



# Release Notes

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## 4.5 Release Notes

ThoughtSpot version 4.5.1 is now available. These release notes include information about new features, fixed issues from previous releases, and any known issues.

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### Supported Upgrade Paths

If you are running the following version, you can upgrade to the 4.5.1.x release directly:

- 4.4.1.3 to 4.5.1.x

If you are running 4.4.1.2 or earlier, you must do a multiple pass upgrade:

1. Upgrade your cluster to 4.4.1.3.
2. Upgrade from 4.4.1.3 to 4.5.1.x.

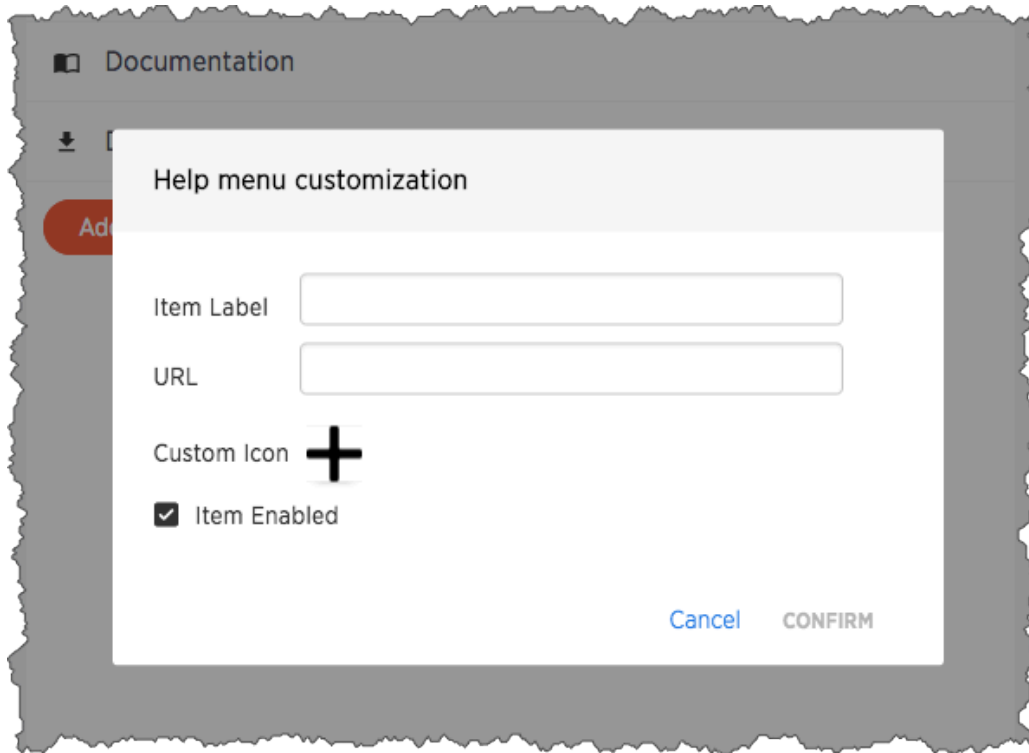
### 4.5.1 New Features and Functionality

#### Provided full integration with Slack via Spot

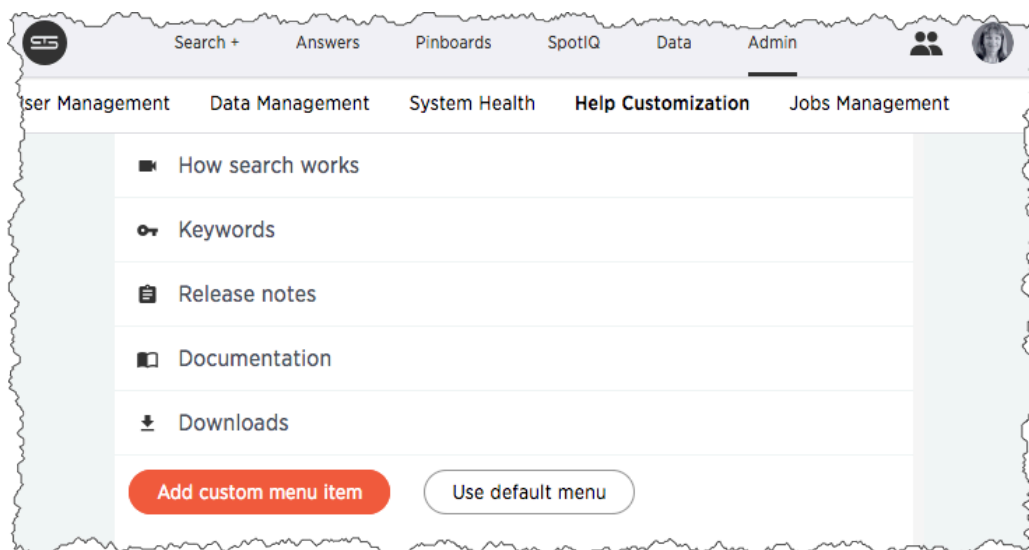
Slack is an enterprise software platform for team communication through a messaging application. Slack also allows users to communicate with applications like ThoughtSpot through chat. ThoughtSpot implemented full Slack integration in version 4.5.1. Administrators can follow setup steps in [Add the Slack integration](#), and ThoughtSpot users can learn how to use Spot in [Slack and Spot](#) and [How to use Spot](#)

#### Added the ability to add custom Help links

When users click the help icon, they see a list of links. You can now add your own links to this list. This allows you to include documentation specific to your company, such as information about the data available in ThoughtSpot, where to get support internally, or company-specific training.

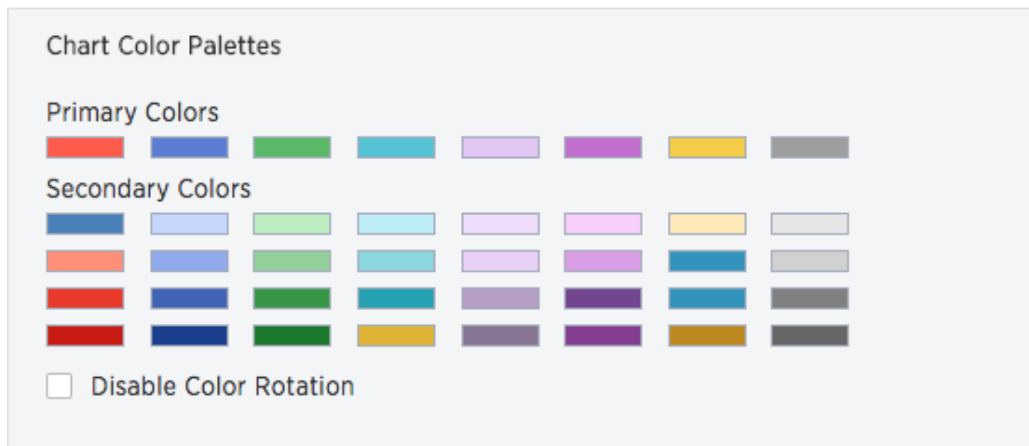


You can also edit existing links, change icons, or remove items from the help listing altogether.



### Admin chart color palettes auto update based on primary colors

In the Admin **Style Customization** "Chart Color Palettes", secondary color gradients are now based off of the primary colors selected. When a different primary color is chosen, the associated secondary color gradients below it automatically update.



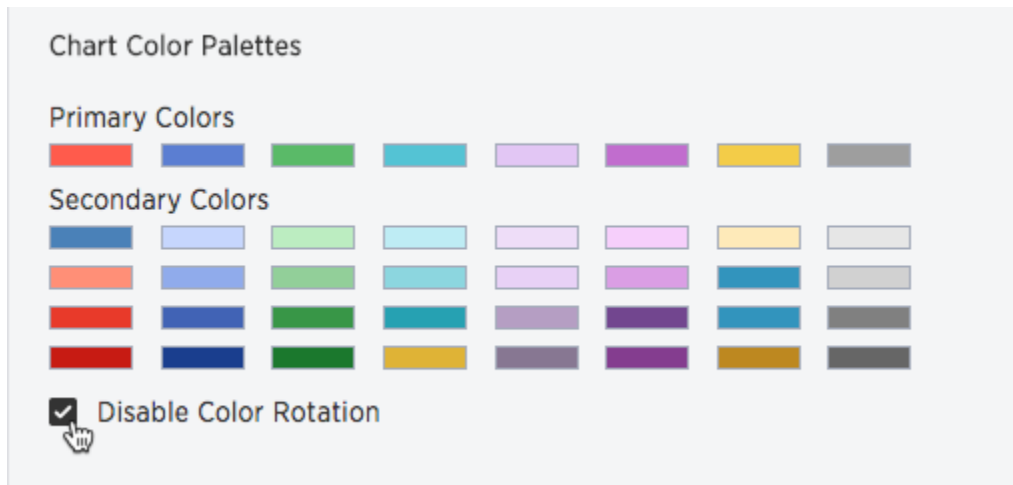
Custom color palettes are reflected in users chart color picker

Color palette changes made by the Admin in Style Customization, are now reflected in users' chart configuration color palettes (not just in the auto-generated chart colors, as in previous releases).



## Admins can enable or disable auto color rotation in Style Customization Chart Color Palettes

When there is a single color on a chart (no legend), ThoughtSpot auto-rotates through primary colors to render the chart for visual variety. If an Admin does not want this behavior, they can disable it by choosing **Disable Color Rotation** on the "Chart Color Palettes", in which case ThoughtSpot will always use the default color on single-color charts.



## Localized Date Format Supported in Search Filters

The search bar now accepts dates in the format used by the user browser's locale setting. For example, European locales accept dates using formats like DD-MM-YYYY. The US locale accepts dates using formats like MM-DD-YYYY.

### 4.5.1 Fixed Issues

Filters now work on formula-derived columns where the formula returns a numeric value of a type other than the integer types. In the past, filtering on a DOUBLE type formula-derived column required that the formula convert any DOUBLE values to an integer (INT32 or INT64). Now this type conversion is not necessary.

A problem was resolved where changes to metadata resulted in rebuilding the search index, even though the data had not changed.

A problem was resolved where a search was returning an unexpected answer, because the last aggregation performed during execution was doing a MIN() rather than a SUM().

A problem was resolved where timeouts were causing a cluster crash in some cases when a right outer join was used.

A problem was resolved where user names were accidentally being sent along with cluster metrics.

A problem was resolved where the space allocation chart was not getting updated.

A problem was resolved where indexes failed to build for empty tables.

An issues with upgrade was resolved which caused the appliance to boot from an incorrect partition causing users to be found missing.

A problem was resolved where you could not add a column to the search in cases where there was a long list of columns on the Search page. Clicking on a column name caused the column names to shift, such that you could no longer double click on the column name to add it to the search.

A problem was resolved where SpotIQ sometimes did not return a result unless a process was restarted.

A problem was resolved where where deadlock issues with the Search service caused indexing to fail.

A problem was resolved where if the word "top" occurred as a data value, you could not use "top" as a keyword.

A problem was resolved where periodic backups was delayed.

A problem was resolved where adding columns to a worksheet and saving it resulted in timeouts and an `HTTP_UNAUTHORIZED(401)` status.

A problem was resolved where idle sessions were never timing out.

An underlying system issue was resolved that caused a saved answer to fail with a read bar error if the answer was created on a relationship(s) which was based on a hidden column(s).

A problem was resolved where sorting on a primary key column produced duplicates for some values, both when viewing results in the ThoughtSpot application and when using TQL.

A problem was resolved where after upgrading, some pinboards could not be opened and instead returned a red bar error.



A problem was resolved where the number format wasn't being honored when the column contained a currency. Setting the format for three digits after the decimal resulted in displaying only two.

An issue was resolved where hidden fields in source data prevented users from creating answers related to other columns in that data.

A problem was resolved where drill down on multiple buckets did not apply all date filters.

An issue was resolved that potentially made ThoughtSpot at risk for Jackson JSON Library Vulnerabilities.

A problem was resolved where a node failed due to a bad DIMM (Dual In-Line Memory Module), but didn't failover successfully.

A problem was resolved where data loaded very slowly.

An issue was resolved where the ThoughtSpot application was potentially vulnerable to Cross-Site Request Forgery (CSRF) . The potential was removed from the application interactions. Any ThoughtSpot API customers will have to be updated to be compliant with this new feature. The primary things that could be affected:

- Sync scripts that manage users and groups creation.
- Scripts that use the public APIs to fetch data.

The easiest way to diagnose this would be to check for the inability of the script to log in to the system. Please contact ThoughtSpot Support to get guidance on the steps to resolve the issue.

## 4.5 New Features and Functionality

### UI Reports query cancellation

Beginning in this release, ThoughtSpot reports queries which exceed system resource:

`Query cancelled due to memory limits being exceeded (OOM) .`

### Data type information available on hover

The data type information is now available when a user hovers over a column in the left panel.

## Improved session security

New improvements in security reduce the amount of information made available by the UI during a user session.

## Improved memory management logs

This release includes improvements to how the system logs memory situations. The logs now record when a situation begins and ends plus information about which request triggered the situation. The system also now keeps a tally of how many distinct clients experienced a rejection.

## Improvements in upgrade

This release includes significant improvements in the performance of upgrades particularly those installations with large objects.

## Multiple data/time formatted columns in data import

Your imported data can now include columns with different date/time formats.

## New commands to install R packages

This release includes the `tscli rpackage` command. This command allows users to manage R packages for use with SpotIQ.

## Setting user feedback email

Users in ThoughtSpot may be asked for feedback for new or BETA features in the system. By default, feedback goes directly to ThoughtSpot support. Alternatively, you can send feedback to someone in your company. See the `tscli` commands reference for details.

## SpotIQ profile preferences

In this release, you can configure your SpotIQ preferences in your user profile. These preferences control notifications and allows you to exclude nulls or zero measures from your analysis.

## Flying our new colors

In this release, we are changing our primary navigation bar from black to light gray. Screen captures in the documentation may show the older color scheme. Expect them to update over all.

## Expand RLS configuration to include all underlying tables

By default, worksheet queries only take into account RLS rules on tables whose columns appear in the query. Other related tables that may underly the worksheet are ignored. This means that not all RLS rules on underlying tables are applied when a user queries a worksheet.

You can configure a stricter application of RLS rules to take into account RLS rules from all the tables underlying the worksheet. This is recommended if you have key dimension tables that worksheets rely on but that are not necessarily regularly accessed through query. To do this, contact ThoughtSpot Customer Support.

## Higher bulk filter limit

Users can now have up to 10K values in a bulk filter. Additionally, bulk filtering no longer requires validation of filtered values. Values in the bulk filter that do not exist in the data are allowed in the filter. This allows a filter to anticipate data that may be present in the future.

## New home page

This release includes updates to the application home page. It now contains several new sections intended to encourage users to explore and learn about your company data:

- **All time popular/Recently trending** answers and pinboards
- **Recently viewed** answers and pinboards
- **Recent team activity** Answers, pinboards, worksheets, and tables people in your company have created or edited recently.
- **Did you know?** Auto analysis results from SpotIQ

The areas are restricted by privileges just as other areas. For example, if a user doesn't have the ability to use SpotIQ, that option does not appear.

## Stricter column sharing feature

This release includes the ability to apply strict column level security. Under the standard column sharing, users without access to a specific table column can still see the column's data if subsequent worksheets relying on that data were shared with them. Now, you can for your installation, prevent this permissive sharing and prevent users from ever seeing the data. Speak with ThoughtSpot Customer Support for information on enabling this feature.

## Grant Download/Upload to All

This release includes two APIs (`v1/group/addprivilege` or `v1/group/removeprivilege`) that allow you to add or remove the `DATADOWNLOADING` or `USERDATAUPLOADING` privilege to/from the system default `ALL_GROUP` group.

## New date functions for formulas

This release includes several new date functions for formulas:

- `day_number_of_quarter`
- `day_number_of_week`
- `month_number_of_quarter`
- `week_number_of_month`
- `week_number_of_quarter`
- `week_number_of_year`

## Metrics pipeline improvements

Included in this release are metrics pipelines that empower both our team and yours to enrich the ThoughtSpot product experience. The new metric pipelines enable:

- **Faster issue resolution:** ThoughtSpot collects the diagnostic information from your system on an ongoing basis: there is no time needed to collect diagnostic information after a problem is reported. Our support team can begin working to remediate any issue with you at once.
- **Failure prevention:** Metrics provides direct visibility to the ThoughtSpot team on your system's limits. Therefore, our Support team can proactively identify critical threshold issues and work to prevent failures. Metrics also help reduce SLA times as the team can debug much faster.
- **Improved Search:** ThoughtSpot can tune search algorithms by studying search history and schema.
- **Improve Performance:** ThoughtSpot analyzes expensive and complex query patterns to look for performance optimizations.
- **Improved Browser Performance:** Finally, the metrics pipeline allows ThoughtSpot to identify application-use patterns that contribute to performance bottlenecks with specific browsers and help your team prevent or alleviate them.

## Relative time filtering

This release includes support for filtering with relative time frame. The syntax for this filter is:

```
last [N] <period> for each <period>
```

For example, this filter presents results for the last two months for all the years available in the data.

```
last 2 months for each year
```

### Gridlines for charts with x/y axis

Users can now enable the display of gridlines in charts that have an x and y axis.

### Improvements to Growth-over-time queries

This release includes improvements with queries that use growth of queries with formats such as the following:

```
growth of <measure_column> by <date_column> <bucket> <period-over-period>
```

This table shows the possible buckets and the period-over keywords you can combine:

quarterly	monthly	weekly	daily	hourly
year-over-year	year-over-year	year-over-year	year-over-year	
	quarter-over-quarter	quarter-over-quarter	quarter-over-quarter	
		month-over-month	month-over-month	
			week-over-week	
				day-over-day

### New period keywords

This release includes expansions to the time-series keywords. The `quarter of year` and `day of month` keywords were added.

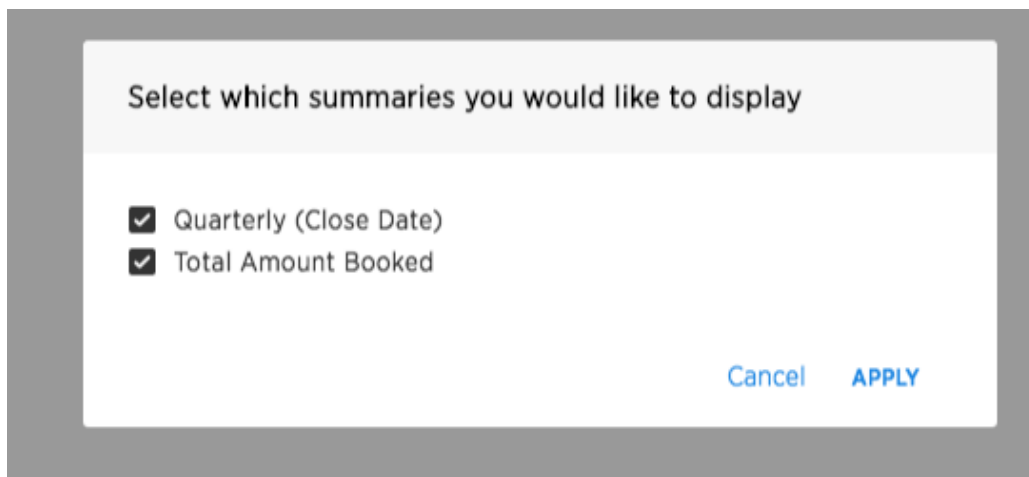
## Ability to set table load prioritization

You can now use `tbl` to set table load priority. You can set priority values between 1–100. The default priority is 50. A lower number indicates a higher priority, with 1 being the highest priority. Tables set to a load priority of 1, load before tables set to higher numbers. The following illustrates examples of the new commands for setting and changing table load priority:

```
alter table 't1' set load priority [value]
alter table 't1' remove load priority
```

## Customize headline display

Now, you can decide whether or not to display headlines in your table results. To customize headlines, choose **Actions > Customize summaries**.



## Pinboard information

The **\*Actions > Pinboard Info\*** was added to the pinboards. This feature allows you to see who authored a pinboard, when it was created, and when it was last modified.

## Improved call home functionality

"Call home" data is metadata and usage data from your ThoughtSpot cluster. ThoughtSpot's "call home" functionality intermittently sends a call home bundle of statistics to a ThoughtSpot S3 server via HTTPS. The data is encrypted at rest on the server.

Beginning with this release, callhome is enabled by default. Your ThoughtSpot Support personnel configures callhome for you during installation and upgrade.

### Additional RLS abilities with privilege

Users in groups with this privilege (directly or via group inheritance) can now add/edit/delete existing RLS rules. They were already permitted to:

- Exempt from row-level security (RLS) rules.
- Permitted to check or uncheck Bypass RLS on a worksheet.

### New default snapshot policy

This release includes a new default snapshot policy. Three snapshots are taken over 4 hour intervals in the course of a day. And 4 daily snapshots are taken. This provides continuity over the long weekends in many countries by ensuring snapshots on Saturday, Sunday, Monday, and Tuesday.

### Learn ThoughtSpot in GA

The Learn option from the main menu has moved from a BETA to a GA feature. Learn uses replay to teach users how to perform search with ThoughtSpot.

### Filtered aggregation

You can now use a set of filtered aggregation functions in the Formula Editor rather than crafting a lengthy `if then else` formula to achieve that today. Filters are useful for queries where the results should reflect a new, filtered value. For example, a query that compares total revenue with the cost of the `west` region. In this example, you filter the `region` column to values in the `west` only.

### Disable footer in some embed situations

This release includes the ability to disable the footer in embed applications that involve an individual visualization.

### Updates to the System Health pinboards

This release includes updates to counts in System Health for:

- pinboard impressions
- ad-hoc searches -new search done from search bar
- user counts

New boards were added and some older boards were deprecated. An expanded monitoring section was added to the documentation as well.

### Comparison with vs and all

Users can now do comparisons with the `vs/versus` keyword. You can also use the new `all` keyword in these comparison expressions.

### New `ts_username` variable for RLS

A new `ts_username` variable was added for use in row level security (RLS) rules.

```
ts_username != 'mark'
```

### Period-ago analysis feature "for each" and versus and more

This feature allows user to analyze and compare two time periods. For example, a user wants to compare monthly performance this year vs last year.

### New languages and Canadian mapping

This release includes support for Canadian province and county maps.

Additionally, following languages are possible from the interface.

Locale	Language	BETA?
<b>de-DE</b>	German	
<b>en-CA</b>	Canadian English	Yes
<b>en-GB</b>	United Kingdom English	
<b>en-US</b>	English (United States)	
<b>es-US</b>	Spanish (United States)	Yes
<b>fr-CA</b>	French (Canada)	Yes
<b>fr-FR</b>	French (France)	Yes
<b>ja</b>	Japanese	
<b>pt-BR</b>	Portuguese (Brazil)	Yes

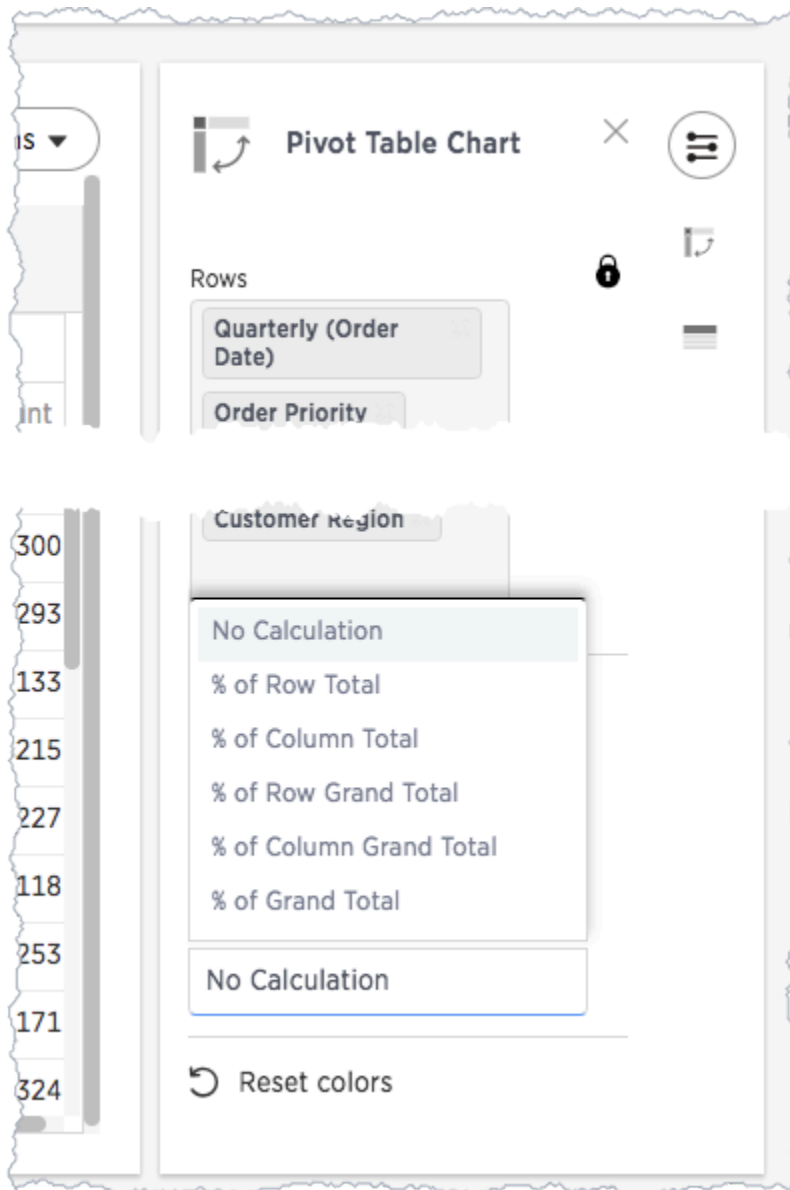


**zh-CN** Chinese (S)

BETA languages are for testing purposes only. You should not rely on them for production clusters.

### Improvements to pivot table visualizations

This release added the ability to show grand totals on pivot tables.



Pivot tables now support the tree layout for row headers:

	109	124	
	226	26	
			2
	80	46	
	2	110	
	17	126	
	51	82	
		36	
	2	80	
	137	57	
	20	11	

Columns

Country Medal

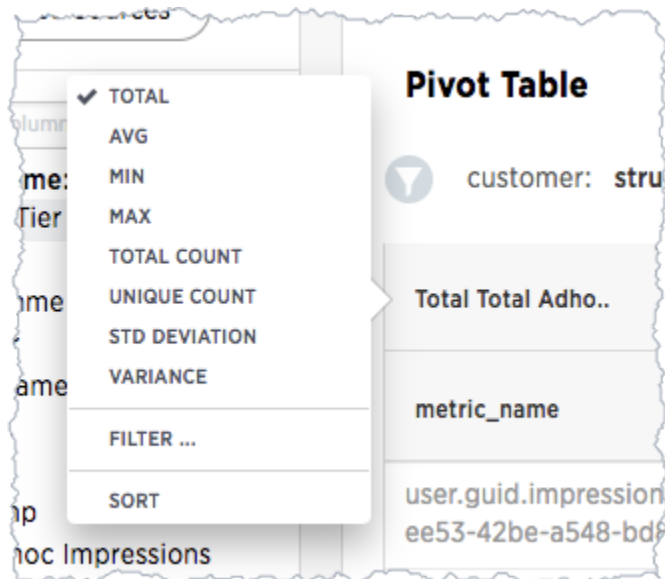
☒ Show Pivot Summaries
☒ Use Tree Layout for Row Headers
☒ Heatmap mode

Show Values As

No Calculation

Reset colors

From the header menu users can now change the type of total shown for an aggregated measure:



Finally, pivot tables no longer limit the number of rows displayed. Previously, rows over the limit showed as (Other) . Now, the system simply shows the rows as expected.

## Ramdisk is preserved across cluster upgrades

A feature was added that preserves RAMDisk across cluster upgrades.

## Present option on pinboard and visualization

The present operation is now available on both the pinboard and an individual visualization **Action** menu.

# 4.5 Fixed Issues

A problem was resolved where insufficient memory caused services on a cluster to crash repeatedly.

A problem was resolved where idle sessions were never timing out.

A problem was resolved where indexes failed to build for empty tables.

A problem was resolved where users were unable to scroll in IE with pivot tables.

An issues with upgrade was resolved which caused the appliance to boot from an incorrect partition causing users to be found missing.

A problem was resolved where where deadlock issues with the Search service caused indexing to fail.

A problem was resolved where periodic backups was delayed.

Adding columns to a worksheet and saving them resulted in timeouts and an `HTTP_UNAUTHORIZED(401)` status. This problem resulted from an internal `SESSION` handling error. This problem was resolved in this release.

A problem was resolved where `tsadmin` and `guest` were prevented from uploading a CSV upload and received a red bar error instead.

A problem with memory links during upgrade was resolved.

A problem was resolved where Google Chrome version 65 broke the formatting of headlines in pinboards. This issue was reported as a Product Support Advisory for versions 3.x and 4.x releases older than 4.4.1.4.

An underlying system issue was resolved that caused a saved answer to fail with a red bar error if the answer was created on a relationship(s) which was based on a hidden column(s).

A pinned answer that relied on an underlying join between two worksheets one of which included a filter failed to display properly. This problem was resolved in this release.

After upgraded customer appliance from 4.4.0.11 to 4.4.1.2 GA, some pinboards could not be opened and instead returned a red bar error. This issue was resolved.

Some customers reported that several data buckets were relative to calendar year/quarter/month rather than relative to the financial year.

- QUARTER\_OF\_YEAR
- MONTH\_OF\_YEAR
- MONTH\_OF\_QUARTER
- WEEK\_OF\_YEAR\_ISO
- WEEK\_OF\_QUARTER
- DAY\_OF\_YEAR
- DAY\_OF\_QUARTER

This issue was resolved.

An issue was resolved where hidden fields in source data prevented users from creating answers related to other columns in that data.

Customers were receiving a `RowSecurityManager not implemented for Atlas` message when scheduling a pinboard. This problem was the result of legacy features in the system. These features no longer are checked.

A problem was resolved where drill down on multiple buckets did not apply all date filters.

A problem was resolved that caused segmentation faults which in turn caused crashes in a cluster during an upgrade.

An issue was resolved that potentially made ThoughtSpot at risk for Jackson JSON Library Vulnerabilities.

A problem was resolved with the **Show underlying data** function ignoring the "last period" filter. This filter is no longer ignored.

A problem was resolved where the presence of a date bucket filter after a measure column was ignored in query execution.

Issues were resolved that potentially exposed ThoughtSpot to two vulnerabilities: "Meltdown" and "Spectre", along with variants. These vulnerabilities only applied when the ThoughtSpot application was sharing hardware with other applications, such as cloud deployments. When deployed in a virtualized environment, either on prem or in AWS, the virtual environment needed to patch the OS for it. When deployed on its own appliance, these vulnerabilities should not have affected ThoughtSpot.

An issue was fixed that occurred when plotting a formula that has either NaN or Infinity as some of the values. In this case, the pivot table treated the first instance of NaN/Infinity and every subsequent value as a single value and plots it in one cell. This problem was fixed.

A problem was resolved where `near` keywords returned a red bar error.

An issue was resolved where requests to update a formula failed due to the complexity of the nesting.

Non-admin user could still see hidden fields. In queries, these users were asked to disambiguate these even though they were hidden. This problem was resolved.

An issue was fixed where the installation path was not properly updated resulting in an environment pointing to old versions of `tsload` and `tql`. Now, the standard path is updated during an upgrade.

A problem was resolved where a saved answer from version 4.3 failed after upgrade because they referred to old table names.

When query has keywords that map to date column and Period Ago date buckets then SpotIQ Insight for that query did not work even though the user-created query succeeded. This SpotIQ bug was resolved.

When a query had keywords that mapped to a date column as well as to date buckets, SpotIQ Analysis failed for that query. For example, in query `revenue in Q1 1992` the last part represents date buckets. If `Q1 1992` maps to a date column then SpotIQ analysis failed. The query itself worked and any answer/pinboard that based on these queries were fine. This problem was resolved.

A problem was resolved where NPS surveys were appearing when ThoughtSpot was provided through embedded content. This should no longer occur.

A problem was occurring where upgrade to a new version caused several types of formulas that relied on aggregated data to stop working. Problems were recorded involving:

- Unique or count not functional when using Aggregated date.
- Group\_count not functional as well.
- Group\_max giving duplicated result.

This problem was resolved and should no longer appear

A problem was resolved where ThoughtSpot would throw an error if the query involved multiple date filters on the same date column. This has been fixed in this release.

A problem was resolved where the `tscli ssl set-min-version` failed because the minimum value was incorrect internally. The internal issue was resolved.

An issue with the callhome metrics feature caused problems during upgrade. This problem was resolved.

A problem was resolved where deleting a relationship failed if either side of that relationship was a worksheet.

A problem was resolved where Zookeeper reported reaching a descriptor limit. This report was returned in error. ThoughtSpot no longer reports this.

A problem was resolved where data loaded very slowly.

A problem where Strict Transport Security was not enforced was fixed. The product now supports Strict Transport Security.

An issue was resolved where the ThoughtSpot application was potentially vulnerable to Cross-Site Request Forgery (CSRF) . The potential was removed from the application interactions. Any ThoughtSpot API clients will have to be updated to be compliant with this new feature. The primary clients that would be effected:

- Sync scripts that manage users and groups creation.
- Scripts that use the public APIs to fetch data.

The easiest way to diagnose this would be the inability of the script to login to the system. Please contact support to get guidance on the steps to resolve the issue.

A problem was resolved with the `JSESSIONID` value. Previously, setting the **Remember Me** option on the login page, caused the server to set a new `JSESSIONID` on the client after the user logs out. This new `JSESSIONID` was used for the next authenticated user session, regardless of the user's identity. This no longer happens. Instead, users that re-login after setting **Remember Me** are given a new `JSESSIONID`.

Dates on the **\*Data\*** page was corrected so that dates now sort chronologically.

Previously, the application allowed cookies to contain information related to session state. An option was added to set more secure cookie handling in the application.

Previously, the login form on the ThoughtSpot application provided an autocomplete feature. Autocomplete is no longer support. Turning off `autocomplete` prevents intruders from compromising ThoughtSpot from a workstation unattended using a previously stored user ID and/or password.

Previously, alerts were time stamped with in PDT. This was fixed, now `tscli alert list` shows alerts display in the cluster's local timezone.

The system now validates both the format and the size of profile pictures, previously these were not checked.

## Notes for Older Versions

- [4.4 Release Notes](#)
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- [3.5 Release Notes](#)