Tabulation** panel allows you to create a basic tabulation.

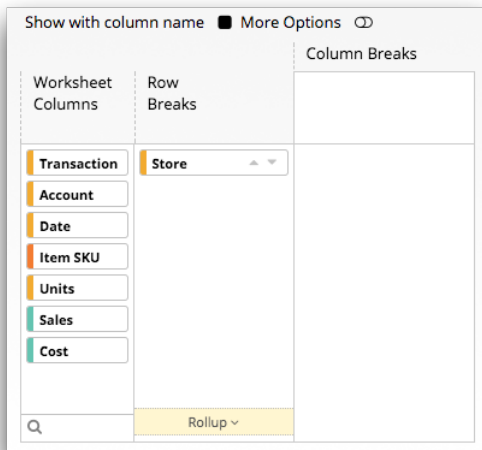
4. Remove the default **cnt** (count) tabulation function by clicking the **Remove** (✕) icon.



Next, choose the column by which you want to group the information. In other words, specify how you want to subtotal the data. When performing a tabulation, a helpful question to ask yourself is "What values do I want to use to group the records?" Since you want to find the total amount of sales for each store, you should group the information by the **Store** column. Grouping is a way of pooling all the records for a single entity or value (in this case, a store) into a single entry in the table.

5. Drag the **Store** column from the **Worksheet Columns** section to the **Row Breaks** section.

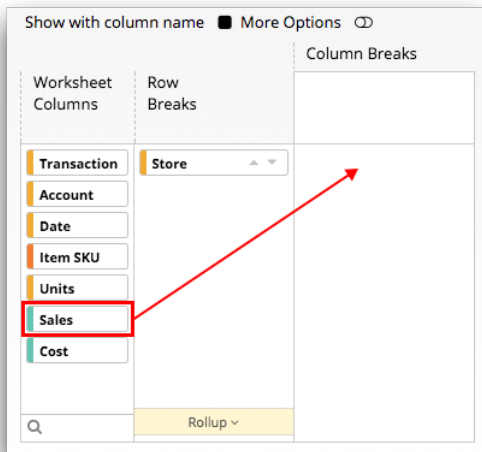
This groups your tabulation by store.



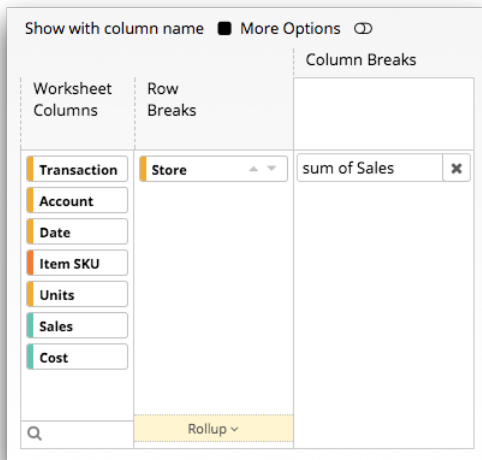
Now that the data grouping is set, choose the data you want to summarize. Since you want to find the total amount of sales, you should summarize the **Sales** column.

6. Drag the **Sales** column from the **Worksheet Columns** section to the lower area of the **Column Breaks** section.

This selection chooses the column of data you want to summarize.

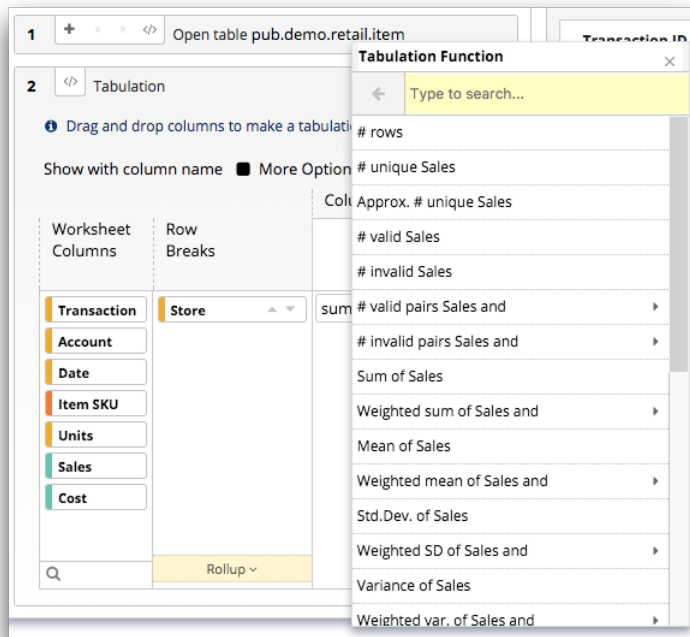


TRS adds the **sum of Sales** summarization and returns the **Sales** column to the **Worksheet Columns** section.



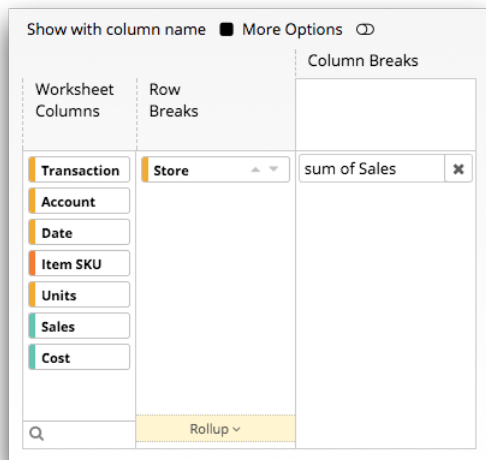
The summarization is a combination of the selected column and the default tabulation function for that column's data type. In this case, **sum** is the default tabulation function for **Sales**. This means the **sum of Sales** summarization will calculate the total amount in the **Sales** column.

The next step of a tabulation is to select the tabulation function you want to perform on the column. This is done by clicking the summarization (in this case, **sum of Sales**) and choosing a tabulation function from the menu.



However, since the default tabulation function happens to be exactly what you are looking for, you do not need to make this selection.

At this point, your tabulation should look like the following image.



Starting from the right and working left, the tabulation panel indicates that the resultant worksheet will contain a single column (**Sales**) and each row in that column will list the total sales amount (**sum of Sales**) grouped by **Store**.

By default, columns in the resultant worksheet are named t_0 , t_1 , t_2 , and so on. You can give the tabulated columns more meaningful names within the **More Options** view of the **Tabulation** panel. In addition, you can define the format of the tabulation.

7. Click the **More Options** switch.

TRS displays the formatting options.

Select **sum of Sales** in the **Tabulation Column** drop-down. This indicates that the name and formatting options you define apply to the **sum of Sales** tabulated column.

8. Complete the following fields:

Tabulation Label Enter `Sum of Sales Tabulation`

Result Name Enter `sumsales.`

This is the column name. Remember, column names must begin with an alphabetic character, may only contain alphanumeric characters or underscores, and may not contain any spaces or other special characters.

Result Heading Enter `Sum of`Sales.`

This is the column label. For easier readability, column labels may contain any combination of uppercase and lowercase letters, numbers, spaces, and special characters. The backtick (`) special character is used to break the column label text line into multiple lines. In this case, "Sum of" will be on the first line of the column label and "Sales" will be on the second line.

Display Format Select **Currency: \$1,234.56.**

Since your totals will be dollar amounts, this option is selected. When currency is selected, TRS adds the dollar sign and uses two decimal places for each tabulated sales value.

Column Width Select **Default.**

Decimal Places Select **Default.**

Because you selected currency above, TRS will automatically use two decimal places.

Tabulation Label	Sum of Sales Tabulation
Tabulation Column	sum of Sales
Result Name	sumsales
Result Heading	Sum of Sales
Display Format	Currency: \$1,234.56
Column Width	Default
Decimal Places	Default

Now that you have selected the data you want to group by, the data you want to summarize, and the formatting options, generate the tabulation.

- Click the **Submit operation** (✓) icon.
TRS displays the results of your tabulation.

Sum of Sales Tabulation		
Cols 1 fixed and 2 to 2 of 2 , Rows 1 to 3 of 3		
Store		Sum of Sales
store		sumsales
		\$59.85
	1	\$23.19
	2	\$16.31
	3	\$20.35

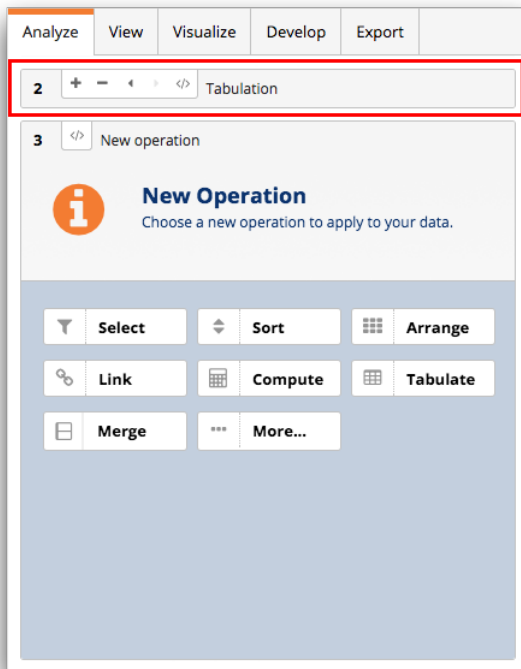
Note: In the image above, the column heading (**Sum of Sales**) is at the top of the column. If you prefer, you can change this to show the column name instead. For details, see [Edit your data preferences](#) in the *1010data Insights Platform User's Guide*.

Notice that there is a row of data, with values in orange, at the top of the worksheet. This row shows the totals for each column of summarized data. The three fictional stores generated \$59.85 in sales with store 1 generating \$23.19, store 2 generating \$16.31, and store 3 generating \$20.35. While this tabulation might not seem very useful for a chain of three stores, it becomes much more useful when summarizing chains with hundreds, or even thousands, of stores.

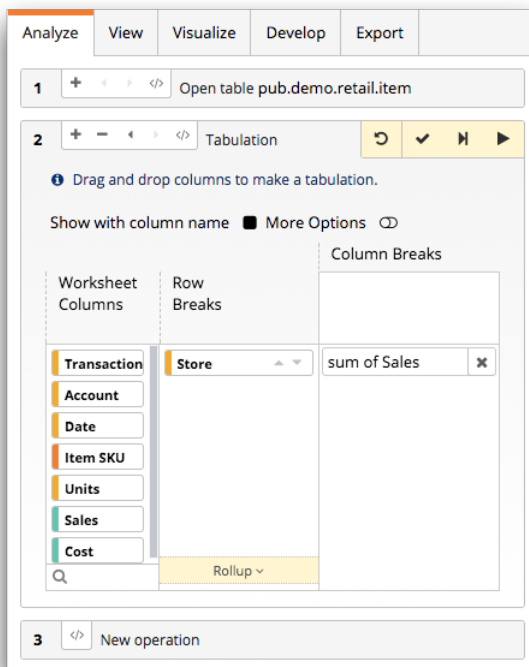
Now, you will take a look at a slightly more complex example of a tabulation.

Instead of looking at the total sales per store, you will determine the sales totals for each transaction in the **Sales Item Detail** table. However, you also want to know at which store any given transaction took place, and also the total number of items in each transaction. The objective is to have a summary table that shows you the transaction ID, store, sum of sales, and total units for each transaction. To accomplish this, you will edit the existing tabulation operation in the timeline.

- In the **Analyze** tab, click the **Tabulation** operation in step 2 of the timeline.



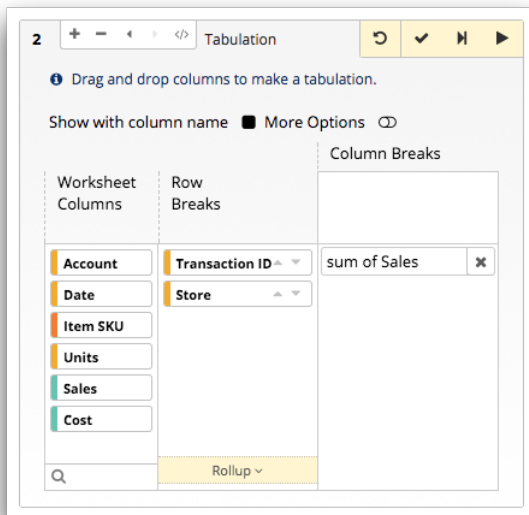
TRS displays the **Tabulation** panel.



Just as before, start by selecting a column to group your data. In this case, you want to see the total sales figures for each transaction. You also want to know which store recorded each of the transactions in the table, so you should also group by store.

11. Drag the **Transaction** column from the **Worksheet Columns** section to the **Row Breaks** section placing it above the **Store** column.

This selection first groups the tabulation by transaction and then divides the tabulated results into subgroups by store. The result of the calculation for each transaction will be displayed on a separate row in the new worksheet.



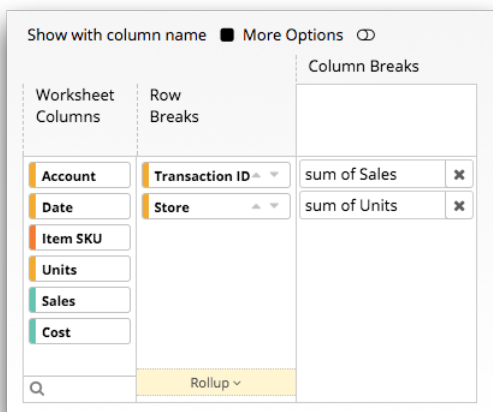
Note: The order by which you choose to group the data is important because it can affect the results of the tabulation.

Now that you have grouped your data, first by transaction, then by store, you can choose the data you want to summarize. In this example, you are still summarizing sales, so you can leave the **sum of Sales** summarization and simply add the summarization of units.

12. Drag the **Units** column from the **Worksheet Columns** section to the lower area of the **Column Breaks** section placing it below the **sum of Sales** summarization.

This selection is chosen because you want to determine the number of units.

TRS adds the **sum of Units** summarization and returns the **Units** column to the **Worksheet Columns** section.



Since the default tabulation function (**sum**) is what you want, once again you do not need to select a tabulation function from the menu.

The tabulation panel indicates that the resultant worksheet will contain two columns, **Sales** and **Units**. The rows in each column will list the total sales amount (**sum of Sales**) and total number of items sold (**sum of Units**) grouped first by **Transaction** and then subgrouped by **Store**.

Next, as before, give the new tabulated column a more meaningful name and define the formatting.

13. Click the **More Options** switch.

TRS displays the formatting options.

Show with column name More Options

Tabulation Label

Tabulation Column

Result Name

Result Heading

Display Format

Column Width

Decimal Places

14. In the **Summary** section, click **sum of Units**.

This selection is chosen because this time you want to define the name and formatting options for the **sum of Units** tabulated column.

TRS displays the formatting options for the **sum of Units** tabulated column.

Analyze View Visualize Develop Export

1 + < > </> Open table pub.demo.retail.item

2 </> Tabulation

Specify column format.

Show with column name More Options

Tabulation Label

Tabulation Column

Result Name

Result Heading

Display Format

Column Width

Decimal Places

15. Complete the following fields:

Tabulation Label	Sum of Sales Tabulation
Result Name	Enter <code>totunits</code> .
Result Heading	Enter <code>Total Units</code> .
Display Format	Select Default .
Column Width	Select Default .
Decimal Places	Select Default .

Now that you have selected the data you want to group by and the data you want to summarize, generate the tabulation.

16. Click the **Submit operation** (✓) icon.
TRS displays the results of your tabulation.

Sum of Sales Tabulation
Cols 2 fixed and 3 to 4 of 4 , Rows 1 to 11 of 11

Transaction ID transid	Store store	Sum of Sales sumsales	Total Units totunits
		\$59.85	44
531	1	\$-5.00	-1
532		\$1.60	2
534		\$8.25	3
535	2	\$3.85	3
536		\$6.02	4
537	3	\$10.35	6
538	1	\$6.95	8
539	2	\$5.00	1
540		\$1.44	2
541	3	\$10.00	7
543	1	\$11.39	9

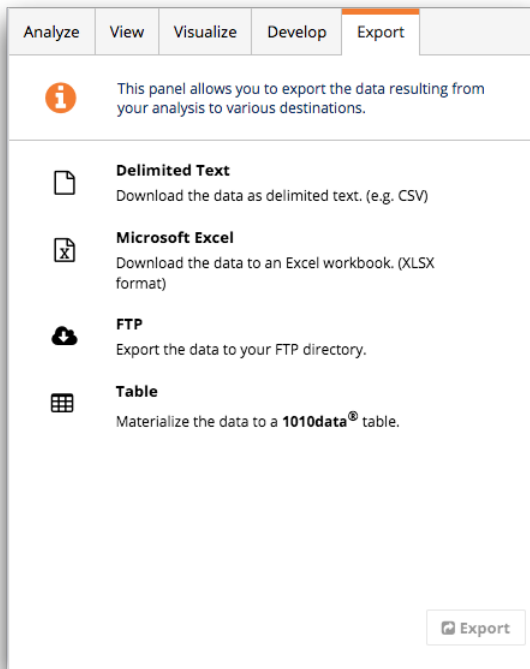
Notice that in the new summary, the total sales figure in the row at the top of the **Sum of Sales** column remains the same. However, instead of the total sales by store, TRS displays the total sales figure for each transaction and the store at which the transaction took place. In addition, the tabulation includes the total number of units sold in every transaction to provide a little more insight into volume. This provides you with an extra layer of detail or granularity in your results. Yet, the new table is still much easier to read and understand than the original **Sales Item Detail** table.

The final step in this tutorial is to download your results in a Microsoft Excel workbook file.

17. In the analysis pane, click the **Export** tab.

The screenshot shows the TRS analysis pane with the **Export** tab selected. The interface includes tabs for Analyze, View, Visualize, Develop, and Export. The main area shows a tabulation configuration for 'pub.demo.retail.item' with columns for Transaction ID and Store, and summary rows for sum of Sales and sum of Units. The Export tab is highlighted with a red box.

TRS displays the export options.



18. Click **Microsoft Excel**.

19. Click the **Export** button.

TRS saves the tabulation to your computer as `download.xlsx`.

Note: Depending on the browser you are using, you may be prompted to open or save the file. If you are prompted, save the file.

20. When you are finished with this tutorial, close the **TRS** window.

After you are comfortable with them, tabulations are a very fast and powerful way to get a sense of what information your data contains and how it can be leveraged to make decisions. So with that in mind, good luck and keep practicing.

Linking

Linking provides a simple yet powerful way of combining the data from two tables. Use linking to join tables or worksheets into a single, bigger table with columns from both.

When you work a lot with data, you will often find yourself in a position where you want to use two separate tables, which contain different but related data, to answer a question. The 1010data Insights Platform has a highly effective feature that allows you join the information from related data tables together in a straightforward manner. It is called linking, and it is one of the things the Insights Platform does best.

The **Sales Item Detail** table you have been working with in the previous tutorials of this guide contains information about every transaction for your fictitious retail chain. However, what if you wanted to know which department each item in those transactions came from? That information is found in the **Product Master** table. Similarly, what if you wanted to know more about the store in which that transaction took place? That information is found in the **Store Master** table. If you could combine those tables with your **Sales Item Detail** table and match up the data, you would be able to learn exactly what those details are.

In the linking tutorials in this guide, you will start with the **Sales Item Detail** table.

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales
531	957	1	2012-05-15	366	-1	
532	478	1	2012-05-15	98A	1	
532	478	1	2012-05-15	3B7	1	
534	738	1	2012-05-16	A96	2	
534	738	1	2012-05-16	65B	1	
535	709	2	2012-05-15	CB7	1	
535	709	2	2012-05-15	96A	1	
535	709	2	2012-05-15	969	1	
536	748	2	2012-05-17	3A4	3	
536	748	2	2012-05-17	366	1	
537	523	3	2012-05-15	CB7	1	
537	523	3	2012-05-15	A96	2	
537	523	3	2012-05-15	98A	1	
537	523	3	2012-05-15	96A	1	
537	523	3	2012-05-15	3B7	1	
538	668	1	2012-05-18	CB7	1	
538	668	1	2012-05-18	98A	4	

This table contains a lot of useful information about every transaction in your fictional retail point of sale (POS) system. The **Item SKU** column provides a reference to the exact product that was purchased. Within this table, you can see the date, store, and sales price of every item that was sold, as well as in which transaction it took place. However, based on the information in this table, you do not know any details about the items other than a SKU code. Fortunately, you have access to a **Product Master** table that gives a description of these items.

Product Master
Cols 1 to 8 of 8 , Rows 1 to 9 of 9

SKU sku	Item Description itemdesc	Class class	Class Description classdesc	Department dept	Department Description deptdesc	Division div	Division Description divdesc
366	LA MICRO TERRY CLOG LARGE	3423	SHOES CORE SLIPPERS	14	FOOTWEAR	1	APPAREL
3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS	2	GROCERY
A96	DUCT TAPE	2202	HARDWARE ADHESIVES CORE	32	TOOLS/AUTO	3	DRY G >
65B	RED DEVIL SILICONE SEALAN	2209	PAINT ACCESSORIES CORE	32	TOOLS/AUTO	3	DRY G >
969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
CB7	DGV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES	2	GROCERY
3A4	MEMO BOOK 3X5	1405	PAPER PRODUCTS	20	OFFICE SUPPLIES	2	GROCERY

Note: It is not necessary to open the **Product Master** table to link it in. Linking in a table can be done without opening the foreign table. It is shown here to illustrate the relationship between the tables in the link operation.

The **Product Master** table shown above contains specific information about all the product SKUs that are also in the **Sales Item Detail** table. Here you can see descriptions for each product, its category, and the department of the fictitious retail chain in which it is sold. But what if you wanted to look at this information as it relates to your sales data? The answer is to link the two tables together at a common data point. In this instance, both tables contain item SKU data. In this tutorial, you will use the SKU column in both tables to link them together.

Note: If you have an SQL background, you can think of linking tables as equivalent to a join in SQL.

For more information about linking, see [Linking tables and worksheets](#) in the *1010data Insights Platform User's Guide*.

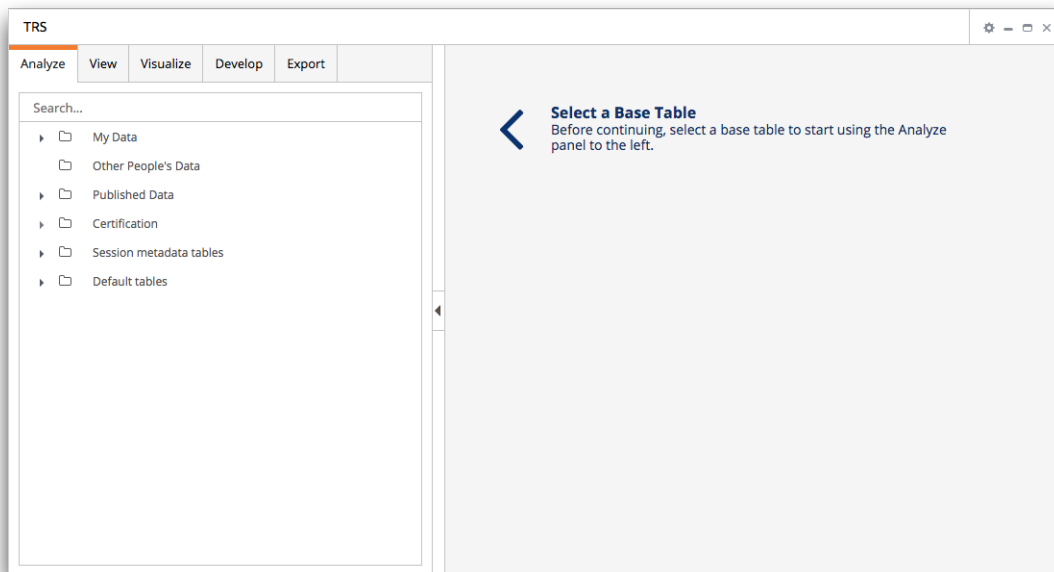
Link in a table

You can link in another 1010data Insights Platform table to the current table or worksheet.

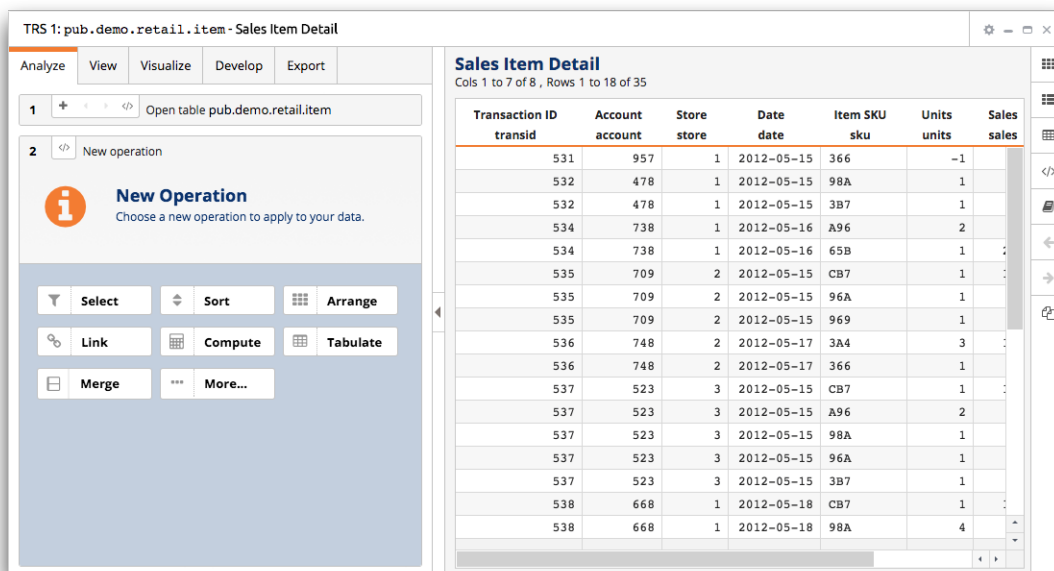
In this tutorial, you will link the **Product Master** table into the **Sales Item Detail** table using the Trillion-Row Spreadsheet (TRS). The combination of these two tables provides you with both the product and sales information within one worksheet for items sold within your fictitious retail chain.

To link in a table:

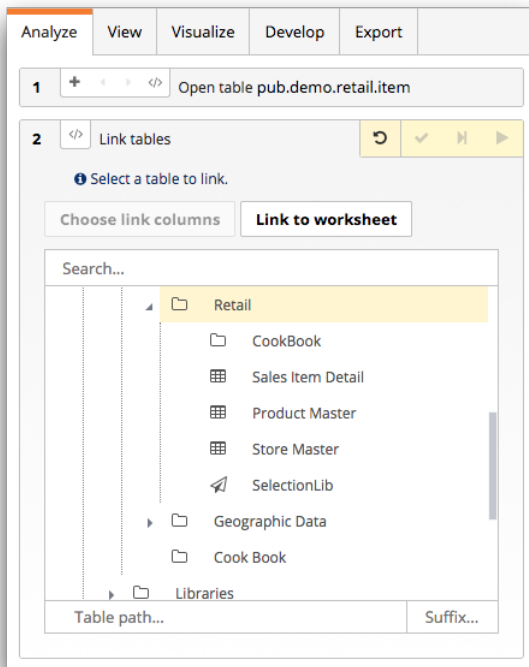
1. From the menu bar, select **Tools > Trillion-Row Spreadsheet**.
The Insights Platform displays the **TRS** window.



- Open the **Sales Item Detail** table (`pub.demo.retail.item`).
TRS displays the **New operation** panel in the analysis pane on the left and the **Sales Item Detail** table in the results pane on the right.



- In the **New operation** panel, click **Link**.
TRS displays the object browser in the **Link tables** panel.

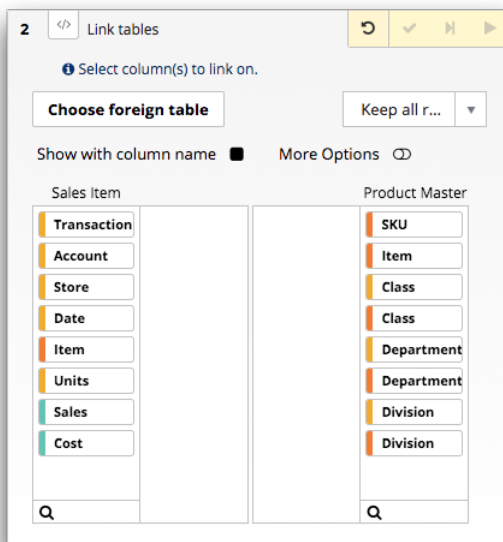


You will use the table browser to select the foreign table (**Product Master**) that you want to link into the current table (**Sales Item Detail**).

- In the **Suffix** field at the bottom of the table browser, enter `_pm`.

While not required, this field is highly recommended as it differentiates the column names from the two tables you are linking. By adding the `_pm` suffix to the columns from the **Product Master** table, it will be clear in the final worksheet which columns came from the **Sales Item Detail** table and which came from the **Product Master** table.

- Browse for and select the **Product Master** table (`pub.demo.retail.prod`). TRS displays the link column options in the **Link tables** panel.



In the **Link tables** panel, you select at least one column in the base table (**Sales Item Detail**) that matches a column in the foreign table (**Product Master**). For example, an item in the **Sales Item Detail** table that has a value of 366 in the **Item SKU** column matches with the first row in the **Product Master** table that has

a value of 366 in the **SKU** column. These columns provide a common data point where the two tables can be linked. While you can link two tables with more than one column at the same time, this tutorial focuses on linking a single column.

Columns in the **Link tables** panel are color coded so that you can quickly determine its data type.

Table 2: Column data type by color

Color	Data Type
Red	Integer The integer data type (int) is used to represent whole numbers that can be stored within 32-bits.
Purple	Big integer The big integer data type (bigint) is used to represent whole numbers that are outside the range of the integer data type and can be stored within 64 bits. (Available as of version 11.25)
Blue	Decimal The decimal data type (dec) is used to represent 32-bit floating point values.
Yellow	Text The text data type (text) is used to represent values that contain uppercase and lowercase letters, numbers, spaces, and symbols.

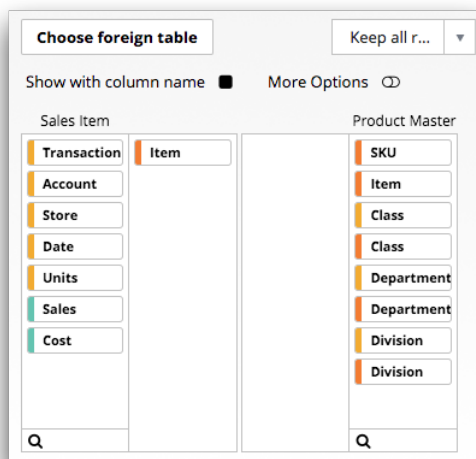
Note: When linking two tables, make sure that the columns from each table have the same data type. An error will occur if you attempt to link a column of one data type in a table to a column of a different data type in the other.

6. In the **After linking** drop-down list, select **Keep all rows**.

This option is selected because you want to link in all rows from the foreign table.

7. Drag the **Item SKU** column from the **Sales Item Detail** section to the blank section directly to the right.

This is the column from the **Sales Item Detail** table you currently have open.

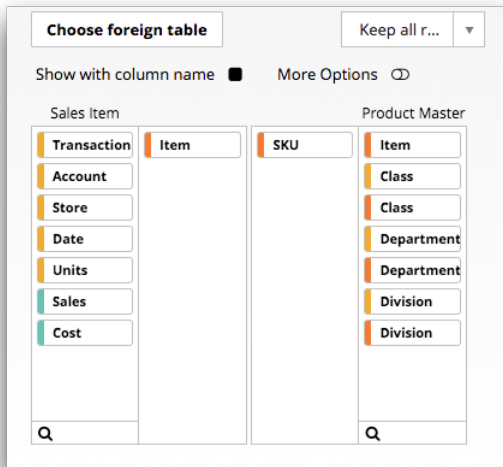


Note: It is important to point out that the columns in each section use the column headings from the table, not the column names. You can view the column names instead by marking the **Show with column name** checkbox.

Next, select a column in the foreign table you are linking in that corresponds to the one you just selected in the table you currently have open.

8. Drag the **SKU** column from the **Product Master** section to the blank section directly to the left.

This is the column in the **Product Master** table you are linking in. Again, this is the heading of the column, not the name.



9. Click the **Submit operation** (✓) icon.

TRS links the **Product Master** table into the **Sales Item Detail** table and displays the columns from the two tables combined.

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales	Cost cost	SKU sku_pm	Item Description itemdesc_pm	Class class_pm	Class Description classdesc_pm	Department dept_pm	Department Description deptdesc_pm	Division div_pm	Division Description divdesc_pm	
531	957	1	2012-05-15	366	-1	-5	-1.84	366	LA MICRO TERRY CLOG LARGE	3423	SHOES CORE SLIPPERS	14	FOOTWEAR		1	APPAREL
532	478	1	2012-05-15	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS		2	GROCERY
532	478	1	2012-05-15	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
534	738	1	2012-05-16	A96	2	6	2.9	A96	DUCT TAPE	2202	HARDWARE ADHESIVES CORE	32	TOOLS/AUTO		3	DRY G >
534	738	1	2012-05-16	65B	1	2.25	1.35	65B	RED DEVIL SILICONE SEALAN	2209	PAINT ACCESSORIES CORE	32	TOOLS/AUTO		3	DRY G >
535	709	2	2012-05-15	CB7	1	1.65	1.1	CB7	DOV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES		2	GROCERY
535	709	2	2012-05-15	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
535	709	2	2012-05-15	969	1	1.1	1	969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
536	748	2	2012-05-17	3A4	3	1.02	0.39	3A4	MEMO BOOK 3X5	1405	PAPER PRODUCTS	20	OFFICE SUPPLIES		2	GROCERY
536	748	2	2012-05-17	366	1	5	1.8	366	LA MICRO TERRY CLOG LARGE	3423	SHOES CORE SLIPPERS	14	FOOTWEAR		1	APPAREL
537	523	3	2012-05-15	CB7	1	1.65	1.1	CB7	DOV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES		2	GROCERY
537	523	3	2012-05-15	A96	2	6	2.9	A96	DUCT TAPE	2202	HARDWARE ADHESIVES CORE	32	TOOLS/AUTO		3	DRY G >
537	523	3	2012-05-15	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS		2	GROCERY
537	523	3	2012-05-15	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
537	523	3	2012-05-15	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
538	668	1	2012-05-18	CB7	1	1.65	1.1	CB7	DOV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES		2	GROCERY
538	668	1	2012-05-18	98A	4	2	1	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS		2	GROCERY
538	668	1	2012-05-18	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
538	668	1	2012-05-18	969	1	1.1	1	969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
538	668	1	2012-05-18	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
539	25	2	2012-06-19	65B	1	5	3.35	65B	RED DEVIL SILICONE SEALAN	2209	PAINT ACCESSORIES CORE	32	TOOLS/AUTO		3	DRY G >
540	361	2	2012-06-19	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2	GROCERY
540	361	2	2012-05-19	3A4	1	0.34	0.13	3A4	MEMO BOOK 3X5	1405	PAPER PRODUCTS	20	OFFICE SUPPLIES		2	GROCERY
541	469	3	2012-05-22	A96	1	4	1.45	A96	DUCT TAPE	2202	HARDWARE ADHESIVES CORE	32	TOOLS/AUTO		3	DRY G >
541	469	3	2012-05-22	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS		2	GROCERY

With the columns combined, not only can you see that an item with the SKU 3B7 was purchased on 5/15/12 at store 1, but you can also see its corresponding item description (PEPSI 20 OZ) and department (SNACKS).

10. When you are finished with this tutorial, close the **TRS** window.

In this tutorial, you linked the **Product Master** table, which had not been changed in any way, into the **Sales Item Detail** table. However, what if you had done some work to the **Product Master** table, thus making it a worksheet? In this case, you would need to link in a worksheet. For instructions, see [Link in a worksheet](#) on page 44.

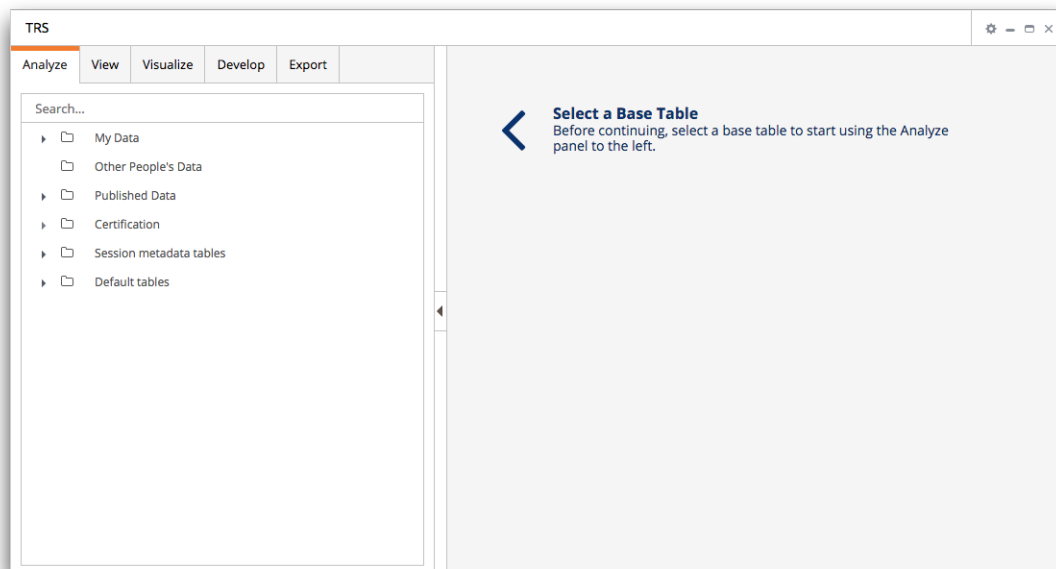
Link in a worksheet

Linking in a worksheet allows you to perform various actions on a table and then link the results into an existing table or worksheet.

What if you wanted to modify the **Product Master** table and link those results into the **Sales Item Detail** table? You might do this because you only want to link in additional information for a subset of the data. For example, in this tutorial you only want to link in the additional product information for items in the snacks department. You can accomplish this in the 1010data Insights Platform Trillion-Row Spreadsheet (TRS) by selecting the rows corresponding to that department in the **Product Master** table and then using the **Link** operation to add the data to the **Sales Item Detail** table. In this example, you are working with only 35 rows of data. However, for tables with billions of rows, linking in only the additional information you need is more efficient and can result in quicker processing.

To link in a worksheet:

1. From the menu bar, select **Tools > Trillion-Row Spreadsheet**.
The Insights Platform displays the **TRS** window.



2. Open the **Sales Item Detail** table (`pub.demo.retail.item`).
TRS displays the **New operation** panel in the analysis pane on the left and the **Sales Item Detail** table in the results pane on the right.

The screenshot shows the TRS interface with the 'Sales Item Detail' table open. The table has 7 columns: Transaction ID, Account, Store, Date, Item SKU, Units, and Sales. The 'New Operation' panel is active, showing a 'New Operation' message and a list of actions: Select, Sort, Arrange, Link, Compute, Tabulate, Merge, and More...

Transaction ID	Account	Store	Date	Item SKU	Units	Sales
531	957	1	2012-05-15	366	-1	
532	478	1	2012-05-15	98A	1	
532	478	1	2012-05-15	3B7	1	
534	738	1	2012-05-16	A96	2	
534	738	1	2012-05-16	65B	1	
535	709	2	2012-05-15	CB7	1	
535	709	2	2012-05-15	96A	1	
535	709	2	2012-05-15	969	1	
536	748	2	2012-05-17	3A4	3	
536	748	2	2012-05-17	366	1	
537	523	3	2012-05-15	CB7	1	
537	523	3	2012-05-15	A96	2	
537	523	3	2012-05-15	98A	1	
537	523	3	2012-05-15	96A	1	
537	523	3	2012-05-15	3B7	1	
538	668	1	2012-05-18	CB7	1	
538	668	1	2012-05-18	98A	4	

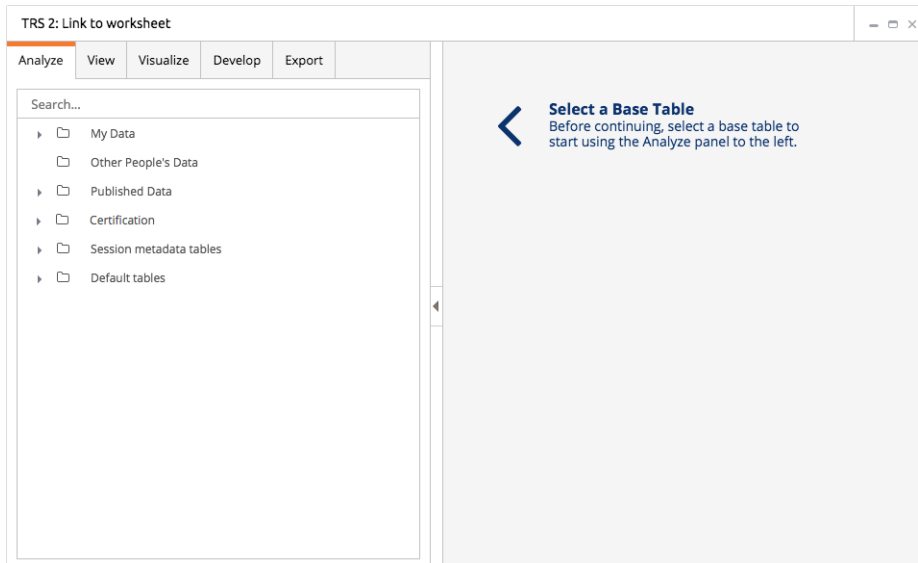
- In the **New operation** panel, click **Link**.
TRS displays the object browser in the **Link tables** panel.

The screenshot shows the TRS interface with the 'Link tables' panel active. The panel displays a search bar and a list of tables under the 'Retail' folder. The 'Link to worksheet' button is highlighted. The table browser shows the following structure:

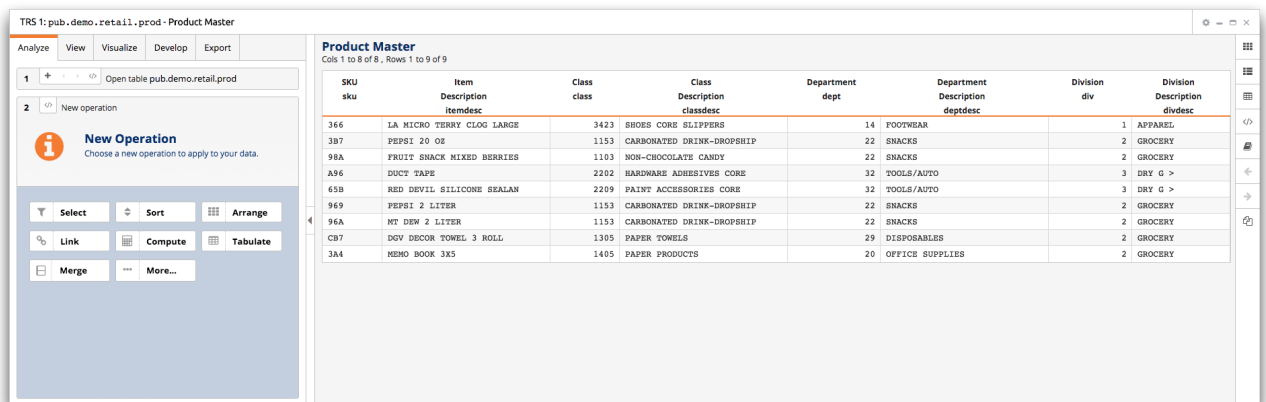
- Retail
 - CookBook
 - Sales Item Detail
 - Product Master
 - Store Master
 - SelectionLib
- Geographic Data
- Cook Book
- Libraries

At the bottom of the table browser, there are fields for 'Table path...' and 'Suffix...'.

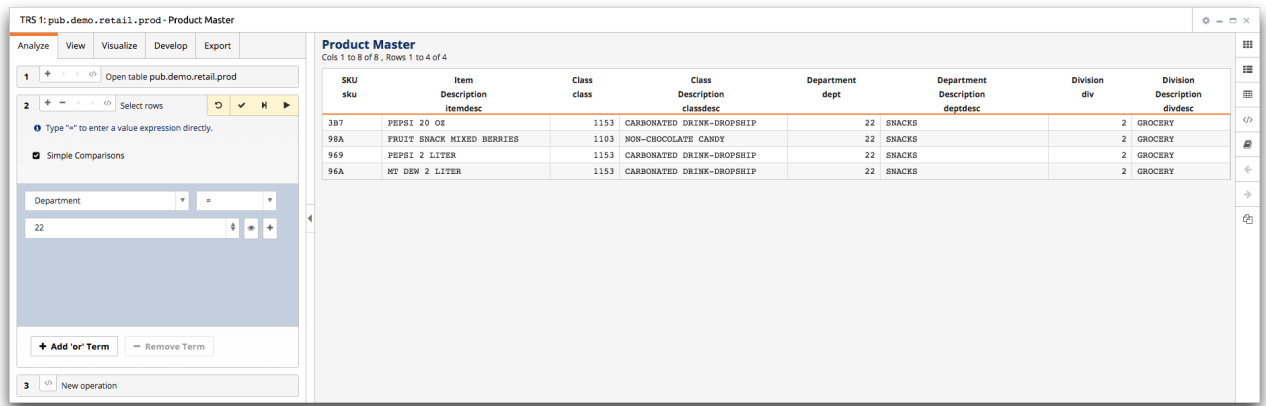
- In the **Suffix** field at the bottom of the table browser, enter `_pm`.
- Click **Link to worksheet**.
The Insights Platform opens a new TRS window used to select the worksheet you want to link into the **Sales Item Detail** table.



6. In the **Analyze** tab of the new TRS window, browse for and select the **Product Master** table (`pub.demo.retail.prod`). TRS displays the **New operation** panel in the analysis pane on the left and the **Product Master** table in the results pane on the right.



7. In the **Department** column of the **Product Master** table, right-click any of the instances of the value 22 and choose **Select rows > Where Department has the value 22** from the menu. TRS performs the row selection and adds the select operation to step 2 in the analysis timeline.

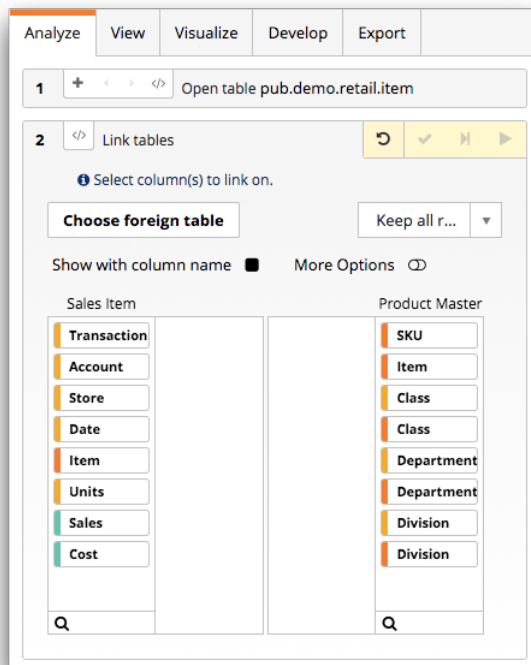


Because the original **Product Master** table has been modified by the row selection, it is now considered a worksheet. The worksheet has four rows.

SKU sku	Item Description itemdesc	Class class	Class Description classdesc	Department dept	Department Description deptdesc	Division div	Division Description divdesc
3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS	2	GROCERY
969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY

This worksheet can now be linked into your **Sales Item Detail** table in its current form.

- In the new **TRS** window, click the **Minimize** () icon to return to the original **TRS** window containing the **Sales Item Detail** table.
TRS displays the link column options for the **Sales Item Detail** table in the **Link tables** panel.



Just like when you linked in the original **Product Master** table in [Link in a table](#) on page 39, link once more on the **SKU** columns.

- In the **After linking** drop-down list, select **Keep all rows**.

This option is chosen because you want to link in the four selected rows from the foreign worksheet (**Product Master**) and retain the rows in the base table (**Sales Item Detail**) that do not have a matching department.

- Drag the **Item SKU** column from the **Sales Item Detail** section to the blank section directly to the right.

- Drag the **SKU** column from the **Product Master** section to the blank section directly to the left.

- Click the **Submit operation** () icon.

TRS links the **Product Master** worksheet into the **Sales Item Detail** table.

Sales Item Detail
Cols 1 to 16 of 16, Rows 1 to 24 of 35

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales	Cost cost	SKU sku_pm	Item Description itemdesc_pm	Class class_pm	Class Description classdesc_pm	Department dept_pm	Department Description deptdesc_pm	Division div_pm	Division Description divdesc_pm
531	957	1	2012-05-15	366	-1	-5	-1.84								
532	478	1	2012-05-15	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS	2	GROCERY
532	478	1	2012-05-15	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
534	738	1	2012-05-16	A96	2	6	2.9								
534	738	1	2012-05-16	65B	1	2.25	1.35								
535	709	2	2012-05-15	CB7	1	1.65	1.1								
535	709	2	2012-05-15	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
535	709	2	2012-05-15	969	1	1.1	1	969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
536	748	2	2012-05-17	3A4	3	1.02	0.39								
536	748	2	2012-05-17	366	1	5	1.8								
537	523	3	2012-05-15	CB7	1	1.65	1.1								
537	523	3	2012-05-15	A96	2	6	2.9								
537	523	3	2012-05-15	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS	2	GROCERY
537	523	3	2012-05-15	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
537	523	3	2012-05-15	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
538	668	1	2012-05-18	CB7	1	1.65	1.1								
538	668	1	2012-05-18	98A	4	2	1	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS	2	GROCERY
538	668	1	2012-05-18	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
538	668	1	2012-05-18	969	1	1.1	1	969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
538	668	1	2012-05-18	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
539	25	2	2012-04-19	65B	1	5	3.35								
540	361	2	2012-04-19	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
540	361	2	2012-05-19	3A4	1	0.34	0.13								

The result is a new worksheet that has information from the **Product Master** worksheet only for those item SKUs that fall under department 22. However, the other rows in the **Sales Item Detail** table remain, and the columns from the **Product Master** worksheet are left blank for items not in department 22. This is useful if you want to look at additional information about one subset of rows in a table or worksheet but still maintain the original level of detail for the other rows.

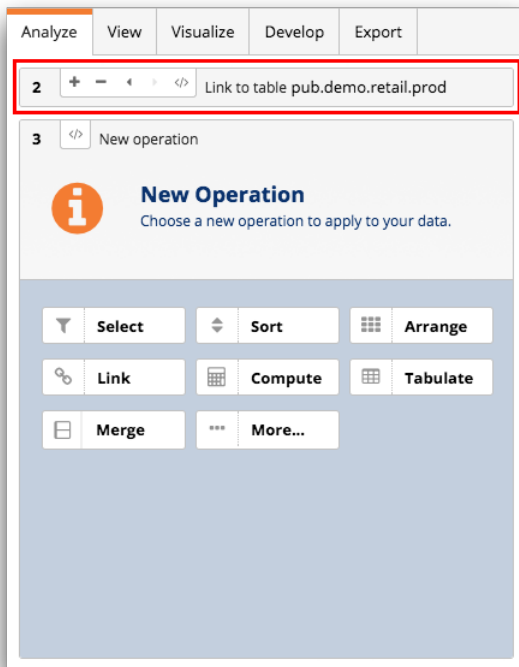
As an alternative, what if you want to simply eliminate the rows in the **Sales Item Detail** table that are not applicable to the selection in the foreign worksheet (**Product Master**)? In that situation, you only need to change one setting. The beauty of the analysis timeline is that you can make that change very easily to obtain those results.

The process to link and select rows is nearly identical to the process of simply linking to another table or worksheet. The only difference is the results produced. Instead of applying the information from the foreign worksheet to the entire base table or worksheet, the **Include matching rows** linking option retains only those rows in the base table that correspond to the selection in the foreign table.

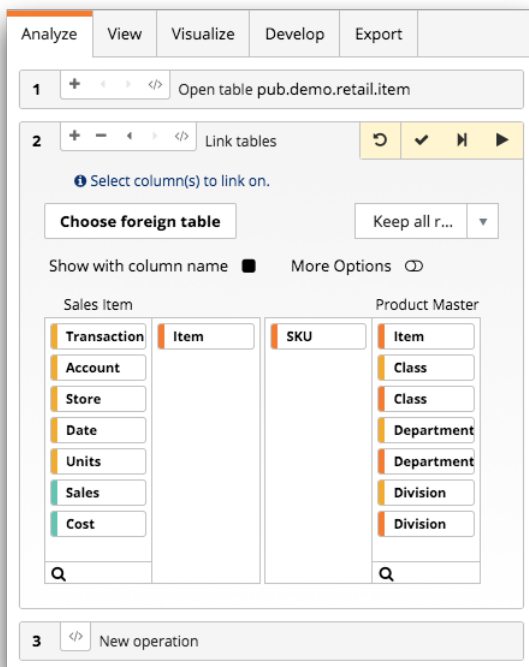
For instance, what if in the exercise you just completed above, you only wanted to see SKUs in the base worksheet that are in department 22? Since department information does not exist in the base table, you cannot make that selection. You could first link in the **Product Master** as the foreign table and then perform a row selection. However, that requires first linking in more rows than you need, which is less efficient. The best solution is to first select the rows in the **Product Master** table, then perform a link and select to eliminate the rows in the base table that cannot be linked.

With this in mind, go back and edit the link operation in the timeline to perform a link and select.

13. In the **Analyze** tab, click the **Link to table pub.demo.retail.prod** operation in step 2 of the timeline.



TRS displays the link column options for the **Sales Item Detail** worksheet in the **Link tables** panel.



14. In the **After linking** drop-down list, select **Include matching rows**.

This option is chosen because you want to link in the four selected rows from the foreign worksheet (**Product Master**) and eliminate the rows in the base table (**Sales Item Detail**) that do not match.

15. Click the **Submit operation** (✓) icon.
TRS displays the results of your selection.

Sales Item Detail
Cols 1 to 16 of 16, Rows 1 to 24 of 35

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales	Cost cost	SKU sku_pm	Item Description itemdesc_pm	Class class_pm	Class Description classdesc_pm	Department dept_pm	Department Description deptdesc_pm	Division div_pm	Division Description divdesc_pm
531	957	1	2012-05-15	366	-1	-5	-1.84	366	LA MICRO TERRY CLOG LARGE	3423	SHOES CORE SLIPPERS	14	FOOTWEAR		1
532	478	1	2012-05-15	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS		2
532	478	1	2012-05-15	387	1	1.1	0.56	387	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
534	738	1	2012-05-16	A96	2	6	2.9	A96	DUCT TAPE	2202	HARDWARE ADHESIVES CORE	32	TOOLS/AUTO		3
534	738	1	2012-05-16	65B	1	2.25	1.35	65B	RED DEVIL SILICONE SEALAN	2209	PAINT ACCESSORIES CORE	32	TOOLS/AUTO		3
535	709	2	2012-05-15	CB7	1	1.65	1.1	CB7	DGV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES		2
535	709	2	2012-05-15	96A	1	1.1	1	96A	MT DENW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
535	709	2	2012-05-15	969	1	1.1	1	969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
536	748	2	2012-05-17	3A4	3	1.02	0.39	3A4	MEMO BOOK 3X5	1405	PAPER PRODUCTS	20	OFFICE SUPPLIES		2
536	748	2	2012-05-17	366	1	5	1.8	366	LA MICRO TERRY CLOG LARGE	3423	SHOES CORE SLIPPERS	14	FOOTWEAR		1
537	523	3	2012-05-15	CB7	1	1.65	1.1	CB7	DGV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES		2
537	523	3	2012-05-15	A96	2	6	2.9	A96	DUCT TAPE	2202	HARDWARE ADHESIVES CORE	32	TOOLS/AUTO		3
537	523	3	2012-05-15	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS		2
537	523	3	2012-05-15	96A	1	1.1	1	96A	MT DENW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
537	523	3	2012-05-15	387	1	1.1	0.56	387	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
538	668	1	2012-05-18	CB7	1	1.65	1.1	CB7	DGV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES		2
538	668	1	2012-05-18	98A	4	2	1	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS		2
538	668	1	2012-05-18	96A	1	1.1	1	96A	MT DENW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
538	668	1	2012-05-18	969	1	1.1	1	969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
538	668	1	2012-05-18	387	1	1.1	0.56	387	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
539	25	2	2012-06-19	65B	1	5	3.35	65B	RED DEVIL SILICONE SEALAN	2209	PAINT ACCESSORIES CORE	32	TOOLS/AUTO		3
540	361	2	2012-06-19	387	1	1.1	0.56	387	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS		2
540	361	2	2012-06-19	3A4	1	0.34	0.13	3A4	MEMO BOOK 3X5	1405	PAPER PRODUCTS	20	OFFICE SUPPLIES		2

The result is a new worksheet with only the rows from the **Sales Item Detail** table that have SKUs in department 22, reflecting the selection from the **Product Master** worksheet. Only rows left in the **Sales Item Detail** worksheet are those that apply to the initial selection you made in the **Product Master** worksheet. This method allows you to use links more efficiently and effectively in your analyses.

16.When you are finished with this tutorial, close both **TRS** windows.

In this tutorial, you learned how to link in a worksheet. In the first part of the exercise, only the rows that applied to the selection in the foreign worksheet had the columns linked from the foreign worksheet. In the second exercise, the rows that were not applicable to the selection in the foreign worksheet were eliminated.

The linking tutorials are intended to introduce you to the topic of linking, but it is a complex topic with many variations, which makes it very powerful. Finding ways to combine data sets and provide them with context is what the Insights Platform is all about. After reviewing these tutorials, take some time to explore tables and see if they have places where they can be joined by columns with similar information. This will help you understand how your data is interrelated, and start you down the path of deeper, more insightful analysis.

Cross tabulations

A cross tabulation allows you to summarize the values in a column based on the values in two or more other columns and display the result as a matrix.

In the tutorials in this section, you will learn how to perform a cross tabulation. After you have performed a cross tabulation, you will learn how to create a computed column from your cross tabulation.

A cross tabulation can help you gain granularity from a summary without losing the highest level of data summarization. For example, in addition to finding the total amount of sales for each store in your chain, you can also obtain the sales figures for the individual departments within each store and how they compare to the total.

To illustrate this concept, shown below is the Sales by Store summary from [Perform a tabulation](#) on page 26.

Store store	Sum of Sales sumsales
	\$59.85
1	\$23.19
2	\$16.31
3	\$20.35

This result was reached simply by adding up the total sales for each store and assigning the total for each result to a single row in the table. Another way to think about this is that you created a "bucket" for each store and placed the amount of each transaction in the bucket of the store where the transaction took place. What if you want to know which departments contributed to the sales of each store?

The best way to get this information, without losing sales totals for each store, is to perform a cross tabulation. Effectively, a cross tabulation groups on a second metric and summarizes it, placing the data into one column for each unique value in the group. Each row will contain sales figures for each store, and a new set of columns will be created to show the sales totals for each department.

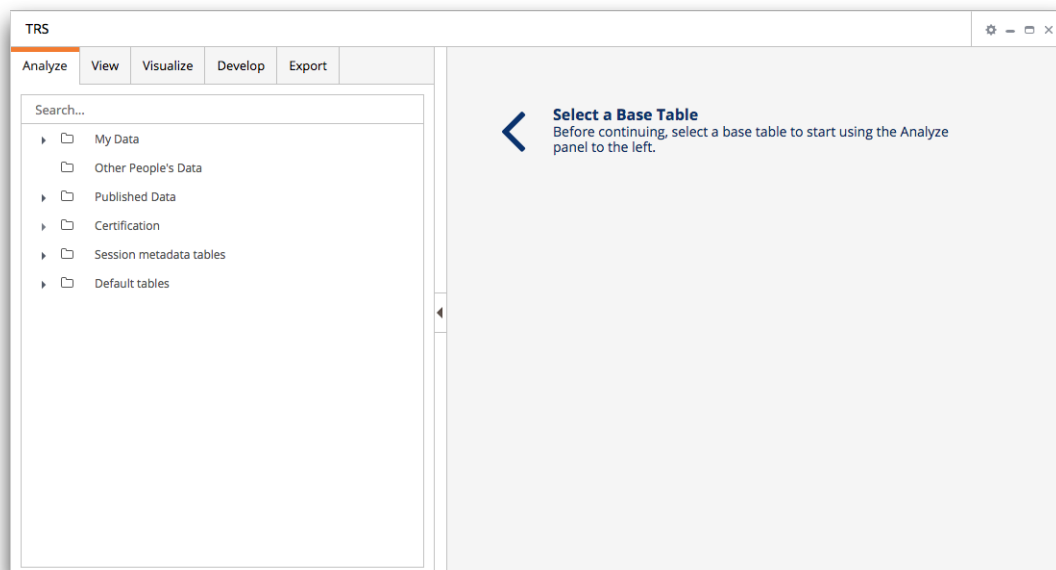
Perform a cross tabulation

A cross tabulation provides extra granularity from a summary without losing the highest level of data summarization.

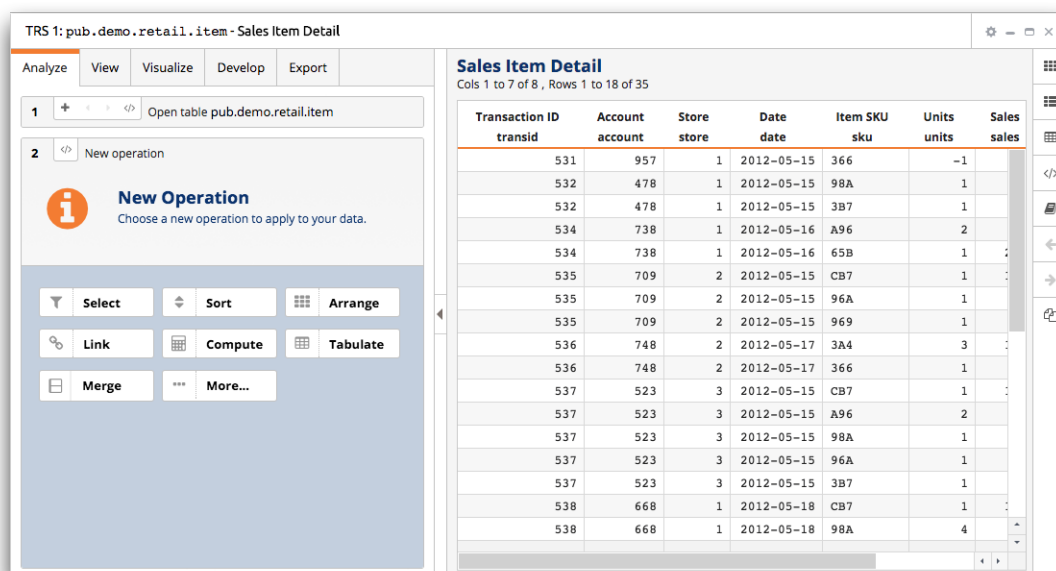
In this tutorial, you will learn how to perform a cross tabulation in the 1010data Insights Platform Trillion-Row Spreadsheet (TRS) to determine the sales amount by store. The sales totals for each store will be broken out by department so you can see how much each department contributed to the total sales.

To perform a cross tabulation:

1. From the menu bar, select **Tools > Trillion-Row Spreadsheet**.
The Insights Platform displays the **TRS** window.



- Open the **Sales Item Detail** table (`pub.demo.retail.item`).
TRS displays the **New operation** panel in the analysis pane on the left and the **Sales Item Detail** table in the results pane on the right.



To get the department information for your cross tabulation, you need to link in the **Product Master** table. This is identical to the process used in [Link in a table](#) on page 39.

- In the **New operation** panel, click **Link**.
TRS displays the table browser in the **Link tables** panel.
- In the **Suffix** field at the bottom of the table browser, enter `_pm`.
- Browse for and select the **Product Master** table (`pub.demo.retail.prod`).
TRS displays the link column options in the **Link tables** panel.
- In the **After linking** drop-down, select **Keep all rows**.
- Link in the table by the SKU columns.
 - Drag the **Item SKU** column from the **Sales Item Detail** section to the blank section directly to the right.

b) Drag the **SKU** column from the **Product Master** section to the blank section directly to the left.

8. Click the **Submit operation** (✓) icon.

TRS links the **Product Master** table into the **Sales Item Detail** table and displays the results of the link.

Sales Item Detail
Cols 1 to 16 of 16, Rows 1 to 24 of 35

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales	Cost cost	SKU sku_pm	Item Description itemdesc_pm	Class class_pm	Class Description classdesc_pm	Department dept_pm	Department Description deptdesc_pm	Division div_pm	Division Description divdesc_pm
531	957	1	2012-05-15	366	-1	-5	-1.84	366	LA MICRO TERRY CLOG LARGE	3423	SHOE CORE SLIPPERS	14	FOOTWEAR	1	APPAREL
532	478	1	2012-05-15	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS	2	GROCERY
532	478	1	2012-05-15	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
534	738	1	2012-05-16	A96	2	6	2.9	A96	DUCT TAPE	2202	HARDWARE ADHESIVES CORE	32	TOOLS/AUTO	3	DRY G >
534	738	1	2012-05-16	65B	1	2.25	1.35	65B	RED DEVIL SILICONE SEALAN	2209	PAINT ACCESSORIES CORE	32	TOOLS/AUTO	3	DRY G >
535	709	2	2012-05-15	CB7	1	1.65	1.1	CB7	DGV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES	2	GROCERY
535	709	2	2012-05-15	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
535	709	2	2012-05-15	969	1	1.1	1	969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
536	748	2	2012-05-17	3A4	3	1.02	0.39	3A4	MEMO BOOK 3X5	1405	PAPER PRODUCTS	20	OFFICE SUPPLIES	2	GROCERY
536	748	2	2012-05-17	366	1	5	1.8	366	LA MICRO TERRY CLOG LARGE	3423	SHOE CORE SLIPPERS	14	FOOTWEAR	1	APPAREL
537	523	3	2012-05-15	CB7	1	1.65	1.1	CB7	DGV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES	2	GROCERY
537	523	3	2012-05-15	A96	2	6	2.9	A96	DUCT TAPE	2202	HARDWARE ADHESIVES CORE	32	TOOLS/AUTO	3	DRY G >
537	523	3	2012-05-15	98A	1	0.5	0.25	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS	2	GROCERY
537	523	3	2012-05-15	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
537	523	3	2012-05-15	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
538	668	1	2012-05-18	CB7	1	1.65	1.1	CB7	DGV DECOR TOWEL 3 ROLL	1305	PAPER TOWELS	29	DISPOSABLES	2	GROCERY
538	668	1	2012-05-18	98A	4	2	1	98A	FRUIT SNACK MIXED BERRIES	1103	NON-CHOCOLATE CANDY	22	SNACKS	2	GROCERY
538	668	1	2012-05-18	96A	1	1.1	1	96A	MT DEW 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
538	668	1	2012-05-18	969	1	1.1	1	969	PEPSI 2 LITER	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
538	668	1	2012-05-18	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
539	25	2	2012-06-19	65B	1	5	3.35	65B	RED DEVIL SILICONE SEALAN	2209	PAINT ACCESSORIES CORE	32	TOOLS/AUTO	3	DRY G >
540	361	2	2012-06-19	3B7	1	1.1	0.56	3B7	PEPSI 20 OZ	1153	CARBONATED DRINK-DROPSHIP	22	SNACKS	2	GROCERY
540	361	2	2012-06-19	3A4	1	0.34	0.13	3A4	MEMO BOOK 3X5	1405	PAPER PRODUCTS	20	OFFICE SUPPLIES	2	GROCERY

9. In the **New operation** panel, click **Tabulate**.

TRS displays the **Tabulation** panel.

Analyze View Visualize Develop Export

2 + - < > </> Link to table pub.demo.retail.prod

3 </> Tabulation

Drag and drop columns to make a tabulation.

Show with column name More Options

Worksheet Columns: Transaction, Account, Store, Date, Item SKU, Units, Sales, Cost, SKU, Item, Class, Class, Department, Department

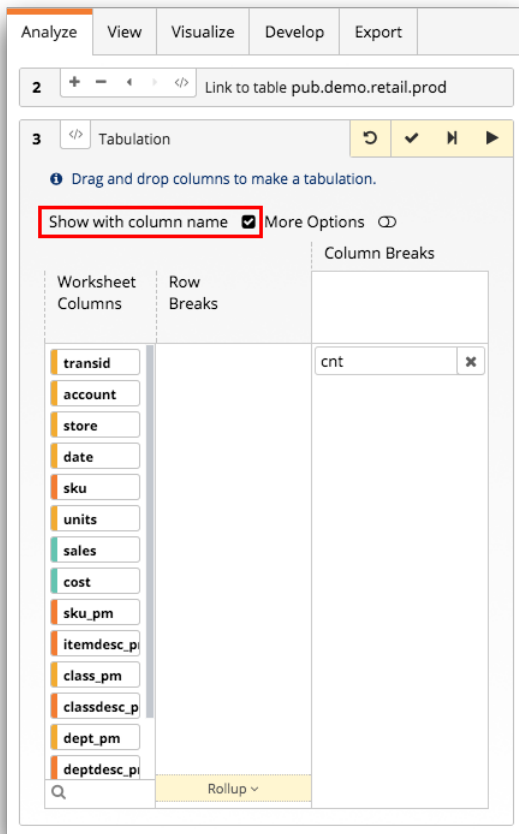
Row Breaks: (empty)

Column Breaks: cnt

Rollup

10. Select the **Show with column name** checkbox.

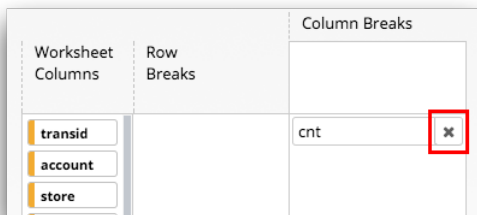
The **Show with column name** checkbox displays the column names instead of the column labels.



Notice the `_pm` suffix that you specified is added to the end of the certain column names. This indicates that a column is a linked column from the **Product Master** table.

11. Clear the **Show with column name** checkbox.

12. Remove the default **cnt** (count) tabulation function by clicking the **Remove** (x) icon.

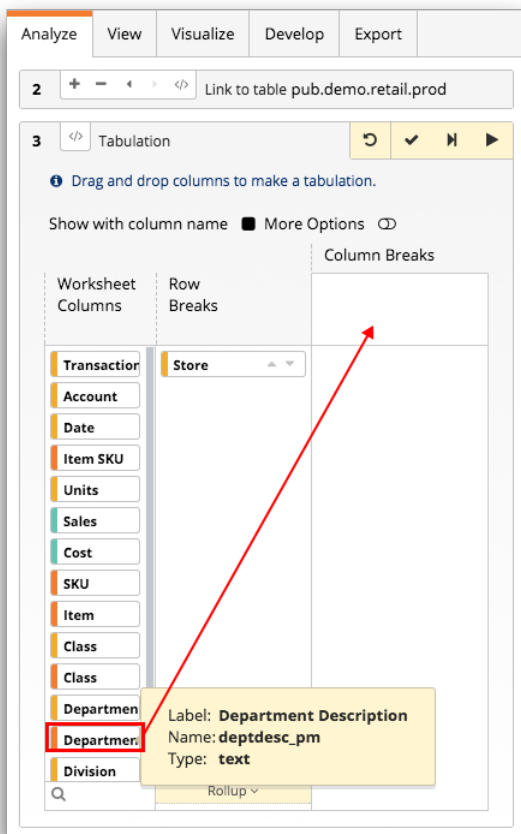


13. Drag the **Store** column from the **Worksheet Columns** section to the **Row Breaks** section.

This selection creates a row for each store in the cross tabulation.

14. Drag the **Department Description** column from the **Worksheet Columns** section to the upper area of the **Column Breaks** section.

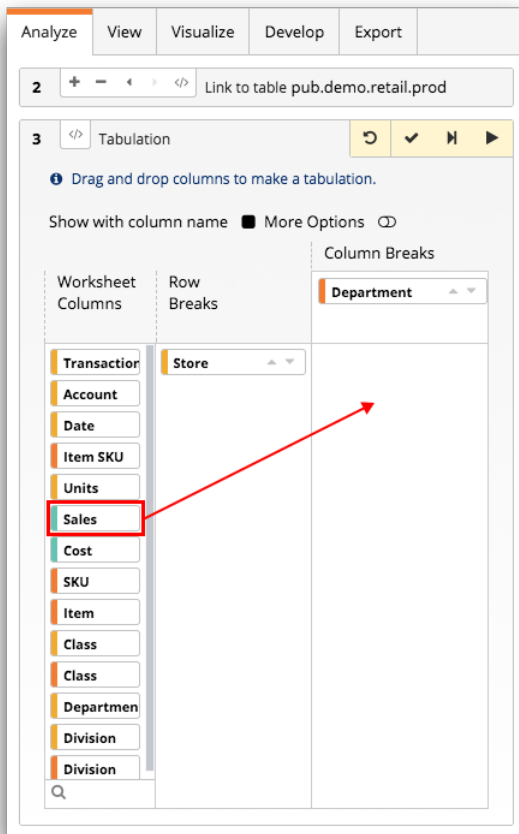
This selection creates a column for each department in the cross tabulation. The **Department Description** will be parsed for its individual values and then summarized. In this case, a column for each department that had sales will be created.



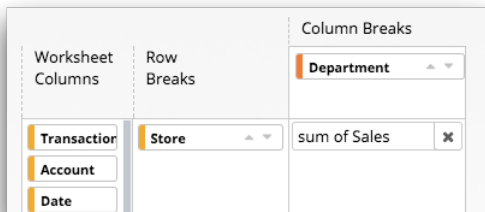
Next, you need to select the actual summary type. The summary applies to both the row grouping and the column grouping. In this case, you are calculating total sales by department for each store.

15. Drag the **Sales** column from the **Worksheet Columns** section to the lower area of the **Column Breaks** section.

This selection chooses the column of data you want to act on. In this instance, you want to calculate the total sales.



TRS adds the **sum of Sales** summarization and returns the **Sales** column to the **Worksheet Columns** section.



The summarization is a combination of the selected column and the default tabulation function for that column's data type. In this case, **sum** is the default tabulation function for **Sales**. This means the **sum of Sales** summarization will calculate the total amount in the **Sales** column.

The next step of a cross tabulation is to select the tabulation function you want to perform on the column. This is done by clicking the summarization (in this case, **sum of Sales**) and choosing a tabulation function from the menu. However, since the default tabulation function happens to be exactly what you are looking for, you do not need to make this selection.

Notice that the selections you made in the **Tabulation** panel represent how your worksheet will display your analysis. In this example, your worksheet will contain stores as rows and department descriptions as columns. The intersection between the two will list the sales total for the store by department.

Next, define the format of the tabulation.

16. Click the **More Options** switch.

TRS displays the formatting options.

Show with column name More Options

Tabulation Label

Tabulation Column

Result Name

Result Heading

Display Format

Column Width

Decimal Places

Select **sum of Sales** in the **Tabulation Column** drop-down. This indicates that the name and formatting options you define apply to the **sum of Sales** tabulated column.

17. Complete the following fields:

- Tabulation Label** Enter Department Sales By Store
- Display Format** Select **Currency: \$1,234.56**.
- Column Width** Select **Default**.
- Decimal Places** Select **Default**.

Tabulation Label

Tabulation Column

Result Name

Result Heading

Display Format

Column Width

Decimal Places

18. Click the **Submit operation** (✓) icon.
 TRS displays the results of your cross tabulation.

Department Sales By Store
Cols 1 fixed and 2 to 7 of 7, Rows 1 to 3 of 3

Department Description	FOOTWEAR	SNACKS	TOOLS/AUTO	DISPOSABLES	OFFICE SUPPLIES	
Store	\$59.85	\$0.00	\$24.30	\$27.25	\$6.60	
store	\$59.85	\$0.00	\$24.30	\$27.25	\$6.60	
1	\$23.19	\$-5.00	\$12.30	\$12.25	\$3.30	\$0.34
2	\$16.31	\$5.00	\$3.30	\$5.00	\$1.65	\$1.36
3	\$20.35	\$0.00	\$8.70	\$10.00	\$1.65	\$0.00

As you can see above, the totals for all the stores are still available in the first column outlined in red. However, you can also see how much each department contributed to those totals. For instance, the snacks department accounted for \$24.30 of the \$59.85 in total sales across all the stores in our fictional retail chain.

Further granularity shows that in store 1, \$12.30 was from the snacks department.

19. When you are finished with this tutorial, close the **TRS** window.

Cross tabulations are a great way to get further insight into the numbers of regular tabulations. You can keep your totals, but see the story behind the numbers by breaking them down into their constituent parts. Next time you are not sure about why a summary looks the way it does, rely on a cross tabulation to better understand your data and your business.

Create a computed column from a cross-tabulated column

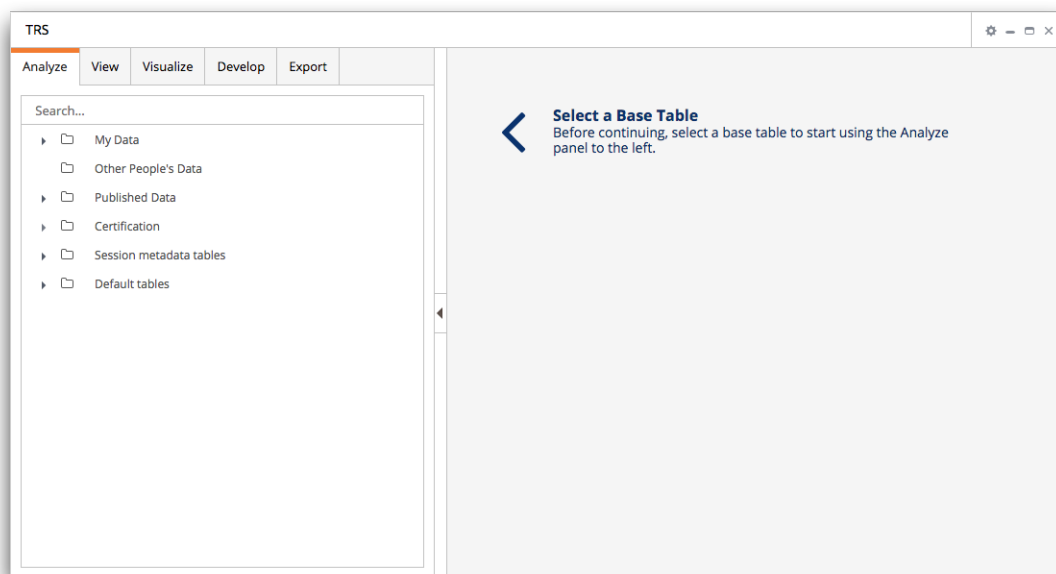
After you have completed a cross tabulation, you can work with the resultant columns of the new worksheet the same as you would with any other 1010data Insights Platform table. This makes it easy to create new metrics based on your summaries.

In this tutorial, you will use the Trillion-Row Spreadsheet to perform a simple day-over-day calculation by first creating a cross tabulation and then creating a computed column.

In your analysis, you want to see the sales of one date compared to the sales of a different date for all three of your fictional stores. For this example, the dates are consecutive.

To create a computed column from a cross-tabulated column:

1. From the menu bar, select **Tools > Trillion-Row Spreadsheet**.
The Insights Platform displays the **TRS** window.



2. Open the **Sales Item Detail** table (`pub.demo.retail.item`).
TRS displays the **New operation** panel in the analysis pane on the left and the **Sales Item Detail** table in the results pane on the right.

The screenshot shows the TRS interface with the 'Sales Item Detail' table and the 'New Operation' panel. The table has the following data:

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales
531	957	1	2012-05-15	366	-1	
532	478	1	2012-05-15	98A	1	
532	478	1	2012-05-15	3B7	1	
534	738	1	2012-05-16	A96	2	
534	738	1	2012-05-16	65B	1	
535	709	2	2012-05-15	CB7	1	
535	709	2	2012-05-15	96A	1	
535	709	2	2012-05-15	969	1	
536	748	2	2012-05-17	3A4	3	
536	748	2	2012-05-17	366	1	
537	523	3	2012-05-15	CB7	1	
537	523	3	2012-05-15	A96	2	
537	523	3	2012-05-15	98A	1	
537	523	3	2012-05-15	96A	1	
537	523	3	2012-05-15	3B7	1	
538	668	1	2012-05-18	CB7	1	
538	668	1	2012-05-18	98A	4	

Next, perform a row selection to limit the data to the two days in which you are interested.

3. In the **New operation** panel, click **Select**.

TRS displays the **Simple Comparisons** options in the **Select rows** panel.

4. Clear the **Simple Comparisons** checkbox.

TRS displays the expression field.

The screenshot shows the 'Simple Comparisons' panel with the checkbox checked. The expression field is empty and contains the placeholder text 'Enter expression here...'.

5. In the expression field, enter the following: `between (date;20120517;20120518)`

The screenshot shows the 'Simple Comparisons' panel with the checkbox checked. The expression field now contains the code `between(date;20120517;20120518)`.

6. Press **Enter**.

TRS displays the results of your selection.

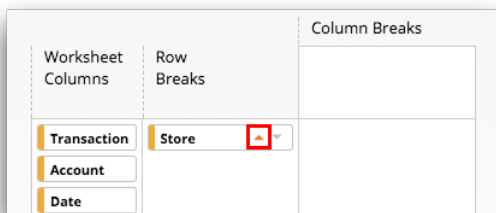
Sales Item Detail
Cols 1 to 8 of 8 , Rows 1 to 7 of 7

Transaction ID transid	Account account	Store store	Date date	Item SKU sku	Units units	Sales sales	Cost cost
536	748	2	2012-05-17	3A4	3	1.02	0.39
536	748	2	2012-05-17	366	1	5	1.8
538	668	1	2012-05-18	CB7	1	1.65	1.1
538	668	1	2012-05-18	98A	4	2	1
538	668	1	2012-05-18	96A	1	1.1	1
538	668	1	2012-05-18	969	1	1.1	1
538	668	1	2012-05-18	3B7	1	1.1	0.56

Next, you will create your cross tabulation. This will give you the totals for both the stores overall, and the totals for each of the two dates you selected.

- In the **New operation** panel, click **Tabulate**.
TRS displays the **Tabulation** panel.

- Remove the default **cnt** (count) tabulation function by clicking the **Remove** (✕) icon.
- Drag the **Store** column from the **Worksheet Columns** section to the **Row Breaks** section.
This selection creates a row for each store in the cross tabulation.
- In the **Store** column within the **Row Breaks** section, click the **Sort Up** (▲) icon.



This selection sorts the cross tabulation results in ascending order by store number.

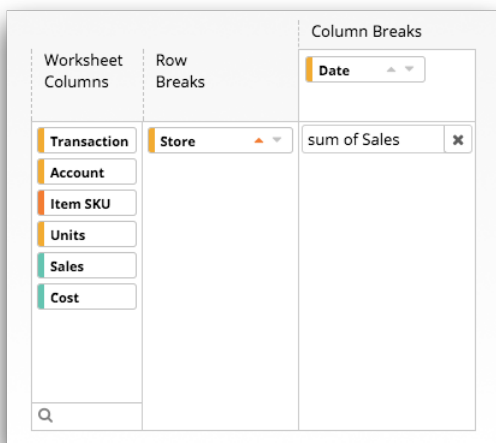
11. Drag the **Date** column from the **Worksheet Columns** section to the upper area of the **Column Breaks** section.

This selection creates a column for each date for which the store had sales.

12. Drag the **Sales** column from the **Worksheet Columns** section to the lower area of the **Column Breaks** section.

This selection chooses the column of data you want to act on. In this instance, you want to calculate the total sales.

TRS adds the **sum of Sales** tabulation function and returns the **Sales** column to the **Worksheet Columns** section.



The next step of a cross tabulation is to select the tabulation function you want to perform on the column. In this case, you want to summarize the data in the sales column. The summary applies to both the row grouping and the column grouping. In other words, you are calculating total sales by date for each store. This is done by clicking the summarization (**sum of Sales**) and choosing a tabulation function from the menu. However, since the default tabulation function happens to be exactly what you are looking for, you do not need to make this selection.

Next, define the format of the tabulation.

13. Click the **More Options** switch.

TRS displays the formatting options.

14. Complete the following fields:

Tabulation Label	Enter <code>Sales by Store for 5/17 and 5/18</code>
Display Format	Select Currency: \$1,234.56.
Column Width	Select Default.
Decimal Places	Select Default.

Tabulation Label

Tabulation Column

Result Name

Result Heading

Display Format

Column Width

Decimal Places

15. Click the **Submit operation** (✓) icon.
 TRS displays the results of your cross tabulation.

Sales by Store for 5/17 and 5/18
 Cols 1 fixed and 2 to 4 of 4 , Rows 1 to 2 of 2

Date	05/17/12		05/18/12	
Store	\$12.97	\$6.02	\$6.95	\$6.95
1	\$6.95	\$0.00	\$6.95	\$6.95
2	\$6.02	\$6.02	\$0.00	\$0.00

Since you eliminated all the dates except the two you are interested in, you can now create a computed column that shows the difference in sales from one day to the next.

16. In the **New operation** panel, click **Compute**.
 TRS displays the **Computed column** panel.

Analyze View Visualize Develop Export

3 + - < > </> Cross-tabulation

4 </> Computed column

i Column names must begin with a letter and may contain only letters, digits, and underscores (_). All letters must be lower case, and names may not end in an underscore.

Name More Options

Label

17. Complete the following fields:

Name Enter dod.
This is a required field.

Label Enter Day-Over-Day.

By default, resultant columns in cross tabulations are named m0, m1, m2, and so on.

In this case, to calculate the day-over-day sales, simply subtract the values in the column with the less recent date (m0) from the values in the column with the more recent date (m1).

18. In the expression field, enter the following: m1-m0

The screenshot shows a configuration window with three input fields: 'Name' containing 'dod', 'Label' containing 'Day-Over-Day', and a larger 'Expression' field containing 'm1-m0'. A 'More Options' button is visible next to the Name field.

Next, define the format of the computed column.

19. Click the **More Options** switch.
TRS displays the formatting options.

20. Complete the following fields:

Display Format Select **Currency: \$1,234.56**.

Column Width Select **Default**.

Decimal Places Select **Default**.

21. Click the **Submit operation** (✓) icon.
TRS creates the **Day-Over-Day** computed column.

Sales by Store for 5/17 and 5/18
Cols 1 fixed and 2 to 5 of 5 , Rows 1 to 2 of 2

Date	2012-05-17		2012-05-18		
date					
Store	12.97	6.020	6.950		Day-Over-Day
store					dod
1	6.95	0.000	6.950		\$6.95
2	6.02	6.020	0.000		\$-6.02

From the results, it is clear that the sales for store 2 plummeted on the last day.

22. When you are finished with this tutorial, close the **TRS** window.

Cross tabulations are a great way to get further insight into the numbers of regular tabulations. You can keep your totals but see the story behind the numbers by breaking them down into their constituent parts. Next time you're not sure about why a summary looks the way it does, rely on cross tabulations to better understand your data and your business.

Charts

The 1010data Insights Platform provides a way for you to generate high-quality charts from your data.

It can sometimes be easier to find trends and see differences more easily in a chart. For example, it may be quicker and easier to find the day of sales with the highest profit margin from a chart than from a table of numbers listing the same information. Charting can help you make sense of large amounts of data that might otherwise be too overwhelming to comprehend.

The tutorial in this section demonstrates how to create a bar chart that shows total sales and profits for all stores combined for the fiscal month of May. In addition, you will learn how to customize and download a chart.

For more information about charting, see [Visualize](#) in the *1010data Insights Platform User's Guide*.

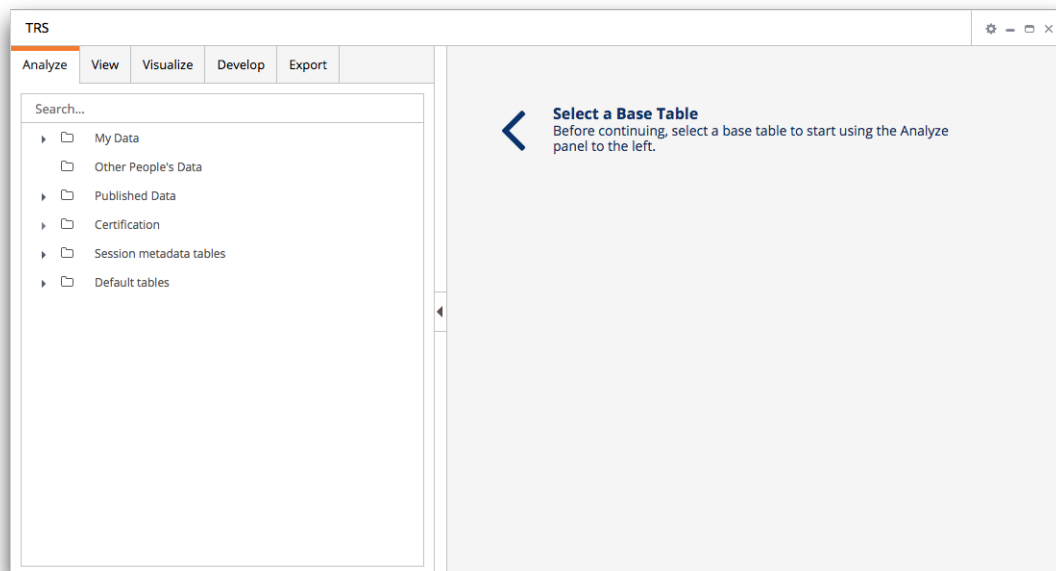
Create a bar chart

You can create a bar chart to show comparisons among categories in your data. You can also customize display settings and save a chart from the Trillion-Row Spreadsheet (TRS) to your computer as a PNG or PDF file.

The first step to creating a chart in the platform is to prepare your data. For this tutorial, this step has already been done so you can focus on creating the chart itself. The sample data provided compares the total sales, cost, and profit for stores in a fictitious retail chain. Use this data to create a bar chart comparing the total profit, sales, and cost of all stores combined for each day in the fiscal month of May. After you have created your chart, you will then change display preferences like colors and labels. A chart created in the 1010data Insights Platform TRS can be downloaded as a PNG or PDF file for a variety of uses. For example, you can share the chart with someone who does not have access to the Insights Platform, or you could use the chart as an image within a report or presentation. This tutorial explains how to download a chart as a PDF file.

To create a bar chart:

1. From the menu bar, select **Tools > Trillion-Row Spreadsheet**.
The Insights Platform displays the **TRS** window.



2. Open the **Bar Chart Sample Data** Quick Query (`pub.doc.retail.barchartex`).
TRS displays the **Bar Chart Sample Data** tabulation.

Bar Chart Sample Data
Cols 1 fixed and 2 to 4 of 4 , Rows 1 to 4 of 4

Date date	Sales total_sales_date	Cost total_cost_date	Profit total_profit_date
	\$37.63	\$20.70	\$16.93
2012-05-19	\$0.34	\$0.13	\$0.21
2012-05-22	\$16.60	\$8.74	\$7.86
2012-06-03	\$14.59	\$7.92	\$6.67
2012-06-19	\$6.10	\$3.91	\$2.19

3. In the analysis pane, click the **Visualize** tab.
TRS displays the **Visualize** options.

TRS 6: pub.demo.retail.item - Profit, Sales, & Cost by Date

Analyze View **Visualize** Develop Export

UPDATE RESET

Date
Sales
Cost
Profit

Histogram (1D)

X-AXIS

Drop column

INTERACTIONS

SETTINGS

Layout: Default

Samples: 100,000

X-Scale

Y-Scale

X-Range (min)

X-Range (max)

Y-Range (min)

Y-Range (max)

Bins: Default

Heights

Bar Chart Sample Data
Cols 1 fixed and 2 to 4 of 4 , Rows 1 to 4 of 4

Date date	Sales total_sales_date	Cost total_cost_date	Profit total_profit_date
	\$37.63	\$20.70	\$16.93
2012-05-19	\$0.34	\$0.13	\$0.21
2012-05-22	\$16.60	\$8.74	\$7.86
2012-06-03	\$14.59	\$7.92	\$6.67
2012-06-19	\$6.10	\$3.91	\$2.19

4. Create a bar chart showing the total sales and profit by day.
a) In the drop-down list below the **Update**, **Reset**, and **More Options** buttons, select **Bar**.

Date
Sales
Cost
Profit

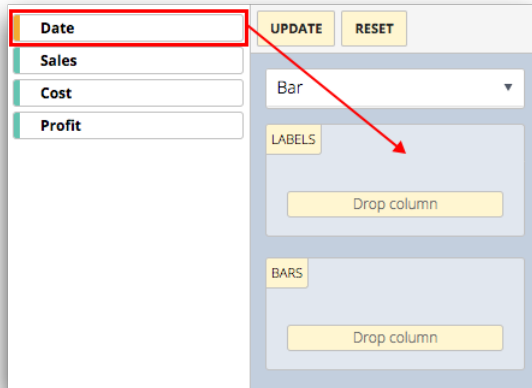
UPDATE RESET

Histogram (1D)

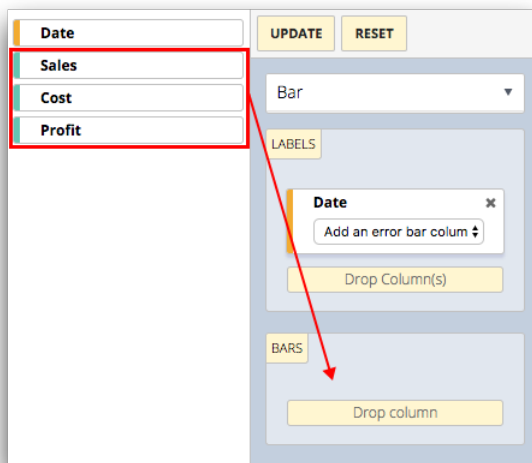
X-AXIS

Drop column

- b) From the column list section to the left of the buttons, drag **Date** into the **Labels** section.



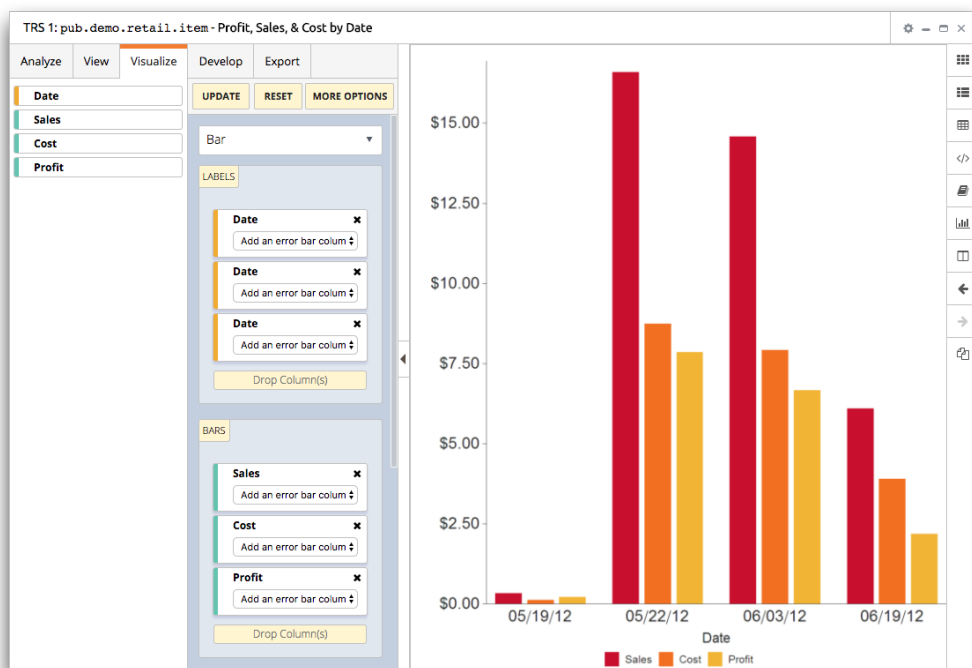
- c) From the column list section, drag **Cost**, **Sales**, and **Profit**, one at a time and in that order, into the **Bars** section.



Note: The order in which the columns are arranged in this section, from top to bottom, determines the order in which the columns appear in the chart, from left to right.

- d) Click **Update**.

TRS displays a bar chart of your data.

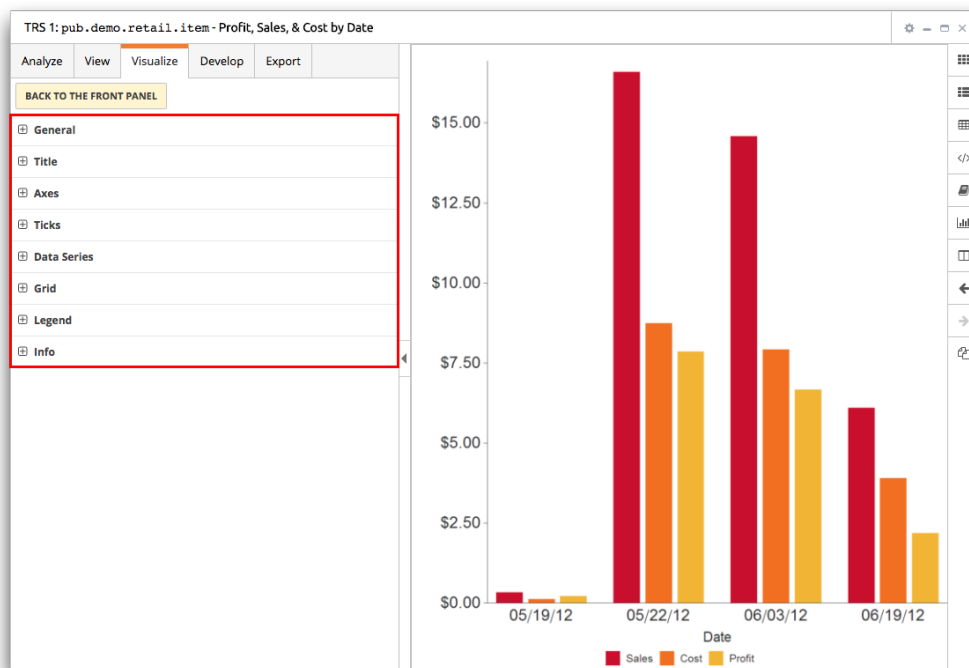


TRS provides a number of customizable settings that control the way a chart is displayed, including the size of the chart, background color, appearance of the title and the axes, and placement of the legend. You can also add titles and labels.

5. Add a title to your chart.

a) Click **More Options**.

TRS displays the customization settings.



b) In the customization settings, click **Title**.

TRS displays the **Title** customization settings.

Title

Show title? Yes

Title text

Title size 24

Background color

Color

Font family Helvetica

Font weight Plain

Font slant Plain

c) In the **Title text** field, enter `Cost, Sales, and Profit by Date`.

d) Press **Enter**.

TRS adds the title to your chart.



6. Add a text label to the y-axis.

a) In the customization settings, click **Axes**.

TRS displays the **Axes** customization settings.

X-AXIS
Y-AXIS
Y-AXIS2
Z-AXIS

Show X-axis

X-axis color

X-axis size

Font family

Font weight

Font slant

Show X-label

X-label

X-label size

X-label color

X-label background

Font family

Font weight

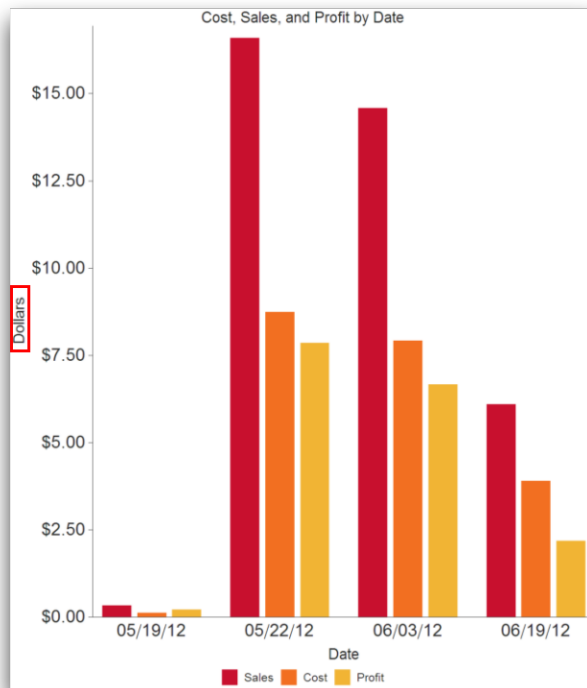
Font slant

b) At the top of the **Axes** section, click the **Y-AXIS** tab.

c) In the **Y-label** field, enter `Dollars`.

d) Press **Enter**.

TRS adds the new text label to the y-axis of your chart.



You can change the colors of the bars in the chart to suit your tastes. In the example above, it might make more sense to change **Sales** to blue and **Profit** to green.

7. Change the color of the bars in your chart.

- a) In the customization settings, click **Data Series**.
TRs displays the **Data Series** customization settings.

Data Series

Colors [Add Del](#)

Thicknesses [Add Del](#)

Opacities [Add Del](#)

Line strokes [Add Del](#)

Show line markers? [↓](#)

Line marker types [Add Del](#)

Line marker colors [Add Del](#)

Line marker sizes [Add Del](#)

Show scatter markers? [↓](#)

Scatter marker types [Add Del](#)

Scatter marker colors [Add Del](#)

Scatter marker sizes [Add Del](#)

Scatter point sizes [Add Del](#)

- b) Next to the **Colors** field, click **Add**.
TRs displays the **Hexadecimal** field and **Color Preview** box below the **Colors** field.

Data Series

Colors [Add Del](#)

Thicknesses [Add Del](#)

Opacities [Add Del](#)

Line strokes [Add Del](#)

Show line markers? [↓](#)

Line marker types [Add Del](#)

Line marker colors [Add Del](#)

Line marker sizes [Add Del](#)

Show scatter markers? [↓](#)

Scatter marker types [Add Del](#)

Scatter marker colors [Add Del](#)

Scatter marker sizes [Add Del](#)

Scatter point sizes [Add Del](#)

- c) Click either the **Hexadecimal** field or the **Color Preview** box.
TRs displays the color palette.

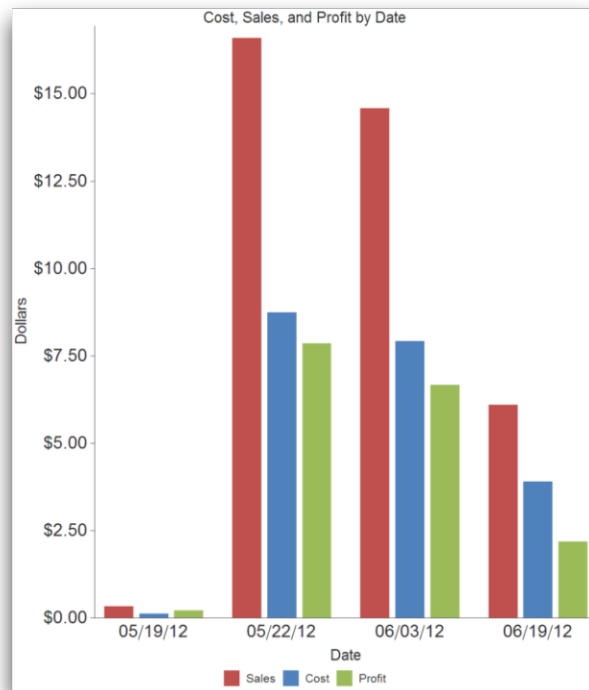


- d) In the **Theme Colors** section, click the red box (■) in the top row.
 TRS enters the hexadecimal code for the selected red color in the **Colors** field and changes all of the bars in the table to that color.

Note: Since there is only one hexadecimal value entered in the **Colors** field, all of the bars are set to the same red color.

To change the bar color for the remaining two columns, repeat the process two more times. Each added color changes the bar color of the next column in the chart. Hexadecimal values in the **Colors** field, from left to right, change the color of the chart object from right to left.

- e) Next to the **Colors** field, click **Add**.
 TRS displays the **Hexadecimal** field and **Color Preview** box containing the hexadecimal code and color for the first column.
- f) Click either the **Hexadecimal** field or the **Color Preview** box and then click the blue box (■) in the top row of the color palette.
 TRS adds the hexadecimal code for the selected blue color to the **Colors** field and changes the **Sales** bars to blue.
- g) Next to the **Colors** field, click **Add**.
 TRS displays the **Hexadecimal** field and **Color Preview** box containing the hexadecimal code and color for the second column.
- h) Click either the **Hexadecimal** field or the **Color Preview** box and then click the green box (■) in the top row of the color palette.
 TRS adds the hexadecimal code for the selected green color to the **Colors** field and changes the **Profit** bars to green.



Finally, download your chart as a PDF file.

8. Right-click anywhere on the chart and select **Download As > PDF** from the menu.



TRS saves the chart to your computer as `download.pdf`.

Note: Depending on the browser you are using, you may be prompted to open or save the PDF file. If you are prompted, save the file.

9. When you are finished with this tutorial, close the **TRS** window.

In this tutorial, you learned how to create, edit, and download a simple bar chart from your data. While the data for this tutorial was small and easy to understand, the data you work with each day will undoubtedly be much more complex. Using the charting options provided in TRS can help you gain insight to your data in ways that would be quite difficult to see otherwise. Feel free to explore and play with the other customization settings. This will help you learn what else is available so that you can fully customize your charts.