



User Guide

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Chapter 1: Introduction

Topics:

- [Finding your way around](#)
- [About the user profile](#)
- [Understanding privileges](#)
- [About stickers](#)

This ThoughtSpot User Guide contains information on navigating and searching data with ThoughtSpot. It will assist you with starting new searches, managing your pinboards, and troubleshooting.

ThoughtSpot enables you to view and analyze your data through a search-based user interface.

You can create your searches on the fly by typing them into a search bar, like you do when using an internet search engine. ThoughtSpot makes it easy to see your data, get your questions answered, create interactive graphs, and customize pinboards. You do not need to understand how the data is stored, attend days of training, or know SQL to do these things. Collaboration and security features make it easy for to protect sensitive data and share information safely with others.

ThoughtSpot gives administrators the ability to modify data properties to meet business needs, for example by providing search synonyms for common terms, boosting the importance of a column in search results, or formatting how the data appears. So if you are not getting the answers you expect when using ThoughtSpot, check with your ThoughtSpot administrator to see if some settings may need to be changed.

Finding your way around

ThoughtSpot is organized into several sections to make navigation easy. You can reach them by using the menu bar.



Figure 1: Menu bar

These are the different sections in ThoughtSpot:

Home

Click the logo to go to the home page. The home page contains:

- Search bar - Click in the search bar to start a new search. This is the same thing as clicking **Search** in the top navigation bar.
- Last viewed pinboard - The home page shows the last pinboard you looked at. The dropdown box on the top left of the pinboard lets you choose a different pinboard without having to leave the home page.
- Activity - The activity button shows recent actions performed by other people.

To view the activity panel, click on the **activity icon** on the right side of the home page.

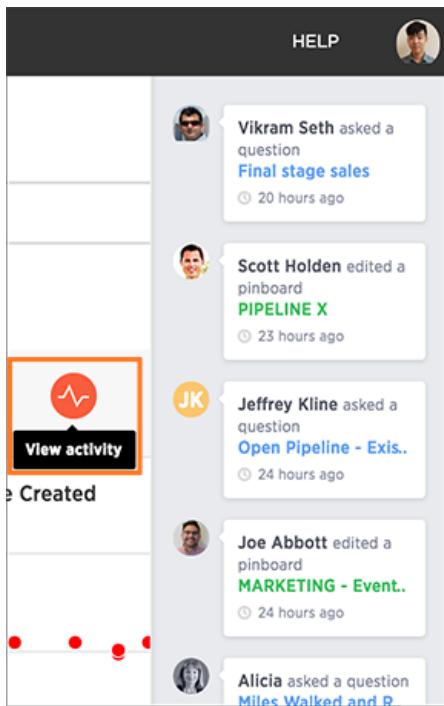


Figure 2: Activity bar

You can even click on one of the object names to jump to its location.

Search

Search is where you will spend most of your time. It allows you to search and explore your data. Choose your data sources and type in the search bar at the top. As you type your search, results will appear in the main part of the screen as either a table or a chart.

To learn more about this section, visit [About search](#).

Answers

Answers are the result of a single search. You can save an answer you want to work more on later, or just keep it for your personal use. Answers are for you alone, until you share them with others.

Pinboards

Pinboards are collections of related search results. You can create your own pinboard or add to an existing one. Once a pinboard has been saved, it can be shared with others or viewed as a slideshow. The **Pinboards** page shows a list of saved pinboards. Click on one to view, edit, or share it.

To learn more about pinboards, visit [About pinboards](#).

Data

Data contains a list of data sources (tables and worksheets). These are usually loaded and managed by your administrator. However, you may be able to import a spreadsheet (Excel or CSV) here, if you have the correct privileges.

To learn more about this section, visit [Working with data](#).

Admin

Admin only appears if you have administrator privileges. This section is covered in the ThoughtSpot Administrator Guide.

Help

Help is a support resource for ThoughtSpot. It contains short videos, a keyword reference, links to documentation, and other useful materials. You can also find the support contact information and software version number here.

User

The **user icon** allows you to either view your preferences or log out. You can also change your icon here.

To learn more about this section, visit [About the user profile](#).

Log in to ThoughtSpot from a browser

To set up and explore your data, access ThoughtSpot from a standard Web browser using a username and password.

Before accessing ThoughtSpot, you need:

- The Web address (IP address or server name) for ThoughtSpot.
- A network connection.
- A Web browser.
- A username and password for ThoughtSpot.

Supported Web browsers include:

Table 1: Supported browsers

Browser	Version	Operating System
Google Chrome	20 and above	<ul style="list-style-type: none">• Windows 7 or greater• Linux• MacOS
Mozilla Firefox	14 and above	<ul style="list-style-type: none">• Windows 7 or greater• Linux• MacOS
Internet Explorer	11	<ul style="list-style-type: none">• Windows 7 or greater

To log in to ThoughtSpot from a browser:

1. Open the browser and type in the Web address for ThoughtSpot:

`http://<hostname_or_IP>`

2. Enter your username and password and click **Enter Now**.

Log out of ThoughtSpot

Once you're done with your search session, you can optionally log out of ThoughtSpot.

To log out of ThoughtSpot from a browser:

1. Click your user icon at the top right hand corner of the screen.
2. Click **Sign out**.

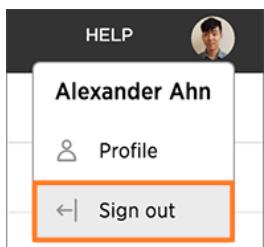


Figure 3: Sign out of ThoughtSpot

Set your ThoughtSpot locale

In addition to American English, ThoughtSpot also supports German and Japanese.

The language displayed in ThoughtSpot is based off of your browser locale. So if you set Japanese as your default language in your browser settings, then the interface will update to reflect that after you refresh your page.

Keywords, operators, and error messages are included in the translated material. Formulas, however, are not translated. Also, all metadata will remain as user inputted.

This feature is supported on all browsers that support ThoughtSpot.

To set your ThoughtSpot locale:

1. Go to the settings page of your browser.
2. Change your default language to one that is supported by ThoughtSpot.
3. Save your settings.
4. Refresh your ThoughtSpot browser page.

Your ThoughtSpot interface should reflect your new chosen language.

About the user profile

The user icon lets you view your profile or sign out of ThoughtSpot.

To view the user actions, click on your user icon on the top right corner of the page.

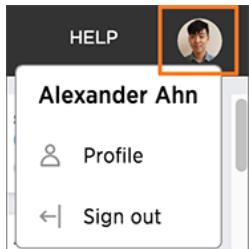


Figure 4: User icon

Click **Profile** to go to your profile preference page, where you can change your icon and email preferences.

You can change your picture by clicking **Upload Picture**. The system accepts PNG or JPEG files that are under 4MB.

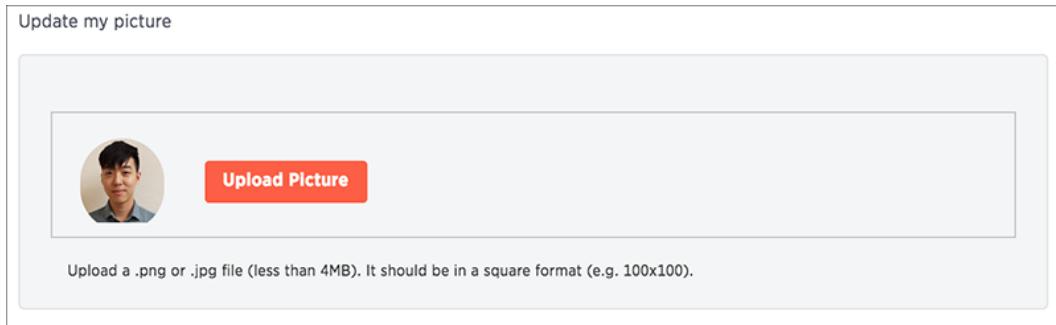


Figure 5: Update my picture

You can change your email notifications preferences by checking or unchecking **Email me sharing notifications** and clicking **Update Preferences**.

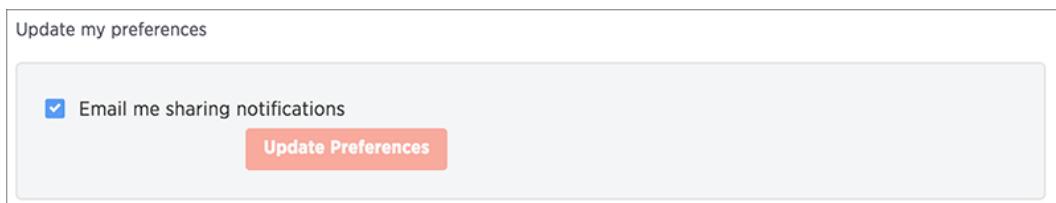


Figure 6: Update my preferences

Clicking **Sign out** logs you out of ThoughtSpot, and takes you back to the sign in page.

Understanding privileges

The things you can do in ThoughtSpot are determined by the privileges you have. These are set at the group level.

If you are trying to do something in ThoughtSpot, and cannot access the screens to accomplish it, you may not have the correct privileges. In this case, you should contact your administrator and explain what you want to accomplish. Your administrator may be able to grant you additional privileges.

-  **Note:** Permissions to see and edit tables, worksheets, and pinboards are not affected by privileges. They are given when these items are shared with you.

Here are the privileges that the administrator sets, and the capabilities they enable:

Table 2: Group Permissions

Privilege	Description
Has administration privileges	Can manage Users and Groups and has view and edit access to all data.
Can upload user data	Can upload their own data from the browser using Import Data .
Can download data	Can download data from search results and pinboards.
Can share with all users	Can see the names of and share with users outside of the groups the user belongs to.
Can manage data	Can create a worksheet. Can also create an aggregated worksheet from the results of a search by selecting Save as worksheet . Can

Privilege	Description
	also use ThoughtSpot Data Connect, if it is enabled on your cluster.
Can schedule pinboards	Can create pinboard schedules and edit their own scheduled jobs.

About stickers

You can create stickers to make it easier for people to find data sources and pinboards.

About stickers

Stickers enable you to create categories for classification of objects, including pinboards, answers, data sources, and worksheets. Only administrators can create stickers, and they are global in scope. This means that everyone can see the stickers and use them to tag objects. They can also filter lists of objects by sticker. Stickers are often used to designate subject areas, such as sales, HR, and finance, but you can use them any way you like.

This is the workflow for using stickers:

1. Only administrators can create stickers.
2. Anyone can [Apply a sticker](#).
3. Anyone can [Filter by a sticker](#).

Apply a sticker

Apply a sticker whenever you want to tag a data source, worksheet, or pinboard to make it easier to find.

Only administrators create stickers, but anyone with edit privileges can tag an object with a sticker.

To tag an object with a sticker:

- From the top menu, choose Answers, Pinboards, or Data.



Figure 7: Choose Answers, Pinboards, or Data

- Find the item(s) you want to tag in the list, and check the box next to its name.
- Click the apply sticker icon and choose one from the list.

You can apply as many stickers as you like to an object.

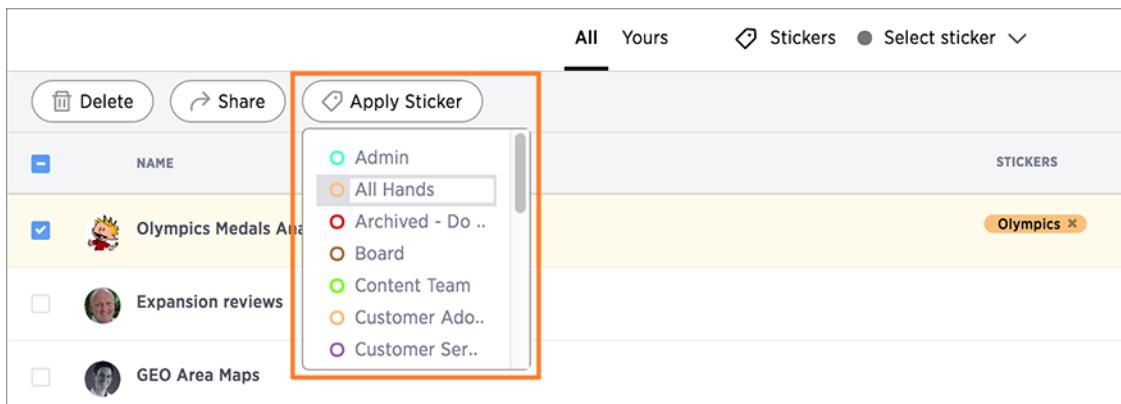


Figure 8: Choose a sticker to apply

Filter by a sticker

Whenever you are selecting objects from a list, you can filter by sticker to find what you're looking for.

Anyone can use stickers to filter lists of pinboards or data sources. You can also filter by sticker when selecting data sources.

To filter by sticker:

- From the top menu, choose **Answers, Pinboards, or Data**.



Figure 9: Choose Answers, Pinboards, or Data

2. Click on **Select sticker**, and select a sticker to filter by. Click on its name.

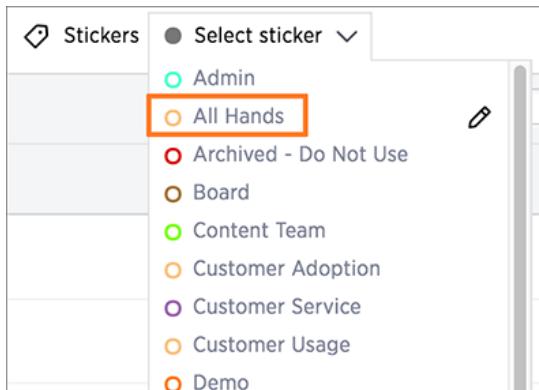


Figure 10: Filter by a sticker

Chapter 2: About search

Topics:

- [About starting a new search](#)
- [About tables](#)
- [About charts](#)
- [About filters](#)
- [About keyword searches](#)
- [About worksheets from searches](#)
- [About formulas in searches](#)
- [Other search actions](#)

Use search to get instant answers about your data without having to consult a data analyst. Using ThoughtSpot's relational search is simple, so anyone can use it. In the search bar, type what you are interested in exploring, for example `revenue midwest sales rep`. ThoughtSpot will return an answer based on your searched terms.

As you get better with ThoughtSpot's search tools, you will be able to get more out of your data by performing more complex searches. For more information on complex searches, refer to the ThoughtSpot Advanced Searches Guide.

About starting a new search

There are a few basic things you should understand before starting a new ThoughtSpot search.

How do I search data?

You've probably seen one of these before:



Figure 11: Search bar

Click in the box and start typing some letters. As soon as you begin typing, search suggestions appear. Type slowly and use the suggestions to find what you're looking for.

Whenever you finish typing a word, you'll see an answer in the form of a chart or a table.

You should know that search in ThoughtSpot is more like an Amazon search than a conversation. For example. Instead of:

Find me all books by Lewis Carroll with the title Alice in Wonderland

You'd type:

carroll alice

Or consider Google. You wouldn't type in:

Find me the largest city by population

You'd type:

largest city by population

or simply:

largest city population

That's how search works in ThoughtSpot. You can use some helping words like "by" and "for" but they can also be left out, and the search will return the same answer.

What kinds of things can I type?

Search is based on the tables that exist in your data. Tables are made of rows and columns, like spreadsheets.

So you can search by typing in any of these words:

- The column name: like revenue, product name, or store
- Any of the values in the columns: like 20000, kitten chow, or richmond
- One of the special **keywords** ThoughtSpot understands: like yesterday, >, or contains

Start a new search

Starting a new ThoughtSpot search is simple, like starting a new Google search.

To start a new search:

1. Click **Search** on the top navigation bar. You can also click **Search your data** at the top of the home page.

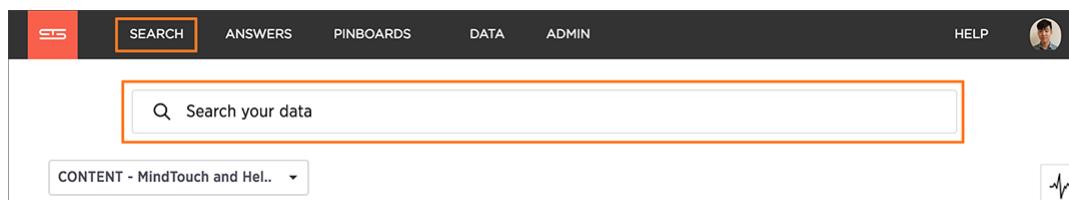


Figure 12: Start a new search

2. Choose your sources by clicking **Choose Sources**.

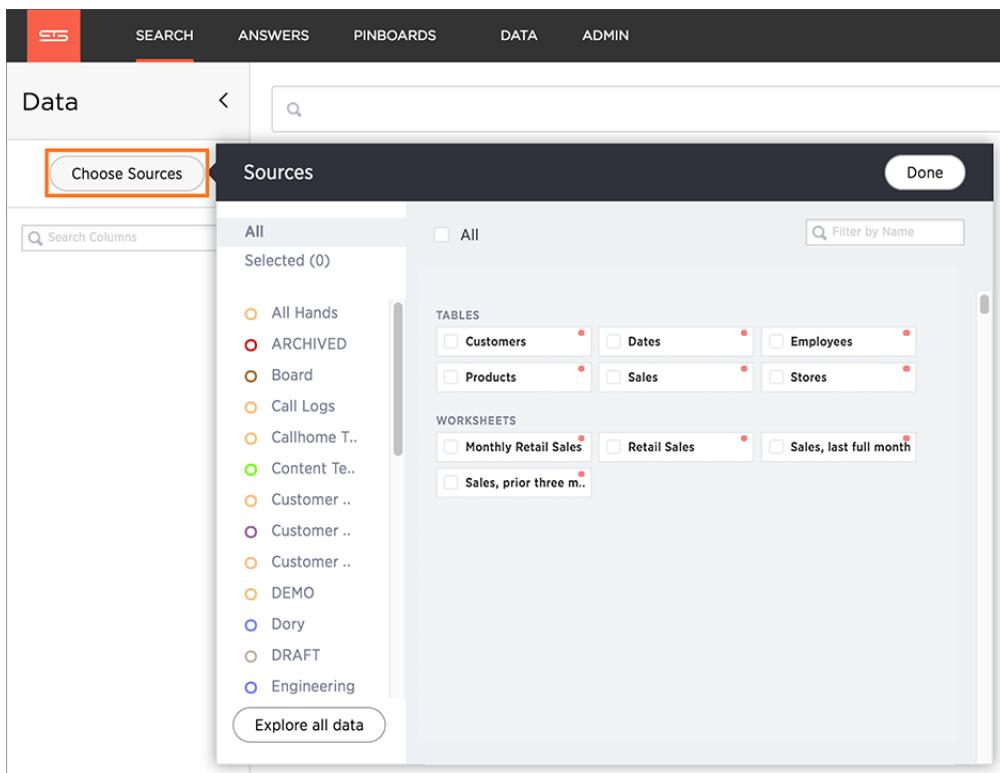


Figure 13: Choose sources menu

 **Tip:** To see details of all of the data, click **Explore all data**.

- a) Filter through all available sources by using the search bar or stickers.
 - b) Select your sources.
 - c) Click **Done**.
3. Add columns to the search bar, or double click columns in the Data column in the left panel. The columns listed in the left panel are grouped together by data sources for discoverability and ease of access.

 **Tip:** You can also add multiple columns at once by clicking each column to select it, and then click **+ Add Columns**.

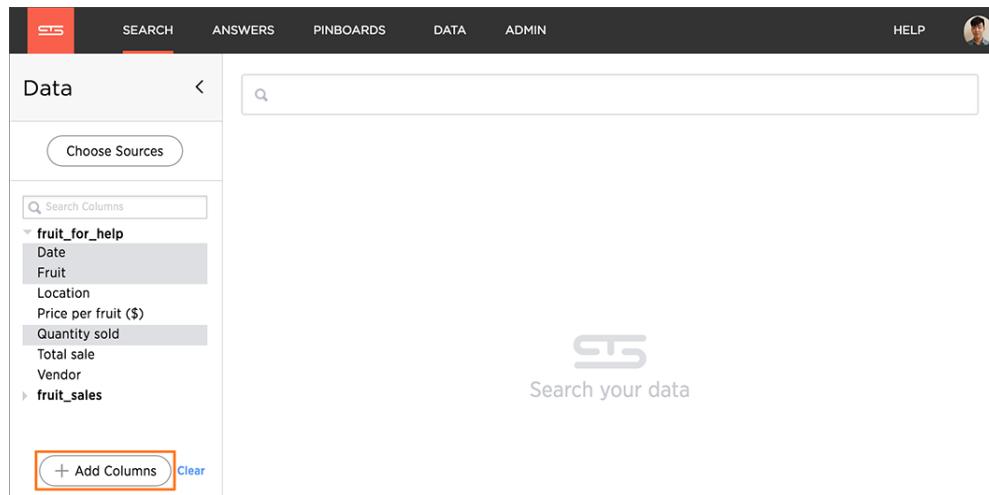


Figure 14: Add multiple columns at once

Your search is given an automatic title based on your search columns, and is displayed as either a table or chart, depending on how it is best represented. You can [change the view](#) to fit your needs.

About choosing sources

Before you start a new search, make sure you have chosen the right data sources.

To begin a new search, you must first select your data sources by clicking on the **Choose Sources** button. You will see a list of data sources that have been shared with you. The data sources are usually created by your administrator, though you can also [upload your own data](#).

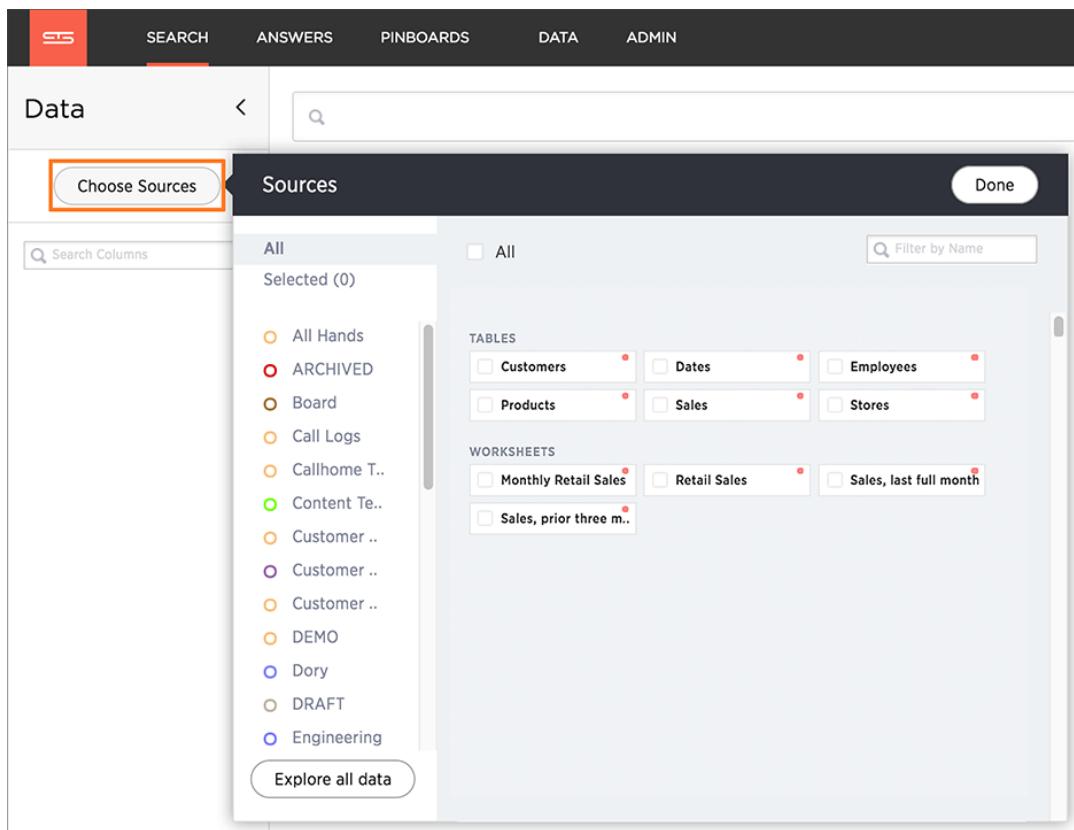


Figure 15: Choose sources

Searches happen in the context of the selected data sources. ThoughtSpot will also make suggestions from other data sources for you, if what you're typing can't be found in the selected data source.

About the search bar

The search bar is designed to make it easy for you to identify your search terms.

A lot of work has gone into making ThoughtSpot's search bar intuitive and easy to use. However, it still helps to know some details of how the search bar works.

Boxed search phrases

The search bar shows boxes around each search phrase, so you can easily see where it begins and ends. Your search phrases still appear as text when you are

typing, but whenever you click out of the search bar, they are boxed. Search phrases have blue boxes, and [filters](#) have white boxes.

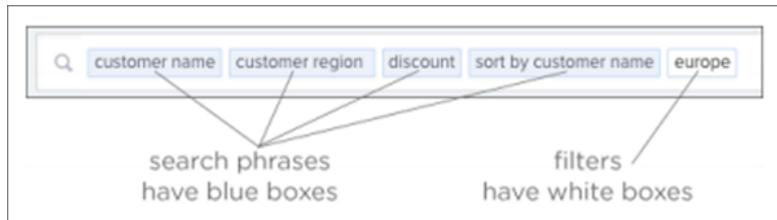


Figure 16: Search bar with boxed phrases

Removing search phrases

When you click on a search phrase, it is highlighted, so you can easily replace it with one of the suggestions. When you hover over on a boxed phrase, you'll see an **x**, which you can click to remove it. When you delete a phrase, your search will automatically update.

If you find yourself looking at a table or chart, but it doesn't seem to contain all the data you expect, try looking in the search bar for white boxes (filters). If you remove all the filters, you will again see all the available data for that search.

Spell check

The search bar includes spell check. If you spell or type a term incorrectly, your suggestions will include the correct spelling of the term or keyword.

The spell check in the search bar also performs a metaphone check for similar sounding words on text data values.

Dictionary synonyms

A dictionary of common word synonyms is bundled with ThoughtSpot. The dictionary contains synonyms for common terms that occur in data. For example, if you type in "gross", and that word is not found, ThoughtSpot will consider it a synonym for "revenue". We use the WordNet library of terms, which

takes word proximity into account, and weights words by similarity to the target term.

This frees you from having to know the exact term or column name used in a data source. You can still find the answer in many cases, if you type a word with the same meaning as a different word that occurs in the data.

Search help

If you type an unrecognized search term, you will be offered tips on searching. The search help appears when you type a term that isn't understood by ThoughtSpot and then press the `Enter` key.

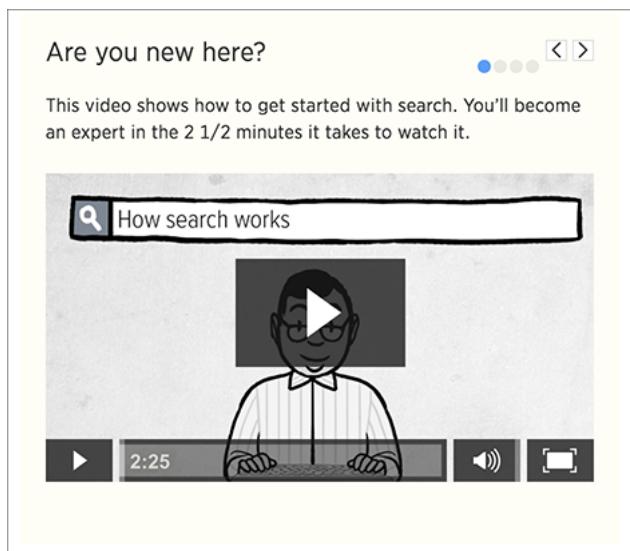


Figure 17: Search help box

Search suggestions

Search suggestions include complete recent searches that are similar to the search you are constructing. You can also search for saved objects, such as pinboards.

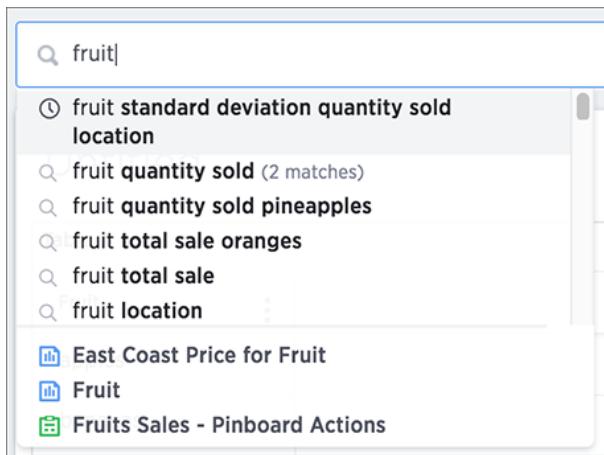


Figure 18: Search suggestions example

Usage-based ranking

Search suggestions are relevant to the data and personalized to your search behavior. ThoughtSpot learns over time what columns are most important to you and to your company as a whole, and uses this knowledge to rank the search terms it offers. This is accomplished through usage-based ranking. So if you frequently type terms related to finance or to a particular product, you will see related suggestions more frequently. ThoughtSpot does this by keeping usage statistics on frequency of search terms in its local cache. Using this information, frequently used terms and phrases are offered in search suggestions more often than those that are not commonly used. This personalization based on search patterns makes ThoughtSpot more valuable over time. Search suggestions become more helpful the more searches you complete.

Recent searches

As you type in the search bar, you are given search suggestions that include recent searches. This makes it easier to learn what you can do with ThoughtSpot. In addition to displaying your own recent searches, the search bar also learns from searches made by other people. This should provide you with interesting searches that you may not have been aware of. You'll see recent searches in

a separate section of search suggestions, as recent searches appear higher in suggestions than other terms.

Auto-disambiguation in search

When there are more than one possible meaning for a search term, you can provide disambiguation by selecting from a list of choices. Now your choice is sticky. That means you won't have to select it again, in the scope of the current search.

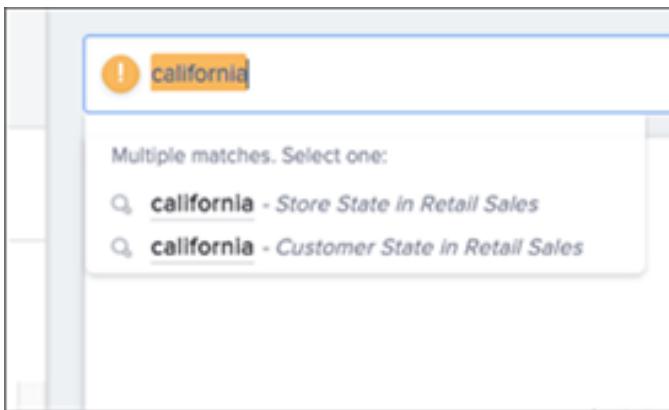


Figure 19: Auto-disambiguation example

Out of scope columns

Search suggestions are not limited in scope to the columns that you select as the data sources. Suggestions can include columns that are out of scope, too. If you choose one of these suggestions, the columns will be added to the data sources scope for you.

Object searches

Search suggestions also include relevant pinboards that have already been created. This means that if a pinboard that is similar to the search you're trying to do already exists, it will appear in search suggestions.

About attributes and measures

Searches in ThoughtSpot use columns that are defined as either attributes or measures.

ThoughtSpot identifies search columns as either attributes or measures. For several chart types, your search needs to contain a certain number of attributes and a certain number of measures.

Attributes

Attribute are primarily text or date values. Attributes make up the x-axis of your chart most of time. Some examples of attributes in terms of a person include name, eye color, occupation, social security number, address, employee ID, and phone number.

Measures

Measures are numeric values you can do math on, with meaningful results. You will most likely find your measures on the y-axis of your chart. Some examples of measures in terms of a person are age, height, and weight.

What am I looking at?

After, or while completing a search, you can see how ThoughtSpot came up with the answer.

Click the **question mark** on the right hand side of the search bar to open the “What am i looking at?” dialogue box.

You'll be shown what measures ThoughtSpot computed, for each combination of attributes. You'll also see filters of the search, and how the tables were linked and used.

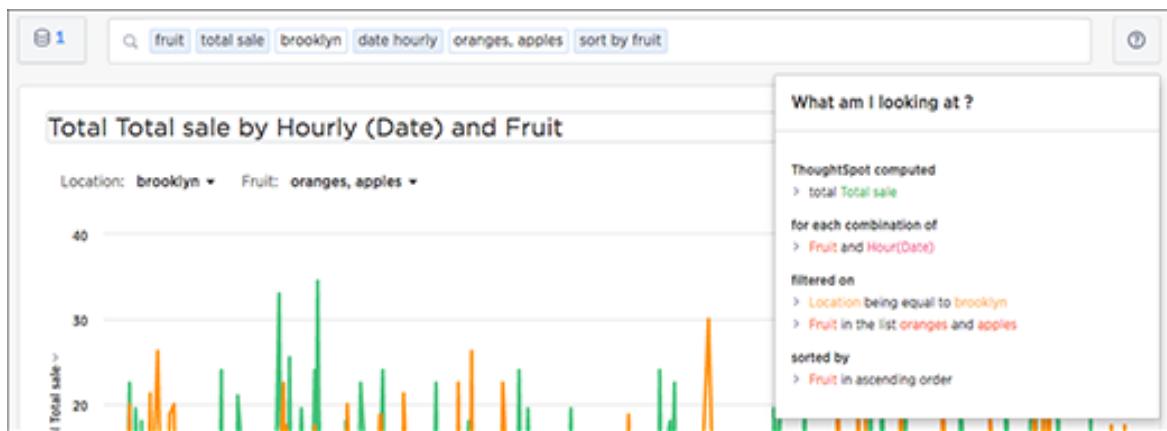


Figure 20: What am I looking at? example

Last data refresh time

You can see the last time at which data was refreshed without having to visit the **Data** page.

Hover over the data when choosing a data source to see the last time it was updated. You will also see when it was created and by whom.

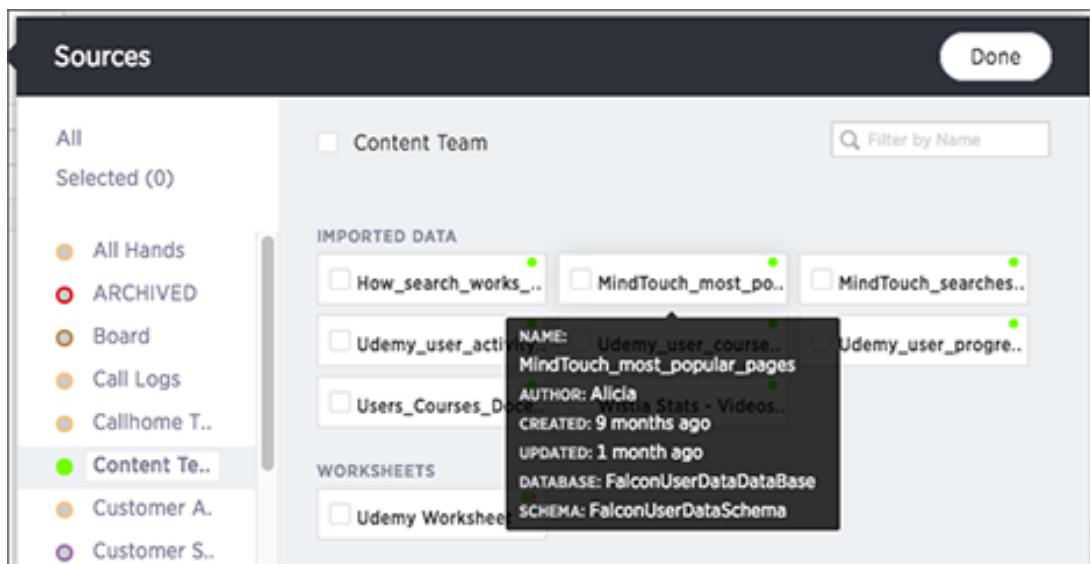


Figure 21: Last updated in source selection

You can also hover over a column in the **Data** column to see when it was last refreshed. This popup will also show sample values from that column.

The screenshot shows a 'Data' view with a sidebar for 'Choose Sources'. A dropdown menu is open over the 'Last searched' column, displaying the following information:

- NAME: Search query
- SOURCE: searched
- MindTouch_searches_last_90_days
- UPDATED: a month ago
- 06/22/FY 2017 09 AM
- SAMPLE VALUES
- filters pinboard 2017 09 AM
- filter pinboard
- filters 06/22/FY 2017 09 AM

Figure 22: Last updated in Data column

And lastly, you can hover over a column or column name in an answer to see last updated information.

The screenshot shows a table titled 'Most Recently Searched' with a dropdown menu over the 'Last searched' column, displaying the following information:

- Last searched
- HOURLY
- 06/22/FY 2017 07 AM
- 06/22/FY 2017 07 AM

Details for the last row:

- SOURCE: Search query (MindTouch_searches_last_90_days)
- UPDATED: a month ago
- date serach

Figure 23: Last updated in answer column

About tables

Tables display your answer in a format similar to an Excel spreadsheet.

Your search is not limited by the number of attributes or columns in order to be presented as a table. You can have a table with just one attribute or measure. When you choose to display your answer as a table, ThoughtSpot will create the columns for you and any relevant [headlines](#).

Sometimes when you view a table, the results will be aggregated (combined). For example, if you only type "revenue", you'll see the total sum of all the revenue the table contains as one combined number. If you include the keyword "monthly", the results will be aggregated by month.

Change the table

You can rearrange the column order of your table among other search actions.

Every table gives you the option to rearrange the column order and change the column widths.

Rearrange column order

You can rearrange the column order of your table after adding all of your search terms.

To rearrange the column order:

1. While viewing your answer as a table, click the column header you would like to move.
2. Drag it across to its new position.

Resize column widths

You can resize the column widths of your table after adding all of your search terms.

Any adjustments you make to the column widths of your table are saved when you pin the table to a pinboard.

To resize the column widths:

1. While viewing your answer as a table, hover over a column border in the column header row.
2. Click and drag the border to create your preferred column width.

About headlines

Headlines display summary information of a table result.

Headlines contain summary information for each column of a table. They appear at the bottom of the table in individual boxes.

Top Clicked Search Result for Frequent Searches			
Search query	Last searched	Top clicked result	Hits
filters pinboard	06/22/FY 2017	about pinboard filtersin 02_administration,	14
filter pinboard	06/22/FY 2017	pinboard filtersin 01_the_basics/3.3	11
filters	06/22/FY 2017	--	11
stickers	06/07/FY 2017	create stickersin 02_administration/admini	10
formula	06/13/FY 2017	formula referencein 02_administration/adr	9
additive	06/07/FY 2017	change the additive setting for a columnin	8
pivot	06/20/FY 2017	--	6
filter	06/10/FY 2017	filter by a stickerin 02_administration/adm	5
macos	05/04/FY 2017	--	5
aggregation	06/07/FY 2017	change the aggregation setting for a colun	4
load	06/20/FY 2017	--	4
change data type	06/05/FY 2017	change the data type of a columnin 02_ad	4

Showing rows 1 - 15 of 153

23 Search query UNIQUE COUNT	04/19/FY 2017 - 06/22/FY 2017 Daily (Last searched)	12 Top clicked result UNIQUE COUNT	130 Hits TOTAL
------------------------------------	--	--	----------------------

Figure 24: Headlines at the bottom of a table

You can modify how you'd like the value to be displayed by clicking the dropdown on a headline and selecting a different type of aggregation. The usual available aggregations are total, average, standard deviation, variance, minimum, and maximum. There are also unique count and total count values available for the appropriate columns.

To add a headline to a pinboard, hover over it and click the **Add to pinboard** icon.

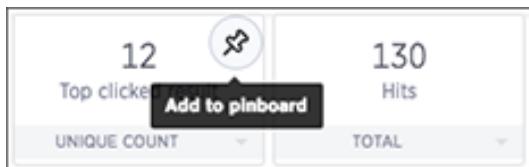


Figure 25: Add a headline to a pinboard

About charts

Charts display your answer in a visual way.

Your search needs at least **one attribute and one measure** to be presented as a chart. When you choose to display your answer as a chart, ThoughtSpot will assign it the best fit chart type.



Note: Colors are maintained across searches within a session. For example, when doing a search on revenue by state, each state will keep its color assigned to it even if you change the search or chart type.

About chart types

You can choose from a large number of chart types in ThoughtSpot. Each chart type provides you with a different visualization for your answer.

You can change the chart type of your answer by clicking **Change Visualization**.

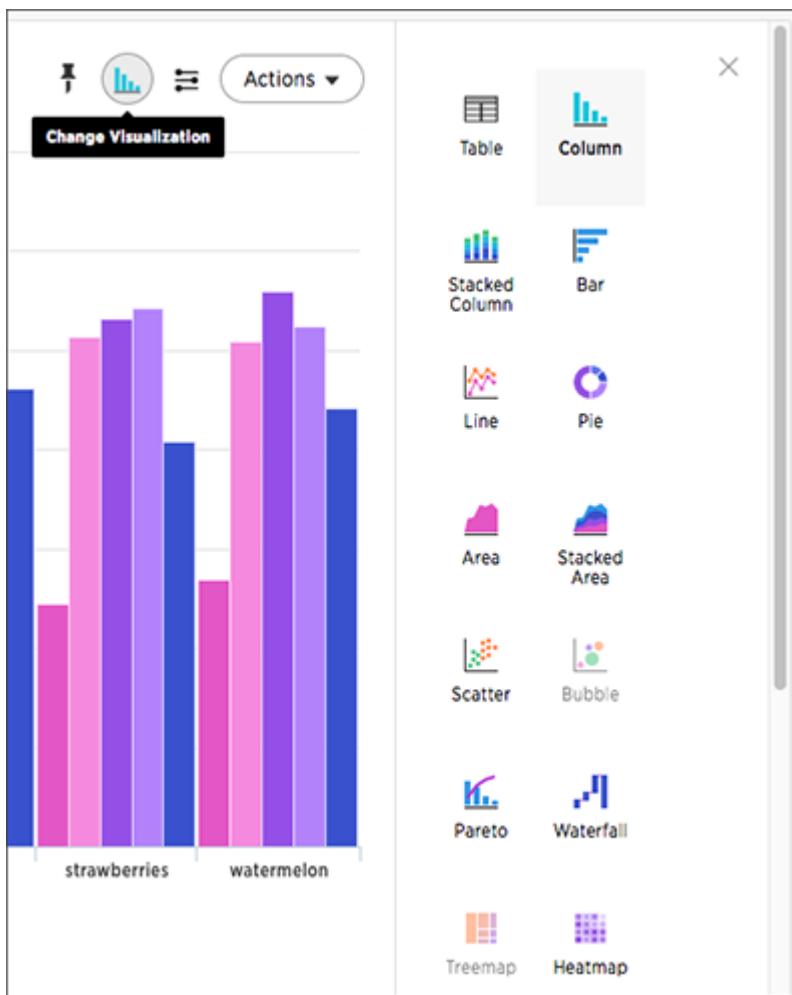


Figure 26: ThoughtSpot chart types

 **Note:** Some chart types may be unavailable for you to select depending on the columns of your search. For example, if your search does not contain at least one geographical column then you will not be able to select any of the geo chart types. Unavailable chart types are grayed out. Hovering over one will tell you what columns are needed before you can choose it.

Column charts

The column chart is one of ThoughtSpot's simplest, yet most versatile chart type. More often than not, the column chart will be chosen as your default chart type.

Column charts are vertical bar charts that display your data using rectangular bars. The length of the bar is proportional to the data value.

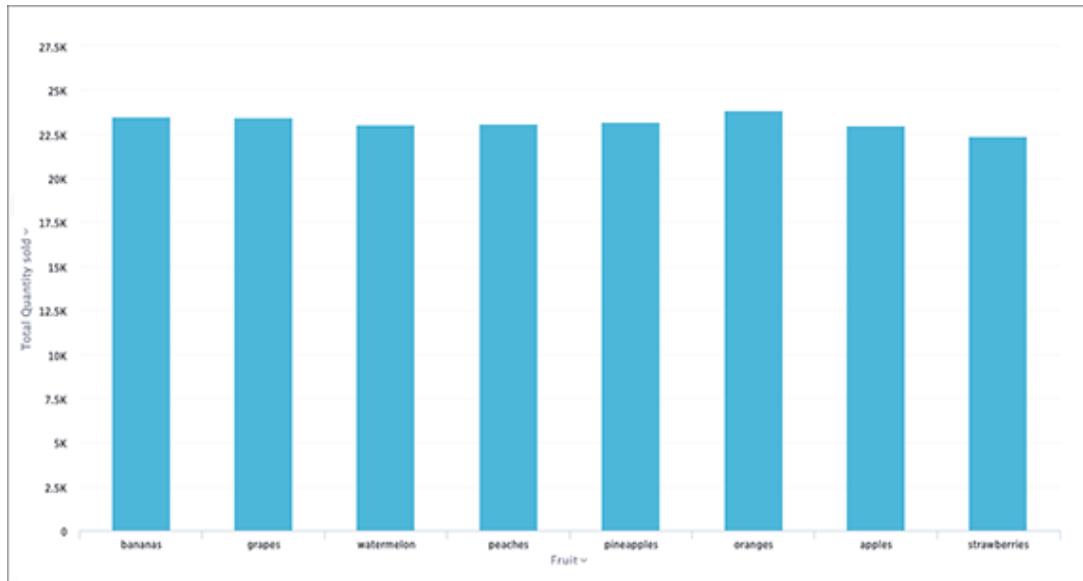


Figure 27: Column chart example

Your search needs at least one attribute and one measure to be represented as a column chart.

Stacked column charts

The stacked column chart is similar to the column chart, but with one major difference. It includes a legend, which divides each column into additional sections by color.

Stacked column charts are typically used when you want to compare aggregated data and the data that it includes together. This chart type benefits when you add the **Show Data Labels** option. Turning it on will show the sum of the stacks at the top of each stack.

It is important to note that stacked column charts plot the y-axis as a percentage by default. You can choose to toggle **Show Y-Axis as %** on or off in the Configuration Options. This feature is also available for stacked area charts.

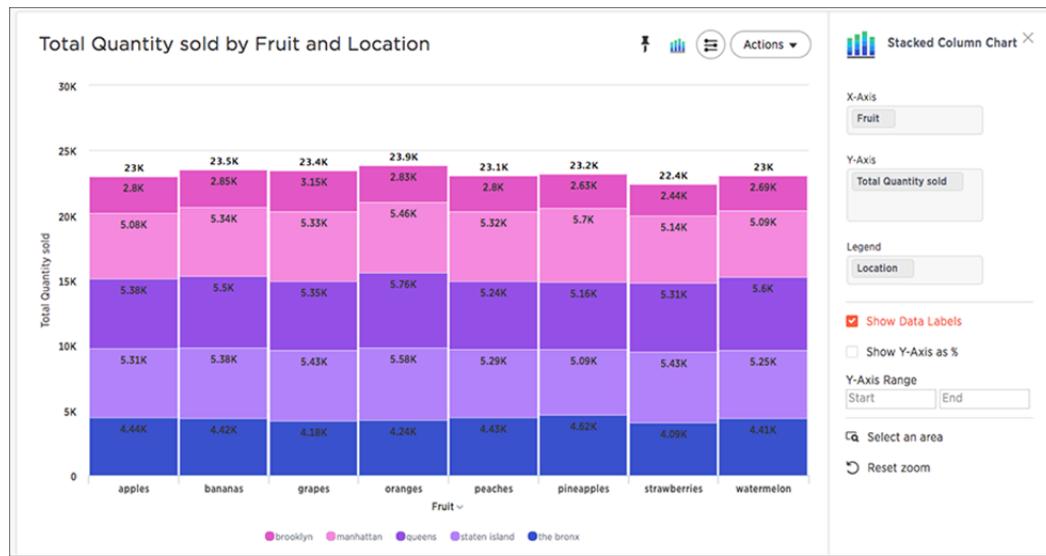


Figure 28: Stacked column chart example: "Show Y-Axis as a %" toggled off

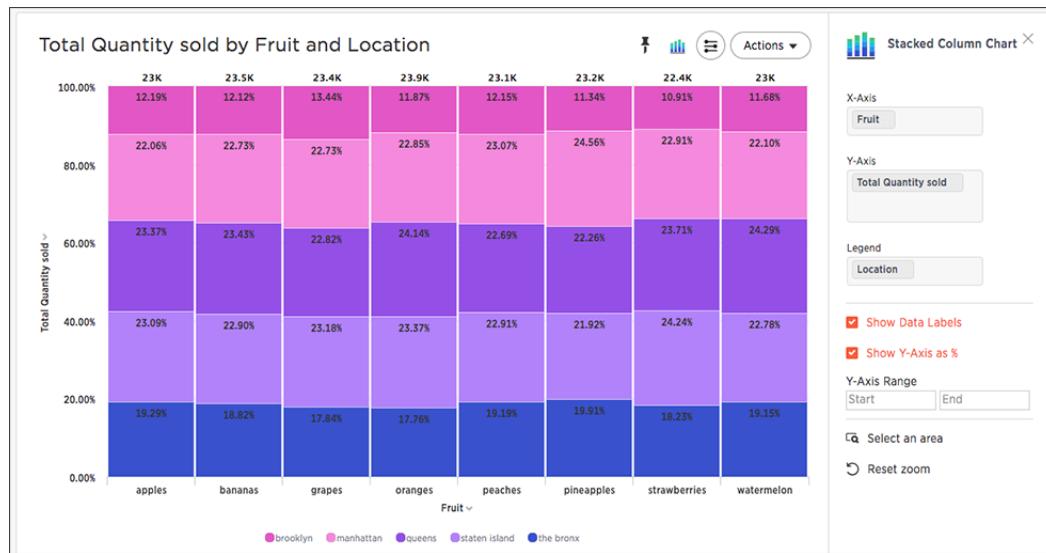


Figure 29: Stacked column chart example: "Show Y-Axis as a %" toggled on

Your search needs at least two attributes and one measure to be represented as a stacked column chart.

Bar charts

The bar chart is very similar to the column chart. The only difference is that it is oriented the other way.

Bar charts display your data using horizontal rectangular bars. The length of the bar is proportional to the data value.

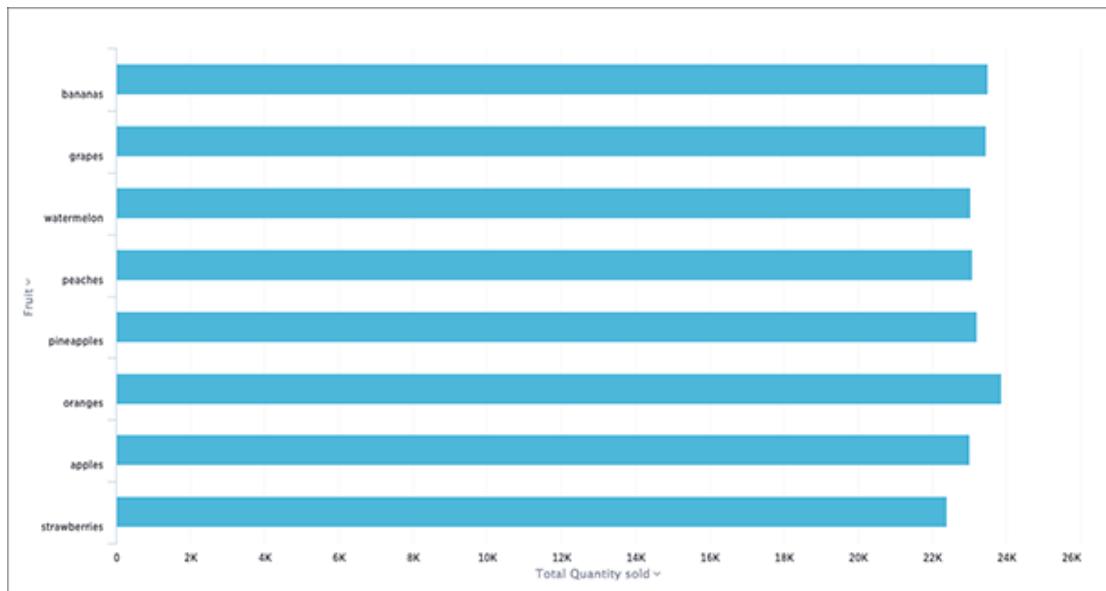


Figure 30: Bar chart example

Your search needs at least one attribute and one measure to be represented as a bar chart.

Line charts

Like the column chart, the line chart is one of ThoughtSpot's simplest, yet most versatile chart type. More often than not the line chart will be chosen as your default chart type.

Line charts displays your data as a series of data points connected by straight line segments. The measurement points are ordered by the x-axis value. Line charts are good at showing trends over intervals of time.

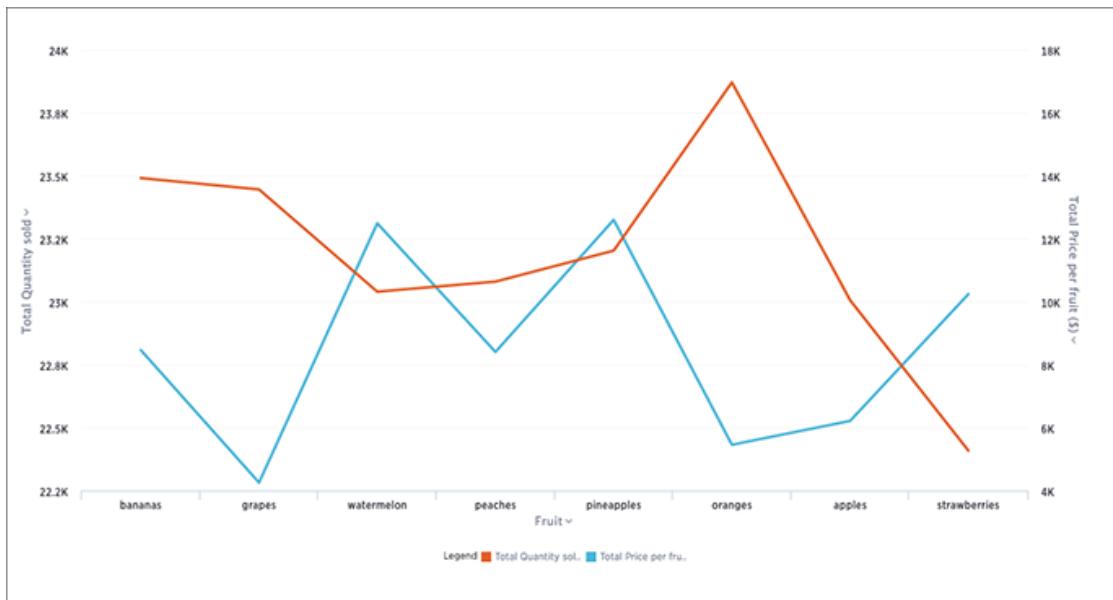


Figure 31: Line chart example

Your search needs at least one attribute and one measure to be represented as a line chart.

Pie charts

The pie chart is a classic chart type that displays your search in a circle. The pie chart ThoughtSpot shows is in the shape of a doughnut.

Pie charts divide your data into sectors that each represent a proportion of a whole circle. You can display the exact values of each slice, in addition to the percentage values by toggling on **Show Data Labels** found under Change chart configuration.

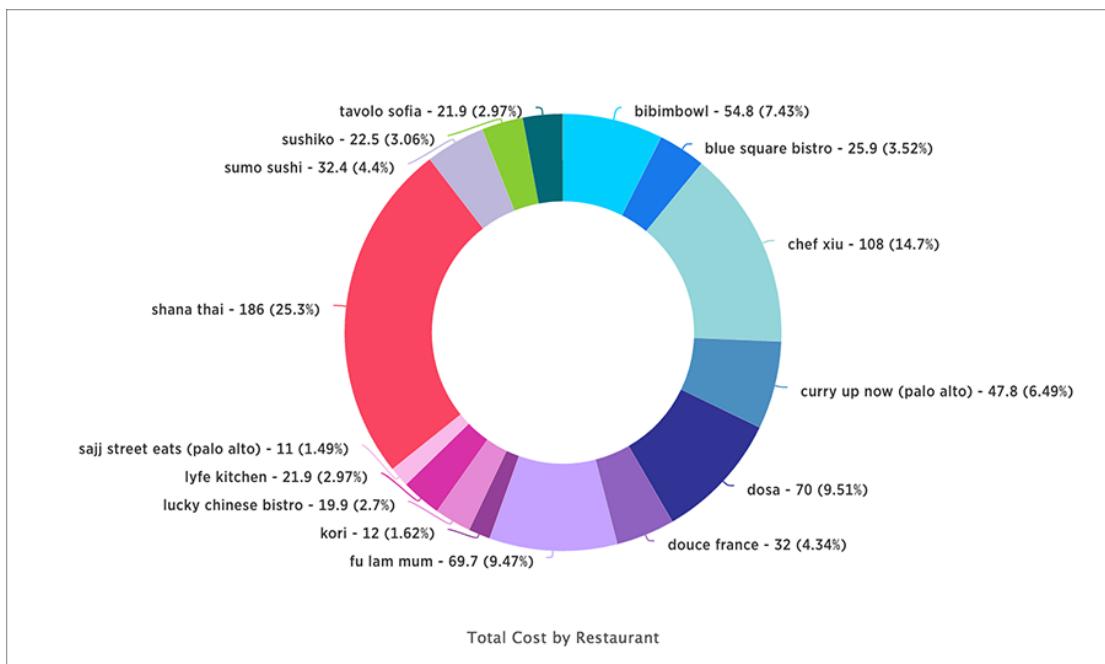


Figure 32: Pie chart example

Your search needs at least one attribute and one measure to be represented as a pie chart. Also, there must be fewer than 50 values in the attribute column.

Pie in pie charts

The pie in pie chart can be created from a regular pie chart in order to compare more than one component of an attribute.

Pie in pie charts show two concentric pie charts comparing different measures.

To see a pie in pie chart, assign two different measures to the y-axis under

Configure Chart.

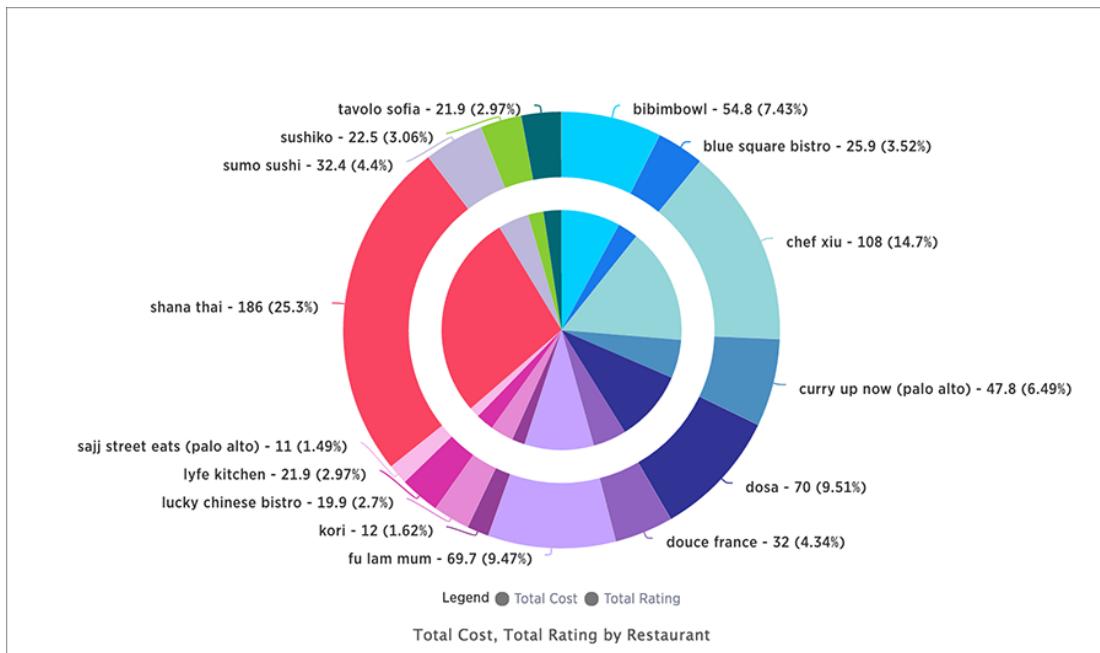


Figure 33: Pie in pie chart example

Your search needs at least one attribute and two measures to be represented as a pie in pie chart. Also, there must be fewer than 50 values in the attribute column.

Area charts

The area chart is based on the line chart, but has filled in regions.

Area charts display quantitative data graphically. The area between the x-axis and the line are colored in to help you compare different portions of the chart.

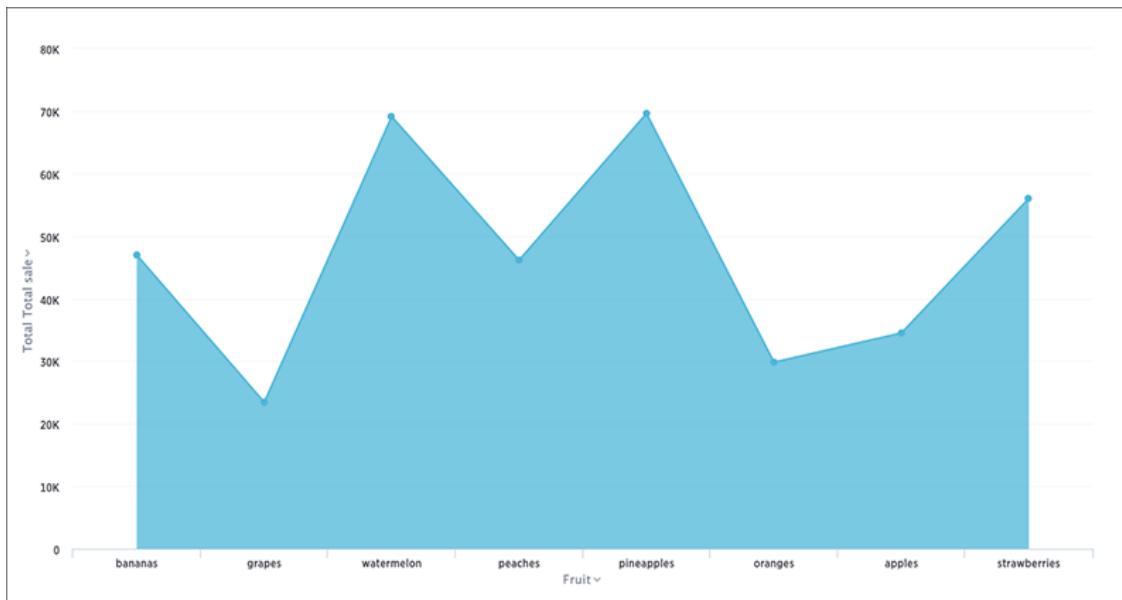


Figure 34: Area chart example

Your search needs at least one attribute and one measure to be represented as an area chart.

Stacked area charts

The stacked area chart is an area chart with an attribute in the legend, which divides the area into layers.

Stacked area charts show the relative contribution to the accumulated total of a measure over time.

Stacked area charts plot the y-axis as a percentage by default. You can choose to toggle **Show Y-Axis as %** on or off in the **Configuration Options** to create your own mountain-style charts.



Figure 35: Stacked area chart example: "Show Y-Axis as %" toggled off



Figure 36: Stacked area chart example: "Show Y-Axis as %" toggled on

Your search needs at least two attributes and one measure to be represented as a stacked area chart.

Scatter charts

The scatter chart is useful for finding correlations or outliers in your data.

Scatter charts display your data as a collection of points, which can either be evenly or unevenly distributed. Each point is plotted based on its own axes values. This helps you determine if there is a relationship between your searched columns.

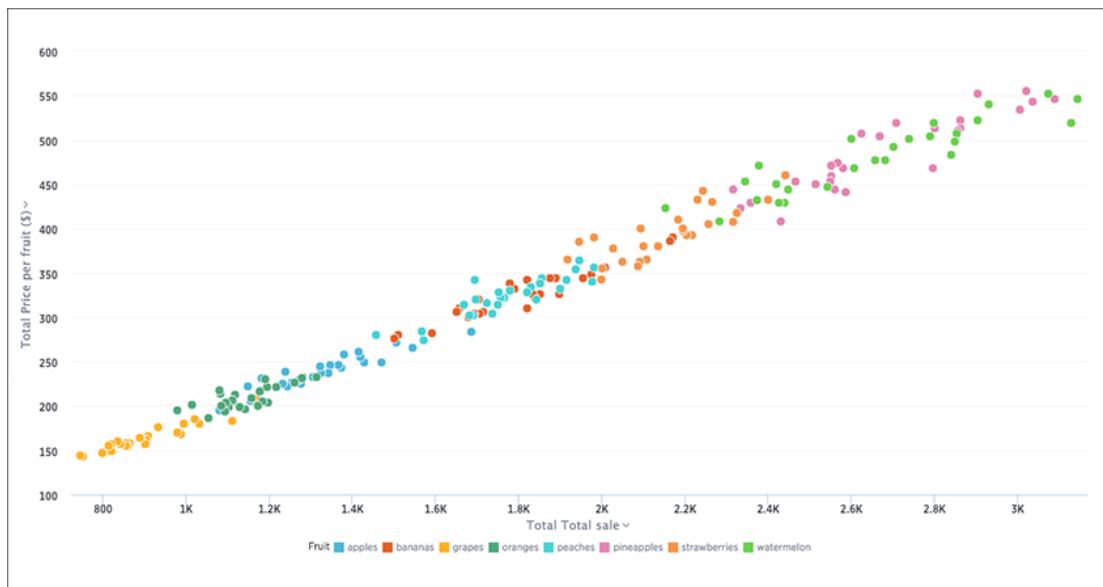


Figure 37: Scatter chart example

Your search needs at least one attribute and one measure to be represented as a scatter chart.

Bubble charts

The bubble chart displays three dimensions of data with each containing a set of values.

The bubble chart is a variation of the scatter chart, with the data points replaced with bubbles. These bubbles add a third data dimension to your answer.

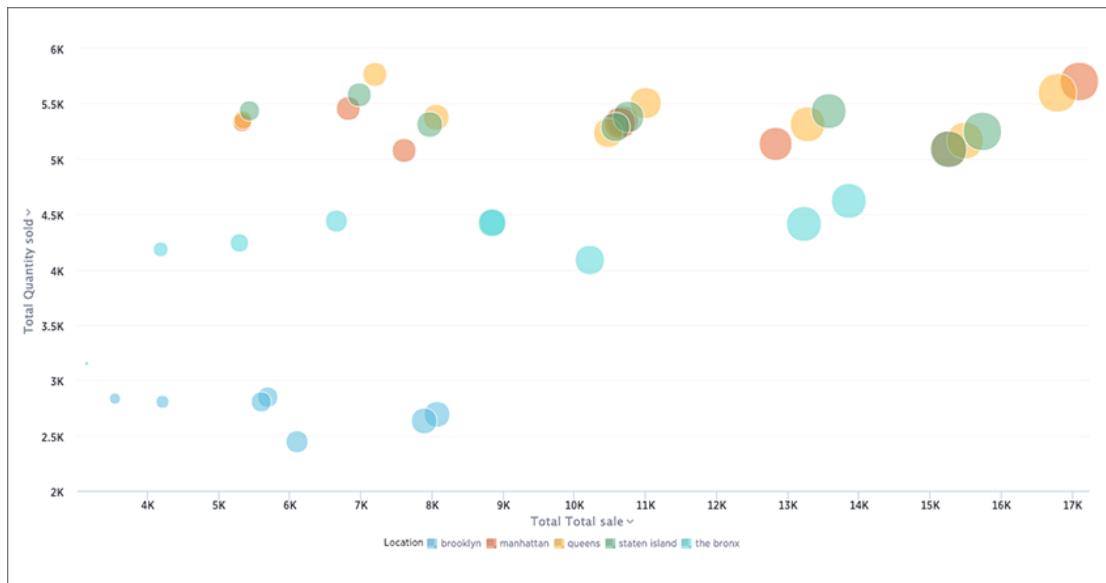


Figure 38: Bubble chart example

The size of each bubble depends on the measure you choose under **Edit chart configuration**.

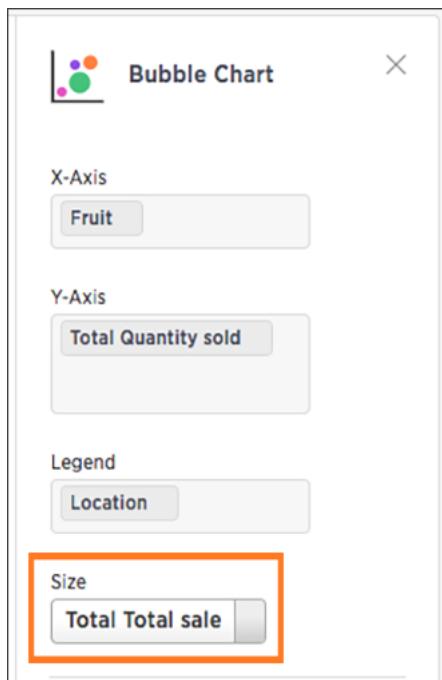


Figure 39: Bubble size dropdown

Your search needs at least one attribute and two measures to be represented as a bubble chart.

Pareto charts

The pareto chart is a type of chart that contains both columns and a special type of line chart.

The individual values of a pareto chart are represented in descending order by columns, and the cumulative percent total is represented by the line. The y-axis on the left is paired with the columns, while the y-axis on the right is paired with the line. By the end of the line, the cumulative percent total reaches 100 percent.

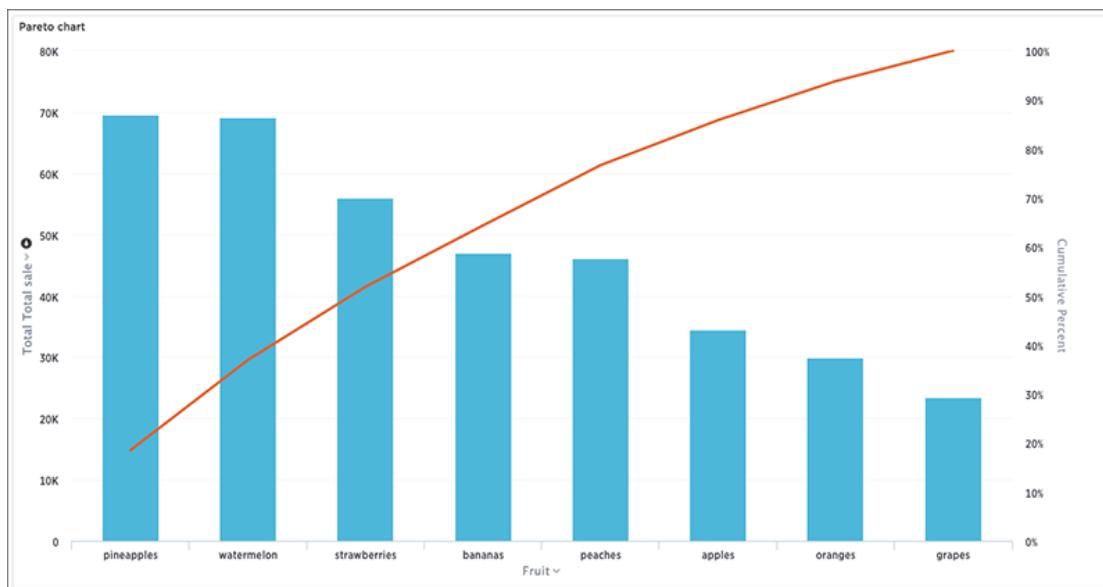


Figure 40: Pareto chart example

Your search needs at least one attribute and one measure to be represented as a pareto chart.

Waterfall charts

The waterfall chart is used to show how an initial value is affected by a series of intermediate positive or negative values.

Waterfall charts are good for visualizing positive and negative growth, and therefore work well with the growth over time keyword. The columns are color-coded to distinguish between positive and negative values.

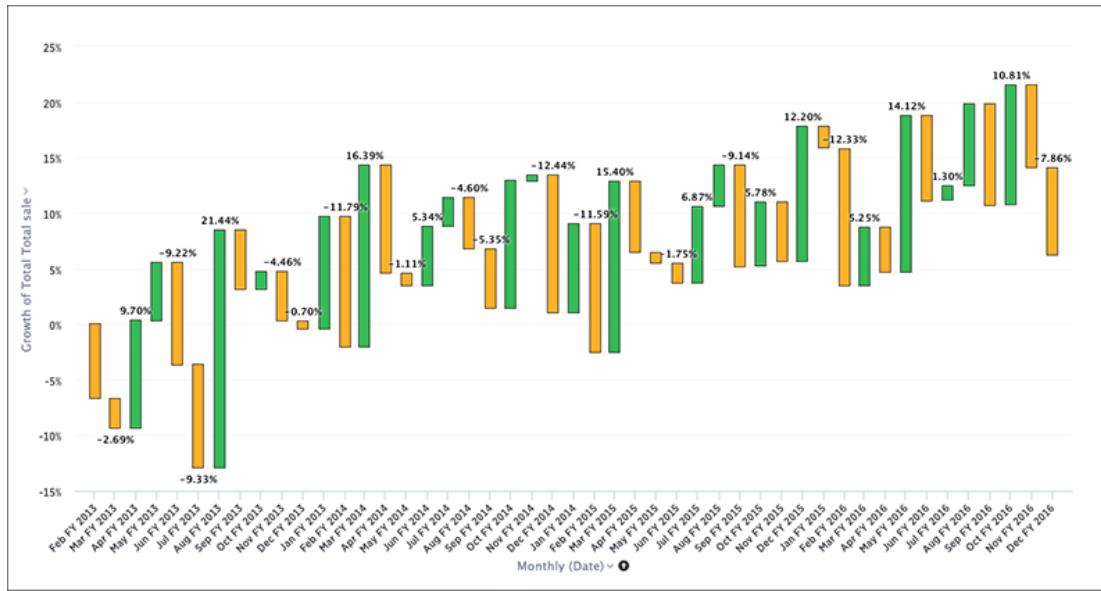


Figure 41: Waterfall chart example

Your search needs at least one attribute and one measure to be represented as a waterfall chart.

Treemap charts

The treemap chart displays hierarchical data as a set of nested rectangles.

Treemap charts use color and rectangle size to represent two measure values. Each rectangle, or branch, is a value of the attribute. Some branches can contain smaller rectangles, or sub-branches. This setup makes it possible to display a large number of items in an efficient way.

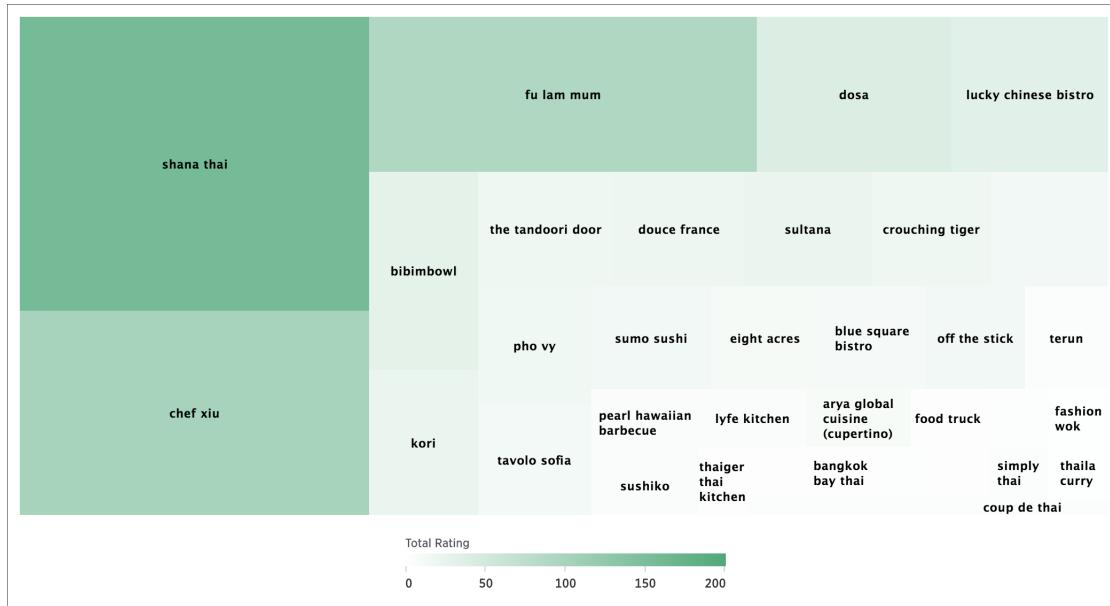


Figure 42: Treemap chart example

You can rearrange the columns of your search into category, color, and size under **Edit chart configuration**.

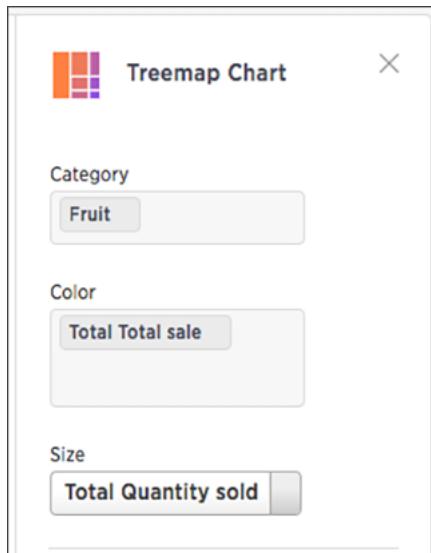


Figure 43: Branch category, color, and size

Your search needs at least one attribute and two measures to be represented as a treemap chart.

Heatmap charts

The heatmap chart displays individual data values in a matrix following a color scale.

Heatmap charts are similar to treemap charts in that they both use a similar system of color-coding to represent data values. However, the heatmap does not use size to measure data, and instead requires an additional attribute.



Figure 44: Heatmap chart example

The value of each cell depends on the measure you choose under **Edit chart configuration**.

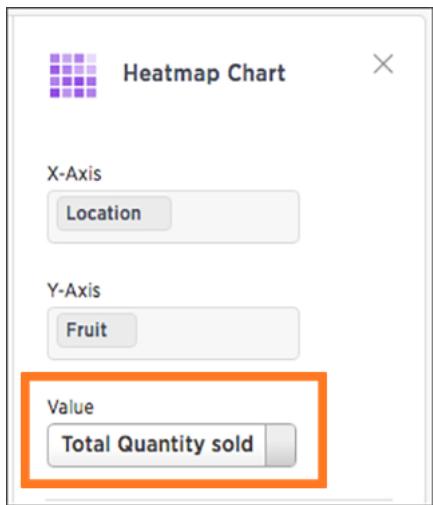


Figure 45: Heatmap value dropdown

Your search needs at least two attributes and one measure to be represented as a heatmap chart.

Line column charts

The line column chart combines the column and line charts.

Line column charts display one measure as a column chart and the other as a line chart. Each of these measures has its own y-axis.

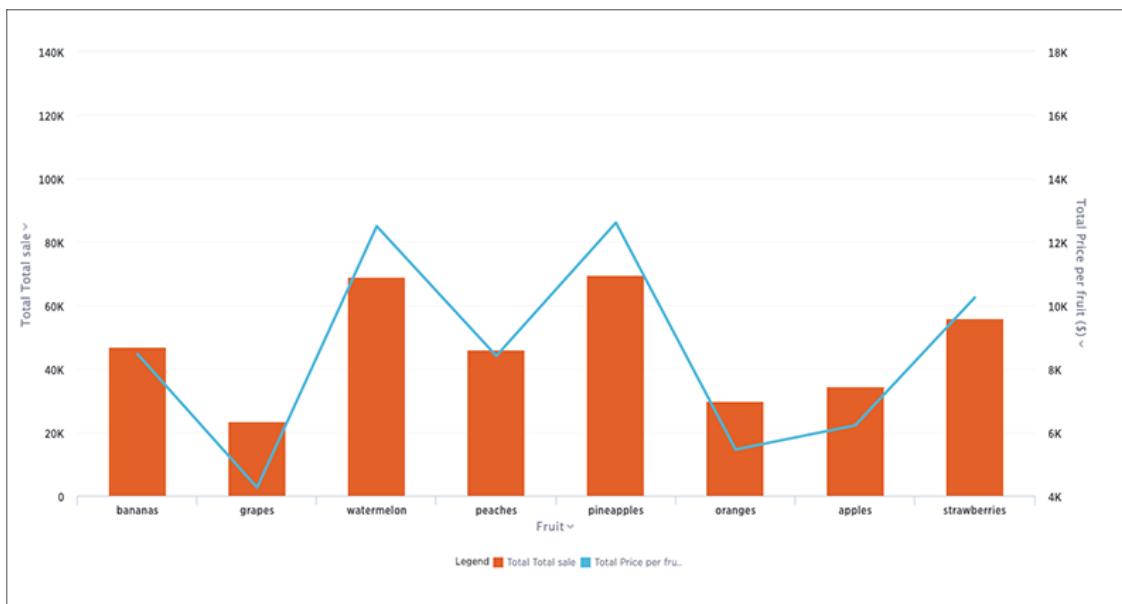


Figure 46: Line column chart example

You can choose to enable shared y-axis by clicking the link icon found under **Edit chart configuration**.

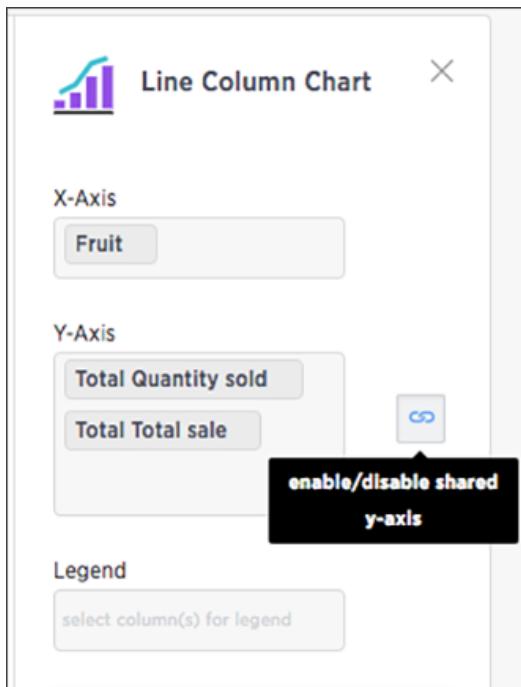


Figure 47: Enable shared y-axis

Your search needs at least one attribute and two measures to be represented as a line column chart.

Line stacked column charts

The line stacked column chart combines stacked column and line charts.

This chart is similar to the line column chart, except that it divides its columns with an attribute in the legend. There are two y-axes, one for each measure.



Figure 48: Line stacked column chart example

You can choose to enable shared y-axis by clicking the link icon found under **Edit chart configuration**.

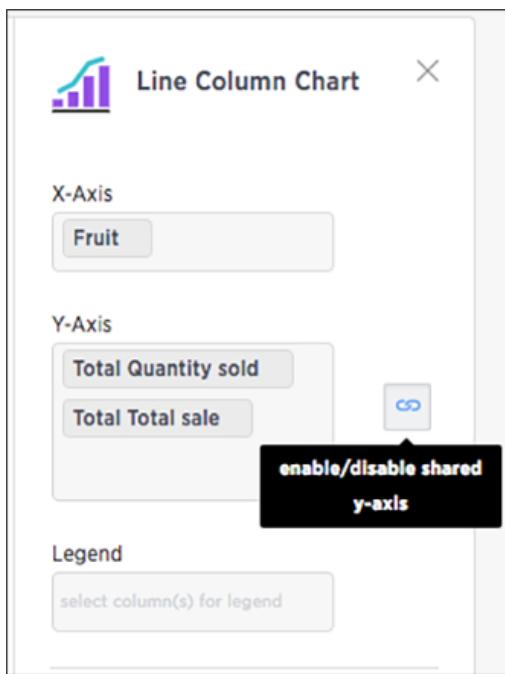


Figure 49: Enable shared y-axis

Your search needs at least two attributes and two measures to be represented as a line stacked column chart.

Funnel charts

The funnel chart shows a process with progressively decreasing proportions amounting to 100 percent in total.

This chart is similar to a stacked percent column chart, and is often used to represent stages in a sales process. You can visualize the progression of data as it passes from one phase to another. Data in each of these phases is represented as different proportions.

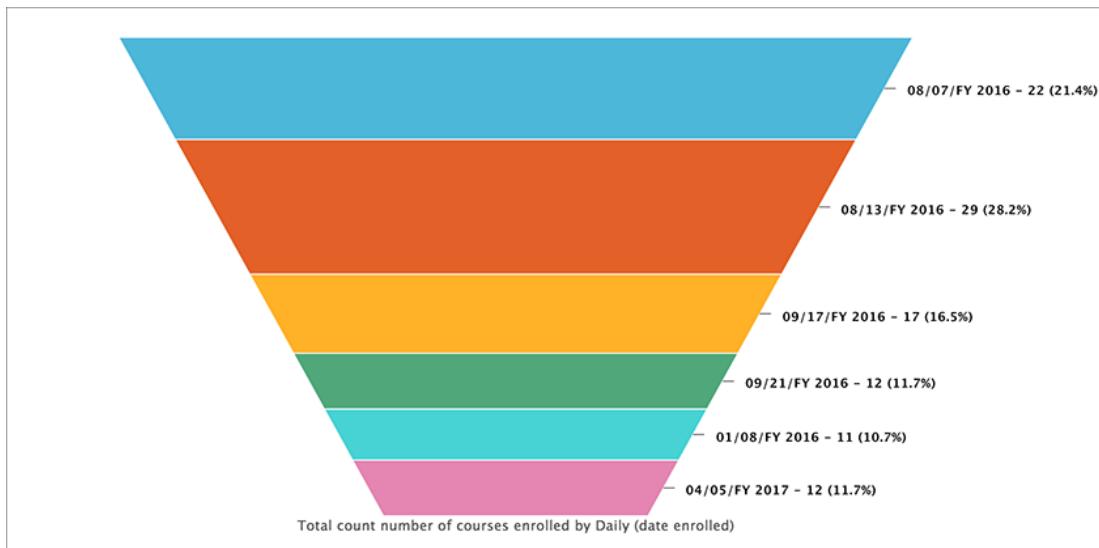


Figure 50: Funnel chart example

Your search needs at least one attribute and one measure to be represented as a column chart. The attribute must contain 50 or fewer values.

About geo charts

There are three geo charts that let you visualize geographical data in ThoughtSpot.

These geo charts show data on a map by location. They are geo area, geo bubble, and geo heatmap charts. And these geo charts can display six types of geographical data, which are:

- Country
- State
- County
- Zipcode
- Point (latitude/longitude)
- Other sub-nation regions (for international countries)



Note: In addition to the United States, ThoughtSpot also supports maps for the United Kingdom, Germany, Sweden, South Africa, and France.

Here is a table that shows which GeoType data can be displayed using which geo chart type.

Table 3: GeoTypes and their geo chart types

GeoType	Geo chart type	Notes
Country	Geo area (default), geo bubble, geo heatmap	<ul style="list-style-type: none"> Can also be regions.
County	Geo area (default), geo bubble, geo heatmap	<ul style="list-style-type: none"> Only for counties in the United States.
Point	Geo bubble (default), geo heatmap	<ul style="list-style-type: none"> Must use both latitude and longitude columns.
State	Geo area (default), geo bubble, geo heatmap	<ul style="list-style-type: none"> Only for states in the United States.
Zipcode	Geo bubble (default), geo heatmap	<ul style="list-style-type: none"> Zip codes and zip codes +4 in the United States.
Other sub-national regions	Geo area (default), geo bubble, geo heatmap	<ul style="list-style-type: none"> The display will depend on the type of administrative region chosen.

In order for data to be displayed using geo charts, your administrator must configure it as geographical data. If you are expecting to be able to get a map visualization, but it isn't available, contact your administrator so they can make the configuration.

-  **Restriction:** Only the first 5,000 data points will be shown on a geo chart.
If you need to increase this limit, please contact ThoughtSpot Support.

Geo area charts

The geo area chart displays country, county, state and zipcode data on a geographical chart.

Geo area charts highlight the regions of interest. Point data (longitude/latitude) doesn't work on geo area charts. Also, only geo area charts display boundaries for counties.

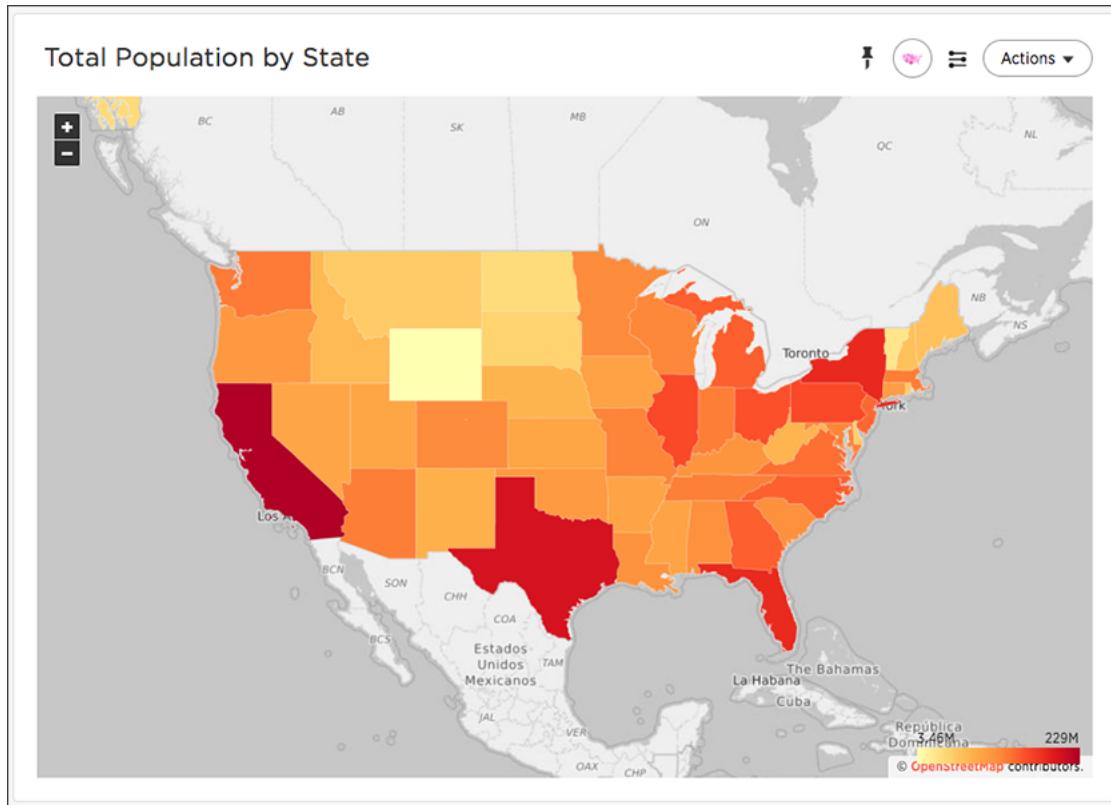


Figure 51: Geo area chart example

Your search needs one geographical column of granularity to be represented as a geo area chart.

Geo bubble charts

The geo bubble chart displays country, county, point, state, and zipcode data on a geographical chart.

Geo bubble charts, like bubble charts, display the value of the measure by the size of the bubble. Zip code data makes the most sense for geo bubble charts.

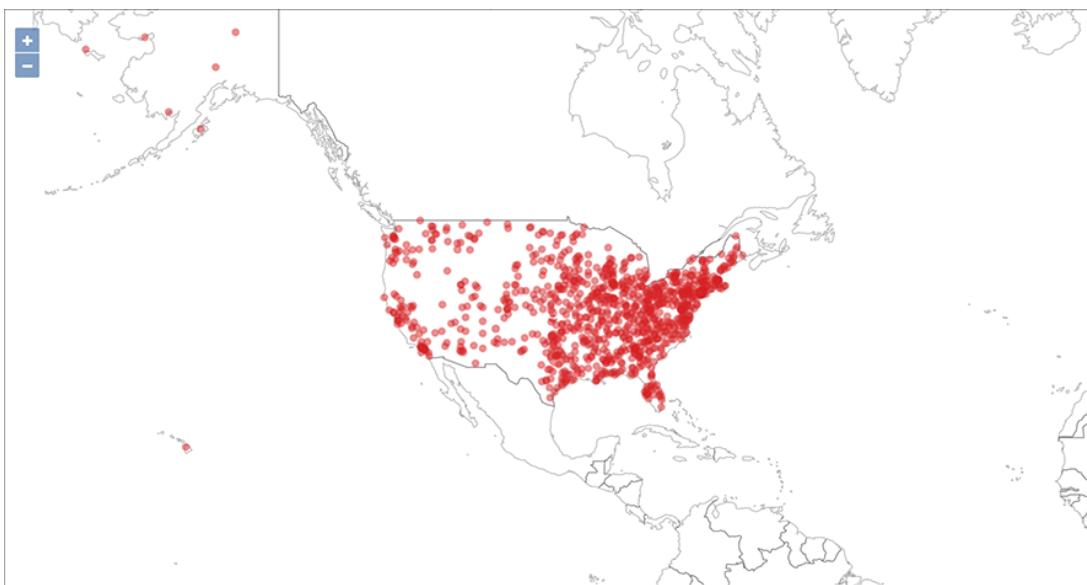


Figure 52: Geo bubble chart example

Your search needs one geographical column or a pair of latitude and longitude columns to be represented as a geo bubble chart.

Geo heatmap charts

The geo heatmap chart displays country, county, point, state, and zipcode data on a geographical chart.

Geo heatmap charts, like heatmap charts, display the value of the measure with color intensity.

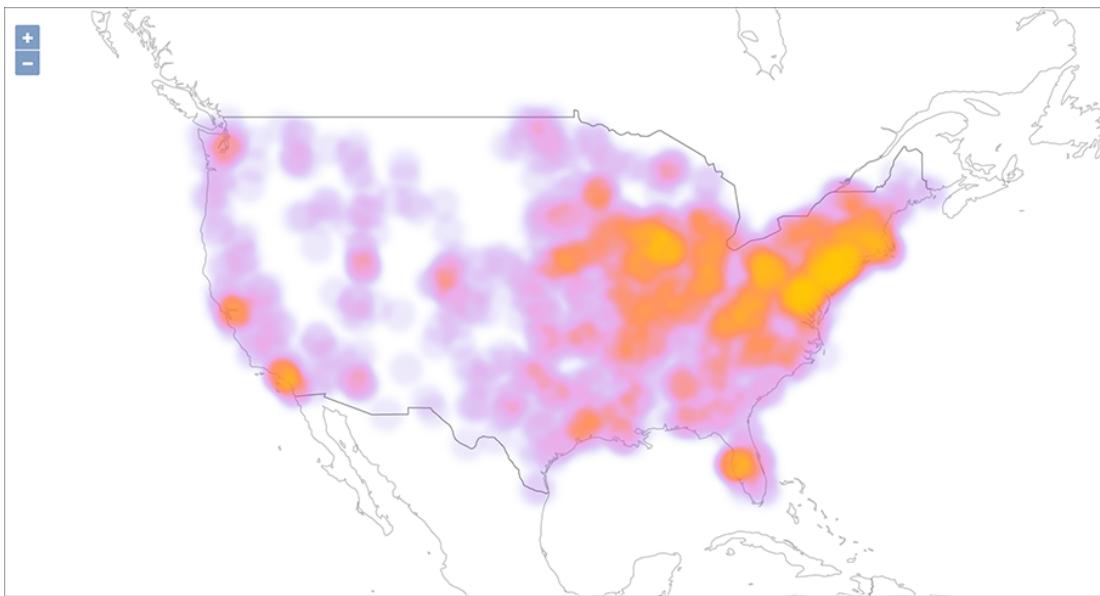


Figure 53: Geo heatmap chart example

Your search needs one geographical column or a pair of latitude and longitude columns to be represented as a geo heatmap chart.

About pivot tables

Pivot tables in ThoughtSpot use the well known drag-and-drop interface. Creating a pivot table enables exploring alternate visualization of data in a wide table. The basic idea is that some data is easier to consume when laid out horizontally, while others, vertically.

Previously, ThoughtSpot used a pivot keyword to select which fields can be columns and which can be rows, thus moving columns to be rows and vice versa. Now, the pivot table is a chart type.

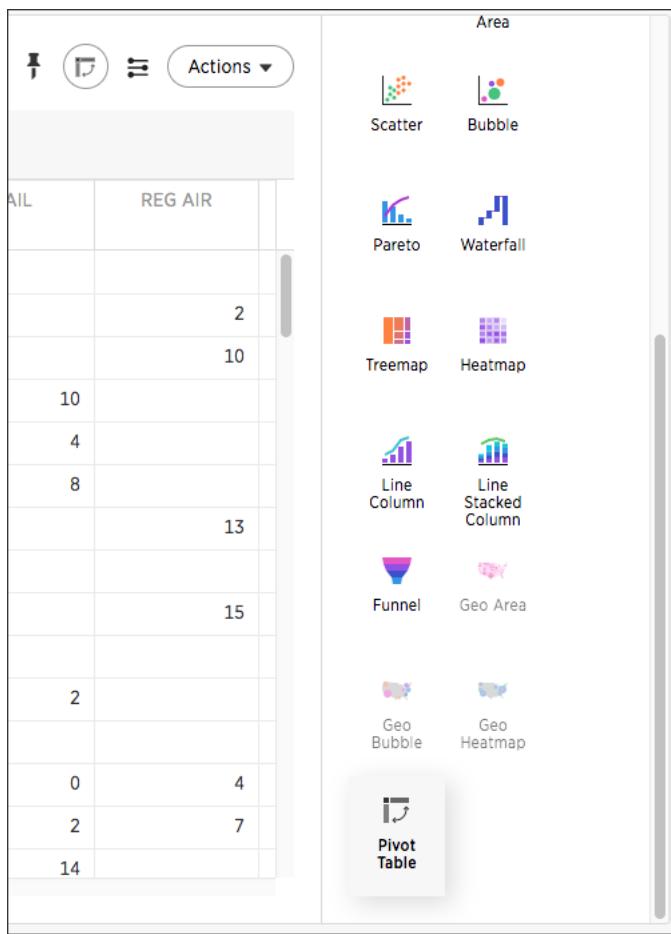


Figure 54: Pivot table chart type

Choose **Pivot Table** under Select Chart Type to view your search as a pivot table. Add rows, measures, and columns to the search bar and restructure your table by moving these values under **Configure Chart** or by dragging and dropping them.

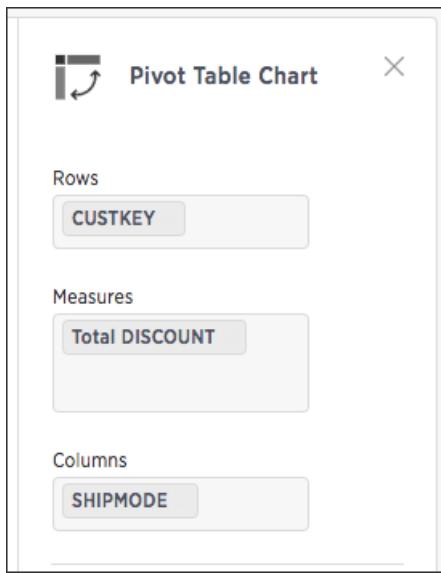


Figure 55: Chart axes: rows, measures, columns

Some additional details about pivot tables include:

- Pivot tables show the grand totals for columns and rows.
- You can toggle on the Heatmap mode found under Configuration Options to add color coordination to your data.

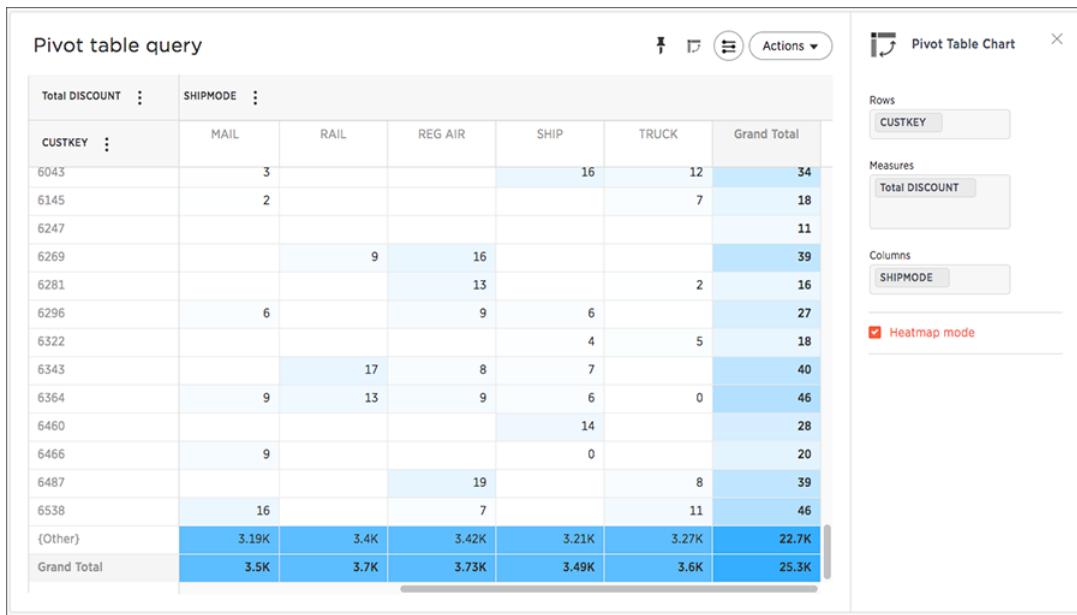


Figure 56: Heatmap mode enabled

- Click a column or row to expand it. Additionally, you can expand or collapse all by right clicking the arrow on the top left of a cell.



Figure 57: Expand or collapse all option

- When you pin a pivot table to a pinboard, it will retain your expansion settings.

The pivot table chart type has these limitations:

- Only the first 10,000 data values will be used. If you would like to increase this limit, please contact ThoughtSpot Support.
- Pivot table is not available if the dataset contains more than 100,000 rows.
- Columns with cardinality beyond 100 are grouped into {Other}.
- Show underlying data menu is unavailable.
- Conditional formatting is not functional.

Change the chart

You can adjust the axes, labels, and view of the chart.

Every chart gives you the option to move columns between the x- and y-axes, hide or show data labels, and zoom.

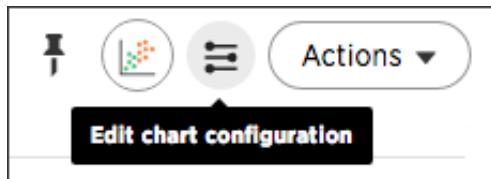


Figure 58: Configure chart icons

The configure chart option (the top icon which looks like a small bar chart) gives you the ability to edit the chart axes and legends. Click on the icon to view the chart axes, add a legend, lock axes, and more.

Reorder labels on the axis or legend

When there are multiple columns on the x- or y-axis or legend of a chart, you can reorder them by using the **Configure Chart** icon.

The order in which columns appear on the axis or legend is based on the sequence they are added. The first field is used as the primary sorting field for the chart. Adding another field adds it after the first one on the axis label or legend. If you want to change the order, you can remove the fields and re-add them in the reverse order.

This example shows you how to reorder the x-axis columns.

1. While viewing your answer as a chart, click **Edit chart configuration** near the top right.

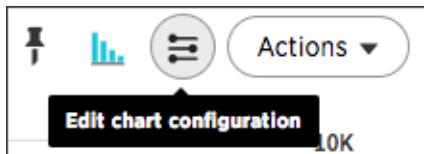


Figure 59: Edit chart configuration icon

2. In the X-Axis box, delete the values. Then re-add them in the new preferred order.



Figure 60: Reordering X-Axis columns

3. Click **Done**.

Your chart will reorganize itself to reflect the new label order.

Set the y-axis range

You can manually set the y-axis range by using the **Edit chart configuration** icon.

The chart configuration panel includes the option to manually set the y-axis range.

To set the y-axis range:

1. While viewing your answer as a chart, click **Edit chart configuration** near the top right.

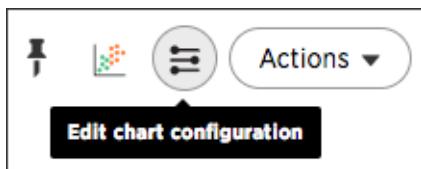


Figure 61: Edit chart configuration icon

2. Under **Y-Axis Range** enter your preferred start and end values.

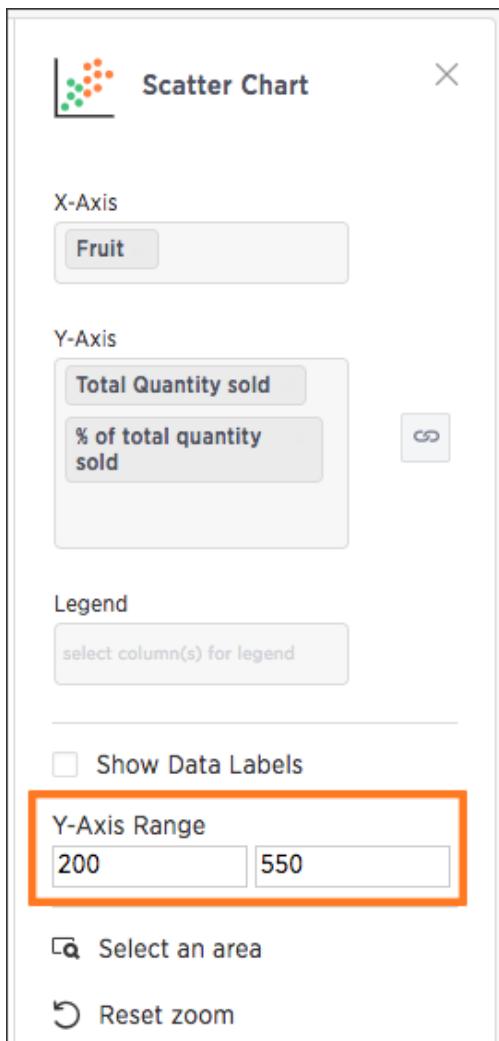


Figure 62: Y-Axis Range details

Your chart will reorganize itself to reflect the new y-axis range.

Hide and show values

You can hide and show values on the chart using the legend.

Clicking on a legend item will hide it from the chart. You can click it again to show it.

To hide and show values:

1. While viewing your answer as a chart, click **Edit chart configuration** on the right.

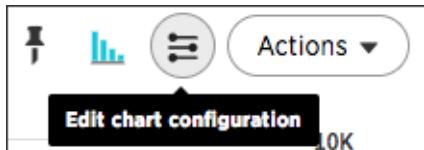


Figure 63: Edit chart configuration icon

2. Make sure you have a column in the **Legend** field.

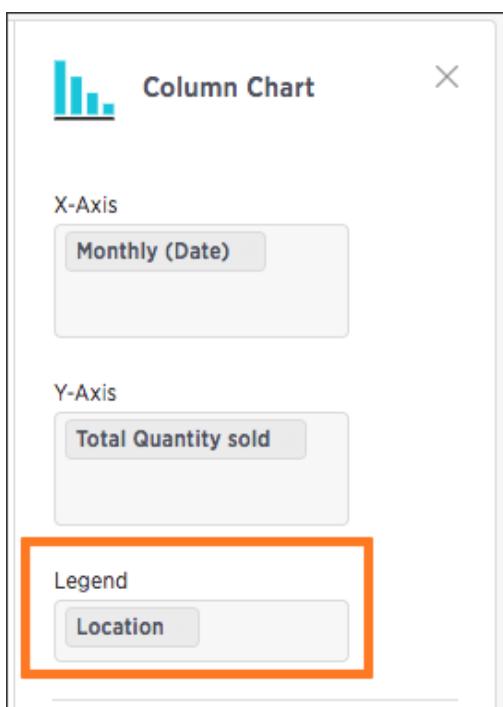


Figure 64: Legend field

3. On the chart, click the legend value you would like to hide. Click the hidden legend value again to show it.

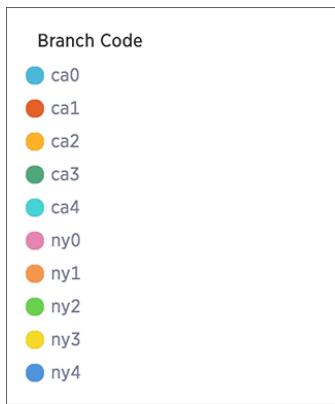


Figure 65: Legend values list

You can also click **only** next to a legend value to only show that value on the chart.

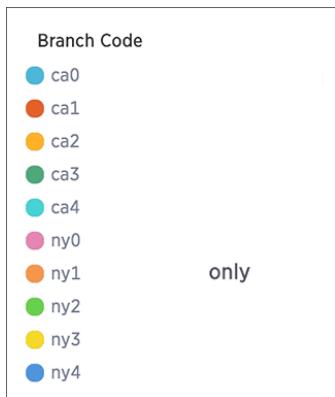


Figure 66: Show only one legend value

Change chart colors

You can easily change the legend colors in a chart.

To change the colors used in the legend of a chart, click on the square next to the attribute whose color you wish to change.

To change the chart colors:

1. While viewing your answer as a chart, click **Edit chart configuration** on the right.

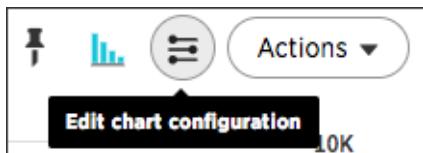


Figure 67: Edit chart configuration icon

2. Make sure you have a column in the **Legend** field.

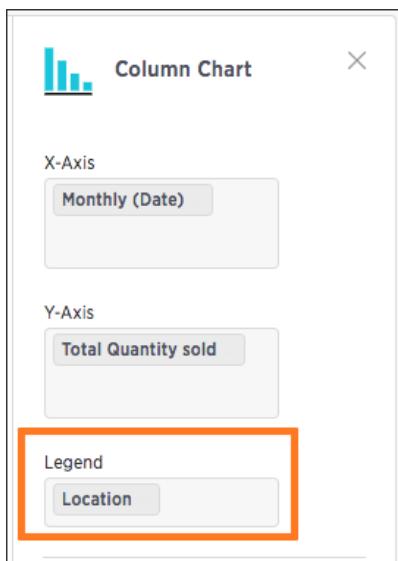


Figure 68: Legend field

3. On the chart, click the color icon of the legend value you would like to change the color of.

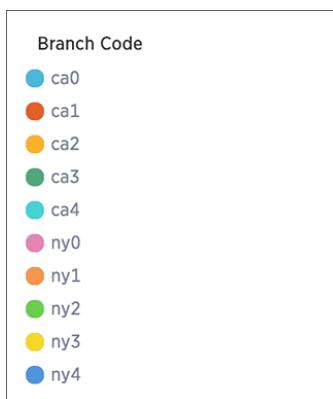


Figure 69: Legend values list

4. Use the color selector to choose a new color to represent that legend value.

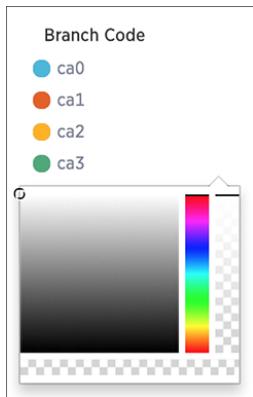


Figure 70: Legend color template

5. Click outside of the selector to apply your change.

Show data labels

You can configure charts to show the y-axis data values.

Some charts have additional options under **Configuration Options** that are covered in each chart type topic.

To show data labels:

1. While viewing your answer as a chart, click **Edit chart configuration**.

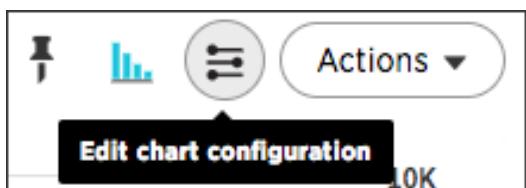


Figure 71: Edit chart configuration icon

2. Select **Show Data Labels**.



Figure 72: Toggle on Show Data Labels

Zoom into a chart

You can zoom into your chart by selecting an area with your mouse.

To zoom into a chart:

1. While viewing your answer as a chart, click **Edit chart configuration** on the right.

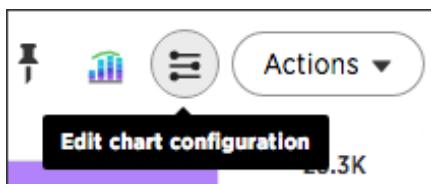


Figure 73: Edit chart configuration icon

2. Click **Select an area**.



Figure 74: Select an area to zoom

3. Select an area on your chart to zoom into by clicking and dragging your mouse.

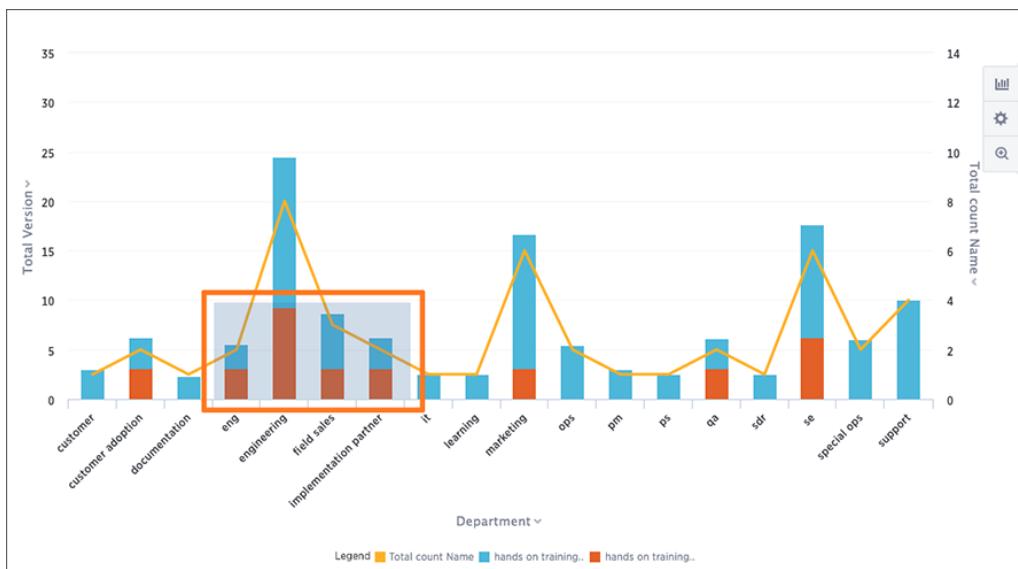


Figure 75: Click and drag to select an area

Your chart will be reconfigured to only show the selected area.

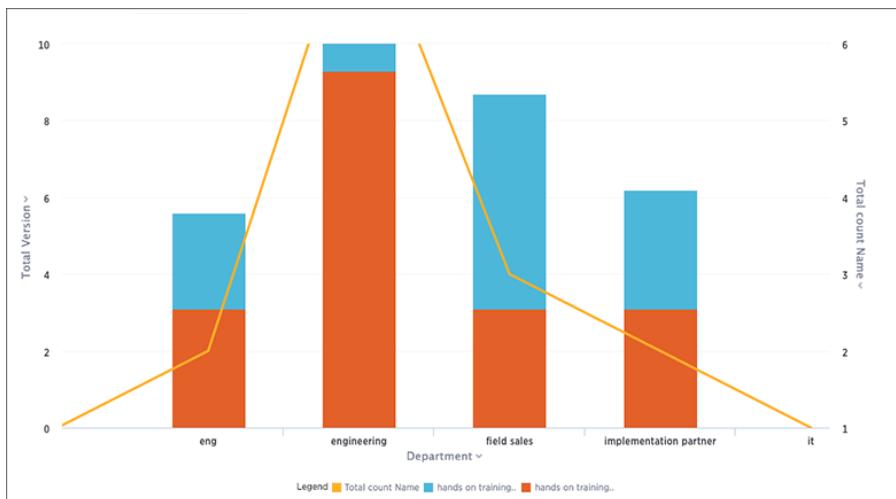


Figure 76: Zoomed in chart area

4. If you would like to return to the original chart view, click **Reset zoom** under **Zoom options**.



Figure 77: Reset zoom option

About filters

Filters narrow down the search result to only include the data you want to see.

When you add a value to your search, it becomes a filter. Simple filters can be applied to an answer, while pinboard filters can be applied to all visualizations of a pinboard. You can find out more about [pinboard filters in the pinboards section](#).

In search, filters appear in white boxes in the search bar.

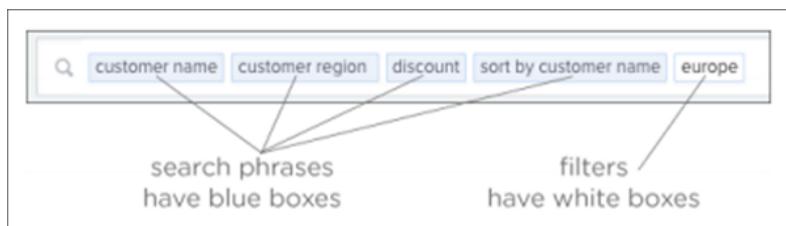


Figure 78: Search bar with filters

In an answer or a pinboard, filters appear just below the title. For pinboards, your filters apply to all worksheet-based visualizations in the pinboard.

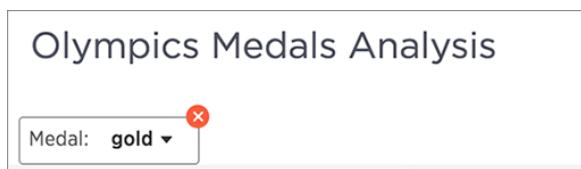


Figure 79: Pinboard filters

If you ever find that your search or pinboard does not appear to contain all the data you want to see, check for any existing filters and remove them by clicking the **X** to see all the data.

Note that filtering on NULL and empty values is a special case. You can find out more about how these values are represented and how to filter for them in [About filtering on null, blank, or empty values](#).

About simple filters

Simple filters can be applied to searches in a few different ways.

You can use the search bar or the **Change Configuration** menu to add a filter to a search. You can apply simple filters to your search, whether it shows a table or a chart. Your filters remain part of the search even when you change the visualization type.

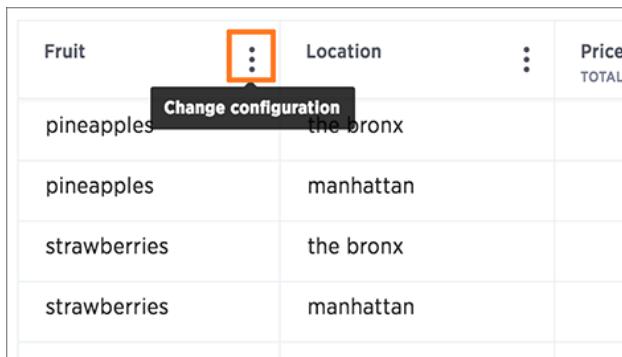
When adding a filter from the **Change Configuration** menu, numeric columns and text columns provide you with a checkbox selector for values. If the column contains a date, you'll see a calendar selector when applying a filter. This is also where you'll go to apply [bulk filters](#).

Add a filter to a table

You can add a simple filter from a column header while viewing your answer as a table.

To add a filter from column headers:

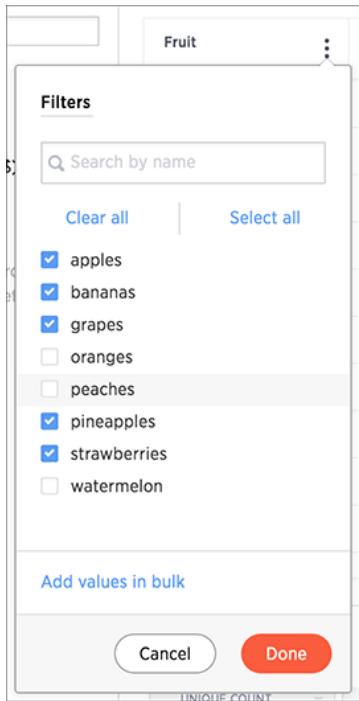
1. While viewing your answer as a table, click **Change configuration** on the column header you want to filter, and select **Filters**.



Fruit	Location	Price TOTAL
pineapples	the bronx	
pineapples	manhattan	
strawberries	the bronx	
strawberries	manhattan	

Figure 80: Change configuration of a column

2. Select the values to include in your answer. Then click **Done**. If there are too many values, you can use the filter search bar to find the ones you want.

**Figure 81: Column filters value box**

Add a filter to a chart

You can add a simple filter from a chart axis while viewing your answer as a chart.

You can filter a chart in two ways:

1. Click on the legend labels to toggle the values on or off.
2. Follow the steps shown here to filter on the axis values.

To add a filter from the chart axes:

1. While viewing your answer as a chart, click the chart axis you want to filter on, and select **Filter**.

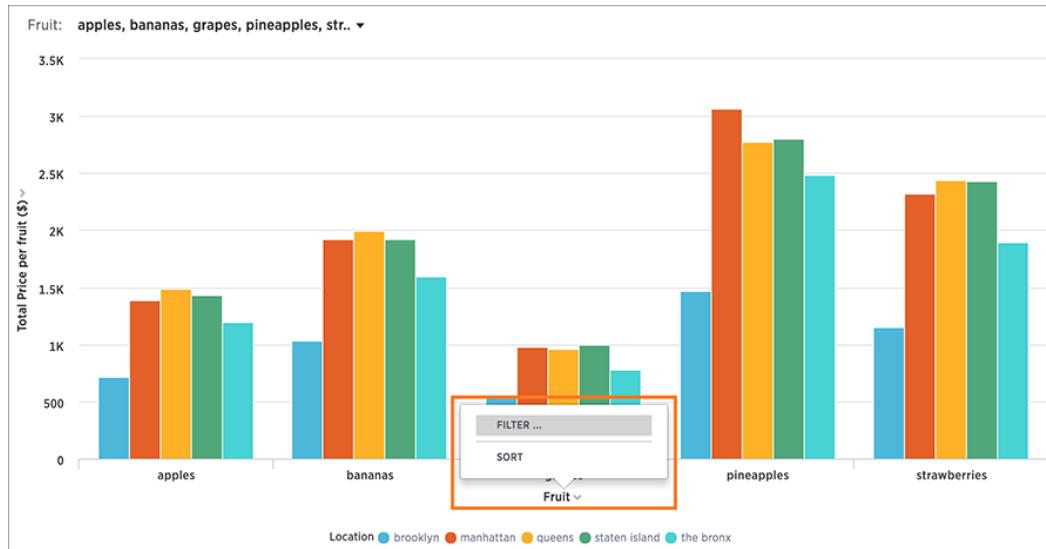


Figure 82: Choose filter from a chart axis

2. Select the values you would like to include in your answer. Then click **Done**.

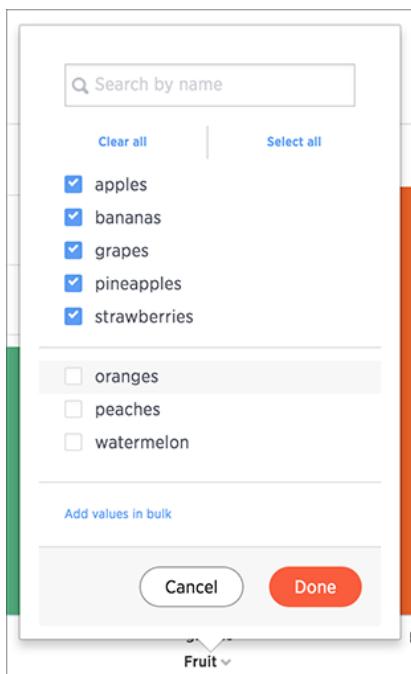


Figure 83: Axis filters value box

Add a filter from the search bar

You can add a simple filter from the search bar while creating your answer.

To add a filter from the search bar:

1. Click in the search bar and type the values you want to include in the search.
Typing a value in the search bar acts as a filter.

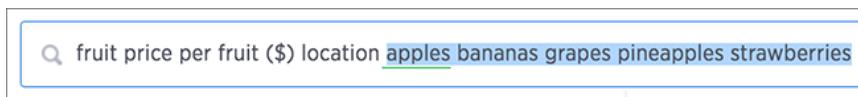


Figure 84: Filter from the search bar

You can also use filter keywords like yesterday, after, next month, 2016 to filter your search. To see more filter keywords, refer to the [keyword reference](#).

2. Click outside of the search bar or push enter to apply your filter.

About bulk filters

If you have a large worksheet or table with thousands or millions of rows, you may want to create bulk filters. You can paste in a list of filter values, without having to click the box next to each value in the filter selector.

Bulk filters can be very useful when you have a very large worksheet or table. You can use them to filter a large list of values easily. For example, this is useful if you want to only search on a list of products that your manager sent to you in an email. You can cut and paste those values into the bulk filter box to quickly generate a report or chart that includes only those items of interest.

Create a bulk filter

You can create a bulk filter by pasting a list of values, separated by commas, semicolons, new lines, or tabs, into the bulk filter box. This allows you to easily search a large list of filters repeatedly.

In this example, we will cut and paste values to create a bulk filter. You could also do this by pasting in a list of text values from an email or cells from an Excel or Google Sheets spreadsheet.

1. When viewing a table, select multiple cells by clicking and dragging.
2. Right click and choose **Copy to Clipboard**.

Most Popular MindTouch Pages November 2015			
Page Title	URL	Views <small>TOTAL</small>	⋮
welcome to the help center	https://help.thoughtspot.com/help_center	2,422	
installation and setup	https://help.thoughtspot.com/02_adminis	2,000	
administration	https://help.thoughtspot.com/02_adminis	1,151	
the basics	https://help.thoughtspot.com/01_the_ba	879	
knowledge base	https://help.thoughtspot.com/03_knowle	743	
keywords	https://help.thoughtspot.com/help_cente	727	
release notes	https://help.thoughtspot.com/03_knowle	677	
help center	https://help.thoughtspot.com/help_cente	630	
tips & tricks	https://help.thoughtspot.com/help_cente	620	
administrator guide 2.2	https://help.thoughtspot.com/02_adminis	581	

Figure 85: Copy to the Clipboard

3. Click the **Filters** icon in the column header, and click **Add values in bulk**:

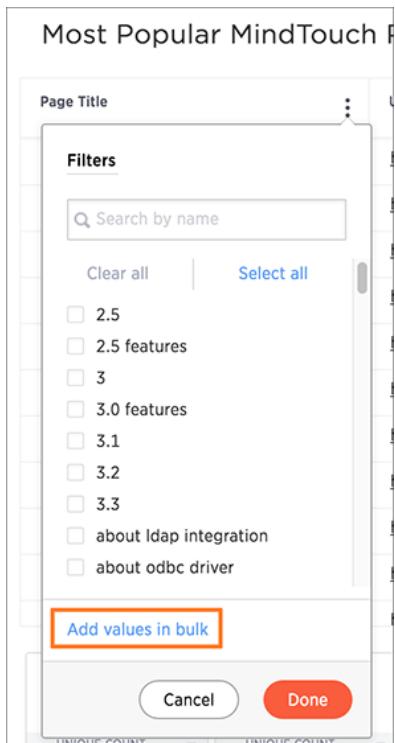


Figure 86: Add values in bulk

4. Paste the values into the bulk filter box.

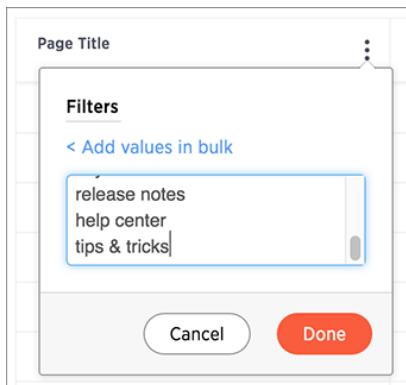


Figure 87: Paste values into the bulk filter box

5. Click **Done**.

Delete a filter

You can delete a filter from an answer to return to the original unfiltered search result.

There are multiple ways to delete a filter.

To delete a filter:

1. Click the **x** on the filter term in the search bar.



Figure 88: Delete the filter term from the search bar

2. You can also click the **x** on the filter bar above the answer.

Total Price per fruit (\$) by Fruit, Location				
Fruit: apples, bananas, oranges, peaches, pinea.. x				
Fruit	⋮	Location	⋮	Price per fruit (\$)
		TOTAL		
pineapples		the bronx		2,487.00
pineapples		manhattan		3,066.00

Figure 89: Delete the filter term from the filter bar

About filtering on null, blank, or empty values

Filtering on null, blank, or empty values can be tricky if your data contains both of these. You can use this method to see what's really going on with these types of values, and to get the filtering behavior you want.

How NULL and blank values are displayed

When you view a table or chart, you may see values that appear as **{blank}**.

These can actually be one of two types of values:

- NULL values, which are essentially missing values.
- blank or empty values, like an empty string of text or a string containing only whitespace (spaces, tabs).

Both of these types of values are represented as **{blank}**, but if you filter on **{blank}**, the filter will apply to only the NULL values. That is, only the NULL values will be included in your result. It can be hard to tell what's going on if you have a data source that contains both NULL and blank/empty values.

To show NULL and blank values differently

If you need to differentiate between NULL and blank values, you can [Add a formula](#) to make them appear differently in charts and tables. In this example, we'll use `<text_column>` to refer to the text column which contains both NULL and blank values:

```
if ( strlen ( <text_column> ) = 0 ) then if ( isnull ( <text_column> ) ) then  
  'null' else 'empty' else <text_column>
```

This formula will show "null" where the value contained in the column is actually NULL. When the value is blank or empty, it will show up as "empty".

To allow filtering on both NULL and blank values

If you want to keep the same display format for NULL and blank values, but be able to filter on both using "{blank}", your [formula](#) will be slightly different. You can use a formula like:

```
if ( strlen ( <text_column> ) = 0 ) then null else <text_column>
```

Use the filter you created instead of the original text column in your search to get the result you desire.

Filtering on your formula

After creating the above formula that fits what you want to do, you can filter on the formula column you created in the search bar by typing the value **{blank}**, which will act as a filter. Or you can filter by left clicking on a **{blank}** value in your search result table, then right clicking and selecting **Show only "{Blank}"**.

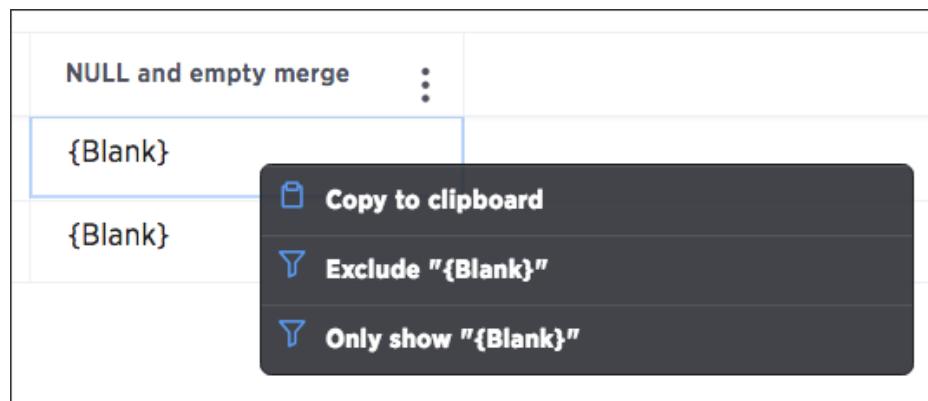


Figure 90: Show only NULL and blank values

About keyword searches

Use keywords when asking a question to narrow and further define your search.

In addition to column names, values, and filters, the search bar also accepts keywords. These keywords serve a variety of predefined purposes, and are divided into different groups. The groups are as follows:

- **Basic keywords**

You can use keywords such as "top" and "bottom" to, for example, only see results for the best or worst performing sales rep.

- **Date keywords**

Date keywords give you the freedom to narrow your search by days, weeks, months, quarters, or years. There are also a number of date related keywords such as "after", "before", and "year-over-year". Use the new date keywords to describe dates in the future. This is useful for exploring things that are scheduled for a future date, such as shipments due to go out in the next week.

- **Time keywords**

Time keywords are the most useful when trying to figure out how many visitors you've received within the last "n minutes or hours".

- **Text keywords**

You can use text keywords to find similar words or phrases that contains a certain word. For example, product name contains "green".

- **Number keywords**

These keywords allows you to define your search by sum, average, count, max, min, and other accumulations.

- **Filter keywords**

Filter keywords work in the same way as filters on table columns or chart axes.

- **Location keywords**

The keywords "near" and "farther than" allow you to search with spatial filters on your geo type columns with latitude/longitude data. This lets you focus your search based on distance and locations. You can specify a specific radius using miles, kilometers, or meters.

You can access a list of keywords and other reference materials in the [references](#) section or in the help center. Open the help center by clicking **Help** on the top

navigation bar. Within the help center, you'll find videos and documentation that pertain to the current version of ThoughtSpot. Here is where you can also find a list of keywords. You can expand each section to see which keywords are available and examples on how to use them.

The screenshot shows the 'KEYWORDS' section of the ThoughtSpot Help Center. On the left, there's a sidebar with a red circular icon containing 'TS'. Below it, a list of keyword categories: Basic keywords, Date keywords, Time keywords, Text keywords, Number keywords, and Filter keywords. To the right, under the heading 'Basic keywords', there are examples for 'top' and 'bottom'. For 'top', examples include 'top sales rep by count sales for average revenue > 10000' and 'sales rep average revenue for each region top'. For 'bottom', examples include 'revenue average', 'revenue by state', 'customer by revenue for each sales rep', and 'bottom'. At the bottom, there's an example for 'top n': 'top 10 sales rep revenue'.

Figure 91: Help center keywords list

About worksheets from searches

If you want to do an advanced search that involves what is essentially a search on top of another search, try saving your search as a worksheet. Then you can use the saved worksheet as a data source for a new search.

Introduction to worksheets from searches

Although a worksheet created from a search is effectively the same as any worksheet, we'll call it an "aggregated worksheet" here to avoid confusion. When you do a search on a data source, ThoughtSpot is only able to aggregate one column by one other column. Because of this, you may come across searches you can't do in one pass, because they are essentially nested queries. But you

can create the equivalent of nested queries using an aggregated worksheet, which is essentially an answer that you save as a worksheet. Then you can use that worksheet just like any other data source. You can even link it to other sources by defining a relationship. When you save an answer as a worksheet, and then use it as a source in a new search, it is similar to doing a nested query in SQL, only much easier to create.

In order to create a worksheet from a search, you must belong to a group that has the privilege Has administration privileges or Can Manage Data. If you are not able to create aggregated worksheets, contact your administrator and request the **Can Manage Data** privilege.

Aggregated worksheet workflow

Suppose you have created a search on the sales fact table that shows the top ten Sales Reps by revenue for the first quarter. Then you want to do some further investigations on that set of data, like ranking them by how much they discounted a specific product using data from the orders fact table. Unless you save your first answer as a worksheet, certain explorations like this won't be possible. If you want to do this, here are the steps at a high level:

1. Create the first search, and [save it as an aggregated worksheet](#).
2. Link your worksheet to any other data sources you'll need.
3. Create a new search that includes your aggregated worksheet and the other sources you linked with it.
4. You may want to create a new worksheet that includes these data sources.

This will make it easy for people to search using the same group of aggregated worksheet and tables that you created.

Best practices for using aggregated worksheets

Aggregated worksheets can be used in a variety of ways. But keep in mind these details about how they work:

- Only users with administrative privileges are able to create aggregated worksheets and link them.
- You can't link an aggregated worksheet with a sharded table. If you do this and try to search on it, you will get an error.
- Joins are directional, meaning that the order of the objects being linked matters. The table/aggregated worksheet with the foreign key needs to occur in the first (left) position. The one with the primary key needs to go in the second (right) position.

Save a search as a worksheet

This procedure walks you through creating a worksheet from a search.

To create a worksheet from a search (i.e. an aggregated worksheet):

1. Start a new search, or edit an existing visualization from a pinboard.
Any filters or aggregations created during this search will be reflected in the worksheet.
2. If you want to use a different aggregation than the default one for any column, set it from the column header.

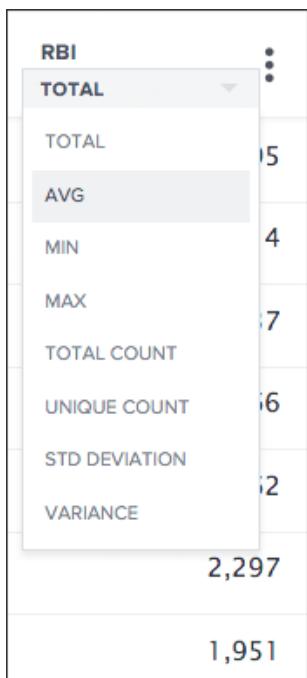


Figure 92: Select an aggregation

3. Save the answer as a **Worksheet**.

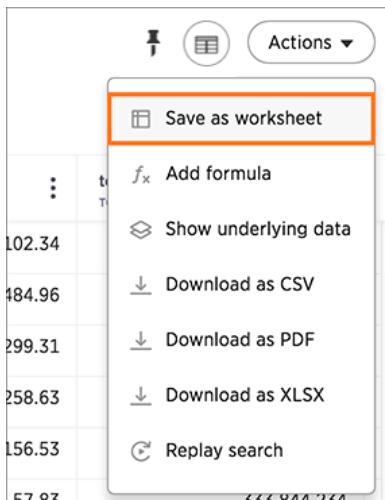


Figure 93: Save as a Worksheet

Create a search from a search saved as a worksheet

After creating a worksheet from a search (also called an aggregated worksheet) and linking it to related data, you're ready to create your new search.

To do a search on the aggregated worksheet, along with any data sources you linked:

1. Click the search icon, and select **Data Source**. Choose your linked sources.

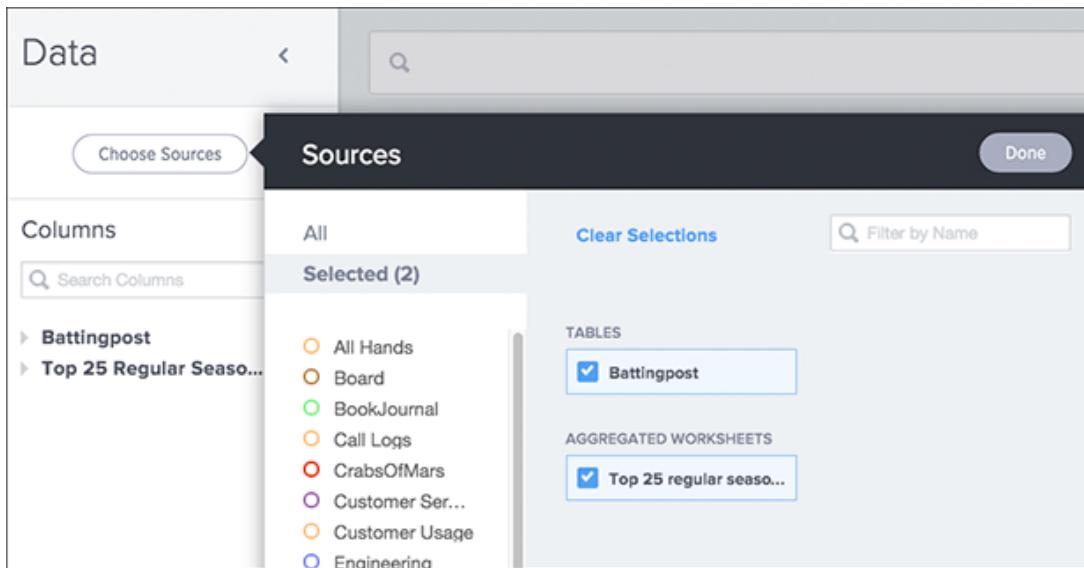


Figure 94: Select sources

2. Do a search using columns from the linked sources, including any aggregations you created.
3. Test the result, to make sure it's what you expect.

If your search shows no data found or doesn't look right to you, it is possible that one of the links between your sources was made on the incorrect column. Check the relationships you created and try linking using a different column, to see if that gives the expected search results.

4. Once you have the expected answer, you can create a worksheet to make it easier for you and other people to use. To do this, click the Data icon.
5. Click the **Actions** icon from the upper right side of the screen, and select **Create worksheet**.

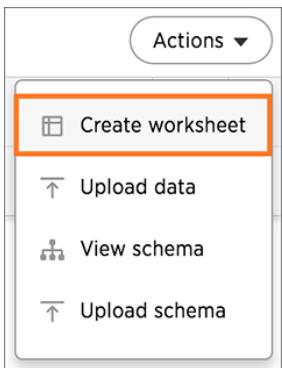


Figure 95: The Create worksheet icon

6. Choose both views using **Choose Sources**.
7. You may need to rename some columns appropriately for searching.
8. Share the worksheet with the appropriate users and groups.

About formulas in searches

To provide richer insights, you can add a formula to your search. The Formula Builder includes many types of operators, such as logical (if, then, else), math, date, and text string functions.

You can create a formula from directly within a search. If you have the privilege that allows you to create or edit worksheets, you can also create a formula within a worksheet. Formulas in worksheets act as derived columns, so that anyone who uses the worksheet as a data source will see the formula as just another column.

Adding a formula within a search works much the same way as adding a formula to a worksheet. However, you will be able to edit the formula directly from within the answer. If you add the answer to a pinboard and share it with the **Edit** privilege, other people can see the formula results, too. In order to make edits to the formula, they also need to have the **Edit** privilege on the underlying data.

Add a formula to a search

You can add a formula directly within a search. Some common reasons for using a formula in a search are to perform mathematical functions, check for and replace null values, or add if...then...else logic.

To create a formula in a search:

1. Start a new search, or choose an existing answer from a pinboard to edit.
2. If the answer shows a chart, switch to **Data View**.



Figure 96: Switch to Data View

3. In the upper right hand side of the table, click **Actions** and select **Add formula**.

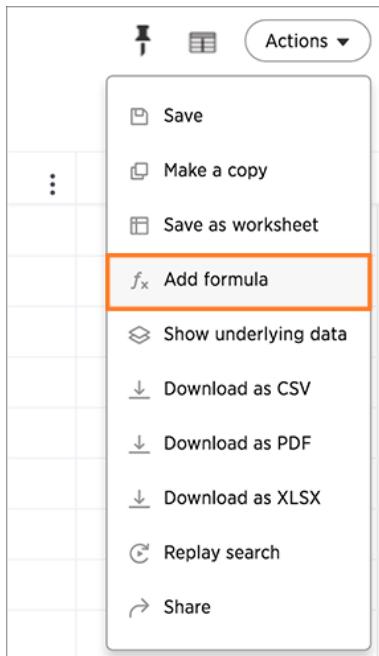


Figure 97: Create a new formula in an answer

4. Type your formula in the Formula Builder.

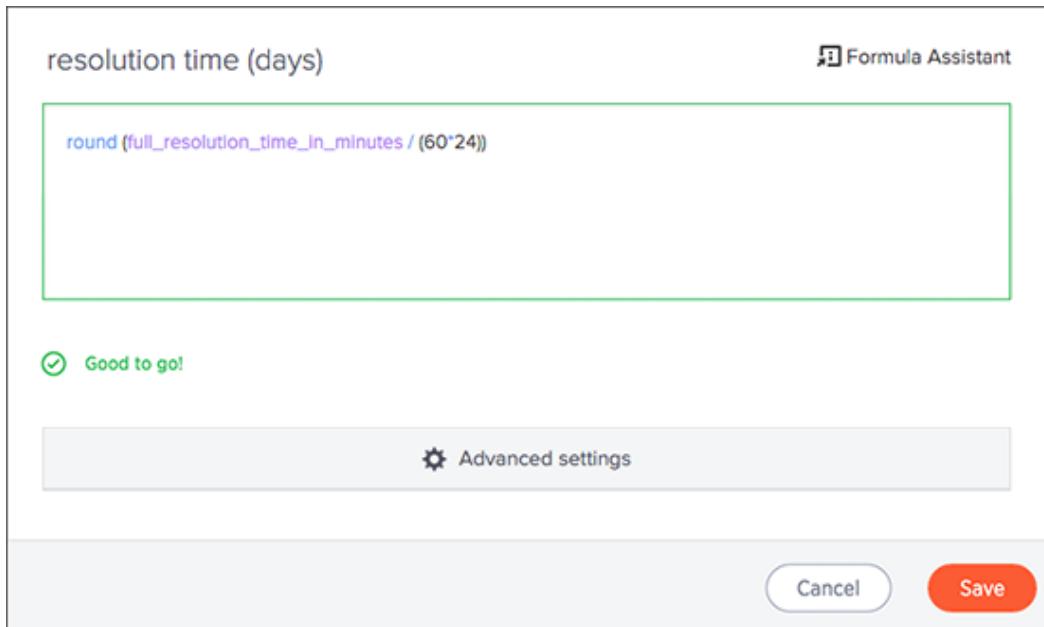


Figure 98: Use the Formula Builder

 **Note:** Formulas elements are color coded by type and can include the formula operators and functions (blue), the names of columns (purple), and/or constants (black).

5. You can see a list of formula operators with examples by clicking on **Formula Assistant**.

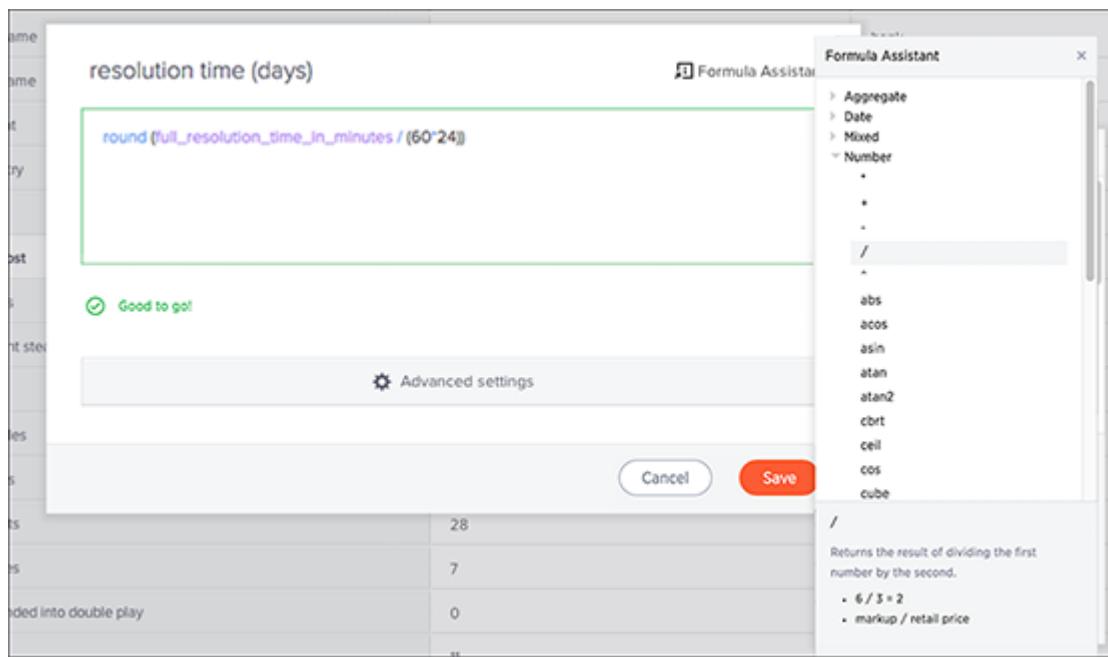


Figure 99: Examples in the Formula Assistant

6. If you want to change what your formula returns, use the **Advanced settings**.

Depending on your formula, you may be able to change:

- Data type
- ATTRIBUTE or MEASURE
- Aggregation type

The screenshot shows the ThoughtSpot Formula Builder interface. At the top, there is a title 'resolution time (days)' and a 'Formula Assistant' button. Below the title is a code editor containing the formula: `round((full_resolution_time_in_minutes / (60*24)))`. A green box highlights this code area. Below the code editor is a message 'Good to go!' with a checkmark icon. Underneath is a section titled 'Advanced settings' with three tabs: 'Data type' (set to 'Numeric'), 'Measure or attribute' (set to 'MEASURE'), and 'Aggregation'. The 'Aggregation' tab is expanded, showing a dropdown menu with various options: TOTAL, AVG, MAX, MIN, STD DEVIATION, TOTAL, TOTAL COUNT, UNIQUE COUNT, and VARIANCE. A red 'Save' button is located at the bottom right of this menu. The bottom part of the interface shows some data rows with columns for 'false', '8', and ' $\leq 120\text{min}$ '.

Figure 100: Advanced settings in the Formula Builder

7. Name the formula by clicking on its title and typing the new name. Click **Save**.

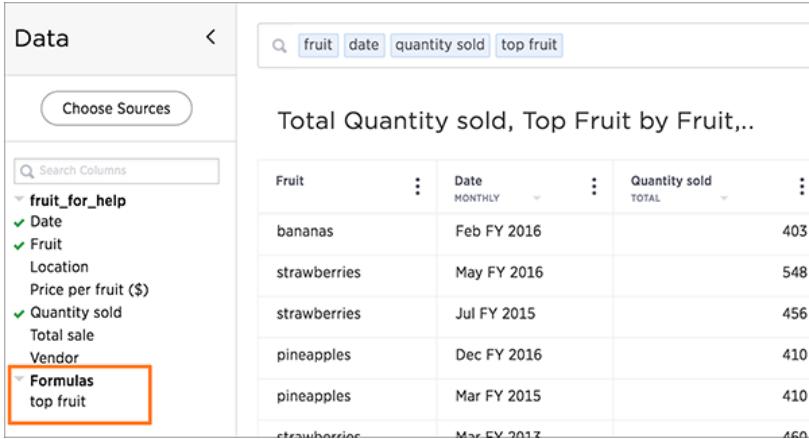
View or edit a formula in a search

You can always go back and view or edit a formula that has been added to a search. Do this by clicking the edit icon next to its name in the **Columns** listing.

Anyone who has edit privileges on an answer can also edit any formulas it contains. To view or edit an existing formula in an answer:

1. Navigate to the pinboard that contains the answer with the formula, and open it.
2. Scroll down to the bottom of the **Columns** listing. You will see a data source called **Formulas**.

3. Expand **Formulas**, and you'll see a list of all the formulas in this answer.



The screenshot shows the 'Data' view with a sidebar containing a search bar and a list of columns. The 'Formulas' section is expanded, showing two formulas: 'Resolution Time' and 'Qa Acceptance Atte...'. The 'top fruit' formula is highlighted with a red box. The main area displays a table titled 'Total Quantity sold, Top Fruit by Fruit,..'. The table has columns for Fruit, Date (Monthly), and Quantity sold (Total). The data includes rows for bananas, strawberries, pineapples, and cherries.

Fruit	Date MONTHLY	Quantity sold TOTAL
bananas	Feb FY 2016	403
strawberries	May FY 2016	548
strawberries	Jul FY 2015	456
pineapples	Dec FY 2016	410
pineapples	Mar FY 2015	410
cherries	Mar FY 2017	460

Figure 101: Formulas section expanded to show formulas in the answer

4. Click the edit icon next to the formula name.



Figure 102: The edit formula icon

5. Type your formula in the Formula Builder.

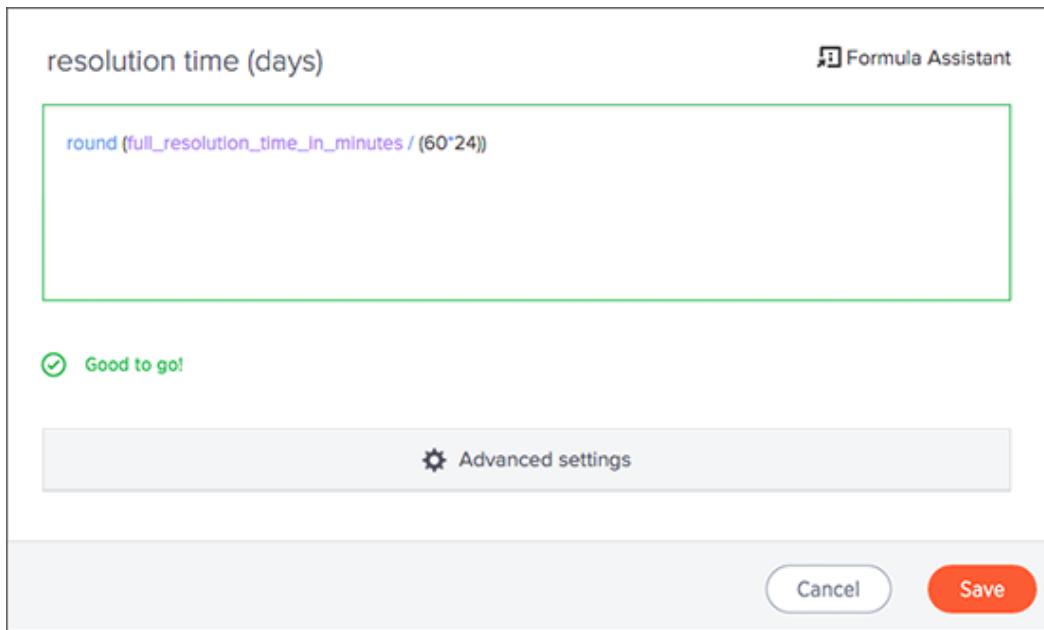


Figure 103: Use the Formula Builder



Note: Formulas elements are color coded by type and can include the formula operators and functions (blue), the names of columns (purple), and/or constants (black).

6. Click **Save** to save the formula with your changes.

Other search actions

There are other search actions you can perform by interacting directly with your answer.

These actions can be performed in an ad hoc way, or you can pin your answer to a pinboard to save your configurations.

Change the view

You can change the view of your answer so it appears as a table or a chart.

To change the view of your answer:

While viewing your answer, toggle between the two views by clicking **Change Visualization** and selecting either table or a chart type.



Figure 104: Toggle between the two views

Sort your search

Sorting your search allows you to order your answer, making it easier to read.

By default, sorting applies in descending order. You can click on a column header to sort again to sort in ascending order.

To sort your search:

1. If you are in the data (table) view, click the column header you would like to sort on.
Tip: Hold shift and click another column to add a secondary sort. You can even add tertiary sorting and so on by continuing to use this trick.
2. If you are in the chart view, click the axis label of your chart and select **Sort**.

Change the date bucketing

You can change the date bucketing on tables and charts for columns with date values.

The default date bucketing takes the entire search result into account. For example, if your search includes last month, dates will be bucketed daily instead of monthly. You can change this default bucketing choice.

To change the date bucketing:

1. Click the date bucket dropdown on the column header of your table or on the axis label of your chart.

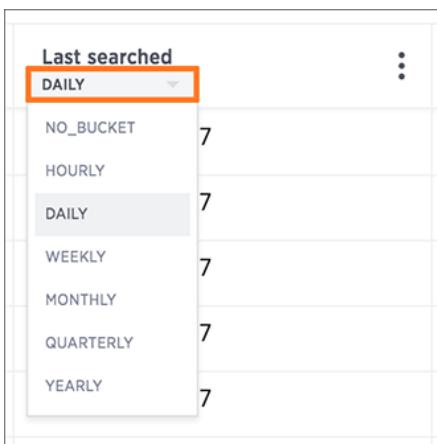


Figure 105: Date bucketing chooser

2. Select a different date bucket.

Show underlying data

Viewing the underlying data of your answer gives you an un-aggregated view of the underlying data.

You can see the most granular details of a given result set, i.e. it shows the un-aggregated view. This feature lets you understand what an answer consists of. For example, if you search for "customer region revenue", the answer shows the aggregate revenue value for each customer region. You can then click on any row and then on **Show underlying data**, to see each value that "revenue" constitutes of, for any given region.

Only the first 1,000 rows are shown when viewing the underlying data. You can even download the results shown when you choose **Show underlying data** from a chart. The download file limit is 100,000 rows.

To show underlying data:

1. Right click on the visualization or table cell of interest, and select **Show underlying data**.

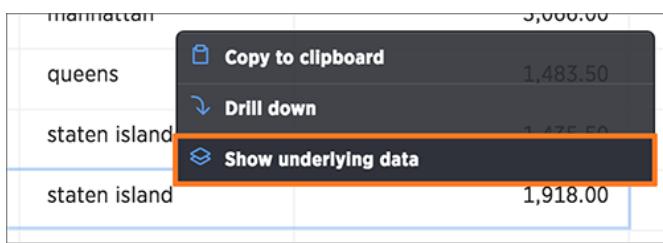


Figure 106: Show underlying data option

A new window will open, displaying a summary and the underlying data.

2. Click **Download** to download a CSV file of the data.

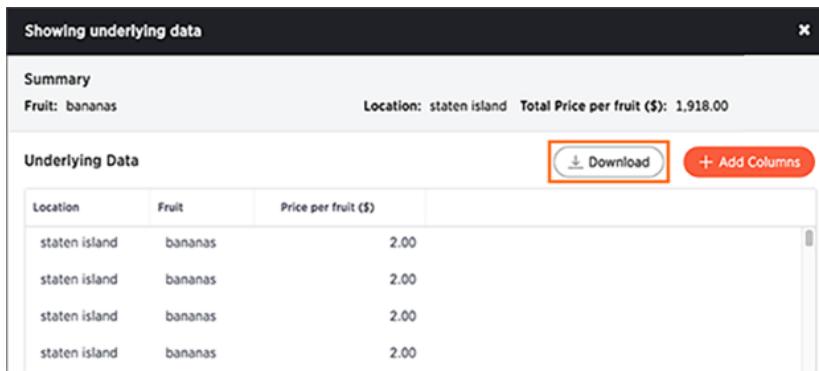


Figure 107: Download underlying data

3. Click **+ Add Column** to add more columns. After selecting columns to add, click **Confirm Changes**.

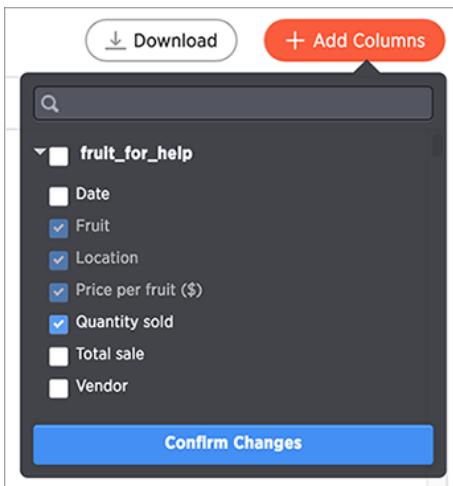


Figure 108: Add columns to underlying data

Drill down

Drilling down allows you to see more information about the columns used within your search.

To drill down:

1. Right click on the visualization or table cell of interest, and select **Drill down**.

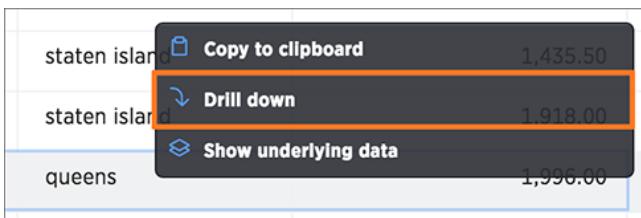


Figure 109: Drill down option

2. Click on any of the listed data to recreate the search with that data included.

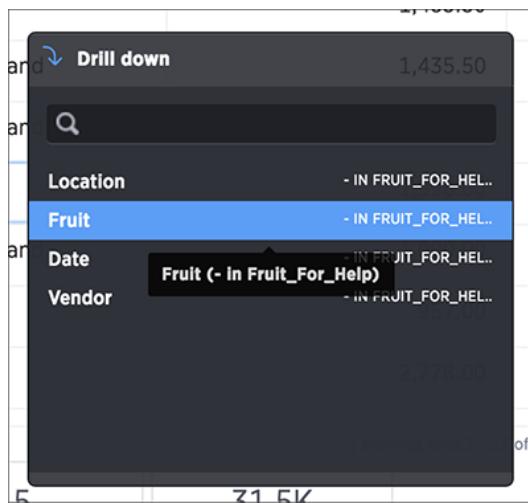


Figure 110: Drill down list

Exclude and include row values

You can include or exclude row values from your answer.

To exclude or include row values:

Right click on the visualization or table cell of interest, and select **Exclude "value"** or **Include "value"** if available.

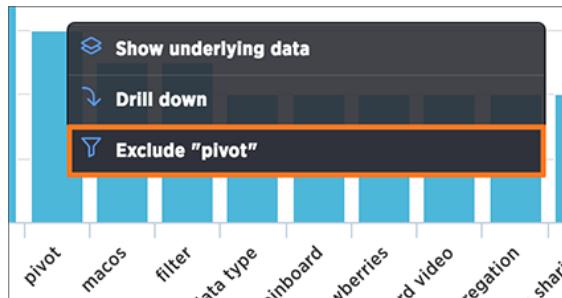


Figure 111: Exclude value option

About conditional formatting

You can apply conditional formatting to tables or charts to highlight values in the data. This makes values above, below, or within a particular threshold stand out.

You can add visual cues for KPIs (Key Performance Indicators) or threshold metrics to charts and tables, to easily show where you are falling short or exceeding targets. These visual cues are called conditional formatting, which applies color formatting to your search result. For tables, you can add conditional formatting to set the background color of cells in a table based on the values they contain. For charts, you can add conditional formatting to show the threshold(s) you defined, and the data that falls within them will be shown using the same color.

Many companies create pinboards with key metrics they want to track in daily or weekly staff meetings. Using conditional formatting, they can see at a glance how they are performing relative to these metrics.

Apply conditional formatting to a table

You can use conditional formatting to show table cells with a background color determined by the value they contain.

To apply conditional formatting to a table:

1. In the column header of your table for the column you want to apply formatting to, click the three dot **Change Configuration** icon.

Number of sessions	
TOTAL	
	Change configuration
3	
6	

Figure 112: Three dot menu

2. Select **Conditional Formatting**.
3. Click the **+** icon in the **Conditional Formatting** menu.

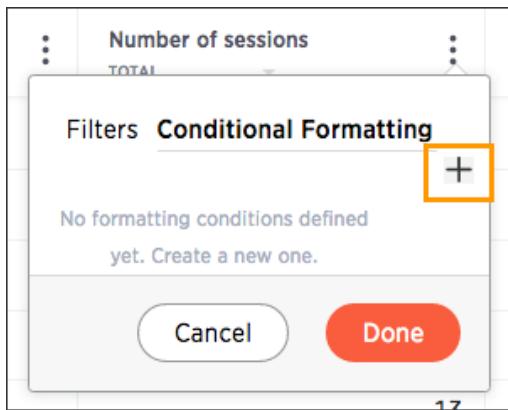


Figure 113: Conditional formatting menu

4. Define the sets of values and the color to use for each set.

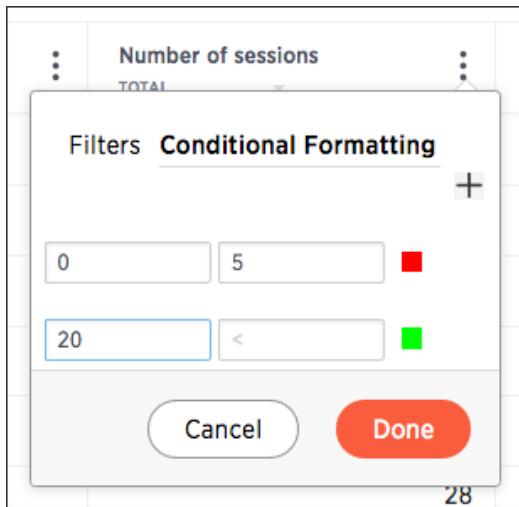


Figure 114: Define the sets of values and color

5. Click **Done** after defining all of your conditional formatting sets.

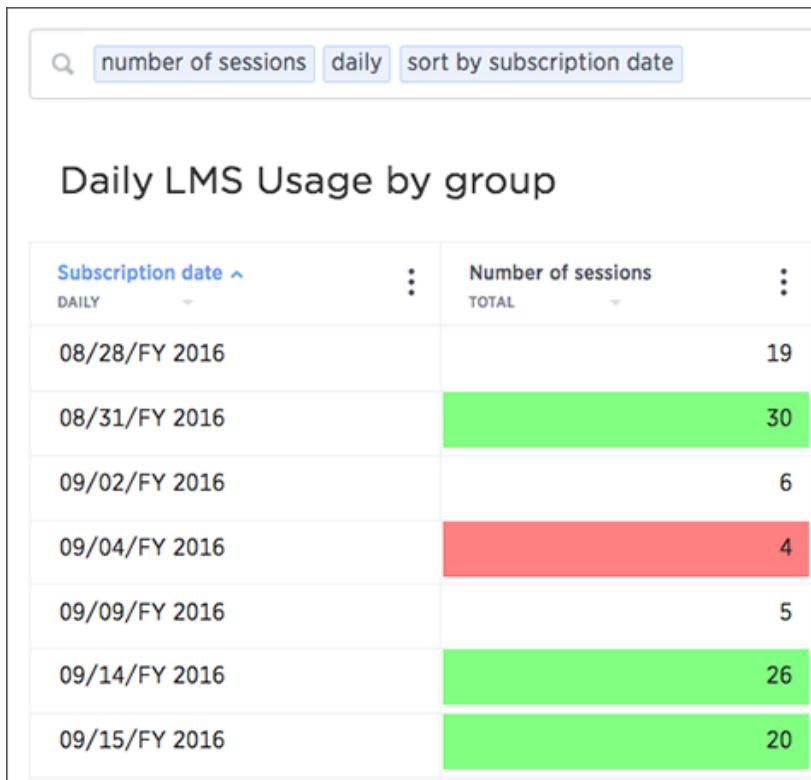


Figure 115: Table with conditional formatting

6. Note that if you change to a chart type, you will need to apply conditional formatting again. Conditional formatting is tied to the specific visualization.

Apply conditional formatting to a chart

You can use conditional formatting to show charts with a target value or range drawn as a line in the chart, and the legend colors determined by where values fall relative to the target.

To apply conditional formatting to a chart:

1. Click the axis label of your chart. Select **Conditional Formatting**.
2. Click the **+** icon in the Conditional Formatting menu.

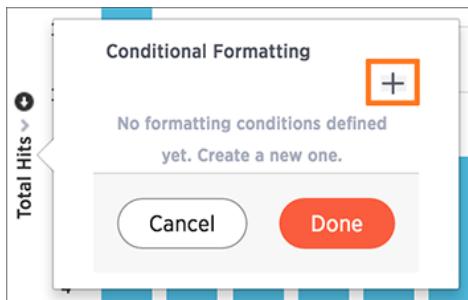


Figure 116: Conditional formatting menu

3. Define the ranges of values and the color to use for each range you want to track. To add another range, click the + icon and repeat.

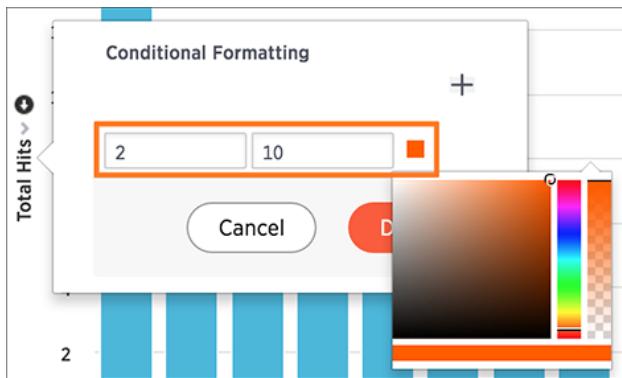


Figure 117: Define the sets of values and color

4. Click **Done** after defining all of your conditional formatting ranges.

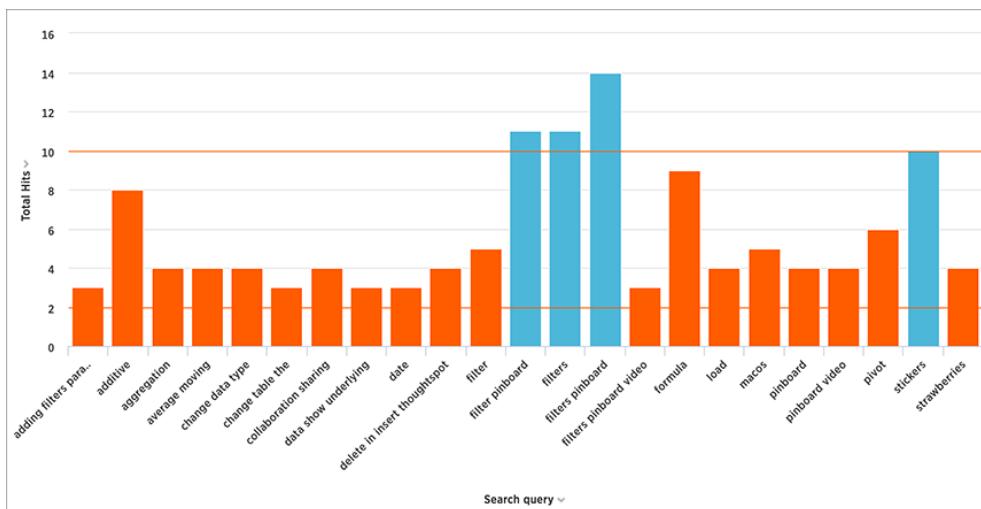


Figure 118: Chart with conditional formatting

5. Note that if you change the chart type, you will need to apply conditional formatting again. It is tied to the specific visualization.

Copy an answer

You can make a copy of an answer if you would like to make edits without changing the original answer.

Making a copy of an answer allows you to make your own edits without overwriting the original. When saving a copy, you can type in a new name.

1. Click on **Answers**, on the top navigation bar.



Figure 119: Answers

2. On the answer list page, click the answer you would like to copy.
3. Click **Actions** and select **Make a copy**.

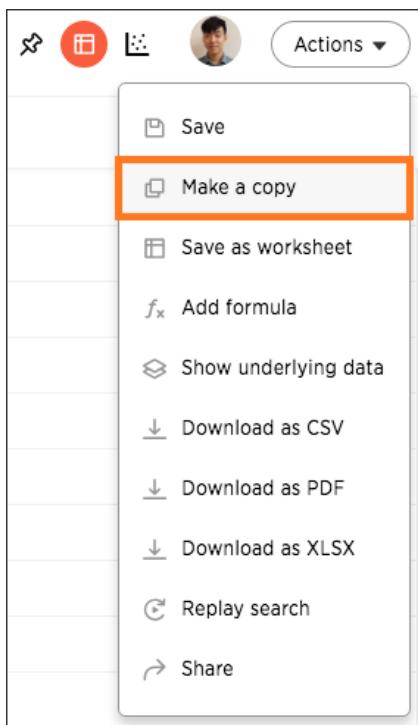


Figure 120: Make a copy of the answer

4. Give your answer a new name and description. Then click **Save**.

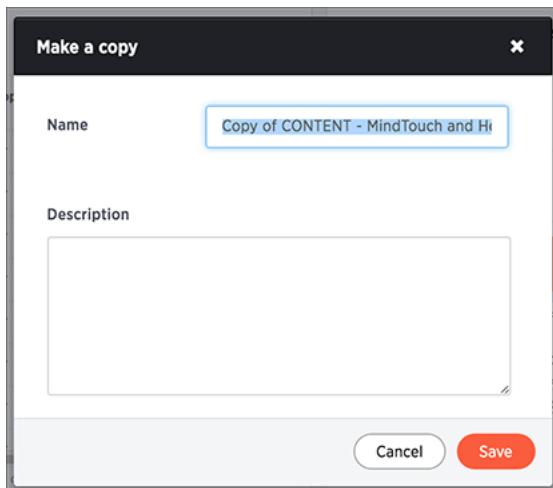


Figure 121: Name and save your answer copy

Download your search

You can download your search as either a table or chart.

You have the option to download your table as a CSV (comma separated values), PDF, or XLSX (Excel) file. When you download a chart, it will be a PNG file.

To download your search:

Click **Actions**.

For a table, choose between **Download as CSV**, **Download as PDF**, or **Download as XLSX**.

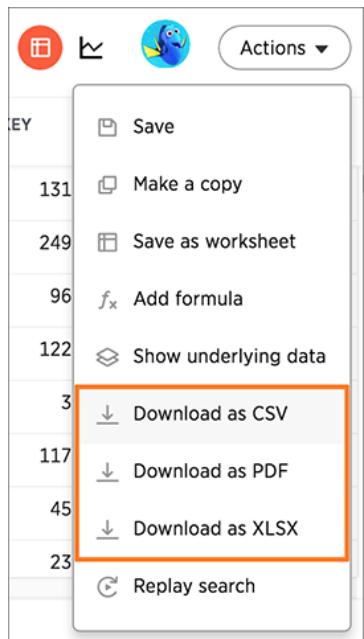


Figure 122: Download your table options

For a chart, select **Download**.

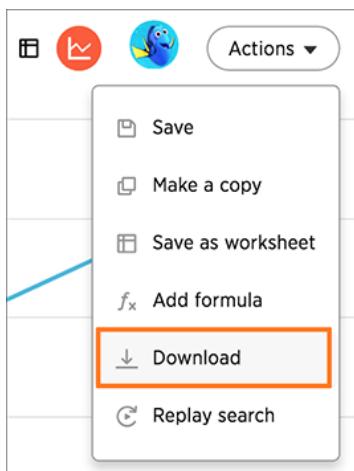


Figure 123: Download your chart option

Replay search

You can instantly generate a step-by-step replay showing the creation of a table or chart.

The replay feature shows how to create the chart or table you are viewing. Use it to teach yourself, or take a screencam of it and create your own ThoughtSpot training for your team.

1. When viewing a chart or table, click **Actions** and select **Replay search**.

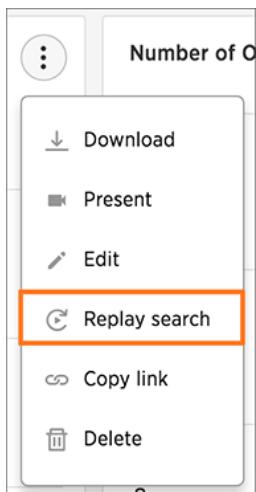


Figure 124: The Replay search icon

2. Then, select **Start Replay** to view the video.

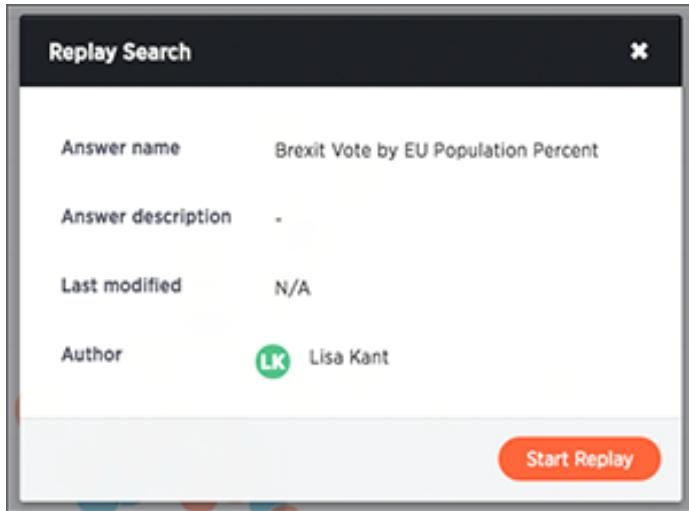


Figure 125: Start Replay

The replay will start automatically. You can pause and resume it by clicking on it.

Chapter 3: Advanced searches topics

Topics:

- [About keyword searches](#)
- [About worksheets from searches](#)
- [About formulas in searches](#)
- [About pivot tables](#)

Most searches in ThoughtSpot are easy to do without training. But there are some advanced search features that are very powerful, which may require some guidance. This section explains how to use the more advanced features.

Here are some of the more advanced features:

- [Keyword searches](#) allow you to augment your search with predefined keywords. These keywords range from date, time, number, and filter words.
- [Worksheets created from searches](#) allow you to save a search as a worksheet, optionally link it to other data sources, and do another search on top of it. This workflow allows you to produce some complex reports, like those that would require nested SQL queries in some other tools.
- [Formulas in searches](#) brings the power of formulas to regular searches, instead of requiring that you first create a worksheet. This allows any user to do mathematical operations, use if...then...else logic, check for empty (null) values, bucket their data, etc.
- [Pivot tables](#) derived their name from their ability to rotate, or pivot, their own graphical structure. You can drag and drop fields to change the display to get different summaries or create cross tabulations.

About keyword searches

Use keywords when asking a question to narrow and further define your search.

In addition to column names, values, and filters, the search bar also accepts keywords. These keywords serve a variety of predefined purposes, and are divided into different groups. The groups are as follows:

- **Basic keywords**

You can use keywords such as "top" and "bottom" to, for example, only see results for the best or worst performing sales rep.

- **Date keywords**

Date keywords give you the freedom to narrow your search by days, weeks, months, quarters, or years. There are also a number of date related keywords such as "after", "before", and "year-over-year". Use the new date keywords to describe dates in the future. This is useful for exploring things that are scheduled for a future date, such as shipments due to go out in the next week.

- **Time keywords**

Time keywords are the most useful when trying to figure out how many visitors you've received within the last "n minutes or hours".

- **Text keywords**

You can use text keywords to find similar words or phrases that contains a certain word. For example, product name contains "green".

- **Number keywords**

These keywords allows you to define your search by sum, average, count, max, min, and other accumulations.

- **Filter keywords**

Filter keywords work in the same way as filters on table columns or chart axes.

- **Location keywords**

The keywords "near" and "farther than" allow you to search with spatial filters on your geo type columns with latitude/longitude data. This lets you focus your search based on distance and locations. You can specify a specific radius using miles, kilometers, or meters.

You can access a list of keywords and other reference materials in the [references](#) section or in the help center. Open the help center by clicking **Help** on the top navigation bar. Within the help center, you'll find videos and documentation that pertain to the current version of ThoughtSpot. Here is where you can also find a list of keywords. You can expand each section to see which keywords are available and examples on how to use them.

The screenshot shows the ThoughtSpot Help center interface. On the left, there's a sidebar with a red circular logo containing 'TS' and a list of keyword categories: Basic keywords, Date keywords, Time keywords, Text keywords, Number keywords, and Filter keywords. The main area has a title 'KEYWORDS' and a search bar 'What are you looking for?'. Below the search bar, under the heading 'Basic keywords', there are examples for the 'top' keyword:

top	Example
	<code>top sales rep by count sales for average revenue > 10000</code>
	<code>sales rep average revenue for each region top</code>

Below these, there are examples for the 'bottom' keyword:

bottom	Example
	<code>revenue average</code>
	<code>revenue by state</code>
	<code>customer by revenue for each sales rep</code>
	<code>bottom</code>

At the bottom, there's an example for the 'top n' keyword:

top n	Example
	<code>top 10 sales rep revenue</code>

Figure 126: Help center keywords list

Search using top keyword

The "top" keyword can be a powerful addition to your search when you remember to use it.

By using one keyword, you can greatly simplify your searches. The `top` keyword is one such keyword. Its syntax looks like `top n` for each `x`.

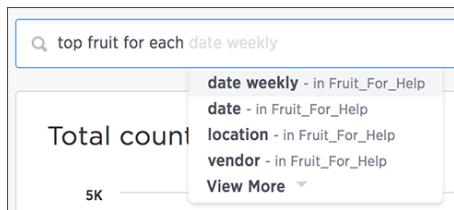


Figure 127: Top keyword syntax

Some common search examples it can simplify are finding the:

- top two performing sales rep
- top revenue average revenue by state
- top two students ranked by score for each class

Search using growth over time

You can show growth over time by using the "growth of" keyword in your search.

This keyword compares the data from different date periods, and returns a percentage of growth.

To search using growth over time:

1. Type `growth of` into the search bar, and choose a measure you're interested in seeing the growth of.

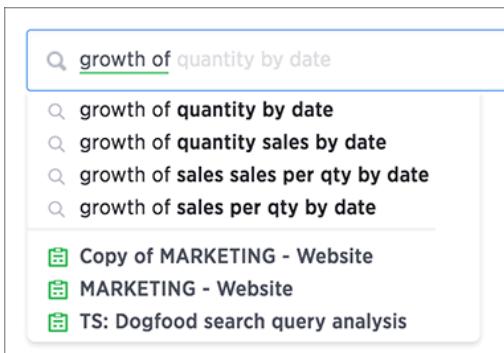


Figure 128: Growth of suggestions

You will see a list of suggestions to choose from based on your sources. You can also type a different column name containing numeric data to compare.

2. Then, type `by`, followed by a date column name.
3. Switch to the Chart view for a visual representation of your search.

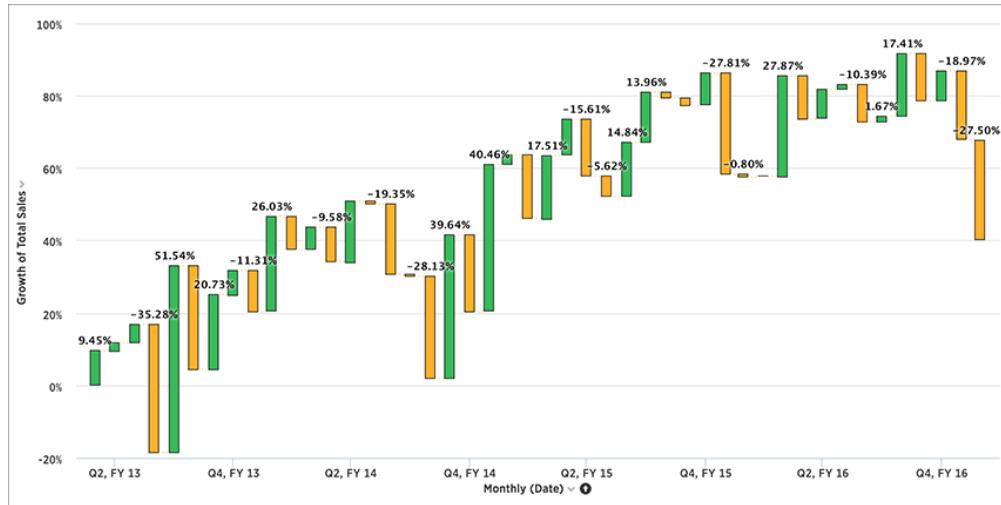


Figure 129: Growth of total sales waterfall chart

The growth is calculated as a positive or negative percentage, for each period relative to the last period in the series. The line chart is a good way to display your data, but the waterfall chart is especially effective to show growth.

4. You can also do year-over-year analysis, which compares each time period to the corresponding time period in the prior year. This type of growth analysis is more common in retail and other seasonal businesses. To do this, type `monthly year-over-year` after your `growth of` phrase in the search bar.



Figure 130: Growth of by monthly year-over-year

This compares data between the same month from different years. For example, it will allow you to compare sales from June of this year to the sales from June of last year. Note that for the first year, values are labeled as "{Blank}" in the Data View since there are no previous data to compare them to.

5. Add an attribute to your search see the breakdown of how each grouping of the attribute contributed to the overall growth of your measure. Click **Configure Chart** and add your attribute to the Legend field.

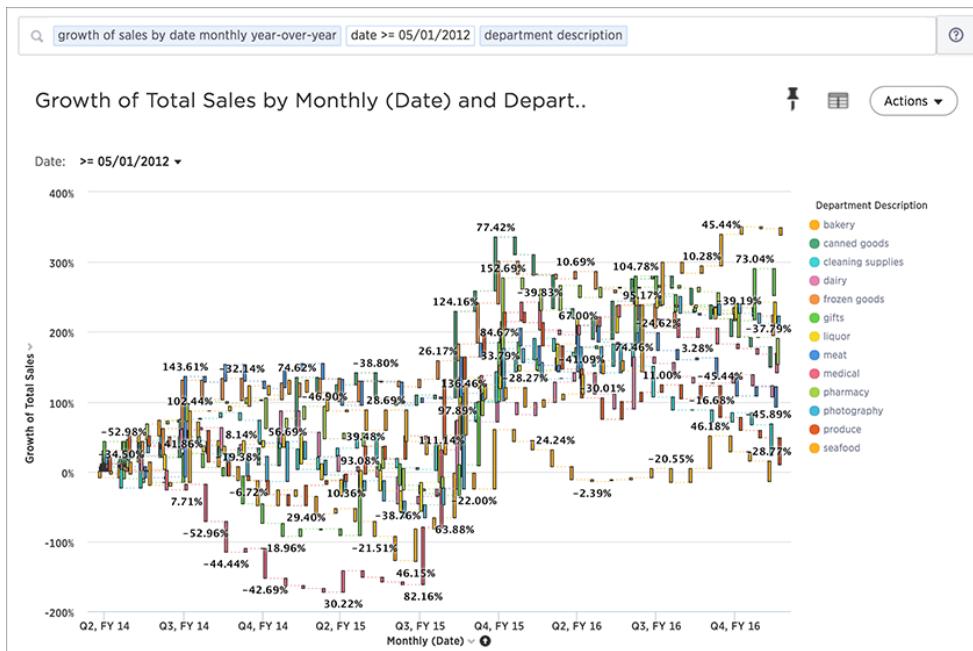


Figure 131: Growth of broken up by category

It looks like Q4, FY 15 was a much more productive period for a number of categories compared to a year ago.

Geographical proximity keywords "near" and "farther than"

The "near" and "farther than" keywords provide proximity searches. If your table contains Latitude and Longitude data, you can use these to do searches that find entities related to each other by location.

First, you'll need to designate the longitude and latitude columns as "Geo" by editing the GeoType column in the modeling file or the **Columns** setting screen.

Columns that can be designated as "Geo" columns need to contain text (VARCHAR) data unless they contain latitude/longitude data. Latitude and longitude columns can contain numeric data (DOUBLE) or text.

If you are using a column with the data type DOUBLE for latitude and longitude, you will also need to change the following settings for those columns:

- Set Column Type to ATTRIBUTE.

- Set Additive to NO.
- Set Aggregation Type to NONE.

If you want to be able to use these search keywords:

- near
- near...within n miles|km|meters
- farther than n miles|km|meters from

the data source (worksheet or one of the tables) must contain a column of type longitude and a column of type latitude, and these must be set using the appropriate GeoType, as shown in this procedure. These keywords allow you to search with spatial filters on data contained in a table or worksheet which contains geo type columns with latitude/longitude data. This lets you search based on spherical distance. The distance is calculated as a straight-line distance (not road distance) radius using miles, kilometers, or meters from the central point. If not specified, the default is 10 km.

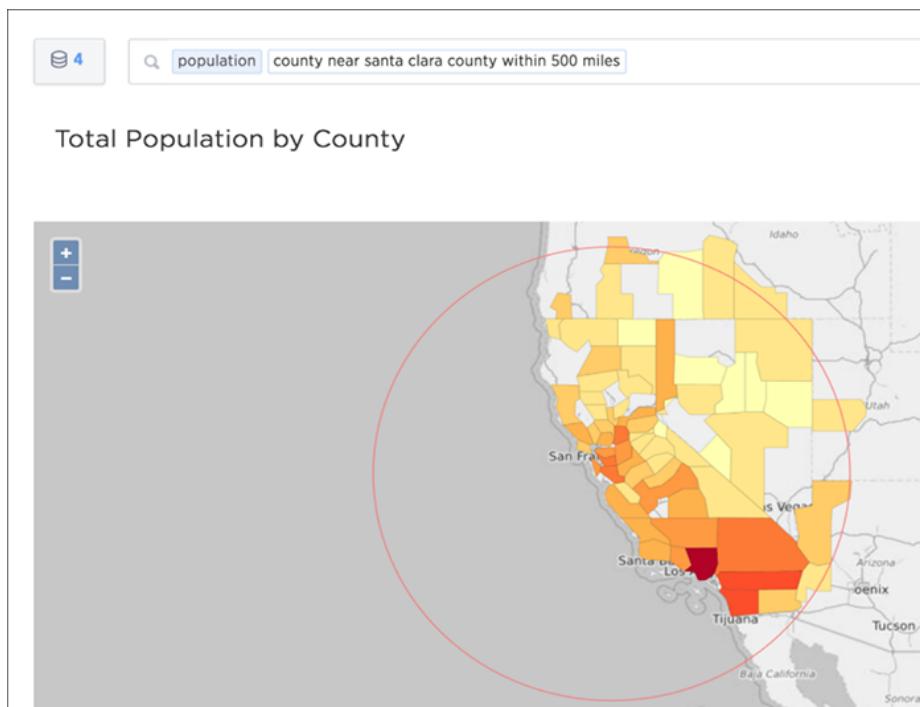


Figure 132: Geospatial search on a geo area map



Note: These keywords:

- work on duplicate counties.
- can be filtered on.
- display a circle that represents your set distance on the geo charts when you filter on a GeoType column.
- are limited to 33 latitude/longitude pairs.

1. Find the **GeoType** for the column that contains the geographical data.
2. Change the value to the appropriate GeoType, depending on the kind of data the column contains.

Table 4: Data that uses geo charts

GeoType	Description	Type: Example
COUNTRY_REGION	Countries	<ul style="list-style-type: none"> • name: United States • long name: United States • name_sort: United States of America • abbreviation: U.S.A. • adm0_a3: USA • adm0_a3_is: USA • adm0_a3_us: USA • admin: United States of America • brk_a3: USA • brk_name: United States • formal_en: United States of America • iso_a2: US • iso_a3: USA • iso_n3: 840
COUNTY	Counties in the United States	<ul style="list-style-type: none"> • santa clara county • pike county, ohio • pike county, OH

GeoType	Description	Type: Example
STATE_PROVINCE	States in the United States	<ul style="list-style-type: none"> • name: California • US Postal Service abbreviation: CA
LATITUDE	Must be used with LONGITUDE	<ul style="list-style-type: none"> • 37.421023 • 1.282911
LONGITUDE	Must be used with LATITUDE	<ul style="list-style-type: none"> • -122.142103 • 103.848865
ZIP_CODE	Zip codes and zip codes +4 in the United States	<ul style="list-style-type: none"> • po_name: MT MEADOWS AREA • ZIP: "00012" • zip2: 12
Other Sub-nation Regions	Administrative regions found in countries other than the United States	<ul style="list-style-type: none"> • bremen • normandy • west midlands

3. If your data includes latitude and/or longitude columns that are stored as a numeric data type (DOUBLE), make these changes for those columns:
 - a) Change the **Type** or **ColumnType** to ATTRIBUTE.
 - b) Change **Additive** to NO/FALSE.
4. Save your changes.

About worksheets from searches

If you want to do an advanced search that involves what is essentially a search on top of another search, try saving your search as a worksheet. Then you can use the saved worksheet as a data source for a new search.

Introduction to worksheets from searches

Although a worksheet created from a search is effectively the same as any worksheet, we'll call it an "aggregated worksheet" here to avoid confusion. When

you do a search on a data source, ThoughtSpot is only able to aggregate one column by one other column. Because of this, you may come across searches you can't do in one pass, because they are essentially nested queries. But you can create the equivalent of nested queries using an aggregated worksheet, which is essentially an answer that you save as a worksheet. Then you can use that worksheet just like any other data source. You can even link it to other sources by defining a relationship. When you save an answer as a worksheet, and then use it as a source in a new search, it is similar to doing a nested query in SQL, only much easier to create.

In order to create a worksheet from a search, you must belong to a group that has the privilege Has administration privileges or Can Manage Data. If you are not able to create aggregated worksheets, contact your administrator and request the **Can Manage Data** privilege.

Aggregated worksheet workflow

Suppose you have created a search on the sales fact table that shows the top ten Sales Reps by revenue for the first quarter. Then you want to do some further investigations on that set of data, like ranking them by how much they discounted a specific product using data from the orders fact table. Unless you save your first answer as a worksheet, certain explorations like this won't be possible. If you want to do this, here are the steps at a high level:

1. Create the first search, and [save it as an aggregated worksheet](#).
2. Link your worksheet to any other data sources you'll need.
3. Create a new search that includes your aggregated worksheet and the other sources you linked with it.
4. You may want to create a new worksheet that includes these data sources.

This will make it easy for people to search using the same group of aggregated worksheet and tables that you created.

Best practices for using aggregated worksheets

Aggregated worksheets can be used in a variety of ways. But keep in mind these details about how they work:

- Only users with administrative privileges are able to create aggregated worksheets and link them.
- You can't link an aggregated worksheet with a sharded table. If you do this and try to search on it, you will get an error.
- Joins are directional, meaning that the order of the objects being linked matters. The table/aggregated worksheet with the foreign key needs to occur in the first (left) position. The one with the primary key needs to go in the second (right) position.

Worksheet from a search example scenarios

Here are three common examples of when you would need to use aggregated worksheets.

Example 1

Our first example involves creating an aggregated worksheet with a default filter.

Say you want to create a worksheet that only shows data for a particular US state. In your search, enter “customer state = texas”.

Then click **Actions**, and select **Save as worksheet**. Give your worksheet a name, then click **Save** to create your worksheet.

Now you have a worksheet that only contains data that pertains to Texas. You can share this worksheet with others to search across.

Another popular example of this concept includes creating a worksheet with only active employee data.

Example 2

Our second example involves joining two aggregated worksheets.

Say you want to plot the revenue of the top five states over time. Search for revenue, store state, and top 5. Save this answer as an aggregated worksheet called "Top 5 states". Then start another search with the tokens revenue, store state, and date. Save this answer as an aggregated worksheet called "Total monthly purchases".

Now you want to join these two worksheets. Navigate to the **Data** tab and make a relationship between the two worksheets, involving store state.

To start a new search, select your two aggregated worksheets as data sources, selecting the appropriate columns: store state from Top 5 States, and date and total sales from Total Monthly Purchases. You will only see data for the top five revenue states.

Example 3

Our third example involves creating a search to find customers who bought product A, but did not buy product B. This example can also be done using [conditional formulas](#).

First, you would have to perform searches for total sales by customer for both A and B, and create aggregated worksheets for both. Then join these two aggregated worksheets back in an outer join looking for conditions where the A and B join values are null.

This approach can become clunky, but depending on the requirement, can also be easily implemented.

Save a search as a worksheet

This procedure walks you through creating a worksheet from a search.

To create a worksheet from a search (i.e. an aggregated worksheet):

1. Start a new search, or edit an existing visualization from a pinboard.

Any filters or aggregations created during this search will be reflected in the worksheet.

2. If you want to use a different aggregation than the default one for any column, set it from the column header.

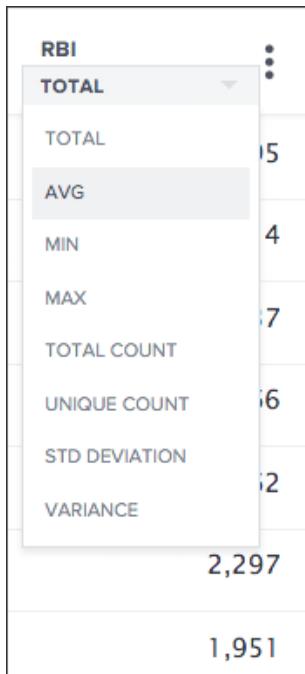


Figure 133: Select an aggregation

3. Save the answer as a **Worksheet**.

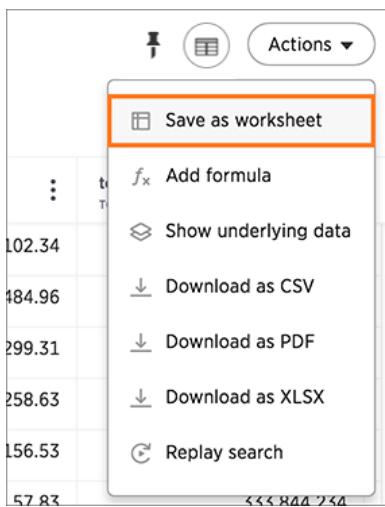


Figure 134: Save as a Worksheet

Create a search from a search saved as a worksheet

After creating a worksheet from a search (also called an aggregated worksheet) and linking it to related data, you're ready to create your new search.

To do a search on the aggregated worksheet, along with any data sources you linked:

1. Click the search icon, and select **Data Source**. Choose your linked sources.

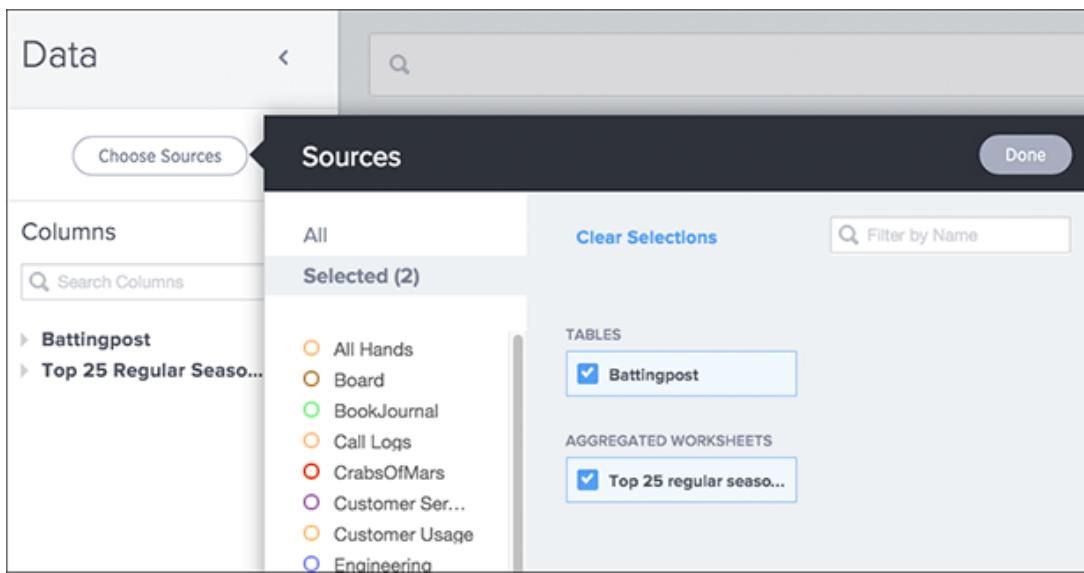


Figure 135: Select sources

2. Do a search using columns from the linked sources, including any aggregations you created.
3. Test the result, to make sure it's what you expect.

If your search shows no data found or doesn't look right to you, it is possible that one of the links between your sources was made on the incorrect column. Check the relationships you created and try linking using a different column, to see if that gives the expected search results.

4. Once you have the expected answer, you can create a worksheet to make it easier for you and other people to use. To do this, click the Data icon.
5. Click the **Actions** icon from the upper right side of the screen, and select **Create worksheet**.

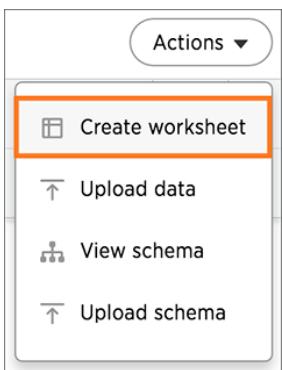


Figure 136: The Create worksheet icon

6. Choose both views using **Choose Sources**.
7. You may need to rename some columns appropriately for searching.
8. Share the worksheet with the appropriate users and groups.

About formulas in searches

To provide richer insights, you can add a formula to your search. The Formula Builder includes many types of operators, such as logical (if, then, else), math, date, and text string functions.

You can create a formula from directly within a search. If you have the privilege that allows you to create or edit worksheets, you can also create a formula within a worksheet. Formulas in worksheets act as derived columns, so that anyone who uses the worksheet as a data source will see the formula as just another column.

Adding a formula within a search works much the same way as adding a formula to a worksheet. However, you will be able to edit the formula directly from within the answer. If you add the answer to a pinboard and share it with the **Edit** privilege, other people can see the formula results, too. In order to make edits to the formula, they also need to have the **Edit** privilege on the underlying data.

Add a formula to a search

You can add a formula directly within a search. Some common reasons for using a formula in a search are to perform mathematical functions, check for and replace null values, or add if...then...else logic.

To create a formula in a search:

1. Start a new search, or choose an existing answer from a pinboard to edit.
2. If the answer shows a chart, switch to **Data View**.



Figure 137: Switch to Data View

3. In the upper right hand side of the table, click **Actions** and select **Add formula**.

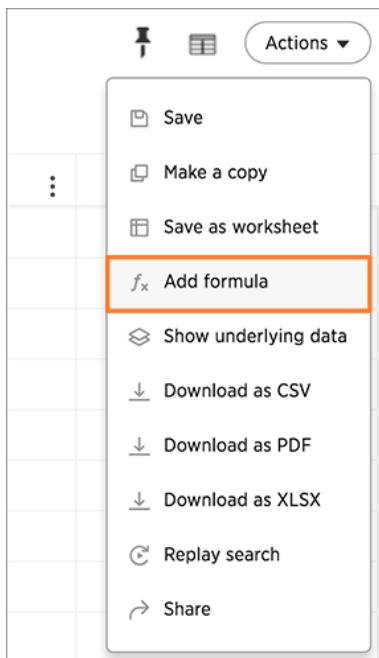


Figure 138: Create a new formula in an answer

4. Type your formula in the Formula Builder.

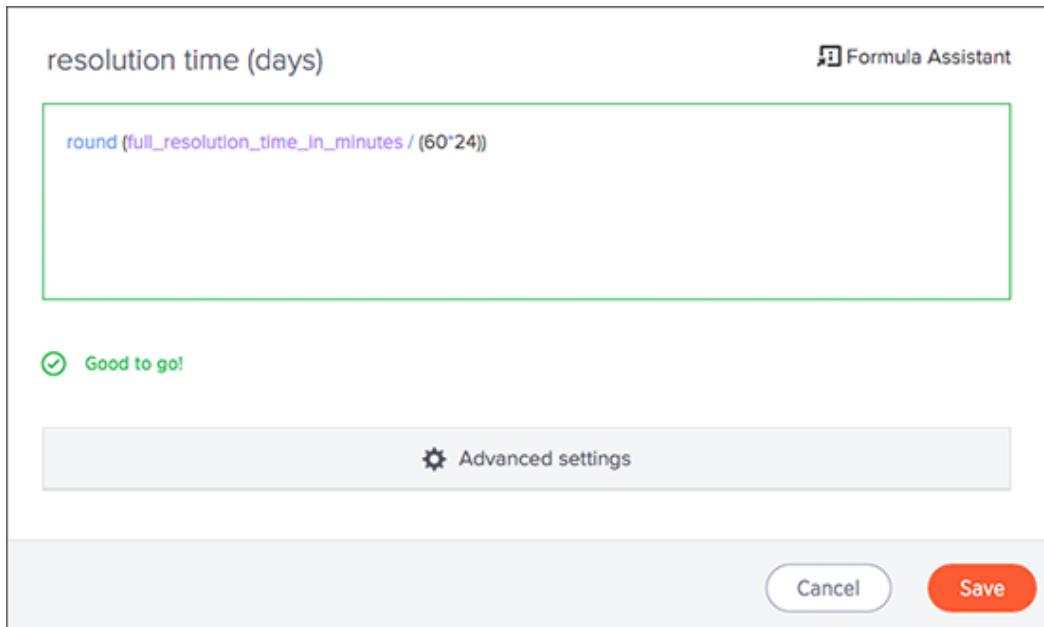


Figure 139: Use the Formula Builder

 **Note:** Formulas elements are color coded by type and can include the formula operators and functions (blue), the names of columns (purple), and/or constants (black).

5. You can see a list of formula operators with examples by clicking on **Formula Assistant**.

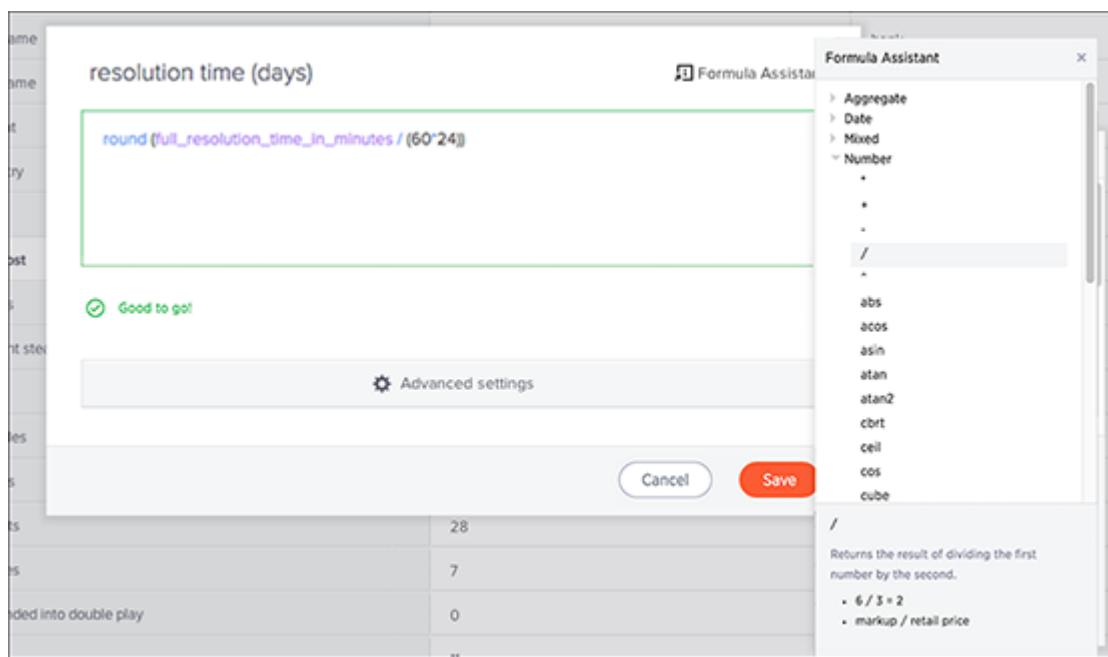


Figure 140: Examples in the Formula Assistant

6. If you want to change what your formula returns, use the **Advanced settings**.

Depending on your formula, you may be able to change:

- Data type
- ATTRIBUTE or MEASURE
- Aggregation type

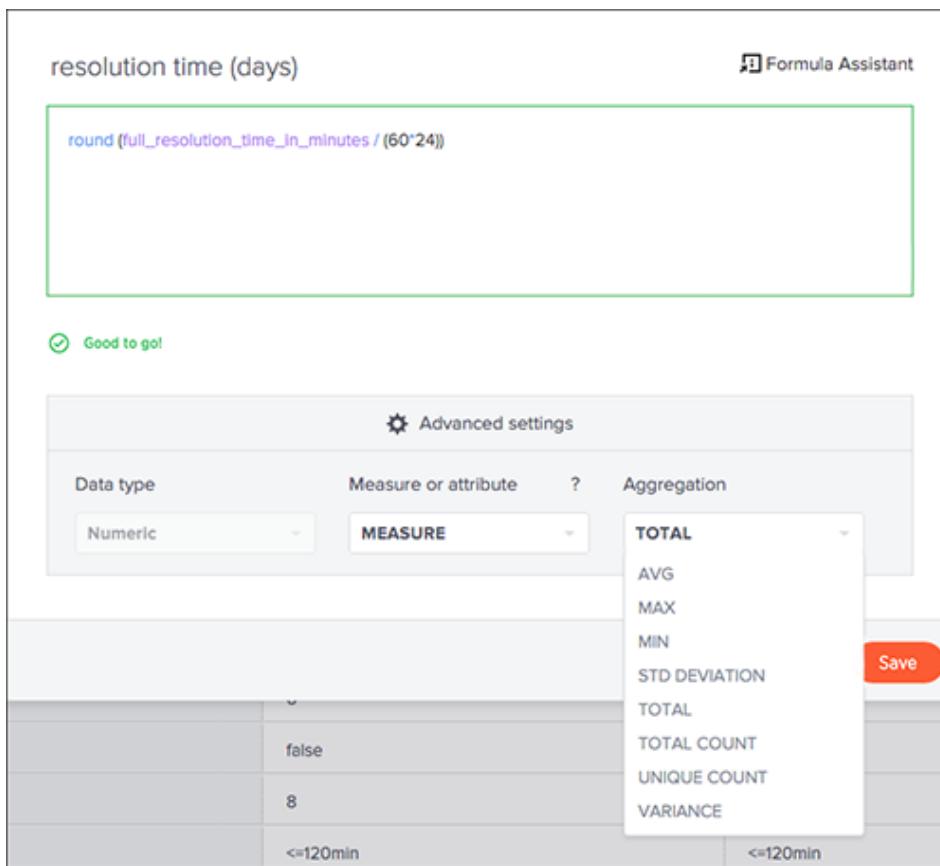


Figure 141: Advanced settings in the Formula Builder

7. Name the formula by clicking on its title and typing the new name. Click **Save**.

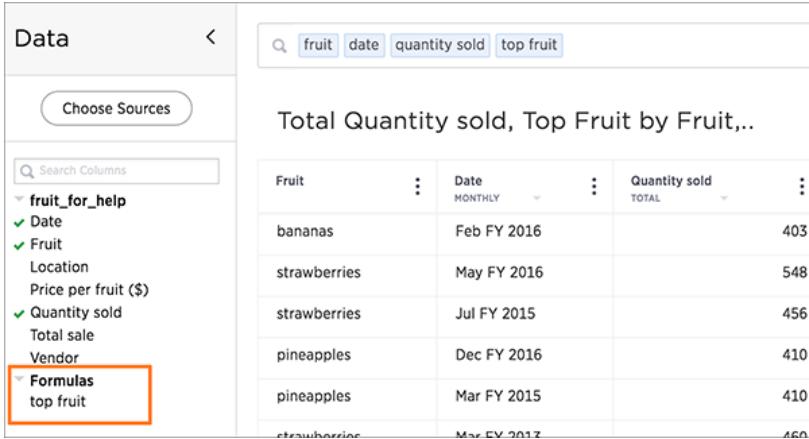
View or edit a formula in a search

You can always go back and view or edit a formula that has been added to a search. Do this by clicking the edit icon next to its name in the **Columns** listing.

Anyone who has edit privileges on an answer can also edit any formulas it contains. To view or edit an existing formula in an answer:

1. Navigate to the pinboard that contains the answer with the formula, and open it.
2. Scroll down to the bottom of the **Columns** listing. You will see a data source called **Formulas**.

3. Expand **Formulas**, and you'll see a list of all the formulas in this answer.



The screenshot shows the ThoughtSpot interface with the 'Data' tab selected. On the left, there's a sidebar with a 'Choose Sources' button and a 'Search Columns' input field containing 'fruit_for_help'. Below this are several columns: 'Date', 'Fruit', 'Location', 'Price per fruit (\$)', 'Quantity sold', 'Total sale', and 'Vendor'. A red box highlights the 'Formulas' section, which contains 'top fruit'. At the top right, there's a search bar with filters: 'fruit', 'date', 'quantity sold', and 'top fruit'. The main area displays a table titled 'Total Quantity sold, Top Fruit by Fruit,..'. The table has columns for 'Fruit', 'Date', and 'Quantity sold'. The data shows various fruits and their total sales across different months and years.

Fruit	Date	Quantity sold
bananas	Feb FY 2016	403
strawberries	May FY 2016	548
strawberries	Jul FY 2015	456
pineapples	Dec FY 2016	410
pineapples	Mar FY 2015	410
strawberries	Mar FY 2017	460

Figure 142: Formulas section expanded to show formulas in the answer

4. Click the edit icon next to the formula name.



Figure 143: The edit formula icon

5. Type your formula in the Formula Builder.

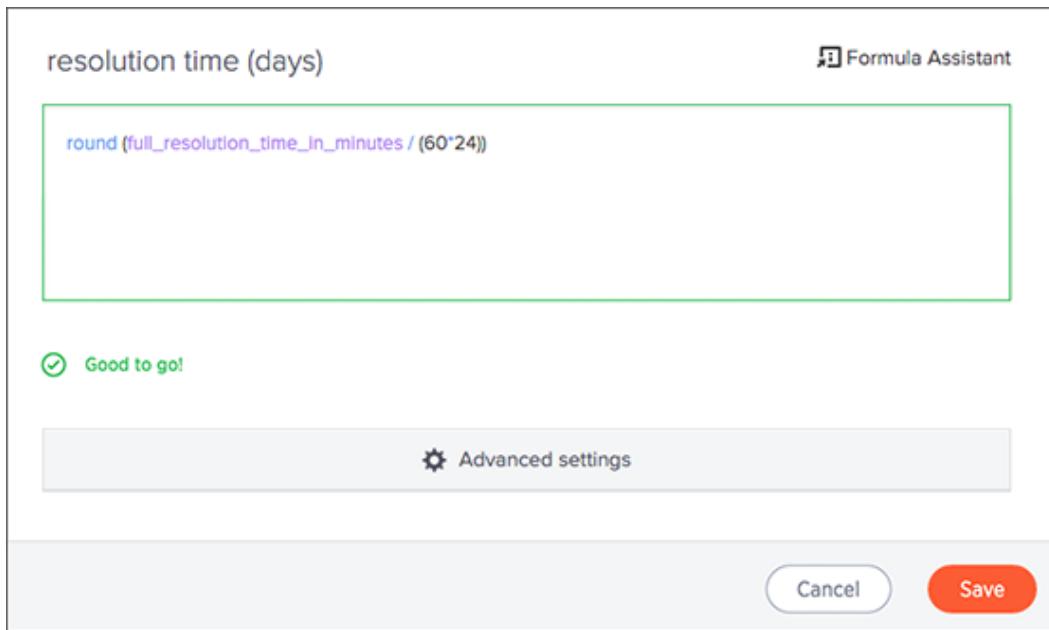


Figure 144: Use the Formula Builder



Note: Formulas elements are color coded by type and can include the formula operators and functions (blue), the names of columns (purple), and/or constants (black).

6. Click **Save** to save the formula with your changes.

About aggregate formulas

When working with formulas, it is useful to understand the difference between regular (or row-wise) formulas and aggregation formulas.

Regular and aggregation formulas

Formulas can be broken down into two types:

Table 5: Regular and aggregation formulas

Formula	Aggregation formula
Acts on individual rows and returns one result per row.	Combines rows together and returns a single result for a group of rows.

Formula	Aggregation formula
Examples: add, subtract, multiply, divide, contains, if...then...else	Examples: Average, cumulative sum, moving average, standard deviation

You can tell which formulas are aggregation formulas by looking at the **Formula Assistant**.

Aggregation formulas have their own section.

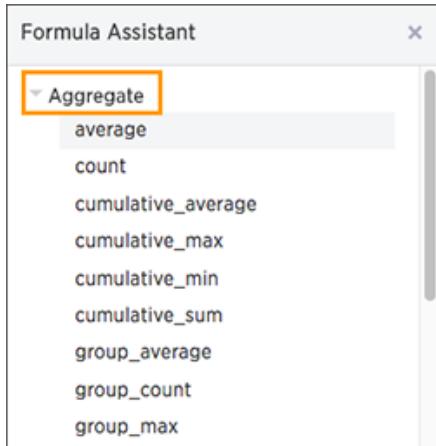


Figure 145: Aggregation formulas in the Formula Assistant

Advanced aggregation formulas

Some more advanced aggregation formulas are widely used in business intelligence, since they provide better insight into data. Some of the more advanced aggregation formulas are:

- **Grouping formulas** apply a specific aggregate to a value, and group the results by an attribute in the data.
- **Cumulative formulas** measure from the start of your data to the current point. They're often applied on time-based data.
- **Moving formulas** measure within a window (usually time-based) that you define.

Data from any rows that are not included in the search result will not be incorporated, and you cannot create a filter on aggregated data.

Using division with aggregation in a search

Whenever your search result combines rows, your formula will get aggregated automatically. For example, if your search contains words like "region", "monthly", or "department", the results will be grouped (aggregated) by that category. The administrator can change the default aggregation that gets applied through a configuration, and you can also change it using the dropdown list in the column header of the search result.

For example, this search would typically return a sum of total sales by department:

```
sum sales department
```

This search would return an average of sales by month:

```
average sales monthly
```

When you're using division in your formula, and the search is aggregated like this, you may have to change the order of operations to get the result you expect. This is best understood by using a real world example.

Suppose you want to calculate the gross margin by department for a grocery store. The formula for gross margin is:

```
profit / sales
```

But if you use that as your formula, you won't get the expected calculation. Why? It's because the formula will be evaluated in this order: For each row, divide profit by sales and then total up all the results. As you can see, the results do not look like gross margin values, which should be between 0 and 1.



Gross margin by department	
Department Description :	Gross Margin without Sum () :
photography	2,012.54
bakery	1,890.42
cleaning supplies	1,493.94
frozen goods	2,453.36
meat	1,152.35
dairy	800.57
gifts	1,736.05

Figure 146: Aggregated search with a division formula

Instead, you'd need to use a formula that uses the order of operations you want:

```
sum (profit) / sum (sales)
```

Now the result is as expected, because the formula totals the profits for all rows, and then divides that by the total of sales for all rows, returning an average gross margin:

Gross margin by department		
Department Description :	Gross Margin without Sum () :	Gross Margin with Sum () :
photography	2,012.54	0.56
bakery	1,890.42	0.54
cleaning supplies	1,493.94	0.40
frozen goods	2,453.36	0.69
meat	1,152.35	0.31
dairy	800.57	0.21
gifts	1,736.05	0.55

Figure 147: Aggregated search with a corrected division formula

About cumulative formulas

Cumulative formulas are aggregate formulas that allow you to calculate the average, max, min, or sum of your data over time, optionally grouped by an attribute (like region or department).

Each of the cumulative formulas accepts a measure and one or more attributes. And each returns the aggregate of the measure accumulated by the attribute(s) in the order specified. Although we usually talk about cumulative formulas over time, you could use them over any other sequential data.

The cumulative formulas include:

Table 6: Cumulative formulas

Function	Description	Examples
cumulative_average	Takes a measure and one or more attributes. Returns the average of the measure, accumulated by the attribute(s) in the order specified.	<ul style="list-style-type: none">• cumulative_average (revenue, order date, state)
cumulative_max	Takes a measure and one or more attributes. Returns the maximum of the measure, accumulated by the attribute(s) in the order specified.	<ul style="list-style-type: none">• cumulative_max (revenue, state)
cumulative_min	Takes a measure and one or more attributes. Returns the minimum of the measure, accumulated by the attribute(s) in the order specified.	<ul style="list-style-type: none">• cumulative_min (revenue, campaign)
cumulative_sum	Takes a measure and one or more attributes. Returns the sum of the measure, accumulated by the attribute(s) in the order specified.	<ul style="list-style-type: none">• cumulative_sum (revenue, order date)

Calculate the cumulative sum

You can use the cumulative function in a search to measure from the start of your data to the current point.

This example will demonstrate using the cumulative_sum formula, also known as a running total. To use the cumulative function in a search:

1. Start a new search.

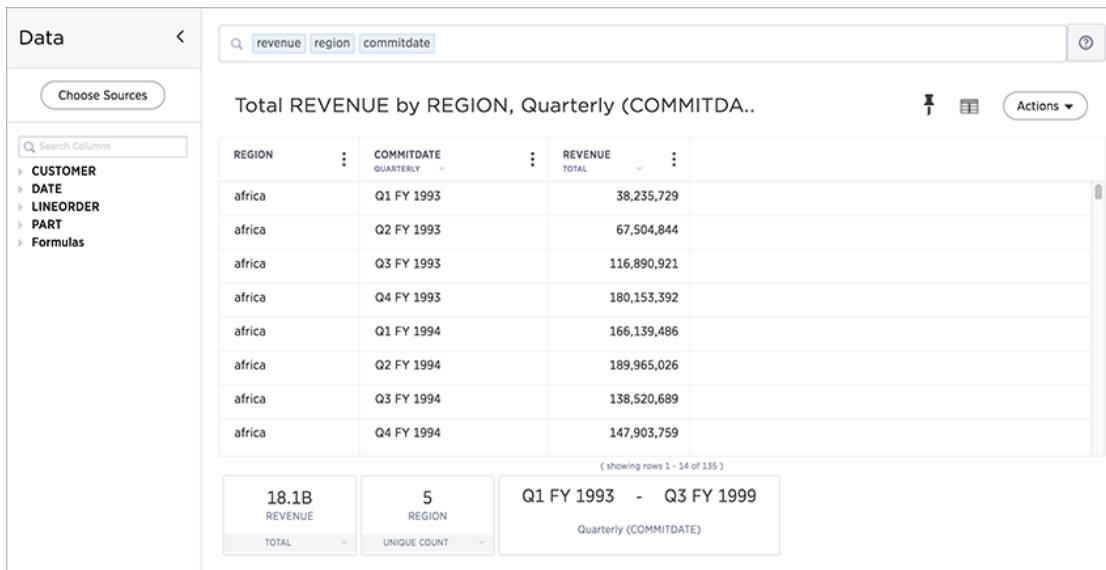


Figure 148: Aggregation Answer example

2. In the upper right hand side of the table, click **Actions** and select **Add formula**.

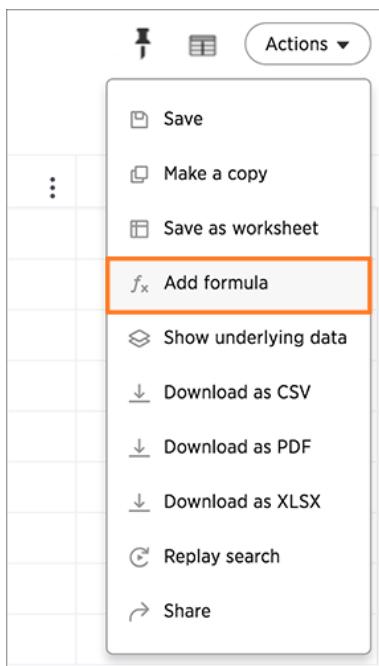


Figure 149: Create a new formula in an answer

3. Enter the cumulative_sum formula, providing a measure and one or more attributes. The example will return the sum of revenue, accumulated by the commit date.

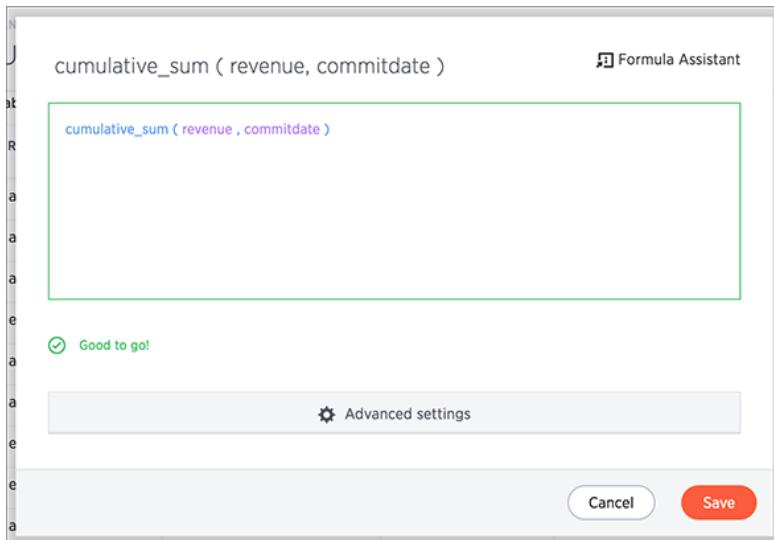
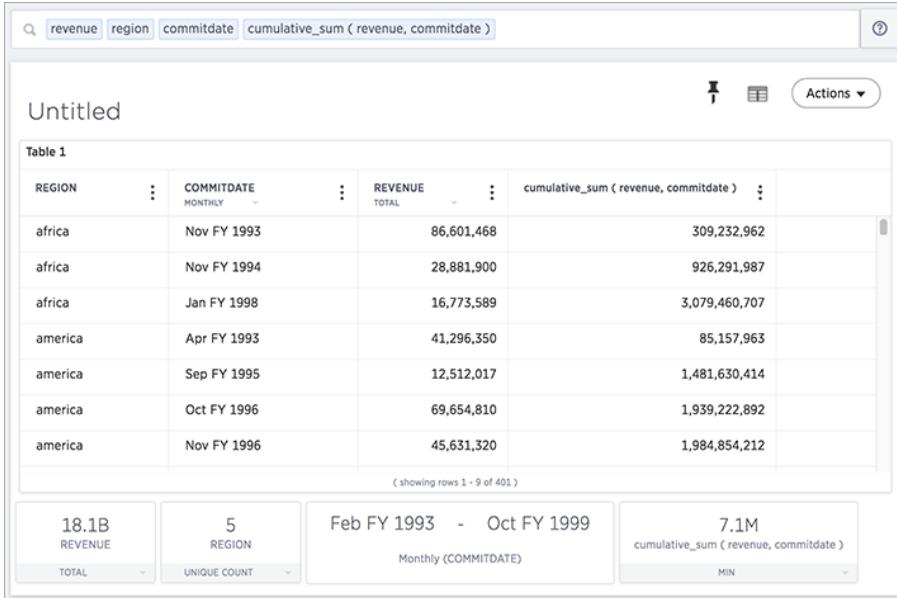


Figure 150: Cumulative Sum Formula

4. Name the formula by clicking on its title and typing the new name. Click **Save**.

5. The formula will appear in the search bar and in the table as its own column.



The screenshot shows a search interface with a search bar containing the query: `revenue region commitdate cumulative_sum (revenue, commitdate)`. Below the search bar is a table titled "Untitled" with the header "Table 1". The table has four columns: REGION, COMMITDATE, REVENUE TOTAL, and cumulative_sum (revenue, commitdate). The data includes rows for various regions and dates, with the cumulative sum column showing the total revenue up to that point. At the bottom of the table, a note says "(showing rows 1 - 9 of 401)". Below the table are four summary cards: "18.1B REVENUE TOTAL", "5 REGION UNIQUE COUNT", "Feb FY 1993 - Oct FY 1999 Monthly (COMMITDATE)", and "7.1M cumulative_sum (revenue, commitdate) MIN".

REGION	COMMITDATE MONTHLY	REVENUE TOTAL	cumulative_sum (revenue, commitdate)
africa	Nov FY 1993	86,601,468	309,232,962
africa	Nov FY 1994	28,881,900	926,291,987
africa	Jan FY 1998	16,773,589	3,079,460,707
america	Apr FY 1993	41,296,350	85,157,963
america	Sep FY 1995	12,512,017	1,481,630,414
america	Oct FY 1996	69,654,810	1,939,222,892
america	Nov FY 1996	45,631,320	1,984,854,212

(showing rows 1 - 9 of 401)

18.1B REVENUE TOTAL

5 REGION UNIQUE COUNT

Feb FY 1993 - Oct FY 1999 Monthly (COMMITDATE)

7.1M cumulative_sum (revenue, commitdate) MIN

Figure 151: Cumulative Sum Table

A headline box displaying the cumulative sum within the entire table will appear at the bottom. You can click on it to toggle between different aggregations.

About grouping formulas

What if you want to aggregate a value by a specific attribute (for example, show revenue by product)? This is known as a grouped aggregation, but some people call it a pinned measure or level-based measure.

You can do this for any aggregation using the grouping formulas. Each of the grouping formulas accepts a measure and one or more attributes. And each returns the aggregate of the measure grouped by the attribute(s).

The grouping formulas include:

Table 7: Grouping formulas

Function	Description	Examples
group_average	Takes a measure and one or more attributes. Returns the average of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • group_average (revenue, customer_region)
group_count	Takes a measure and one or more attributes. Returns the count of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • group_count (revenue, customer_region)
group_max	Takes a measure and one or more attributes. Returns the maximum of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • group_max (revenue, customer_region)
group_min	Takes a measure and one or more attributes. Returns the minimum of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • group_min (revenue, customer_region)
group_stddev	Takes a measure and one or more attributes. Returns the standard deviation of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • group_stddev (revenue, customer_region)
group_sum	Takes a measure and one or more attributes. Returns the sum of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • group_sum (revenue, customer_region)
group_unique_count	Takes a column name and one or more attributes. Returns the number of unique values in a column, grouped by the attribute(s).	<ul style="list-style-type: none"> • group_unique_count (product, supplier)
group_variance	Takes a measure and one or more attributes. Returns the variance of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • group_variance (revenue, customer_region)

About moving formulas

Moving formulas are aggregate formulas that allow you to calculate the average, max, min, or sum of your data over a predetermined interval, or window, with an adjustable range.

Each of the moving formulas accepts a measure, two integers to define the window, and one or more attributes. And each returns the aggregate of the measure over the given window. Moving formulas can be used to smooth out any irregularities in your data to easily recognize trends. The larger the interval you set, the more the peaks and valleys are smoothed out. While the smaller the interval, the closer the moving averages are to the actual data points.

The moving formulas include:

Table 8: Moving formulas

Function	Description	Examples
moving_average	Takes a measure, two integers to define the window to aggregate over, and one or more attributes. Returns the average of the measure over the given window. The attributes are the ordering columns used to compute the moving average. The window is (current - Num1...Current + Num2) with both end points being included in the window. For example, "1,1" will have a window size of 3. To see periods in the past, use a negative number for the second endpoint, as in the example "moving_average(sales, 1, -1, date)".	<ul style="list-style-type: none"> • <code>moving_average (revenue, 2, 1, customer region)</code>
moving_max	Takes a measure, two integers to define the window to aggregate over, and one or more attributes. Returns the maximum of the measure over the given window. The attributes are the ordering columns	<ul style="list-style-type: none"> • <code>moving_max (complaints, 1, 2, store name)</code>

Function	Description	Examples
	used to compute the moving maximum. The window is (current - Num1...Current + Num2) with both end points being included in the window. For example, "1,1" will have a window size of 3. To see periods in the past, use a negative number for the second endpoint, as in the example "moving_max(sales, 1, -1, date)".	
moving_min	Takes a measure, two integers to define the window to aggregate over, and one or more attributes. Returns the minimum of the measure over the given window. The attributes are the ordering columns used to compute the moving minimum. The window is (current - Num1...Current + Num2) with both end points being included in the window. For example, "1,1" will have a window size of 3. To see periods in the past, use a negative number for the second endpoint, as in the example "moving_min(sales, 1, -1, date)".	<ul style="list-style-type: none"> • <code>moving_min (defects, 3, 1, product)</code>
moving_sum	Takes a measure, two integers to define the window to aggregate over, and one or more attributes. Returns the sum of the measure over the given window. The attributes are the ordering columns used to compute the moving sum. The window is (current - Num1...Current + Num2) with both end points being included in the window. For example, "1,1" will have a window size of 3. To see periods in the past, use a negative number for	<ul style="list-style-type: none"> • <code>moving_sum (revenue, 1, 1, order date)</code>

Function	Description	Examples
	the second endpoint, as in the example "moving_sum(sales, 1, -1, date)".	

Calculate the moving average

You can use the moving formulas to compute a measure within a moving window of your data, usually defined by time.

This example will demonstrate using the moving_average formula. To use the moving function in a search:

1. Start a new search.

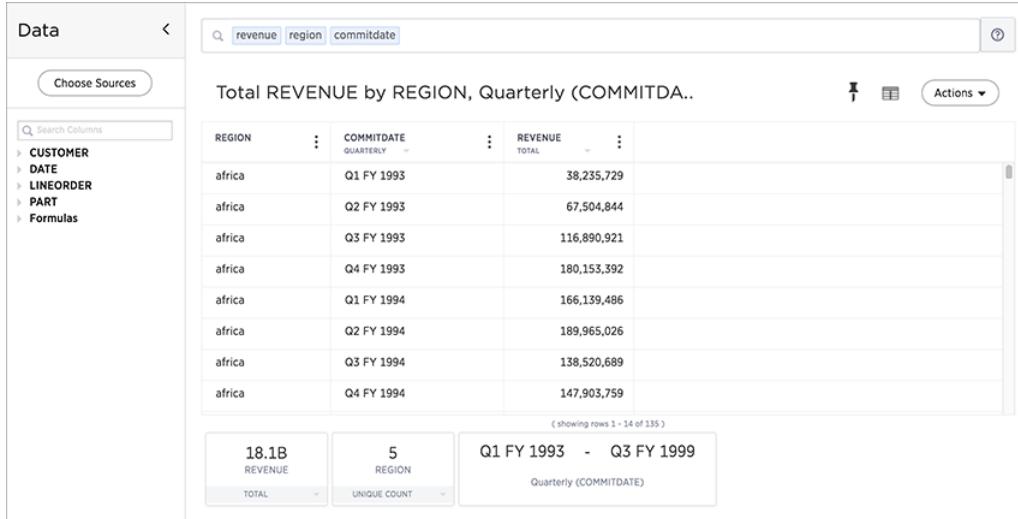


Figure 152: Aggregation Answer example

2. In the upper right hand side of the table, click **Actions** and select **Add formula**.

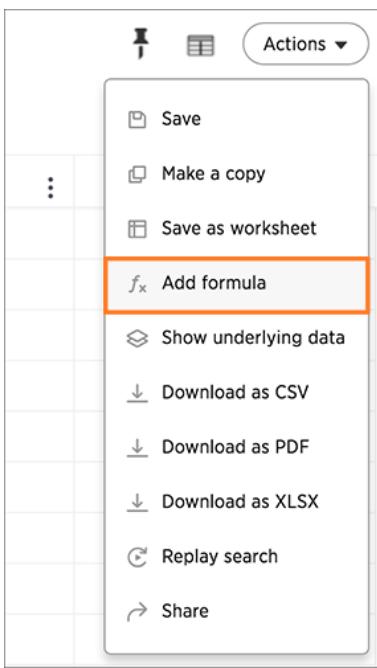


Figure 153: Create a new formula in an answer

3. Enter the moving_average formula, providing a measure, a window, and one or more attributes. The example will return the average of revenue, within the commit date window size of 3. The window includes the previous, current, and next rows.

The attributes are the ordering columns used to compute the moving average. The window is (current - Num1...Current + Num2) with both end points being included in the window. For example, "1,1" will have a window size of 3. To see periods in the past, use a negative number for the second endpoint, as in the example "moving_average(sales, 1, -1, date)".

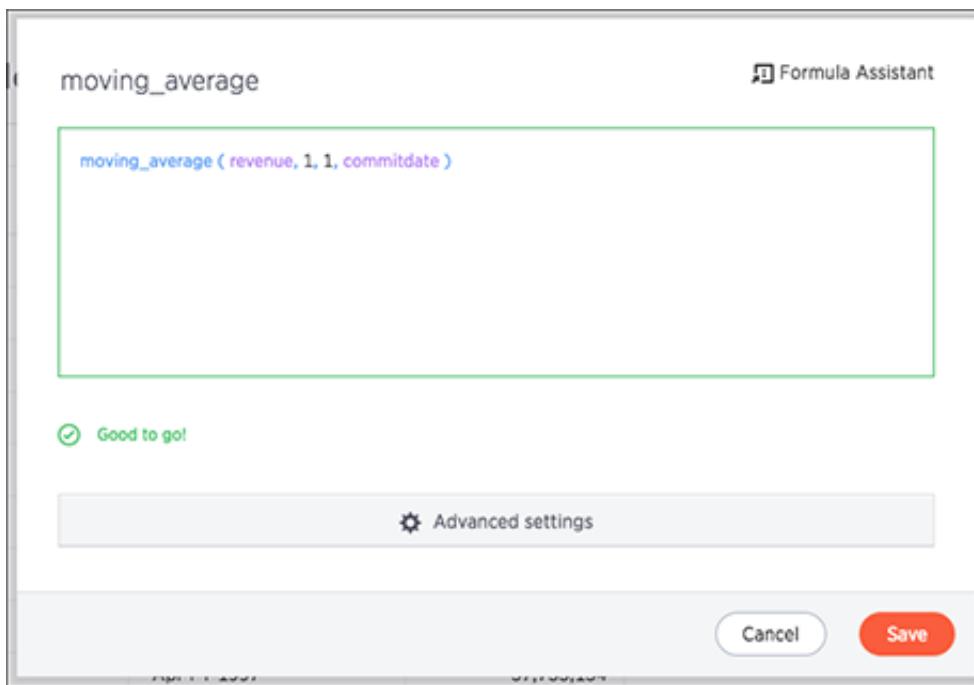
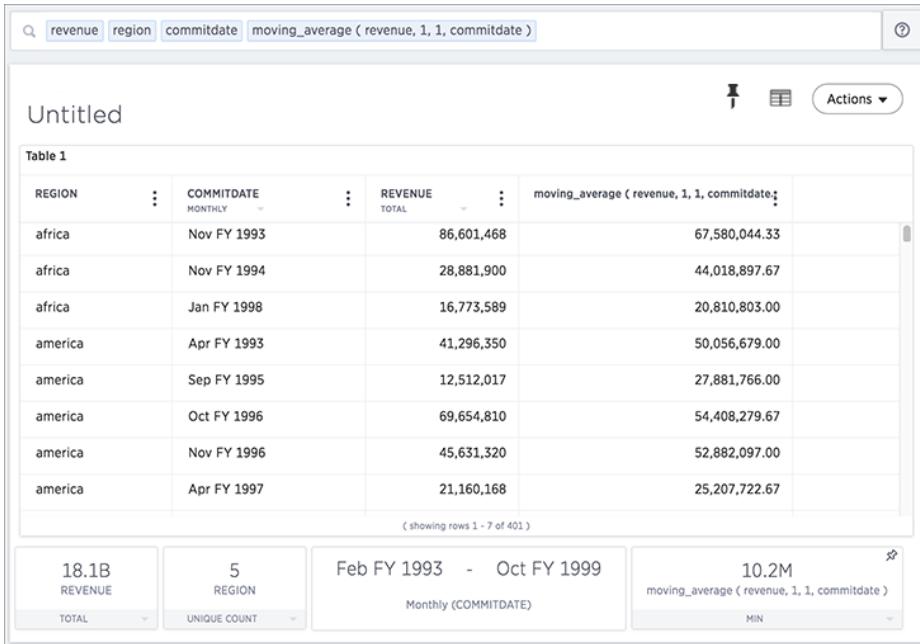


Figure 154: Moving Average Formula

4. Name the formula by clicking on its title and typing the new name. Click **Save**.
5. The formula will appear in the search bar and in the table as its own column.



The screenshot shows a ThoughtSpot search interface with the following details:

- Search Bar:** Contains terms: revenue, region, commitdate, moving_average (revenue, 1, 1, commitdate).
- Table Title:** Untitled
- Table Header:** Table 1, with columns: REGION, COMMITDATE, REVENUE, moving_average (revenue, 1, 1, commitdate).
- Data Rows:** A sample of 8 rows from 401 total, showing data for regions like africa and america across various fiscal years (FY 1993-1997) with their respective revenue totals and moving averages.
- Bottom Metrics:**
 - 18.1B REVENUE TOTAL
 - 5 REGION UNIQUE COUNT
 - Feb FY 1993 - Oct FY 1999 Monthly (COMMITDATE)
 - 10.2M moving_average (revenue, 1, 1, commitdate) MIN

Figure 155: Moving Average Table

A box displaying the moving average within the entire table will appear at the bottom. You can click on it to toggle between aggregation types.

About conversion formulas

Some formulas require the input to be of a particular data type. If you find that you want to pass a value to the function, but it is of the wrong data type, you can convert it using a conversion formula.

The following are the default conversion formulas:

- to_bool
- to_integer
- to_string
- to_float

Information on the usage for these formulas is in the [Formula reference](#).

Booleans are interpreted in the following ways:

Table 9: How Boolean Values are Interpreted when Changing Data Type

Data Type	Description
to_bool(integer)	Boolean true maps to integer 1 and boolean false to integer 0.
to_bool(string)	Boolean true maps to string "true" and boolean false to string "false".
to_double(boolean)	0 maps to boolean false, everything else to boolean true.
to_integer(boolean)	0 maps to boolean false, everything else to boolean true.
to_string(boolean)	The string "true" maps to boolean true, everything else to boolean false.

About date formulas

Date formulas allow you to apply date related functions to your formulas.

Date formulas are useful when you want to compare data collected between two date periods.

The date functions include:

Table 10: Date functions for use in formulas

Function	Description	Examples
add_days	Returns the result of adding the specified number of days to the given date.	<ul style="list-style-type: none"> • add_days (01/30/2015, 5) = 02/04/2015 • add_days (invoiced, 30)
date	Returns the date portion of a given date.	<ul style="list-style-type: none"> • date (home visit)
day	Returns the number (1-31) of the day for the given date.	<ul style="list-style-type: none"> • day (01/15/2014) = 15 • day (date ordered)

Function	Description	Examples
day_number_of_week	Returns the number (1-7) of the day in a week for the given date with 1 being Monday and 7 being Sunday.	<ul style="list-style-type: none"> • <code>day_number_of_week (01/30/2015) = 6</code> • <code>day_number_of_week (shipped)</code>
day_number_of_year	Returns the number (1-366) of the day in a year for the given date.	<ul style="list-style-type: none"> • <code>day_number_of_year (01/30/2015) = 30</code> • <code>day_number_of_year (invoiced)</code>
day_of_week	Returns the day of the week for the given date.	<ul style="list-style-type: none"> • <code>day_of_week (01/30/2015) = Friday</code> • <code>day_of_week (serviced)</code>
diff_days	Subtracts the second date from the first date and returns the result in number of days, rounded down if not exact.	<ul style="list-style-type: none"> • <code>diff_days (01/15/2014, 01/17/2014) = -2</code> • <code>diff_days (purchased, shipped)</code>
diff_time	Subtracts the second date from the first date and returns the result in number of seconds.	<ul style="list-style-type: none"> • <code>diff_time (01/01/2014, 01/01/2014) = -86,400</code> • <code>diff_time (clicked, submitted)</code>
hour_of_day	Returns the hour of the day for the given date.	<ul style="list-style-type: none"> • <code>hour_of_day (received)</code>
is_weekend	Returns true if the given date falls on a Saturday or Sunday.	<ul style="list-style-type: none"> • <code>is_weekend (01/31/2015) = true</code> • <code>is_weekend (emailed)</code>
month	Returns the month from the given date.	<ul style="list-style-type: none"> • <code>month (01/15/2014) = January</code> • <code>month (date ordered)</code>
month_number	Returns the number (1-12) of the month for the given date.	<ul style="list-style-type: none"> • <code>month_number (09/20/2014) = 9</code> • <code>month_number (purchased)</code>

Function	Description	Examples
now	Returns the current timestamp.	<ul style="list-style-type: none"> • now ()
start_of_month	Returns the date for the first day of the month for the given date.	<ul style="list-style-type: none"> • start_of_month (01/31/2015) = Jan FY 2015 • start_of_month (shipped)
start_of_quarter	Returns the date for the first day of the quarter for the given date.	<ul style="list-style-type: none"> • start_of_quarter (09/18/2015) = Q3 FY 2015 • start_of_quarter (sold)
start_of_week	Returns the date for the first day of the week for the given date.	<ul style="list-style-type: none"> • start_of_week (06/01/2015) = 05/30/2015 Week • start_of_week (emailed)
start_of_year	Returns the date for the first day of the year for the given date.	<ul style="list-style-type: none"> • start_of_year (02/15/2015) = FY 2015 • start_of_year (joined)
time	Returns the time portion of a given date.	<ul style="list-style-type: none"> • time (3/1/2002 10:32) = 10:32 • time (call began)
year	Returns the year from the given date.	<ul style="list-style-type: none"> • year (01/15/2014) = 2014 • year (date ordered)

Calculate date formulas

Calculating date formulas is useful when you want to compare data from different date periods.

Here are some examples of using date formulas:

Example 1

The following example shows you how to create formulas that you can use to compare data from this week to last week.

1. The formula for this week is `week (today ()) - week (date)`.
2. The formula for last week is `diff_days (week (today)) , week (date)`.

Example 2

The following example shows you how to calculate the percent increase from the last date period to this period in terms of revenue.

1. Create the formula, `this week revenue = sum (if (this week) then revenue else 0)`.
2. Then create the formula, `last week revenue = sum (if (last week) then revenue else 0)`.
3. Now you can use [nested formulas](#) to calculate the percent increase by creating a parent formula, `percent increase = ((last week revenue - this week revenue) / last week revenue) * 100`.

About percent (simple number) calculations

You can use simple number functions to perform useful percent calculations.

Simple number functions include addition, subtraction, multiplication, and division.

Table 11: Number functions for use in formulas

Function	Description	Examples
*	Returns the result of multiplying both numbers.	<ul style="list-style-type: none"> • <code>3 * 2 = 6</code> • <code>price * taxrate</code>

Function	Description	Examples
+	Returns the result of adding both numbers.	<ul style="list-style-type: none"> • $1 + 2 = 3$ • price + shipping
-	Returns the result of subtracting the second number from the first.	<ul style="list-style-type: none"> • $3 - 2 = 1$ • revenue - tax
/	Returns the result of dividing the first number by the second.	<ul style="list-style-type: none"> • $6 / 3 = 2$ • markup / retail price

Calculate percentages

Calculating percentages is useful when you want to see, for example, the percentage revenue generated from each channel (online, stores, partner, etc.).

Here is a common percentage example:

Example

The following example shows you how to figure out the percentage revenue generated from each channel (online, stores, partners, etc.).

1. Create the following formula in the Formula Builder, percent

```
revenue = ( sum ( revenue ) / group sum ( revenue ) ) * 100.
```

2. Now you can search by each channel, using the percent revenue formula that you just created.

About conditional formulas (operators)

Conditional formulas, or operators, allow you to apply if/then/else conditions in your formulas.

You can leverage operators in your conditional formulas to have them return true, false, or a predetermined value.

The operators include:

Table 12: Operators

Operator	Description	Examples
and	Returns true when both conditions are true, otherwise returns false.	<ul style="list-style-type: none"> (1 = 1) and (3 > 2) = true lastname = 'smith' and state = 'texas'
if...then...else	Conditional operator.	<ul style="list-style-type: none"> if (3 > 2) then 'bigger' else 'not bigger' if (cost > 500) then 'flag' else 'approve'
ifnull	Returns the first value if it is not null, otherwise returns the second.	<ul style="list-style-type: none"> ifnull (cost, 'unknown')
isnull	Returns true if the value is null.	<ul style="list-style-type: none"> isnull (phone)
not	Returns true if the condition is false, otherwise returns false.	<ul style="list-style-type: none"> not (3 > 2) = false not (state = 'texas')
or	Returns true when either condition is true, otherwise returns false.	<ul style="list-style-type: none"> (1 = 5) or (3 > 2) = true state = 'california' or state = 'oregon'

Calculate the conditional sum

Calculating the conditional sum is useful when you want to see, for example, the total revenue for a product by region.

Conditional sum formulas follow this syntax: `if (some condition) then (measure) else 0`. You can use this syntax to limit your search in cases when you don't want to add a column filter. For example, `if (product = shoes) then revenue else 0`.

Example

The following example shows you how to figure out the number of customers who bought both products, in this case an ipad and galaxy tablet. You can then find out the revenue generated by both products.

1. Create the following formula in the Formula Builder `ipadcount = sum (if (product = 'ipad') then 1 else 0) > 0.`
This formula will provide you with the number of ipads that were bought.
2. You can then create another formula that looks like this:
`galaxycount = sum (if (product = 'galaxy' then 1 else 0) > 0.` And this formula will provide you with the number of galaxys that were bought.
3. Using [nested formulas](#), you can combine these two formulas. For example, `f1 = ipadcount + galaxycount.`
4. Now, you can search using the `f1` formula to find out the revenue generated by both products.

About nested formulas

Nested formulas, or formula on formula, allow you to reference a formula within another formula.

This feature enables encapsulation and decomposition of formula logic and minimizes duplication by allowing a formula to reuse another formula. These formulas become columns, and are even suggested within the Formula Builder. Invalid formulas, such as cyclic or inconsistent aggregation formulas, are prevented from being created.

In addition, these formulas have dependency awareness, which ensure that you do not break any dependent formulas while editing a formula with dependent

formulas. Some common cases of invalidating occur when you try to change a data type. Also, the system does not let you delete a formula that is nested in other formulas.

 **Note:** There is no limit to the number of nestings you can create.



Figure 156: formula1 nested in formula2

About formula support for chasm trap schemas

You can create a formula that involves aggregated measures coming from multiple fact tables of a chasm trap.

Just as you would create any other formula, you can create a formula that spans across a chasm trap. The Formula Builder will provide column suggestions for formulas that span across chasm traps.

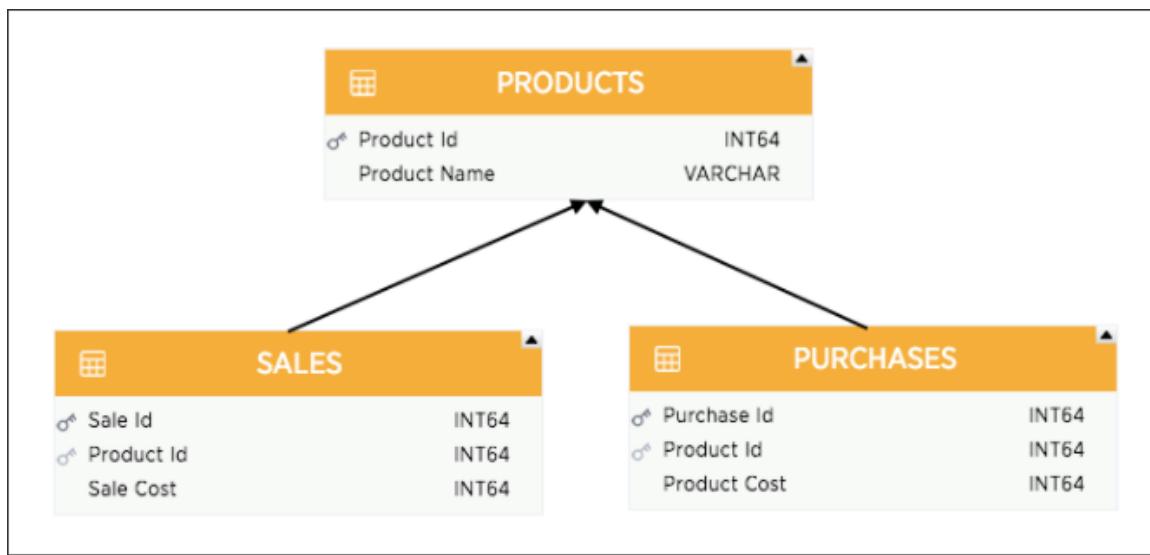


Figure 157: Formula: sum(Product Cost) / sum (Sales Cost)

About pivot tables

Pivot tables in ThoughtSpot use the well known drag-and-drop interface.

Creating a pivot table enables exploring alternate visualization of data in a wide table. The basic idea is that some data is easier to consume when laid out horizontally, while others, vertically.

Previously, ThoughtSpot used a pivot keyword to select which fields can be columns and which can be rows, thus moving columns to be rows and vice versa. Now, the pivot table is a chart type.

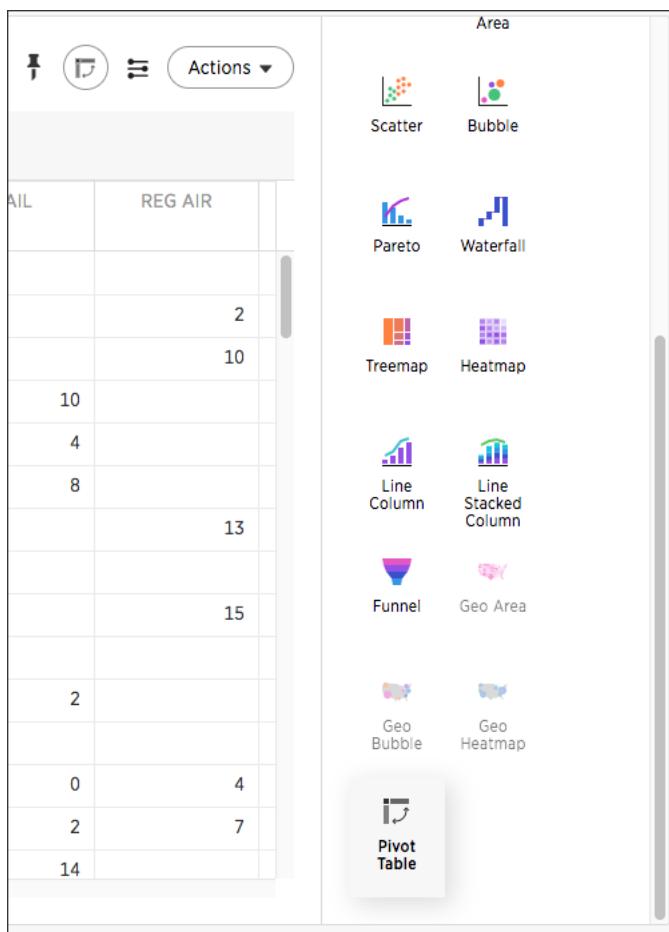


Figure 158: Pivot table chart type

Choose **Pivot Table** under Select Chart Type to view your search as a pivot table. Add rows, measures, and columns to the search bar and restructure your table by moving these values under **Configure Chart** or by dragging and dropping them.

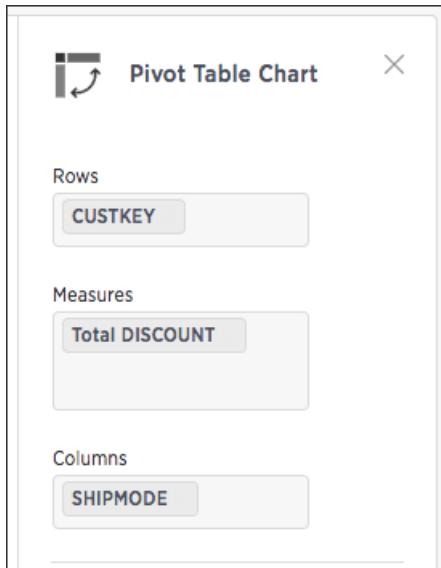


Figure 159: Chart axes: rows, measures, columns

Some additional details about pivot tables include:

- Pivot tables show the grand totals for columns and rows.
- You can toggle on the Heatmap mode found under Configuration Options to add color coordination to your data.

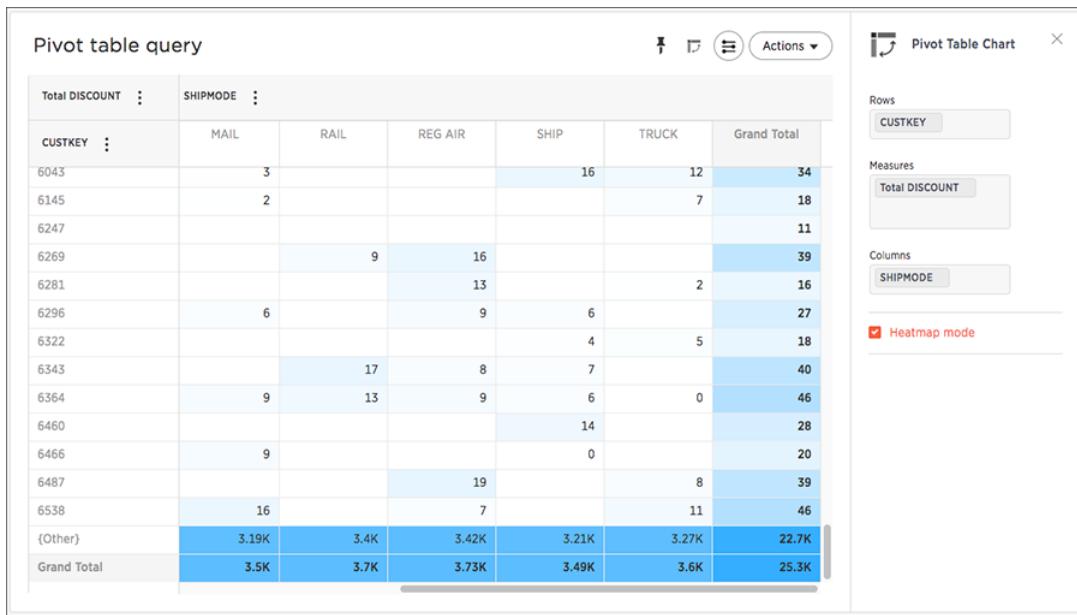


Figure 160: Heatmap mode enabled

- Click a column or row to expand it. Additionally, you can expand or collapse all by right clicking the arrow on the top left of a cell.



Figure 161: Expand or collapse all option

- When you pin a pivot table to a pinboard, it will retain your expansion settings.

The pivot table chart type has these limitations:

- Only the first 10,000 data values will be used. If you would like to increase this limit, please contact ThoughtSpot Support.
- Pivot table is not available if the dataset contains more than 100,000 rows.
- Columns with cardinality beyond 100 are grouped into {Other}.
- Show underlying data menu is unavailable.
- Conditional formatting is not functional.

Chapter 4: About pinboards

Topics:

- [Create a pinboard](#)
- [Add an answer to a pinboard](#)
- [Edit the layout of a pinboard](#)
- [About pinboard filters](#)
- [About scheduled pinboards](#)
- [Other pinboard actions](#)

Pinboards act like live dashboards, and are collections of your related charts, tables, and headline.

You can pin charts and tables to any pinboard which you created, and those that have been shared with you with the **Edit** privilege. When you create a pinboard, you can share it with other people with either the **View** or **Edit** privilege. Pinboards are interactive, allowing you to perform actions like filtering, excluding values, and drilldown on the visualizations.

Create a pinboard

Create a new pinboard to group and manage related search results.

You can also create a new pinboard when you [add an answer to a pinboard](#).

To create a pinboard:

1. Click on **Pinboards**, on the top navigation bar.



Figure 162: Pinboards

2. Click **+ New Pinboard** on the pinboards list page.

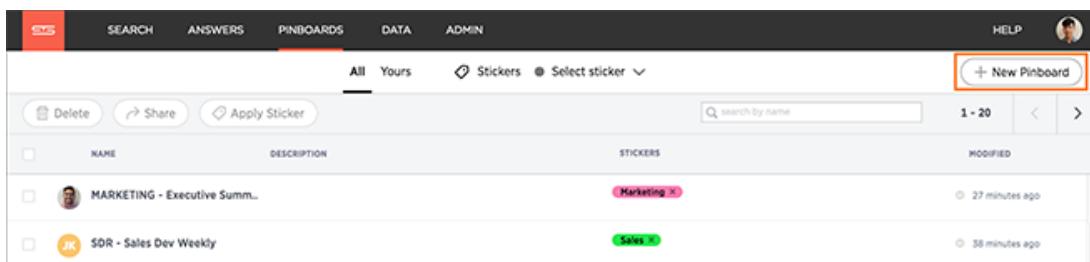


Figure 163: New Pinboard button

3. In the New Pinboard dialog box, give your pinboard a name and description.

Then click **Create**.

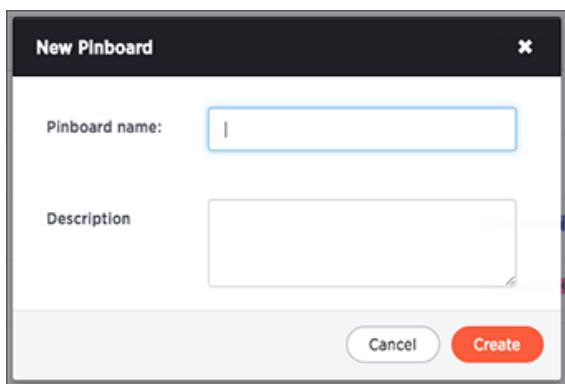


Figure 164: New Pinboard menu

Add an answer to a pinboard

Instead of saving an answer you can add it to a pinboard by pinning it.

To add an answer to a pinboard:

1. While viewing your answer of interest, click the **Pin** icon on the top right of the answer.



Figure 165: Pin an answer to a pinboard icon

2. In the Copy to pinboard(s) dialog box, click the **+** icons next to the pinboards you would like to add your answer to.

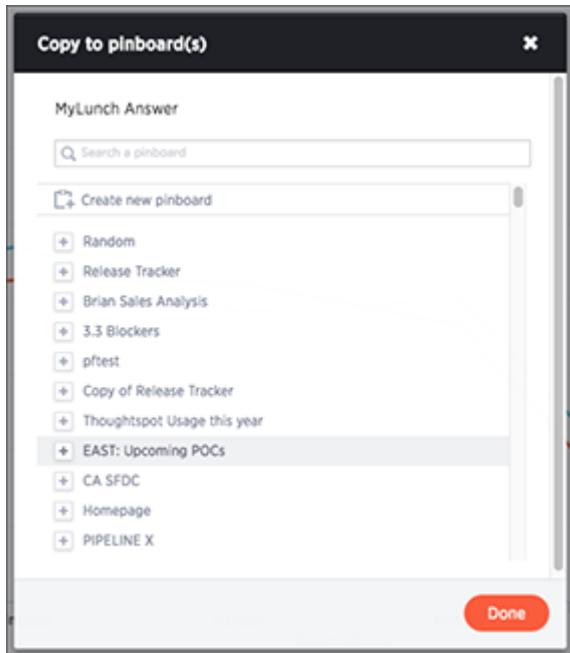


Figure 166: Add filters menu

 **Tip:** You can also select **Create new pinboard** at the top of the list to create a new pinboard, then add your answer to it.

Edit the layout of a pinboard

Editing the layout of a pinboard lets you snap visualizations into place, choose between set visualization sizes, and reset your layout.

Visualizations within a pinboard are easy to move around and snap into place on a relative flow layout. Your pinboard layout is also responsive to your browser resolution. This helps keep the layout of your pinboard neat and organized.

In addition, the size picker at the bottom of a visualization dropdown lets you toggle between predetermined sizes for each visualization. Charts and graphs can be toggled between a small, medium, and full width size, while headlines can be only one size (small). One row of the pinboard can hold a predetermined number of visualizations of each size.

1. Click on **Pinboards**, on the top navigation bar.



Figure 167: Pinboards

2. On the pinboard list page, click the pinboard you would like to edit.
3. Resize your visualizations by choosing between the predetermined sizes under the visualization dropdown menu.

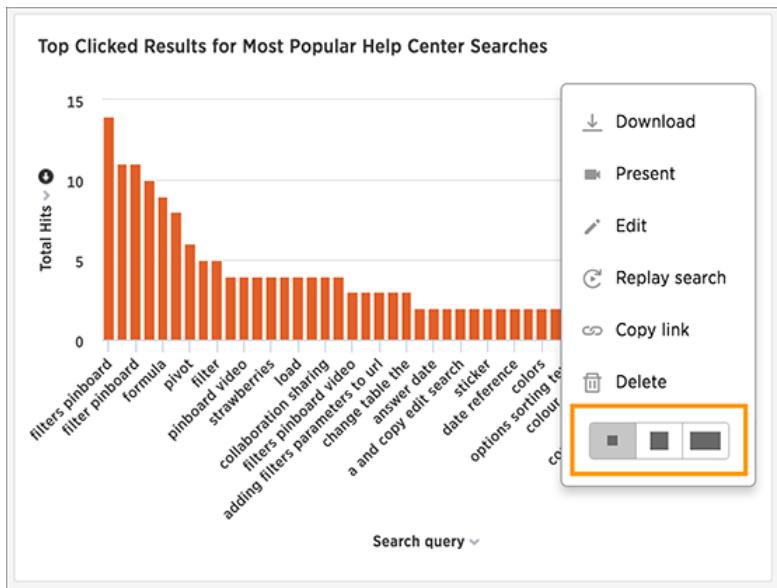


Figure 168: Resize your visualization

4. Drag and drop your visualizations on the layout grid to reorder your pinboard.
5. If you are unhappy with your layout or you would like ThoughtSpot to configure your layout for you, go ahead and [reset your layout](#).
6. Save your pinboard by clicking **Actions** and **Save**.

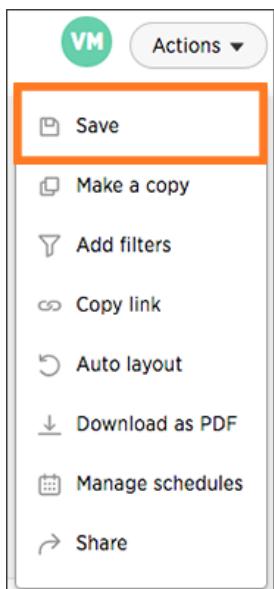


Figure 169: Save your pinboard

About pinboard filters

Filters, including bulk filters, can be applied to pinboards just as with tables and charts. These kinds of filters apply to an entire pinboard, making it easy to see only the data that you are interested in across the tables and charts within a pinboard.

Pinboard filters can be very useful when you want to apply the same filters to more than one related visualization. You can narrow the focus of your pinboard for specific purposes or audiences.

When you apply a filter, the pinboard is not automatically saved with your filter applied. This is to encourage ad hoc filtering. Therefore, people with read-only access can create pinboard filters. You must have edit access to the pinboard, and view access (or higher) to the underlying data source in order save a pinboard filter.

Note that pinboard filters only apply to the tables and charts that are based on worksheets. If a pinboard also includes tables and charts that were created from underlying tables or on user uploaded data, the filters don't apply to them.

Create a pinboard filter

You can create a filter in the pinboard view for any pinboard. This allows you to easily manipulate the visualizations and view the modified presentation in one place.

Here is an example that shows you how to add a single filter to a pinboard. To create a pinboard filter:

1. Click the **Actions** button, and click **Add filters**.

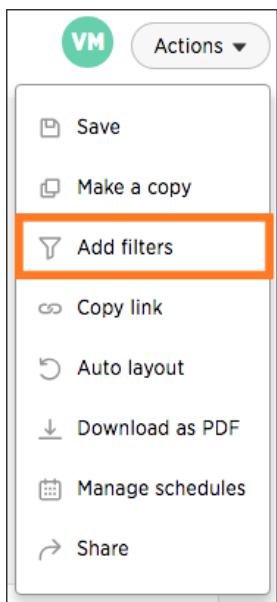


Figure 170: Add filters under Actions

2. In the populated columns menu, click the **Add filter** icon next to the columns you would like to use as filters.

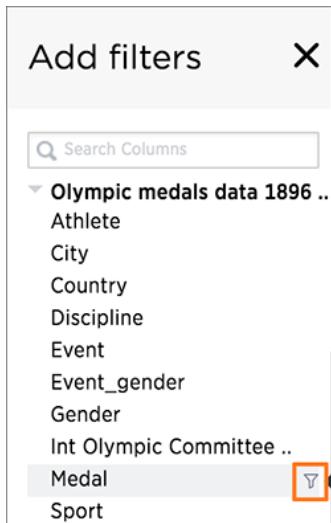


Figure 171: Add filters menu

3. Choose the values you are interested in by typing them in, selecting the appropriate checkboxes, or using **Add values in bulk**. Then click **Done**.



Figure 172: Select Filter Values

4. Your applied filter will sit at the top of the pinboard, where you can either edit or delete it.

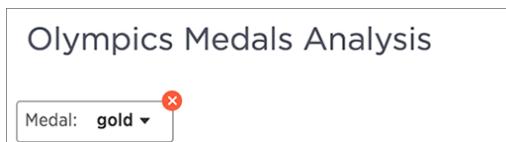


Figure 173: Applied Pinboard Filter

When you apply a filter, the pinboard is not automatically saved with your filter applied to every object in the pinboard that was created from a worksheet. Pinboard filters do not apply to tables and charts built directly on top of base tables.

About scheduled pinboards

You can get pinboards emailed to you on a regular basis and do analysis offline.

This introduces an additional format for you to consume and share pinboards with others, including those who don't have a ThoughtSpot account.

Scheduled pinboards should help with preparing for recurrent meetings, when reviewing the same pinboard is necessary. They should also be useful when you have metrics you want to monitor at a consistent interval, like daily or monthly sales targets.

Contact ThoughtSpot Support if scheduled pinboards is not enabled on your cluster, or you can run the command `tscli scheduled-pinboards` to enable it yourself.

Scheduled pinboard creators

Administrators and users with `can schedule` pinboard privilege `can schedule` and manage pinboard jobs. These scheduled pinboard creators must have at least edit-only and view-only rights to the pinboard they want to share.

 **Caution:** It is recommended that admins carefully choose who to give `can schedule` pinboard privilege to, since there is a possible security hole where a user with limited access can get a pinboard email with all access data.

Row level security

The scheduled pinboards respect row level security rules. This means if the recipients are users in ThoughtSpot, then they can only see data based on their own access to the pinboard. If the user does not have at least view-only access to the pinboard, then they will not see anything in the email. However, if the recipients are from outside of the cluster, then they will have access to the dataset of the pinboard based on the sender's permissions.

Scheduled pinboard formats

The pinboard visualizations are attached to the scheduled email as CSV or PDF files. Saved configurations such as pinboard filters are applied to the attachments. Refer to the table to see how the pinboard data is represented in each file format.

Table 13: CSV - PDF report comparison

CSV	PDF
The CSV file gets data only for table visualizations.	The PDF file gets data for all visualizations.
The email has n CSV attachments, where there are n table visualizations in the pinboard.	The email has only one attachment file, which includes every visualization on its own page.
Table visualizations have all data rows that they're supposed to have.	Table visualizations include only the first 100 rows.
In the case of a corrupted pinboard: no email is sent. An error message indicating failure to export data is visible on the Admin Jobs Management page.	In the case of a corrupted pinboard: the PDF attachment has empty/error screenshots.
In the case of a corrupted visualization: an email with the visualizations whose data can be exported is sent. An error message indicating visualization export error is visible on the Jobs Management page.	In the case of a corrupted visualization: the PDF attachment has empty/error slots for the corrupted visualizations.

The size of each email is limited to 25 MB, which matches most email services size limitations.

And the total number of recipients for a scheduled pinboard job cannot exceed the default of 1000.

Schedule a pinboard job

You can schedule a pinboard job for any pinboard by using the Add a schedule prompt page.

You can add multiple schedules with different configurations for a single pinboard. However, each job is limited to one pinboard schedule. In order to add a schedule, you must have administrator or can schedule pinboard privilege, and at least edit-only and view-only access to the pinboard.

To schedule a pinboard:

1. Log in to ThoughtSpot from a browser.
2. Click on **Pinboards**, on the top navigation bar.



Figure 174: Pinboards

3. Select the pinboard you would like to create a schedule for.
4. Click **Actions** and select **Manage schedules** to view all of the schedules set for the pinboard.

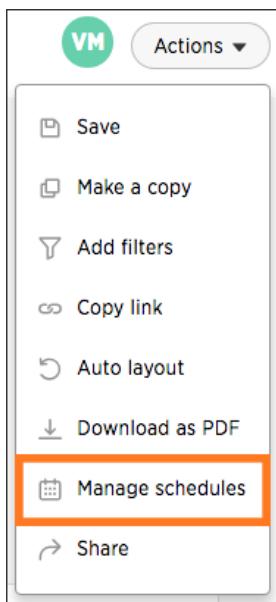


Figure 175: View pinboard schedules

5. Click **New schedule** to add a new pinboard schedule.

	NAME	DESCRIPTION	STATUS	RECIPIENT	CREATED
<input type="checkbox"/>	SC test	test	▷ Scheduled	1 Recipient	2 hours ago
<input type="checkbox"/>	SC max jobs test	max jobs	▷ Scheduled	1 Recipient	2 hours ago
<input type="checkbox"/>	SC header	header	▷ Scheduled	1 Recipient	2 hours ago

Figure 176: Add a new pinboard schedule

6. On the Add a schedule prompt page, set the times you would like to schedule the pinboard for.

Schedule

Repeats

Run the task every week on

Sunday Monday Tuesday Wednesday Thursday
 Friday Saturday

at :

Figure 177: Set the pinboard schedule

Scheduled pinboards can be set to repeat every n minutes, hourly, daily, weekly, or monthly. For some of these, you can also choose specific times of the day or days of the week. Make sure to note the Server time zone which is the timezone which will be used.

7. Enter the name and description of your schedule. Then select whether you'd like to send the pinboard as CSV or PDF attachments.

Server time zone America/Los_Angeles

Name

Description

Type CSV PDF

CSV files will be sent only for the tables in this pinboard.

Figure 178: Set the pinboard type

CSV files provide all data for tables, with one attachment per table. Use CSV files to perform further analysis offline. PDF files show all visualizations in the pinboard. Each chart takes up a whole page in the file, while only the first 100 rows of a table are included. Use PDF files to skim the data.

8. Add recipients by entering ThoughtSpot users or groups. Suggestions are shown as you type. Click **Add** to add the selected users or groups. You can also add recipients that are not ThoughtSpot users by entering their email addresses. To do so, you must first set the whitelist domains. Contact ThoughtSpot Support to set your whitelist domains.

The screenshot shows a 'Recipients' section with two main input fields. The top field is labeled 'Users or groups' and the bottom field is labeled 'Emails:'. Each field has a text input box and a red 'Add' button to its right. Below these fields is a red 'Add & Save' button.

Figure 179: Set the pinboard recipients

You are limited to 1000 recipients per job.

9. Click **Schedule** to save your scheduled pinboard.

Other pinboard actions

Other pinboard actions include actions you normally perform on your search as well as actions that you can only perform on a pinboard.

Most of these actions are found under the Actions button.

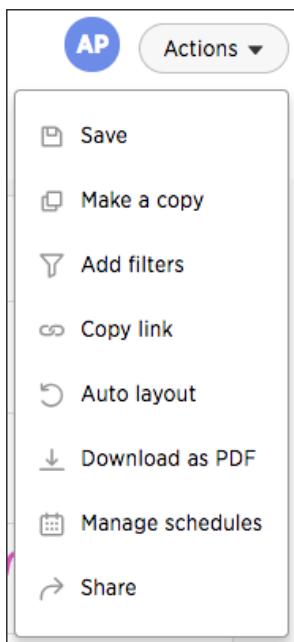


Figure 180: Pinboard actions button

Search actions within a pinboard

You can perform many of the same search actions on individual visualizations within a pinboard as you can within a search.

You can interact directly with a visualization of a pinboard to perform ad hoc searches or edit it. These search actions include the following:

- Editing a search - You can edit the original search and reconfigure the answer.
In the dropdown of a visualization, click **Edit**.

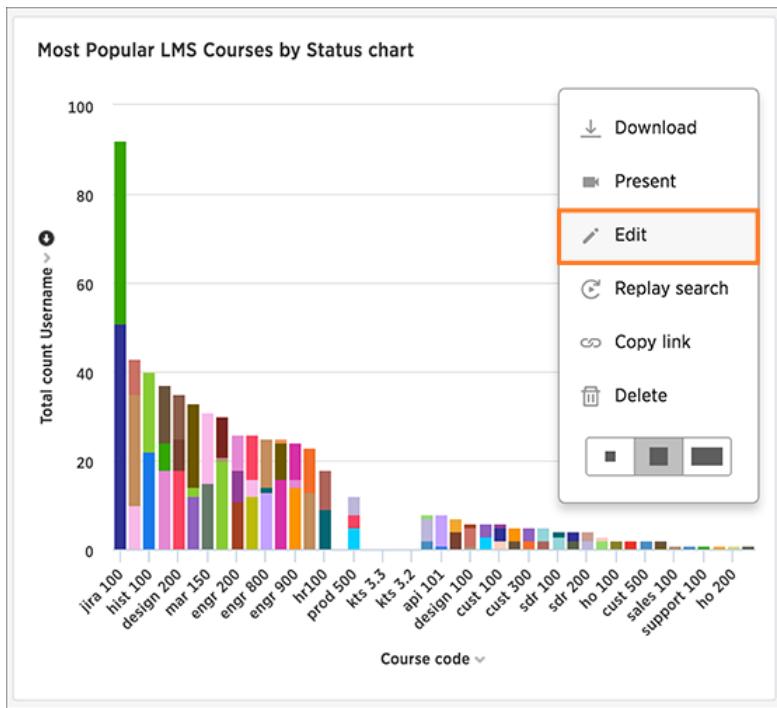


Figure 181: Edit a pinboard visualization

You will be taken to an edit mode, where you can [view and change sources](#), [search different columns](#), see the [what am I looking at](#) option, [change the view](#), [save the answer as a worksheet](#), [add a formula](#), [change the table](#), and [change the chart](#).

- Sorting
- Changing the date bucketing
- Showing underlying data
- Drilling down
- Excluding and including row values
- Applying conditional formatting
- Filtering
- Downloading the answer
- Replaying the search

Copy a pinboard

You can make a copy of a pinboard if you would like to make edits without changing the original pinboard.

Making a copy of a pinboard allows you to make your own edits without overwriting the original. When saving a copy, you can type in a new name.

1. Click on **Pinboards**, on the top navigation bar.



Figure 182: Pinboards

2. On the pinboard list page, click the pinboard you would like to copy.
3. Click **Actions** and select **Make a copy**.

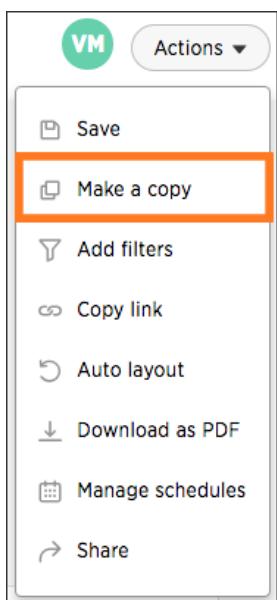


Figure 183: Make a copy of the pinboard

4. Give your pinboard a new name and description. Then click **Save**.

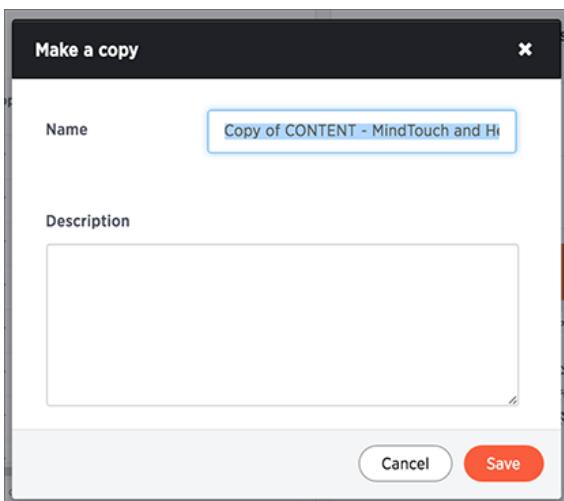


Figure 184: Name and save your pinboard copy

Copy the link for a pinboard or visualization

In pinboards, there is a copy link option that lets you copy the link to access the pinboard and visualizations directly.

You can copy and paste the copied link to include in a presentation or spreadsheet, or email or Slack it to other people in your company. Note that when clicking the link, the person must be authenticated to ThoughtSpot to see the visualization (e.g. by logging in or LDAP).

You can also use this link for embedding the chart or table in another Web page, Web portal, or application when using the ThoughtSpot JavaScript API with Embedding or the REST API. For details, read the ThoughtSpot Application Integration Guide.

To copy the link for a pinboard:

1. Click on **Pinboards**, on the top navigation bar.

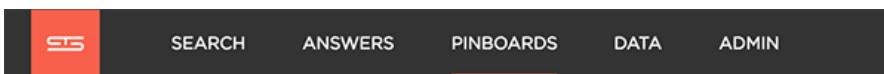


Figure 185: Pinboards

2. On the pinboard list page, click the pinboard you would like to get a link for.

3. Click **Actions** and select **Copy link**.

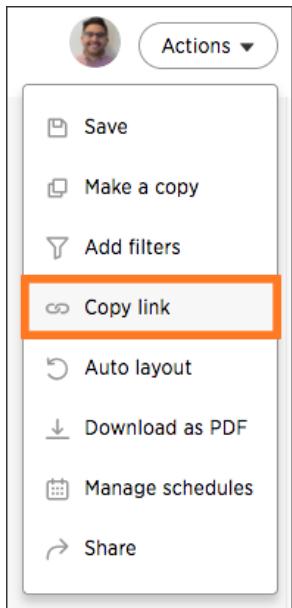


Figure 186: Copy pinboard link option

4. Copy the pinboard link. The highlighted portion is the pinboard ID.

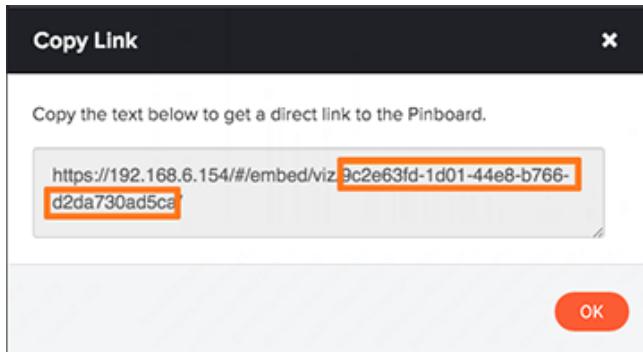


Figure 187: Copy pinboard link

5. To copy an individual visualization link, click **Copy link** under the dropdown menu of the visualization you would like to get a link for.

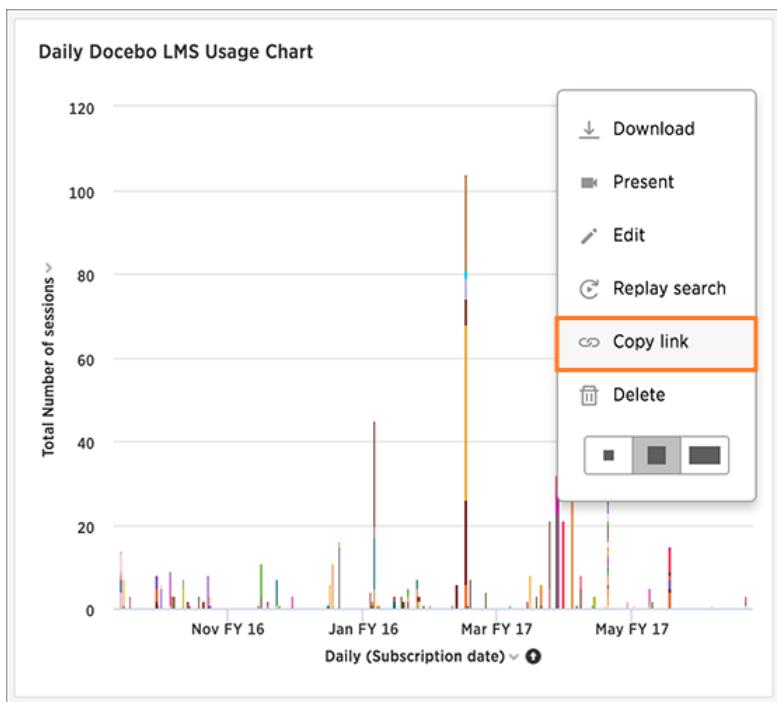


Figure 188: Copy visualization link option

6. Copy the visualization link. The highlighted portion is the visualization ID.

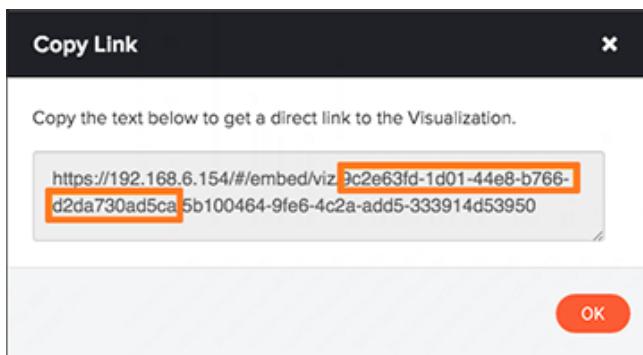


Figure 189: Copy visualization link

Reset a visualization

Resetting a visualization removes any changes you've made to its form.

After performing ad hoc actions or edits to a visualization of your pinboard, you can reset the visualization to its original form.

To reset a visualization:

1. On an altered visualization, click the reset icon.

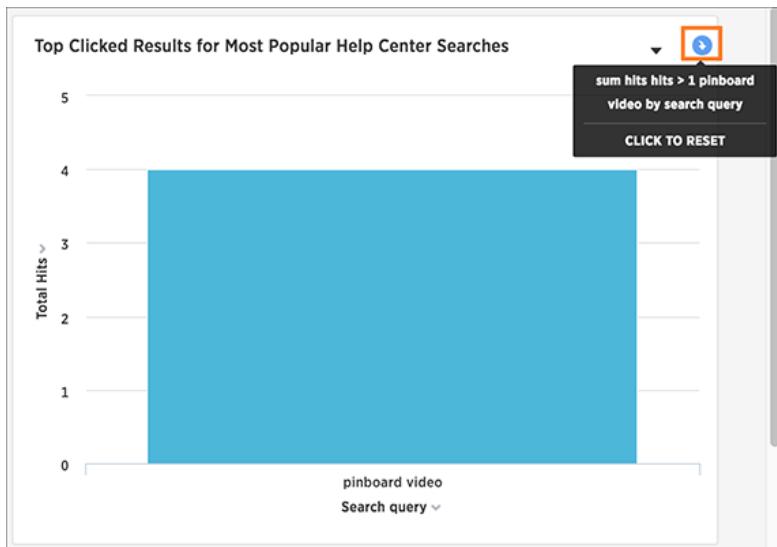


Figure 190: Click to reset

2. Save your pinboard by clicking **Actions** and **Save**.

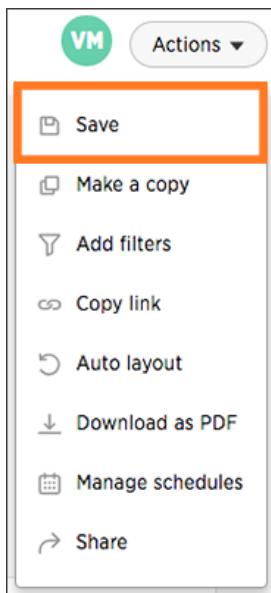


Figure 191: Save your pinboard

Reset the layout of a pinboard

Reset the layout of a pinboard to undo your changes or have ThoughtSpot create a layout for you.

You can reset the layout of your pinboard if you would like to undo your edits or have ThoughtSpot optimize your layout space for you. This action will keep the sizes of your visualizations, but not the order.

To reset the layout of a pinboard:

1. Click on **Pinboards**, on the top navigation bar.



Figure 192: Pinboards

2. On the pinboard list page, click the pinboard you would like to edit.
3. Click **Actions** and select **Auto layout**.

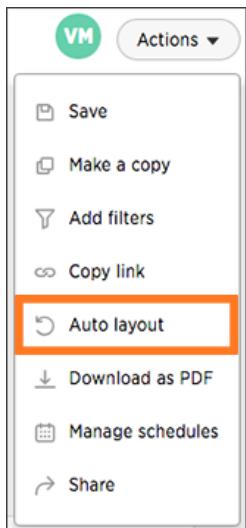


Figure 193: Reset your pinboard layout option

4. Save your pinboard by clicking **Actions** and **Save**.

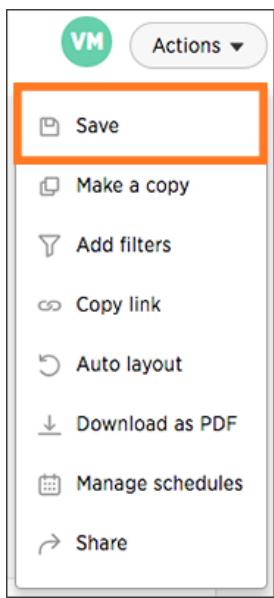


Figure 194: Save your pinboard

Download a pinboard

You can download a pinboard as a PDF file, without having to download each visualization separately.

Downloading a pinboard works just as it would when downloading an answer.

To download a pinboard:

Click **Actions**, and select **Download as PDF**.

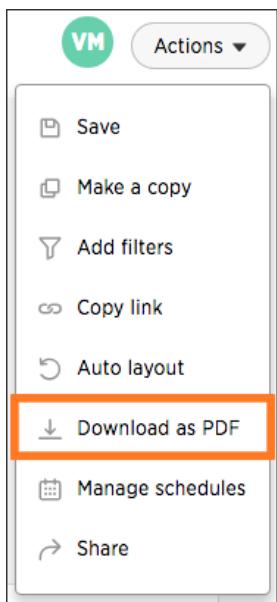


Figure 195: Download your pinboard

Start a slideshow

Displaying your pinboard as a slideshow is a good way to present its contents to others.

Presenting your pinboard displays your visualizations in order from left to right and top to bottom.

To start a slideshow:

1. Click on **Pinboards**, on the top navigation bar.



Figure 196: Pinboards

2. On the pinboard list page, click the pinboard you would like to present.
3. Click **Present** under the dropdown menu of the visualization you would like to start the slideshow with.

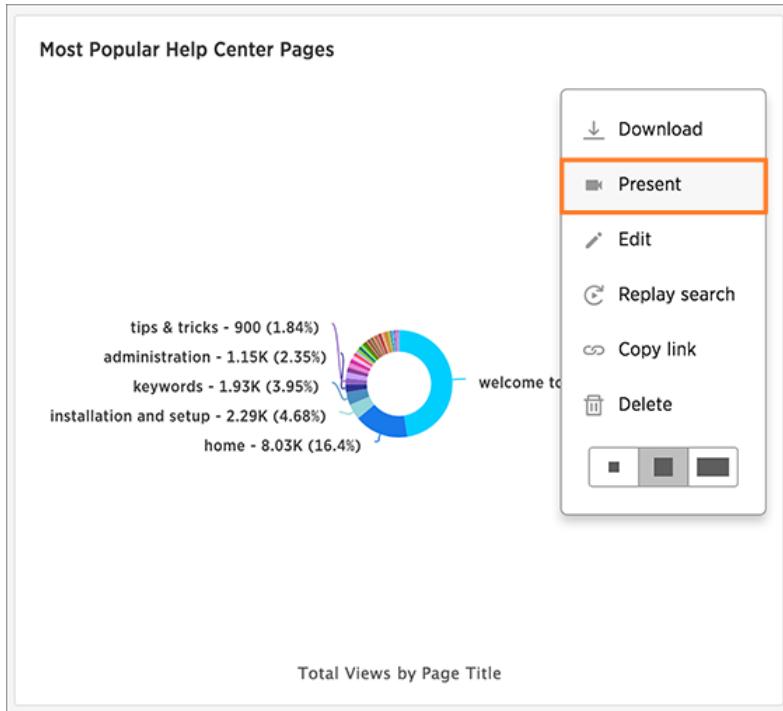


Figure 197: Present a visualization

4. Use the left and right arrow keys to navigate between your pinboard's visualizations.

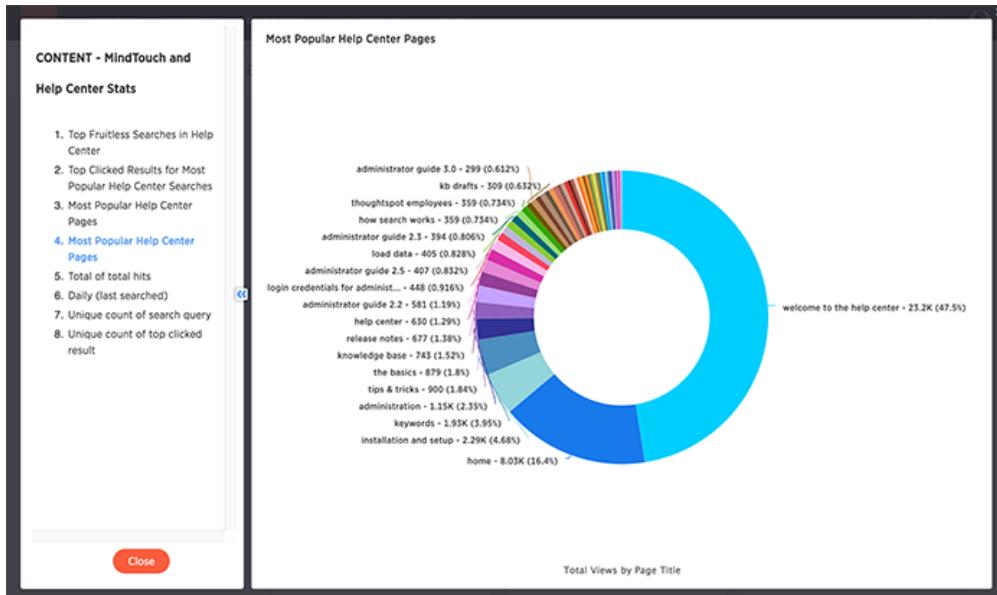


Figure 198: Pinboard slideshow view

Click the **x** at the top right of the screen or push the **Esc** key to exit the slideshow view.

Delete a visualization

You can remove a visualization from your pinboard.

To delete a visualization:

1. Click on **Pinboards**, on the top navigation bar.



Figure 199: Pinboards

2. On the pinboard list page, click the pinboard you would like to edit.
3. Click **Delete** under the dropdown menu of the visualization you would like to delete.

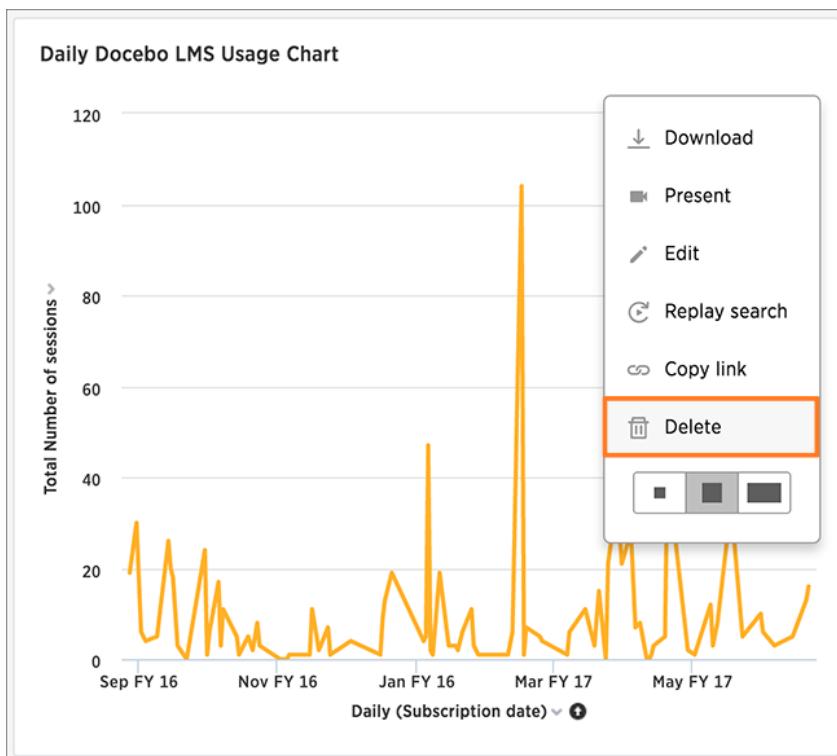


Figure 200: Delete a visualization

4. Save your pinboard by clicking **Actions** and **Save**.

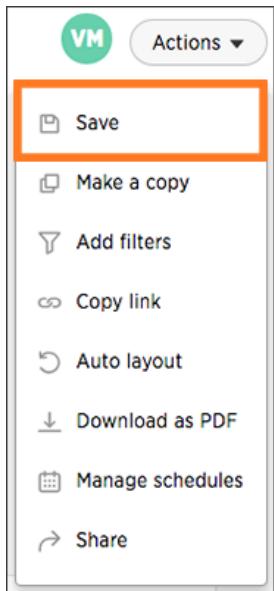


Figure 201: Save your pinboard

Chapter 5: Working with data

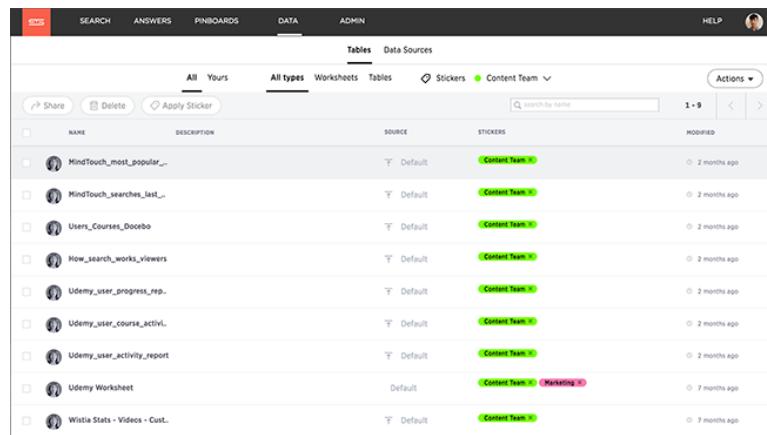
Topics:

- Generate CSV files with the data to be loaded
- Load data from a web browser
- Append data from a web browser
- View your data profile
- About sharing

The **Data** tab takes you to a list page of all of the tables and data sources available to you.

Use the filters at the top of the page to find the data you are interested in. Clicking on the name of one of a table or data source shows you detailed information about it. You won't be able to change these settings or edit the table unless it was shared with you with the **Edit** privilege. To see how to edit a data source, refer to the ThoughtSpot Administrator Guide.

From the **Data** screen, you can also delete or apply stickers to tables and data sources in bulk by selecting them and clicking the appropriate action button.



The screenshot shows the ThoughtSpot Data page interface. At the top, there are tabs for SEARCH, ANSWERS, PINBOARDS, DATA (which is selected), and ADMIN. Below the tabs, there are two main sections: 'Tables' and 'Data Sources'. Under 'Tables', there are filters for 'All', 'Yours', 'All types', 'Worksheets', 'Tables', and 'Stickers'. There is also a search bar and a 'Actions' dropdown. The main area displays a list of tables with columns for NAME, DESCRIPTION, SOURCE, STICKERS, and MODIFIED. Each table entry includes a small preview icon, the table name, its source (e.g., Default, Content Team), any applied stickers (e.g., Content Team, Marketing), and the last modified date (e.g., 2 months ago). One entry has 'Marketing' sticker applied.

Figure 202: Data page

There are three types of data sources that you may see in the data list. They are tables, worksheets, and

user uploaded data. You will most likely only see worksheets and user uploaded sources. These are the most commonly used data sources for searching.

Name	Icon	Definition	Created By
Table		Raw tables loaded by an Administrator.	Administrators
Worksheet		Collection of related tables, optimized for searching. (Like a view).	Anyone
User Imported		Table uploaded by a user through the Web browser.	Anyone

Figure 203: Types of Data Sources

Generate CSV files with the data to be loaded

The first step in loading data is to obtain or create one or more flat files that contain the data to be loaded into ThoughtSpot.

Your data should be in a CSV (comma separated values) or delimited flat file before you load it. A CSV file is a text file made up of data fields separated by a delimiter and optionally enclosed with an enclosing character. If your data contains multiple tables, you'll have a separate CSV for each table.

A CSV file contains:

- A delimiter that marks the separation between fields in the data. The delimiter is usually comma, but it can be any character.
- Fields optionally enclosed with double quotes.

Use these guidelines when creating the CSV file:

- Columns in the CSV file must be in the same order as defined in the target table.
- If the CSV contains column headers, they must match the column names in the database exactly.
- Often a | (pipe) or tab is used as the delimiter, because it may be less likely to occur within the data values.
- When a field contains a double quote, it must be escaped with the character specified in the escape character argument in tsload.
- When a field contains the delimiter, the field must be enclosed in double quotes.

For more information about CSV files and the rules for creating them, check http://en.wikipedia.org/wiki/Comma-separated_values.

1. If your source is another database:
 - a) Connect to the source database.

- b) Export each of the tables you wish to import into ThoughtSpot as a CSV file, specifying a delimiter of comma, | (pipe) or tab.
2. If your source is an Excel spreadsheet, save it as a CSV file.

Load data from a web browser

The simplest way to load data is to upload a CSV or Excel file from the ThoughtSpot Web interface. This method is recommended for small, one time data loads. Using this method, the data schema is created for you automatically.

Loading data from a Web browser requires your data to be in a CSV (comma separated values) or a native Excel file.

Any user who belongs to a group that has the privilege **Has administration privileges** or **Can upload user data** will be able to upload their own data from the browser.

CSV is a common format for transferring data between databases. Your ETL (extract, transform, load) process will typically generate CSV files. You can also create a CSV file from a Microsoft Excel spreadsheet by opening the spreadsheet in Excel, choosing **Save As** and selecting CSV.

ThoughtSpot supports a wide range of [date and timestamp formats](#) in the CSV file.

Loading data through the Web browser is recommended for smaller tables (under 50MB) with simple relationships between them. If you are loading a fact table that joins to dimension tables, you must load the fact table first, and then the dimension tables. The joining key must be a single column of unique values in the dimension table. NULL values in the fact table will not be able to be joined.

Blank values in user uploaded CSV files are interpreted as NULL values. These include the values (case insensitive):

- NULL

- \N
- NA
- N/A
- [space]

To load the CSV or Excel file into ThoughtSpot:

1. [Log in to ThoughtSpot from a browser.](#)
2. Click on **Data**, on the top navigation bar.



Figure 204: Data

3. Click the **Actions** button in the upper right corner, and select **Upload Data**.

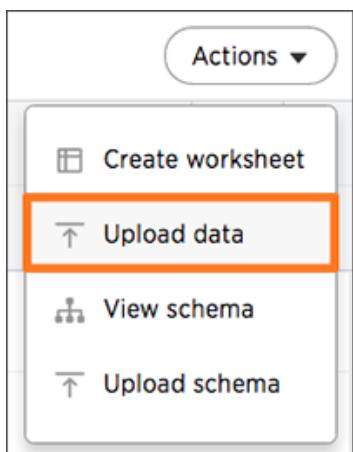


Figure 205: Upload data

4. Upload the CSV or Excel file by doing one of these options:
 - Click on **Browse your files** and select the file.
 - Drag and drop the file into the drop area.
5. Answer the question **Are the column names already defined in the file header?**
6. Answer the question **Are the fields separated by?** Click **Next**.

7. Click on the column header names to change them to more useful names, if you'd like. Click **Next**.
8. Review the automatically generated data types for each column, and make any changes you want. There are four data types: Text, Integer, Decimal, and Date.
9. Click **Import**.
10. Click **Link to Existing Data** if you want to link the data you uploaded to the data in another table or worksheet. Or click **Search** if you want to begin a new search.

Append data from a web browser

You can append data to your existing system tables through the ThoughtSpot application, even if the tables were initially loaded using Data Connect or tsload.

Loading data from a Web browser requires your data to be in a CSV (comma separated values) or a native Excel file. The file must have the same structure as the table it is being loaded into, including number and type of columns, in the same order as the target table.

Any user who belongs to a group that has the privilege **Has administration privileges** or **Can upload user data** will be able to upload their own data from the browser.

CSV is a common format for transferring data between databases. Your ETL (extract, transform, load) process will typically generate CSV files. You can also create a CSV file from a Microsoft Excel spreadsheet by opening the spreadsheet in Excel, choosing **Save As** and selecting CSV.

ThoughtSpot supports a wide range of [date and timestamp formats](#) in the CSV file.

Loading data through the Web browser is recommended for smaller tables (under 50MB) with simple relationships between them. If you are loading a fact

table that joins to dimension tables, you must load the fact table first, and then the dimension tables. The joining key must be a single column of unique values in the dimension table. NULL values in the fact table will not be able to be joined.

Blank values in user uploaded CSV files are interpreted as NULL values. These include the values (case insensitive):

- NULL
- \N
- NA
- N/A
- [space]

To append data into ThoughtSpot:

1. [Log in to ThoughtSpot from a browser.](#)
2. Click on **Data**, on the top navigation bar.



Figure 206: Data

3. Click the on the table you would like to append data to.
4. Click the **Load data** button.

A screenshot of the "Load data" interface for the "stackedexample" table. The interface has a header with tabs: IMPORTED, stackedexample, Columns (underlined), Data, Relationships, Dependents, Row security, Load data (button with an orange border), and Save. Below the header is a table with columns: COLUMN NAME, DESCRIPTION, DATA TYPE, COLUMN TYPE, ADDITIVE, AGGREGATION, and HIDDEN. The table rows are: Company (VARCHAR, ATTRIBUTE, NO, NONE, NO), Number of emplo.. (INT64, MEASURE, YES, SUM, NO), and Department (VARCHAR, ATTRIBUTE, NO, NONE, NO).

Figure 207: Load data

5. Upload the CSV or Excel file by doing one of these options:
 - Click on **Browse your files** and select the file.

- Drag and drop the file into the drop area.
6. Answer the question **Are the column names already defined in the file header?**
7. Answer the question **Do you want to append to the existing data or overwrite it?**
8. Answer the question **Are the fields separated by?** Click **Next**.
9. Click on the column header names to change them to more useful names, if you'd like. Click **Next**.
10. Review the automatically generated data types for each column, and make any changes you want. There are four data types: Text, Integer, Decimal, and Date.
11. Click **Import**.
12. Click **Link to Existing Data** if you want to link the data you uploaded to the data in another table or worksheet. Or click **Search** if you want to begin a new search.

View your data profile

Basic column data profile information is available under **Profile** on the Data page.

When data is first loaded into ThoughtSpot, it is often unfamiliar to users. This profile view should help you get a better sense of what's there before asking questions on the data.

Tables Data Sources						
SYSTEM TABLE LINEORDER		Columns	Data	Profile	Relationships	Dependents
		Load data				Row security
	ORDER TOTAL PRICE	DISCOUNT	REVENUE	SUPPLY COST	TAX	COMMIT DATE
NULL VALUES	0	0	0	0	0	0
MIN	0	0	0	0	0	02/10/1992
MAX	43,226,660	10	10,304,950	125,159	8	10/24/1998
AVERAGE	19,100,242.55	5.05	3,608,079.64	89,749.2	4.04	N/A
SUM	95,558,513,471	25,254	18,051,222,4..	449,015,252	20,228	N/A

Figure 208: Column profile view

The data profile includes null values, min, max, average, and sum information for each column.

About sharing

Whenever you are working in ThoughtSpot, you are in your own private environment until you share your work with others. This applies to searches, pinboards, and any data you upload.

Objects you can share

This is a list of objects a regular, non-administrator user can share. Administrators have more granular control over data security.

You can share with groups and with individual people. You can share several different types of objects:

Table 14: What you can share

Object type	Description	Default security model	Sharing procedure
Uploaded data	Data that was uploaded using a Web browser.	Only the user who uploaded the data (and any user with administrator privileges) has access to it by default. They can share	Share uploaded data

Object type	Description	Default security model	Sharing procedure
		a table (or selected columns) with other people or groups.	
Pinboards	A pinboard of saved search results.	Anyone who can view a pinboard can share it.	Share a pinboard
Answers	The result of a single search.	Anyone who can view an answer can share it.	Share answers

Share a pinboard

You do not have to be an administrator or the owner to share saved pinboards.

Any user can share them, based on the access levels the user has.

Whenever you view a pinboard you have the option of sharing it with others.

What you are really sharing is a live link to the pinboard, when you click **Share with....** So whenever someone else views it, they will see the most recently saved version with the most recent data.

1. Configure the pinboard to look as you'll want it to appear when shared.
2. Click the **Share** icon.

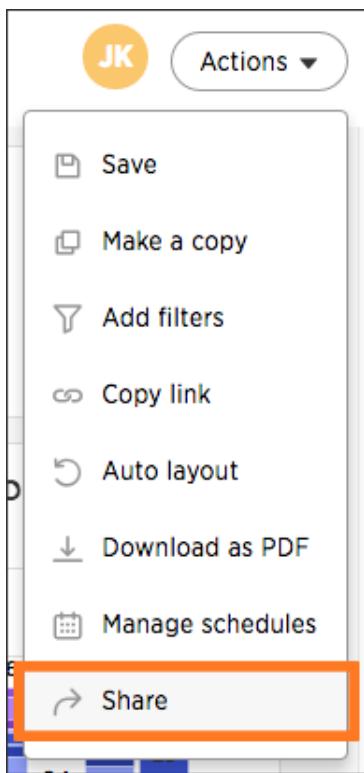


Figure 209: Share with option

3. Click **+ Add users or groups** and select users or groups that you want to share with.

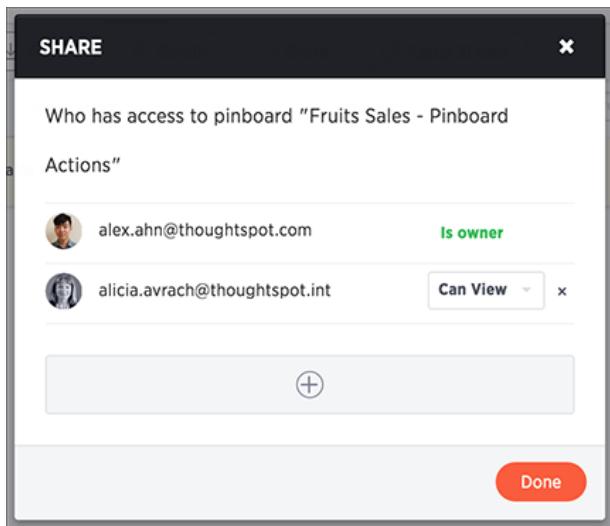


Figure 210: Configure sharing settings

4. Configure the level of access by selecting from the dropdown list. You will only see options available, based on your own access level. For example, if you have only **View** access, you cannot share as **Edit**. You can select:
 - **Can View** to provide read-only access. If the person doesn't have access to the underlying data, they can only view a shared pinboard. If they change anything on the pinboard, their changes are not saved. In order to persist the changes, the user would need to make a copy of the modified pinboard.
 - **Can Edit** to allow modification. Enables renaming or deleting the shared pinboard. If a person with edit privileges modifies a shared pinboard, their changes will be saved to it.
5. Click **Add and Save**.
6. Click **Add Permissions**.

Share answers

You do not have to be an administrator or the owner, to share saved answers. Any user can share them, based on the access levels the user has.

Whenever you view an answer, you have the option of sharing it with others. It will be shared in its current state, so if you have modified the answer by interacting with the table or chart, the modified version is what will be shared.

1. Configure the answer to look as you'll want it to appear when shared.
2. Save the answer by clicking **Actions** and **Save**.
3. Click **Actions** and then **Share**.

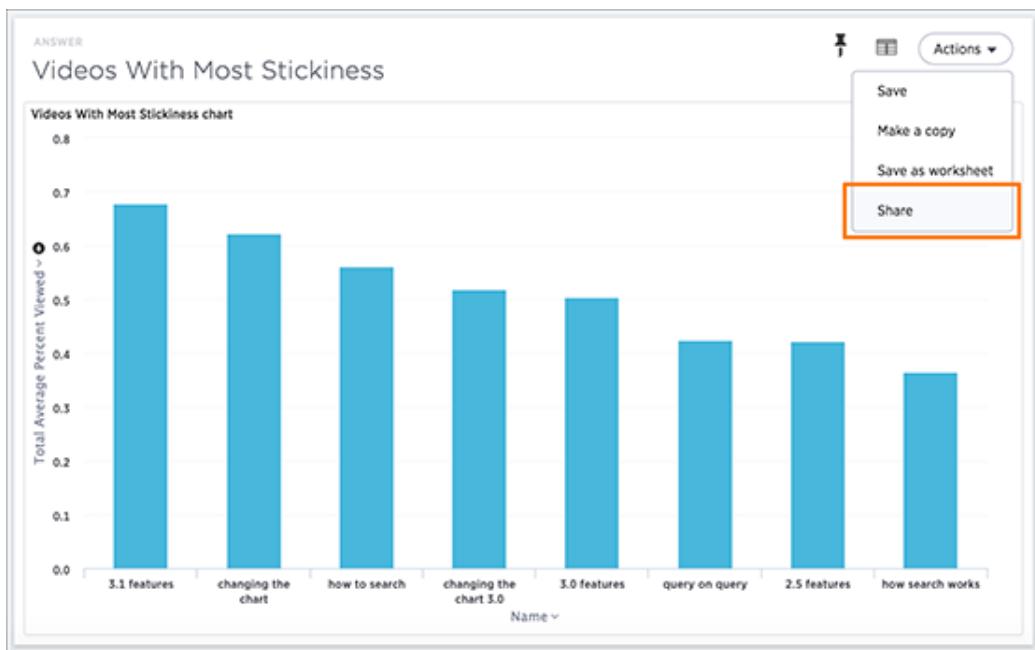


Figure 211: Share an answer

4. Click **+ Add users or groups** and select users or groups that you want to share with.

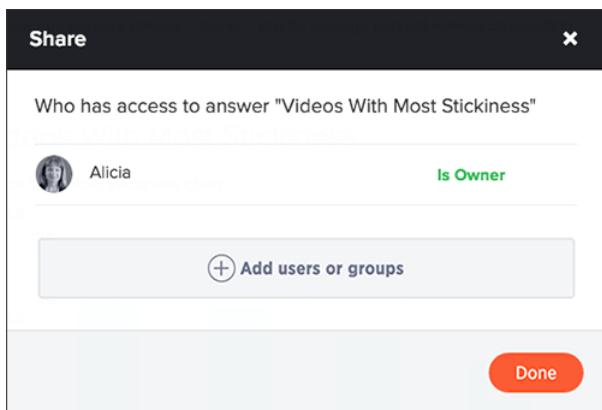


Figure 212: Configure answer sharing settings

5. Configure the level of access by selecting from the dropdown list. You can select:
 - **Can View** to provide read-only access. If the user doesn't have access to the underlying worksheet, they can only view the shared answer.
 - **Can Edit** to allow modification. Enables renaming or deleting the shared answer. If a user with edit privileges modifies a shared answer, their changes will be saved to it.
6. Click **Add and Save**.
7. Click **Done**.

Share uploaded data

If you upload a spreadsheet, you can share **Can View** or **Can Edit** privileges with other people, who can further share them with others.

Data that you uploaded from a Web browser is only visible to you and to the administrator. You can share the entire uploaded table, or only some of its columns.

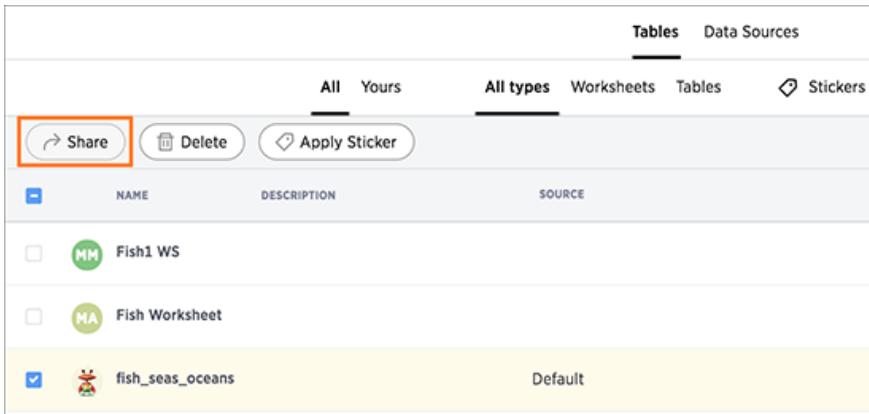
Share uploaded data by following these steps:

1. Click on **Data**, on the top navigation bar.



Figure 213: Data

2. Click on the name of the uploaded data you want to share.
3. Click the **Share** icon.



	NAME	DESCRIPTION	SOURCE
<input type="checkbox"/>	 Fish1 WS		
<input type="checkbox"/>	 Fish Worksheet		
<input checked="" type="checkbox"/>	 fish_seas_oceans		Default

Figure 214: Select tables to share

4. Select **Entire Table** or **Specific Columns**.

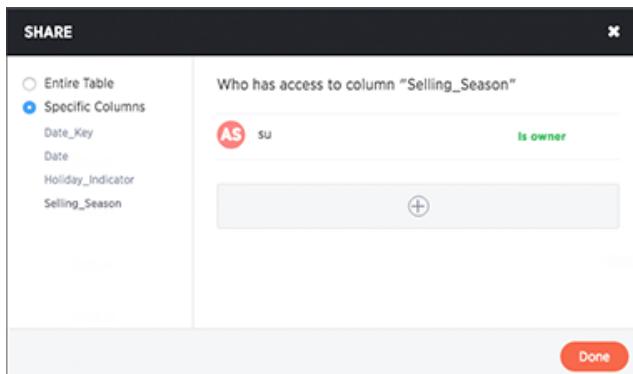
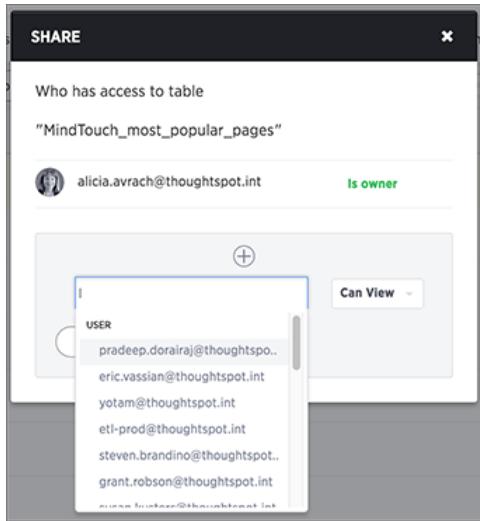


Figure 215: Configure table sharing settings

5. If you selected **Specific Columns**, select the column(s) to share.
6. Click **+ Add users or groups** and select the users and groups that you want to share with.

Figure 216: Select people to share with



7. Configure the level of access by selecting from the dropdown list. You can select:

- **Can View** to provide read-only access. This enables viewing the table data and defining worksheets on the table.
- **Can Edit** to allow modification. This enables renaming, modifying, or deleting the entire table and adding or removing its columns.

8. Click **Add and Save**.

9. Click **Done**.

Revoke access (unshare)

You may need to revoke access to an object (table, worksheet, or pinboard) that you have previously shared. Unsharing an object is very similar to sharing it.

To unshare one or more objects:

1. Go to the area where the object(s) you want to unshare is located. From the top menu bar:
 - If the object is a table or worksheet, click **Data**.
 - If the object is a pinboard, click **Pinboards**.
 - If the object is an answer, click **Answers**.

2. Find the object(s) in the list, and check the corresponding box(es).

3. Click the **Share** icon.

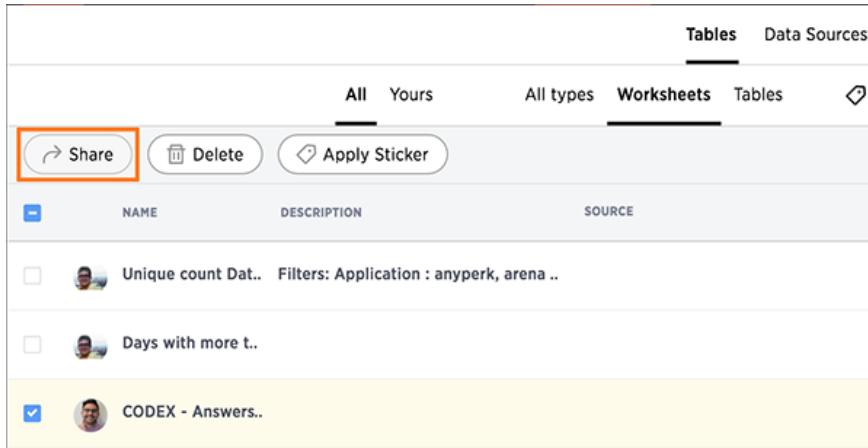


Figure 217: The Share icon

4. Click the X next to the users and groups that you want to remove from sharing.

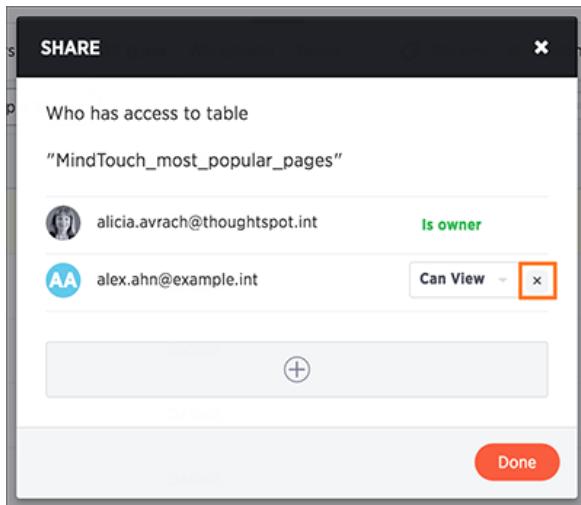


Figure 218: Click the X to unshare

5. Click **Done**.

Chapter 6: About the Help Center

Topics:

- [What you can find in the Help Center](#)

The online Help Center serves as your first line of support for when you run into any questions while using ThoughtSpot.

The Help Center can be accessed by clicking on **Help** on the top navigation bar. This opens a simple dialog box with links to How to search, Keywords, Release notes, Documentation, and Downloads. Click one of them to open a new tab containing your selected topic.

What you can find in the Help Center

The Help Center provides links to different resources that were created to help you use ThoughtSpot.

The Help Center provides the following resources:

- **A search bar** - You can use the search bar to search through all of ThoughtSpot's documentation and videos.
- **Short training videos** - Each of these videos cover a popular topic or feature, especially those that have just been released.
- **Keyword reference** - This reference contains all of the keywords that you can use to improve your search experience. The keywords are categorized into sections, and each of them are accompanied by an example.
- **Release Notes** - A new Release Notes is made available with every major, minor, and patch release. It contains information on new features and bug fixes.
- **Documentation** - The Documentation section includes links to various documentation guides and topics.
- **Downloads** - You can download ThoughtSpot clients and API files from here, including ODBC and JDBC drivers and the Data API.
- **Support contact information** - If you still can't find what you're looking for, you can contact support.

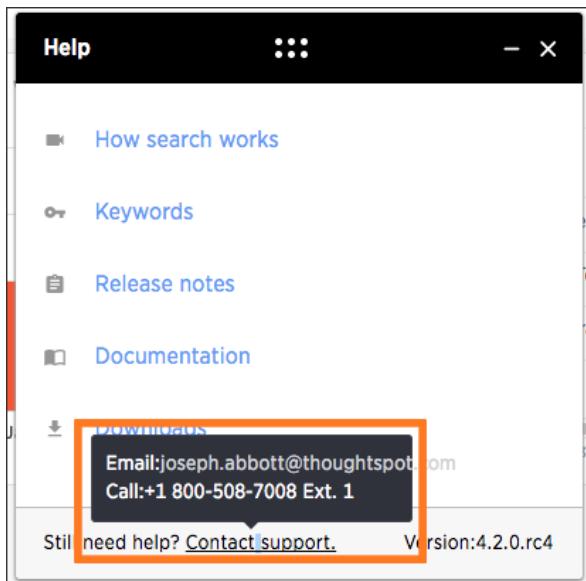


Figure 219: Contact support

- Version information: The version number of the ThoughtSpot instance you are currently using can be found in the Help Center.

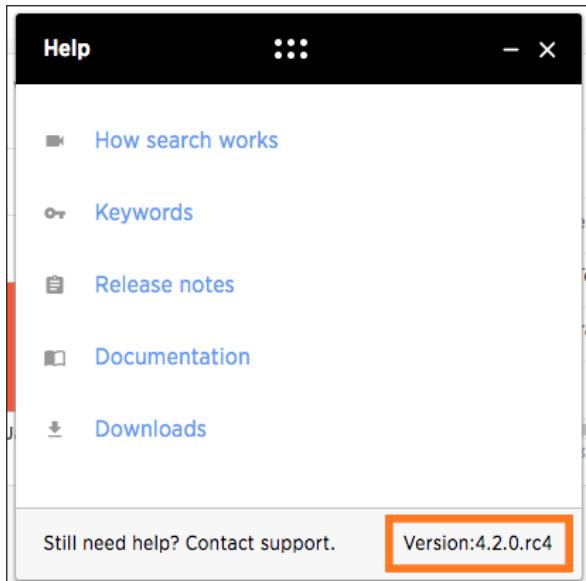


Figure 220: Version number

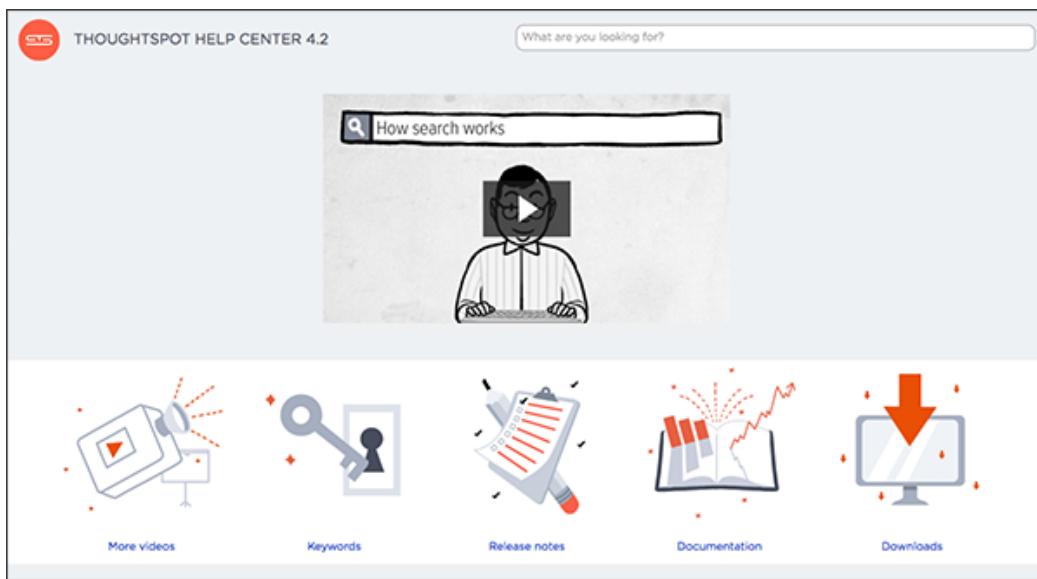


Figure 221: Help Center home page

Chapter 7: Reference guide

Topics:

- [Keyword reference](#)
- [Formula reference](#)
- [Date and time formats reference](#)

This Reference Guide contains keyword, formula, and date and time format lists with examples to use with all the features found in ThoughtSpot.

Included in this guide are:

- [Keyword reference](#) lists the available keywords to use in your search. These are also listed in the Help Center, which is available from **Help** on the top navigation bar in ThoughtSpot.
- [Formula reference](#) lists the available formula operators and functions. These are also listed in the Formula Assistant, which is available from the place in ThoughtSpot where you build formulas.
- [Date and time formats reference](#) lists the accepted date, time, and timestamp formats that you can use when uploading data through the Web interface or using the ThoughtSpot Loader.

Keyword reference

You can use keywords when asking a question to help define your search. This reference lists the various keywords.

You can also see this list of keywords and examples from within the help center.

Table 15: Basic keywords

Function	Examples
top	<ul style="list-style-type: none"> • top sales rep by count sales for average revenue >10000 • sales rep average revenue for each region top
bottom	<ul style="list-style-type: none"> • bottom revenue average revenue by state • customer by revenue for each sales rep bottom
top <i>n</i>	<ul style="list-style-type: none"> • top 10 sales rep revenue
bottom <i>n</i>	<ul style="list-style-type: none"> • bottom 25 customer by revenue for each sales rep
sort by	<ul style="list-style-type: none"> • revenue by state sort by average revenue • revenue by customer sort by region

Table 16: Date keywords

Function	Examples
after	<ul style="list-style-type: none"> • order date after 10/31/2014
before	<ul style="list-style-type: none"> • order date before 03/01/2014
between ... and ...	<ul style="list-style-type: none"> • order date between 01/01/2012 and 01/01/2013
day of week	<ul style="list-style-type: none"> • revenue by day of week last 6 months
week	<ul style="list-style-type: none"> • revenue by week last quarter
month	<ul style="list-style-type: none"> • revenue by month last year

Function	Examples
daily	<ul style="list-style-type: none"> shipments by region daily
weekly	<ul style="list-style-type: none"> revenue weekly
monthly	<ul style="list-style-type: none"> commission > 10000 monthly
quarterly	<ul style="list-style-type: none"> sales quarterly for each product
yearly	<ul style="list-style-type: none"> shipments by product yearly
<i>day of week</i>	<ul style="list-style-type: none"> count shipments Monday
<i>month</i>	<ul style="list-style-type: none"> commission January
<i>month year</i>	<ul style="list-style-type: none"> commission by sales rep February 2014
<i>year</i>	<ul style="list-style-type: none"> revenue by product 2013 product name contains snowboard
yesterday	<ul style="list-style-type: none"> sales yesterday for pro-ski200 by store
week to date	<ul style="list-style-type: none"> sales by order date week to date for pro-ski200
month to date	<ul style="list-style-type: none"> sales by product month to date sales > 2400
quarter to date	<ul style="list-style-type: none"> sales by product quarter to date for top 10 products by sales
year to date	<ul style="list-style-type: none"> sales by product year to date
last day	<ul style="list-style-type: none"> customers last day by referrer
last week	<ul style="list-style-type: none"> customers last week by store
last month	<ul style="list-style-type: none"> customers last month by day
last quarter	<ul style="list-style-type: none"> customers last quarter sale >300
last year	<ul style="list-style-type: none"> top 10 customers last year by sale by store for region west

Function	Examples
last <i>n</i> days	<ul style="list-style-type: none"> visitors last 7 days
last <i>n</i> weeks	<ul style="list-style-type: none"> visitors last 10 weeks by day
last <i>n</i> months	<ul style="list-style-type: none"> visitors last 6 months for homepage visits > 30 by month
last <i>n</i> quarters	<ul style="list-style-type: none"> visitors last 2 quarters by month by campaign
last <i>n</i> years	<ul style="list-style-type: none"> visitors last 5 years by revenue for sum revenue >5000
growth of ... by ...	<ul style="list-style-type: none"> growth of sales by order date
growth of ... by ... daily	<ul style="list-style-type: none"> growth of sales by order date daily
growth of ... by ... monthly	<ul style="list-style-type: none"> growth of sales by date shipped monthly sales > 24000
growth of ... by ... weekly	<ul style="list-style-type: none"> growth of sales by receipt date weekly for proski2000
growth of ... by ... quarterly	<ul style="list-style-type: none"> growth of sales by date shipped quarterly
growth of ... by ... yearly	<ul style="list-style-type: none"> growth of sales by date closed yearly
daily year-over-year	<ul style="list-style-type: none"> growth of revenue by order date daily year-over-year
weekly year-over-year	<ul style="list-style-type: none"> growth of revenue by date shipped weekly year-over-year
monthly year-over-year	<ul style="list-style-type: none"> growth of revenue by receipt date monthly year-over-year
quarterly year-over-year	<ul style="list-style-type: none"> growth of revenue by date shipped quarterly year-over-year
<i>n</i> days ago	<ul style="list-style-type: none"> sales 2 days ago

Function	Examples
n weeks ago	<ul style="list-style-type: none"> sales 4 weeks ago by store
n months ago	<ul style="list-style-type: none"> sales 2 months ago by region
n quarters ago	<ul style="list-style-type: none"> sales 4 quarters ago by product name contains deluxe
n years ago	<ul style="list-style-type: none"> sales 5 years ago by store for region west
today	<ul style="list-style-type: none"> sales today by store
next day	<ul style="list-style-type: none"> shipments next day by order
next week	<ul style="list-style-type: none"> shipments next week by store
next month	<ul style="list-style-type: none"> appointments next month by day
next quarter	<ul style="list-style-type: none"> opportunities next quarter amount > 30000
next year	<ul style="list-style-type: none"> opportunities next year by sales rep
next n days	<ul style="list-style-type: none"> shipments next 7 days
next n weeks	<ul style="list-style-type: none"> shipments next 10 weeks by day
next n months	<ul style="list-style-type: none"> openings next 6 months location
next n quarters	<ul style="list-style-type: none"> opportunities next 2 quarters by campaign
next n years	<ul style="list-style-type: none"> opportunities next 5 years by revenue

Table 17: Time keywords

Function	Examples
detailed	<ul style="list-style-type: none"> ship time detailed
last minute	<ul style="list-style-type: none"> count homepage views last minute
last hour	<ul style="list-style-type: none"> count unique visits last hour

Function	Examples
last <i>n</i> minutes	<ul style="list-style-type: none"> count visitors last 30 minutes
last <i>n</i> hours	<ul style="list-style-type: none"> count visitors last 12 hours
hourly	<ul style="list-style-type: none"> visitors by page name hourly
<i>n</i> minutes ago	<ul style="list-style-type: none"> sum inventory by product 10 minutes ago
<i>n</i> hours ago	<ul style="list-style-type: none"> sum inventory by product by store 2 hours ago

Table 18: Text keywords

Function	Examples
begins with	<ul style="list-style-type: none"> product name begins with 'pro'
contains	<ul style="list-style-type: none"> product name contains "alpine" description contains "snow shoe"
ends with	<ul style="list-style-type: none"> product name ends with 'deluxe'
not begins with	<ul style="list-style-type: none"> product name not begins with "tom's"
not contains	<ul style="list-style-type: none"> product color not contains 'tan' product color not contains 'red'
not ends with	<ul style="list-style-type: none"> product name not ends with "trial"
similar to	<ul style="list-style-type: none"> course name similar to 'hand'
not similar to	<ul style="list-style-type: none"> course name not similar to 'hand'

Table 19: Number keywords

Function	Examples
sum	<ul style="list-style-type: none"> sum revenue
average	<ul style="list-style-type: none"> average revenue by store

Function	Examples
count	<ul style="list-style-type: none"> • count visitors by site
max	<ul style="list-style-type: none"> • max sales by visitor by site
min	<ul style="list-style-type: none"> • min revenue by store by campaign for cost > 5000
standard deviation	<ul style="list-style-type: none"> • standard deviation revenue by product by month for date after 10/31/2010
unique count	<ul style="list-style-type: none"> • unique count visitor by product page last week
variance	<ul style="list-style-type: none"> • variance sale amount by visitor by product for last year

Table 20: Filter keywords

Function	Examples
between... and	<ul style="list-style-type: none"> • revenue between 0 and 1000
>	<ul style="list-style-type: none"> • sum sale amount by visitor by product for last year sale amount > 2000
<	<ul style="list-style-type: none"> • unique count visitor by product by store for sale amount < 20
>=	<ul style="list-style-type: none"> • count calls by employee lastname >= m
<=	<ul style="list-style-type: none"> • count shipments by city latitude <= 0
=	<ul style="list-style-type: none"> • unique count visitor by store purchased products = 3 for last 5 days
!=	<ul style="list-style-type: none"> • sum sale amount region != canada region != mexico

Table 21: Location keywords

Function	Examples
near	<ul style="list-style-type: none"> revenue store name county near san francisco
near... within <i>n</i> miles km meters	<ul style="list-style-type: none"> revenue store name county near alameda within 50 miles
farther than <i>n</i> miles km meters from	<ul style="list-style-type: none"> average hours worked branch farther than 80 km from scarborough

 **Note:** Location keywords only work for searches where the data source includes latitude/longitude data.

Formula reference

ThoughtSpot allows you to create derived columns in worksheets using formulas. This reference lists the various operators and functions you can use to create formulas.

You can also see this list of operators and examples from within the Formula Builder by selecting **Formula Assistant**.

Aggregate functions

These functions can be used to aggregate data.

Table 22: Mixed functions for use in formulas

Function	Description	Examples
average	Returns the average of all the values of a column.	<ul style="list-style-type: none"> average (revenue)
count	Returns the number of rows in the table containing the column.	<ul style="list-style-type: none"> count (product)

Function	Description	Examples
cumulative_average	Takes a measure and one or more attributes. Returns the average of the measure, accumulated by the attribute(s) in the order specified.	<ul style="list-style-type: none"> • <code>cumulative_average (revenue, order date, state)</code>
cumulative_max	Takes a measure and one or more attributes. Returns the maximum of the measure, accumulated by the attribute(s) in the order specified.	<ul style="list-style-type: none"> • <code>cumulative_max (revenue, state)</code>
cumulative_min	Takes a measure and one or more attributes. Returns the minimum of the measure, accumulated by the attribute(s) in the order specified.	<ul style="list-style-type: none"> • <code>cumulative_min (revenue, campaign)</code>
cumulative_sum	Takes a measure and one or more attributes. Returns the sum of the measure, accumulated by the attribute(s) in the order specified.	<ul style="list-style-type: none"> • <code>cumulative_sum (revenue, order date)</code>
group_average	Takes a measure and one or more attributes. Returns the average of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • <code>group_average (revenue, customer region, state)</code>
group_count	Takes a measure and one or more attributes. Returns the count of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • <code>group_count (revenue, customer region)</code>

Function	Description	Examples
group_max	Takes a measure and one or more attributes. Returns the maximum of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • <code>group_max (revenue, customer region)</code>
group_min	Takes a measure and one or more attributes. Returns the minimum of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • <code>group_min (revenue, customer region)</code>
group_stddev	Takes a measure and one or more attributes. Returns the standard deviation of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • <code>group_stddev (revenue, customer region)</code>
group_sum	Takes a measure and one or more attributes. Returns the sum of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • <code>group_sum (revenue, customer region)</code>
group_unique_count	Takes a measure and one or more attributes. Returns the unique count of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • <code>group_unique_count (product , supplier)</code>
group_variance	Takes a measure and one or more attributes. Returns the variance of the measure grouped by the attribute(s).	<ul style="list-style-type: none"> • <code>group_variance (revenue, customer region)</code>
max	Returns the maximum value of a column.	<ul style="list-style-type: none"> • <code>max (sales)</code>
min	Returns the minimum value of a column.	<ul style="list-style-type: none"> • <code>min (revenue)</code>
moving_average	Takes a measure, two integers to define the window to aggregate over, and one or	<ul style="list-style-type: none"> • <code>moving_average (revenue, 2, 1, customer region)</code>

Function	Description	Examples
	more attributes. The window is (current - Num1...Current + Num2) with both end points being included in the window. For example, "1,1" will have a window size of 3. To define a window that begins before Current, specify a negative number for Num2. Returns the average of the measure over the given window. The attributes are the ordering columns used to compute the moving average.	
moving_max	Takes a measure, two integers to define the window to aggregate over, and one or more attributes. The window is (current - Num1...Current + Num2) with both end points being included in the window. For example, "1,1" will have a window size of 3. To define a window that begins before Current, specify a negative number for Num2. Returns the maximum of the measure over the given window. The attributes are the ordering columns used to compute the moving maximum.	<ul style="list-style-type: none"> <code>moving_max (complaints, 1, 2, store name)</code>
moving_min	Takes a measure, two integers to define the window to aggregate over, and one or more attributes. The window	<ul style="list-style-type: none"> <code>moving_min (defects, 3, 1, product)</code>

Function	Description	Examples
	<p>is (current - Num1...Current + Num2) with both end points being included in the window.</p> <p>For example, "1,1" will have a window size of 3. To define a window that begins before Current, specify a negative number for Num2. Returns the minimum of the measure over the given window. The attributes are the ordering columns used to compute the moving minimum.</p>	
moving_sum	<p>Takes a measure, two integers to define the window to aggregate over, and one or more attributes. The window is (current - Num1...Current + Num2) with both end points being included in the window.</p> <p>For example, "1,1" will have a window size of 3. To define a window that begins before Current, specify a negative number for Num2. Returns the sum of the measure over the given window. The attributes are the ordering columns used to compute the moving sum.</p>	<ul style="list-style-type: none"> • <code>moving_sum (revenue, 1, 1, order date)</code>
stddev	Returns the standard deviation of all values of a column.	<ul style="list-style-type: none"> • <code>stddev (revenue)</code>
sum	Returns the sum of all the values of a column.	<ul style="list-style-type: none"> • <code>sum (revenue)</code>

Function	Description	Examples
unique count	Returns the number of unique values of a column.	<ul style="list-style-type: none"> unique count (customer)
variance	Returns the variance of all the values of a column.	<ul style="list-style-type: none"> variance (revenue)

Conversion functions

These functions can be used to convert data from one data type to another.

Conversion to or from date data types is not supported.

Table 23: Conversion functions for use in formulas

Function	Description	Examples
to_bool	Returns the input as a boolean (true or false).	<ul style="list-style-type: none"> to_bool (0) = false to_bool (married)
to_date	Accepts a date represented as an integer or text string, and a second string parameter that can include strftime date formatting elements. Replaces all the valid strftime date formatting elements with their string counterparts and returns the result. Does not accept epoch formatted dates as input.	<ul style="list-style-type: none"> to_date (date_sold, '%Y-%m-%d')
to_double	Returns the input as a double.	<ul style="list-style-type: none"> to_double ('3.14') = 3.14 to_double (revenue * .01)
to_integer	Returns the input as an integer.	<ul style="list-style-type: none"> to_integer ('45') + 1 = 46 to_integer (price + tax - cost)
to_string	Returns the input as a text string.	<ul style="list-style-type: none"> to_string (45 + 1) = '46' to_string (revenue - cost)

Date functions

Table 24: Date functions for use in formulas

Function	Description	Examples
add_days	Returns the result of adding the specified number of days to the given date.	<ul style="list-style-type: none"> • <code>add_days (01/30/2015, 5) = 02/04/2015</code> • <code>add_days (invoiced, 30)</code>
date	Returns the date portion of a given date.	<ul style="list-style-type: none"> • <code>date (home visit)</code>
day	Returns the number (1-31) of the day for the given date.	<ul style="list-style-type: none"> • <code>day (01/15/2014) = 15</code> • <code>day (date ordered)</code>
day_number_of_week	Returns the number (1-7) of the day in a week for the given date with 1 being Monday and 7 being Sunday.	<ul style="list-style-type: none"> • <code>day_number_of_week (01/30/2015) = 6</code> • <code>day_number_of_week (shipped)</code>
day_number_of_year	Returns the number (1-366) of the day in a year for the given date.	<ul style="list-style-type: none"> • <code>day_number_of_year (01/30/2015) = 30</code> • <code>day_number_of_year (invoiced)</code>
day_of_week	Returns the day of the week for the given date.	<ul style="list-style-type: none"> • <code>day_of_week (01/30/2015) = Friday</code> • <code>day_of_week (serviced)</code>
diff_days	Subtracts the second date from the first date and returns the result in number of days, rounded down if not exact.	<ul style="list-style-type: none"> • <code>diff_days (01/15/2014, 01/17/2014) = -2</code> • <code>diff_days (purchased, shipped)</code>
diff_time	Subtracts the second date from the first date and returns the result in number of seconds.	<ul style="list-style-type: none"> • <code>diff_time (01/01/2014, 01/01/2014) = -86,400</code> • <code>diff_time (clicked, submitted)</code>

Function	Description	Examples
hour_of_day	Returns the hour of the day for the given date.	<ul style="list-style-type: none"> hour_of_day (received)
is_weekend	Returns true if the given date falls on a Saturday or Sunday.	<ul style="list-style-type: none"> is_weekend (01/31/2015) = true is_weekend (emailed)
month	Returns the month from the given date.	<ul style="list-style-type: none"> month (01/15/2014) = January month (date ordered)
month_number	Returns the number (1-12) of the month for the given date.	<ul style="list-style-type: none"> month_number (09/20/2014) = 9 month_number (purchased)
now	Returns the current timestamp.	<ul style="list-style-type: none"> now ()
start_of_month	Returns the date for the first day of the month for the given date.	<ul style="list-style-type: none"> start_of_month (01/31/2015) = Jan FY 2015 start_of_month (shipped)
start_of_quarter	Returns the date for the first day of the quarter for the given date.	<ul style="list-style-type: none"> start_of_quarter (09/18/2015) = Q3 FY 2015 start_of_quarter (sold)
start_of_week	Returns the date for the first day of the week for the given date.	<ul style="list-style-type: none"> start_of_week (06/01/2015) = 05/30/2015 Week start_of_week (emailed)
start_of_year	Returns the date for the first day of the year for the given date.	<ul style="list-style-type: none"> start_of_year (02/15/2015) = FY 2015 start_of_year (joined)
time	Returns the time portion of a given date.	<ul style="list-style-type: none"> time (3/1/2002 10:32) = 10:32 time (call began)

Function	Description	Examples
year	Returns the year from the given date.	<ul style="list-style-type: none"> year (01/15/2014) = 2014 year (date ordered)

Mixed functions

These functions can be used with text and numeric data types.

Table 25: Mixed functions for use in formulas

Function	Description	Examples
!=	Returns true if the first value is not equal to the second value.	<ul style="list-style-type: none"> 3 != 2 = true revenue != 1000000
<	Returns true if the first value is less than the second value.	<ul style="list-style-type: none"> 3 < 2 = false revenue < 1000000
<=	Returns true if the first value is less than or equal to the second value.	<ul style="list-style-type: none"> 1 <= 2 = true revenue <= 1000000
=	Returns true if the first value is equal to the second value.	<ul style="list-style-type: none"> 2 = 2 = true revenue = 1000000
>	Returns true if the first value is greater than the second value.	<ul style="list-style-type: none"> 3 > 2 = true revenue > 1000000
>=	Returns true if the first value is greater than or equal to the second value.	<ul style="list-style-type: none"> 3 >= 2 = true revenue >= 1000000
greatest	Returns the larger of the values.	<ul style="list-style-type: none"> greatest (20, 10) = 20 greatest (q1 revenue, q2 revenue)
least	Returns the smaller of the values.	<ul style="list-style-type: none"> least (20, 10) = 10 least (q1 revenue, q2 revenue)

Number functions

Table 26: Number functions for use in formulas

Function	Description	Examples
*	Returns the result of multiplying both numbers.	<ul style="list-style-type: none"> <code>3 * 2 = 6</code> <code>price * taxrate</code>
+	Returns the result of adding both numbers.	<ul style="list-style-type: none"> <code>1 + 2 = 3</code> <code>price + shipping</code>
-	Returns the result of subtracting the second number from the first.	<ul style="list-style-type: none"> <code>3 - 2 = 1</code> <code>revenue - tax</code>
/	Returns the result of dividing the first number by the second.	<ul style="list-style-type: none"> <code>6 / 3 = 2</code> <code>markup / retail price</code>
^	Returns the first number raised to the power of the second.	<ul style="list-style-type: none"> <code>3 ^ 2 = 9</code> <code>width ^ 2</code>
abs	Returns the absolute value.	<ul style="list-style-type: none"> <code>abs (-10) = 10</code> <code>abs (profit)</code>
acos	Returns the inverse cosine in degrees.	<ul style="list-style-type: none"> <code>acos (0.5) = 60</code> <code>acos (cos-satellite-angle)</code>
asin	Returns the inverse sine (specified in degrees).	<ul style="list-style-type: none"> <code>asin (0.5) = 30</code> <code>asin (sin-satellite-angle)</code>
atan	Returns the inverse tangent in degrees.	<ul style="list-style-type: none"> <code>atan (1) = 45</code> <code>atan (tan-satellite-angle)</code>
atan2	Returns the inverse tangent in degrees.	<ul style="list-style-type: none"> <code>atan2 (10, 10) = 45</code> <code>atan2 (longitude, latitude)</code>
cbrt	Returns the cube root of a number.	<ul style="list-style-type: none"> <code>cbrt (27) = 3</code>

Function	Description	Examples
		<ul style="list-style-type: none"> • <code>cbrt (volume)</code>
ceil	Returns the smallest following integer.	<ul style="list-style-type: none"> • <code>ceil (5.9) = 6</code> • <code>ceil (growth rate)</code>
cos	Returns the cosine of an angle (specified in degrees).	<ul style="list-style-type: none"> • <code>cos (63) = 0.45</code> • <code>cos (beam angle)</code>
cube	Returns the cube of a number.	<ul style="list-style-type: none"> • <code>cube (3) = 27</code> • <code>cube (length)</code>
exp	Returns Euler's number (~2.718) raised to a power.	<ul style="list-style-type: none"> • <code>exp (2) = 7.38905609893</code> • <code>exp (growth)</code>
exp2	Returns 2 raised to a power.	<ul style="list-style-type: none"> • <code>exp2 (3) = 8</code> • <code>exp2 (growth)</code>
floor	Returns the largest previous integer.	<ul style="list-style-type: none"> • <code>floor (5.1) = 5</code> • <code>floor (growth rate)</code>
ln	Returns the natural logarithm.	<ul style="list-style-type: none"> • <code>ln (7.38905609893) = 2</code> • <code>ln (distance)</code>
log10	Returns the logarithm with base 10.	<ul style="list-style-type: none"> • <code>log10 (100) = 2</code> • <code>log10 (volume)</code>
log2	Returns the logarithm with base 2 (binary logarithm).	<ul style="list-style-type: none"> • <code>log2 (32) = 5</code> • <code>log2 (volume)</code>
mod	Returns the remainder of first number divided by the second number.	<ul style="list-style-type: none"> • <code>mod (8, 3) = 2</code> • <code>mod (revenue, quantity)</code>
pow	Returns the first number raised to the power of the second number.	<ul style="list-style-type: none"> • <code>pow (5, 2) = 25</code> • <code>pow (width, 2)</code>
random	Returns a random number between 0 and 1.	<ul style="list-style-type: none"> • <code>random () = .457718</code>

Function	Description	Examples
		<ul style="list-style-type: none"> random ()
round	Returns the first number rounded to the second number (the default is 1).	<ul style="list-style-type: none"> round (35.65, 10) = 40 round (battingavg, 100)
safe_divide	Returns the result of dividing the first number by the second. If the second number is 0, returns 0 instead of NaN (not a number).	<ul style="list-style-type: none"> safe_divide (12, 0) = 0 safe_divide (total_cost, units)
sign	Returns +1 if the number is greater than zero, -1 if less than zero, 0 if zero.	<ul style="list-style-type: none"> sign (-250) = -1 sign (growth rate)
sin	Returns the sine of an angle (specified in degrees).	<ul style="list-style-type: none"> sin (35) = 0.57 sin (beam angle)
spherical_distance	Returns the distance in km between two points on Earth.	<ul style="list-style-type: none"> spherical_distance (37.465191, -122.153617, 37.421962, -122.142174) = 4,961.96 spherical_distance (start_latitude, start_longitude, start_latitude, start_longitude)
sq	Returns the square of a numeric value.	<ul style="list-style-type: none"> sq (9) = 81 sq (width)
sqrt	Returns the square root.	<ul style="list-style-type: none"> sqrt (9) = 3 sqrt (area)
tan	Returns the tangent of an angle (specified in degrees).	<ul style="list-style-type: none"> tan (35) = 0.7 tan (beam angle)

Operators

Table 27: Operators for use in formulas

Operator	Description	Examples
and	Returns true when both conditions are true, otherwise returns false.	<ul style="list-style-type: none"> (1 = 1) and (3 > 2) = true lastname = 'smith' and state = 'texas'
if...then...else	Conditional operator.	<ul style="list-style-type: none"> if (3 > 2) then 'bigger' else 'not bigger' if (cost > 500) then 'flag' else 'approve'
ifnull	Returns the first value if it is not null, otherwise returns the second.	<ul style="list-style-type: none"> ifnull (cost, 'unknown')
isnull	Returns true if the value is null.	<ul style="list-style-type: none"> isnull (phone)
not	Returns true if the condition is false, otherwise returns false.	<ul style="list-style-type: none"> not (3 > 2) = false not (state = 'texas')
or	Returns true when either condition is true, otherwise returns false.	<ul style="list-style-type: none"> (1 = 5) or (3 > 2) = true state = 'california' or state = 'oregon'

Text functions

Table 28: Text functions for use in formulas

Function	Description	Examples
concat	Returns the two values as a concatenated text string.	<ul style="list-style-type: none"> concat ('hay', 'stack') = 'haystack' concat (last_name, first_name)
contains	Returns true if the first string contains the second string, otherwise returns false.	<ul style="list-style-type: none"> contains ('broomstick', 'room') = true

Function	Description	Examples
		<ul style="list-style-type: none"> • <code>contains (product, 'trial version')</code>
edit_distance	Accepts two text strings. Returns the edit distance (minimum number of operations required to transform one string into the other) as an integer. Works with strings under 1023 characters.	<ul style="list-style-type: none"> • <code>edit_distance ('attorney', 'atty') = 4</code> • <code>edit_distance (color, 'red')</code>
edit_distance_with_cap	Accepts two text strings and an integer to specify the upper limit cap for the edit distance (minimum number of operations required to transform one string into the other). If the edit distance is less than or equal to the specified cap, returns the edit distance. If it is higher than the cap, returns the cap plus 1. Works with strings under 1023 characters.	<ul style="list-style-type: none"> • <code>edit_distance_with_cap ('pokemon go', 'minecraft pixelmon', 3) = 4</code> • <code>edit_distance_with_cap (event, 'burning man', 3)</code>
similar_to	Accepts a document text string and a search text string. Returns true if relevance score (0-100) of the search string with respect to the document is greater than or equal to 20. Relevance is based on edit distance, number of words in the query, and length of words in the query which are present in the document.	<ul style="list-style-type: none"> • <code>similar_to ('hello world', 'hello swirl') = true</code> • <code>similar_to (current team, drafted by)</code>
similarity	Accepts a document text string and a search text string. Returns the relevance score (0-100) of the search string with respect	<ul style="list-style-type: none"> • <code>similarity ('where is the burning man concert', 'burning man') = 46</code> • <code>similarity (tweet1, tweet2)</code>

Function	Description	Examples
	to the document. Relevance is based on edit distance, number of words in the query, and length of words in the query which are present in the document. If the two strings are an exact match, returns 100.	
spells_like	Accepts two text strings. Returns true if they are spelled similarly and false if they are not. Works with strings under 1023 characters.	<ul style="list-style-type: none"> spells_like ('thouhgspot', 'thoughtspot') = true spells_like (studio, distributor)
strlen	Returns the length of the text.	<ul style="list-style-type: none"> strlen ('smith') = 5 strlen (lastname)
strpos	Returns the numeric position (starting from 0) of the first occurrence of the second string in the first string, or -1 if not found.	<ul style="list-style-type: none"> strpos ('haystack_with_needles', 'needle') = 14 strpos (complaint, 'lawyer')
substr	Returns the portion of the given string, beginning at the location specified (starting from 0), and of the given length.	<ul style="list-style-type: none"> substr ('persnickety', 3, 7) = snicket substr (lastname, 0, 5)

Date and time formats reference

This is a list of all the date and time formats you can load into ThoughtSpot, whether using data upload from the browser or tsload.

Using ThoughtSpot Loader

For date data types, the default format is yearmonthday e.g. "Dec 30th, 2001" and is represented as 20011230. Use the date format specifications supported in the [strftime library function](#).

For time and datetime data types, the default is yearmonthday hour:minute:second e.g. Dec 30th, 2001 1:15:12 and is represented as 20011230 01:15:12. Use the datetime format specifications supported in the [strftime library function](#).

Using data upload from a browser

These date and time formats are supported in an Excel or CSV file when uploading via the browser:

- 1/30/2014
- 2014-01-30
- 2014-1-9
- 30-Jan-2014
- 2014-Jan-13
- 2014-01-30 10:32 AM
- 2014-01-30 14:52
- 2014-01-30 10:32:22
- 2014-01-30 10:32:22 AM
- 2014-01-30 10:32:22.0
- 2014-01-30 10:32:22.0 AM
- 2014-01-30 10:32:22.000
- 2014-01-30 10:32:22.000 AM
- 1/9/2014
- 30-Jan-14
- 01-Mar-02 (assumes 2002)

- 3/1/2002 10:32 AM
- 3/1/2002 14:52
- 3/1/2002 10:32:22
- 3/1/2002 10:32:22 AM
- 3/1/2002 10:32:22.0
- 3/1/2002 10:32:22.0 AM
- 3/1/2002 10:32:22.000
- 3/1/2002 10:32:22.000 AM
- 30-Jan-14 10:32 AM
- 30-Jan-14 14:52
- 30-Jan-14 10:32:22
- 30-Jan-14 10:32:22 AM
- 30-Jan-14 10:32:22.0
- 30-Jan-14 10:32:22.0 AM
- 30-Jan-14 10:32:22.000
- 30-Jan-14 10:32:22.000 AM
- Fri Oct 04 2013 3:26 PM
- Fri Oct 04 2013 13:46
- Fri Oct 04 2013 10:32:22
- Fri Oct 04 2013 10:32:22 AM
- Fri Oct 04 2013 10:32:22.0
- Fri Oct 04 2013 10:32:22.0 AM
- Fri Oct 04 2013 10:32:22.000
- Fri Oct 04 2013 10:32:22.000 AM
- 14:52
- 10:32 AM
- 10:32:22
- 10:32:22 AM

- 10:32:22.0
- 10:32:22.000
- 10:32:22.0 AM
- 10:32:22.000 AM

Chapter 8: Contact ThoughtSpot

You can contact ThoughtSpot by phone, mail, email, or by filing a support ticket.

File a support ticket

If you encounter a technical issue, file a support ticket using the Support Portal ticket filing system at:

<http://support.thoughtspot.com/>

Please provide as much detail as possible about your issue, to help us resolve it quickly.

You need a Support Portal login to file a ticket. Please contact ThoughtSpot to get an account, if necessary.

Address

ThoughtSpot, Inc.

1 Palo Alto Square, Building 1, Suite 200

Palo Alto, CA 94306

Phone numbers

Table 29: Phone numbers

Phone Number	Description
1-800-508-7008 ext 1	ThoughtSpot Support
1-800-508-7008	Toll free number for ThoughtSpot headquarters.

Email

Table 30: Email addresses

Reason for contacting	Email
For sales inquiries.	sales@thoughtspot.com
For customer support and software update inquiries.	support@thoughtspot.com
For other inquiries.	hello@thoughtspot.com

Chapter 9: Copyright

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