ThoughtSpot

ThoughtSpot in Practice

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ThoughtSpot in Practice

Summary: This guide demonstrates the power of ThoughtSpot to solve real solutions we developed for our clients.

The purpose of this section is to guide you through a few solutions we created for our clients, so you can leverage our experience to quickly and confidently employ ThoughtSport in meeting your own business objectives.

Each topic and scenario includes a real-world data modeling problem, and how we solved it with ThoughtSpot technology.

Reaggregation scenarios in practice

Summary: We provide real world scenarios for using flexible aggregation in ThoughtSpot.

The following scenarios showcase the use of the `group_aggregate` function in the real world. We provide them to demonstrate to you how the function works, and the scenarios where it proved useful.

Best practices for flexible aggregations

The `group_aggregate` function enables you to calculate a result at a specific aggregation level, and then returns it at a different aggregation level. For this reaggregation result to return correctly, follow these syntax guidelines:

- Wrap `group_aggregate` in an aggregate function, such as `sum` or `average`
- The wrapping function must be the immediate preceding function, such as `sum(group_aggregate(...))`
- Do not use with conditional operators. For example, the following expression does not reaggregate the data because the `if` precedes `group_aggregate`:

```
(if(group_aggregate(...)))
```

Scenario 1: Supplier tendering by job

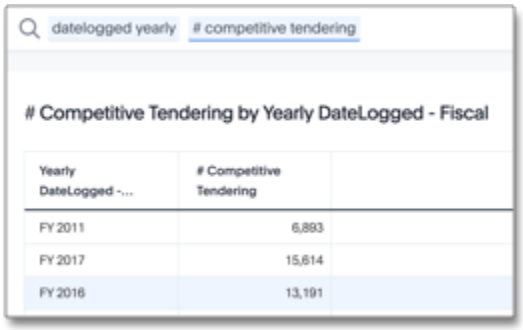
We have a fact table at a job or supplier tender response aggregation level. There are many rows for each job, where each row is a single row from a supplier. A competitive tender is a situation when multiple suppliers bid on the same job.

Our objective is to determine what percentage of jobs had more than 1 supplier response. We want to see high numbers, which indicate that many suppliers bid on the job, so we can select the best response.

Valid solution

A valid query that meets our objective may look something like this:

```
sum(group_aggregate(if(sum(# trades tendered ) > 1) then 1 els
e 0,
                    query_groups() + {claimid, packageid},
                    query_filters()))
```



Resolution

1. The **`sum ( # trades tendered )`** function aggregates to these attributes:
    - **`{claimid, packageid}`**

      The job-level identifier
    - **`query_groups( )`**

      Adds any additional columns in the search to this aggregation. Here, this is the **`datelogged`** column at the yearly level.
    - **`query_filters ( )`**

      Applies any filters entered in the search. Here, there are no filters.

2. For each row in this virtual table, the conditional `if() then else` function applies. So, if the sum of tendered responses is greater than 1, then the result returns 1, or else it returns 0.

3. The outer function, `sum()`, reaggregates the final output as a single row for each `datelogged` yearly value.

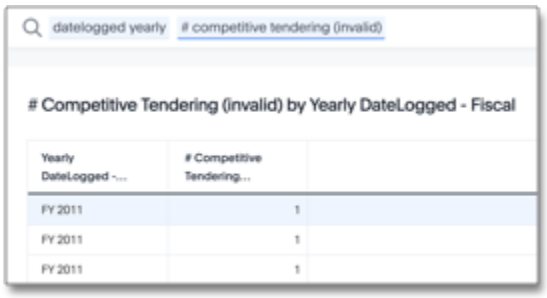
    - This reaggregation is possible because the conditional statement is inside the `group_aggregate` function.
    - Rather than return a row for each `{claimid,packageid}`, the function returns a single row for `datelogged yearly`.
    - The default aggregation setting does not reaggregate the result set.

Non-Aggregated Result

We include the following result to provide contrast to an example where ThoughtSpot does not reaggregate the result set. Reaggregation requires the aggregate function, `sum`, to precede the `group_aggregate` function.

In the following scenario, the next statement is the conditional `if` clause. Because of this, the overall expression does not reaggregate. The returned result is a row for each `{claimid,packageid}`.

```
sum(if(group_aggregate (sum (# trades tendered),
                              query_groups() + {claimid, packag
eid},
                              query_filters ( ) )>1) then 1 els
e 0)
```



Scenario 2: Average rates of exchange

The Average rate of exchange calculates for the selected period. These average rates provide a mechanism to hedge the value of loans against price fluctuations in the selected period. We apply the average rate *after the aggregation*.

The pseudo-logic that governs the value of loans is `sum(loans) * average(rate)`.

The data model has two tables: a primary fact table, and a dimension table for `rates`.

- The `loans` column is from the primary fact table.
- The `rate` column is from the `rates` table.

These tables are at different levels of aggregation:

- The primary fact table uses a lower level of aggregation, on `product`, `department`, or `customer`.
- The `rates` dimension table use a higher level of aggregation, on `daily`, `transaction currency`, or `reporting currency`.

The two tables are joined through a relationship join on `date` and `transaction currency`.

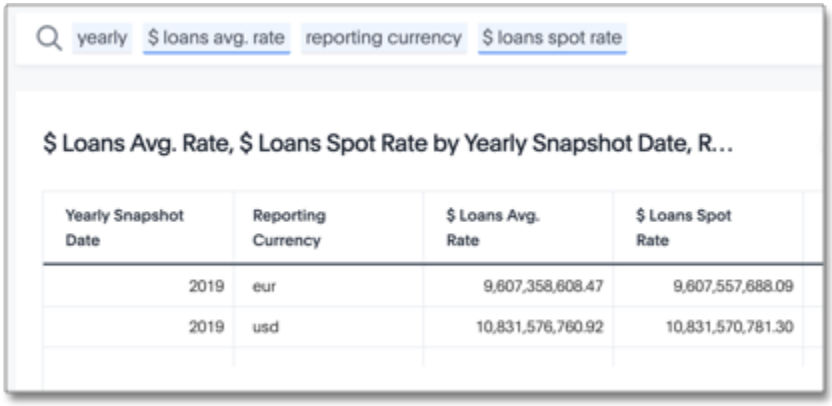
To simplify the scenario, we only use a single `reporting currency`. The join ensures that a single rate value returns each day for each transaction currency.

Valid solution

A valid query that meets our objective may look something like this:

```
sum(group_aggregate (sum(loans)*average (rate),
                     query_groups () + {transaction_currency},
                     query_filters () ))
```

The following search and resulting response returns the dollar value for each year, for each target reporting currency. Note that the dataset contains both euro (€) and US dollars ($). The `$ Loans Avg. Rate` calculates the average rate of exchange for the entire period. The `$ Loans Spot Rate` applies the rate of exchange on the day of the transaction.



Resolution

1. The **`sum(loans)`** function aggregates to these attributes:
    - **`{transaction_currency}`** and **`query_groups()`**

      Add additional search columns to this aggregation. Here, this at the level of `reporting currency` and `year`.
    - **`query_filters( )`**

      Applies any filters entered in the search. Here, there are no filters.

2. Similarly, the **`average(rate)`** function aggregates to these attributes:
    - **`{transaction_currency}`** and **`query_groups()`**

      Add additional search columns to this aggregation. Here, this at the level of `reporting currency` and `year`.
    - **`query_filters( )`**

      Applies any filters entered in the search. Here, there are no filters.

3. For each row in this virtual table, the exchange rate applies to the sum of loans: `sum(loans) * average(rate)`.

4. The outer `sum()` function reaggregates the final output as a single row for each yearly reporting currency value.

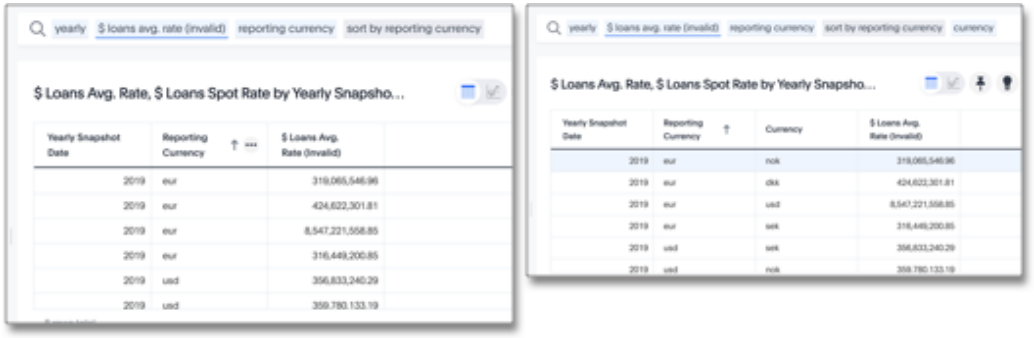
   Note that the default aggregation setting does not reaggregate the result set.

Non-Aggregated Result

We include the following result to provide contrast to an example where ThoughtSpot does not reaggregate the result set. Reaggregation requires the aggregate function, `sum`, to precede the `group_aggregate` function.

In the following scenario, the formula assumes that the default aggregation applies. Here, the result returns 1 row for each `transaction currency`.

```
group_aggregate (sum(loans )*average (rate ),
                 query_groups() + {transaction_currency},
                 query_filters())
```



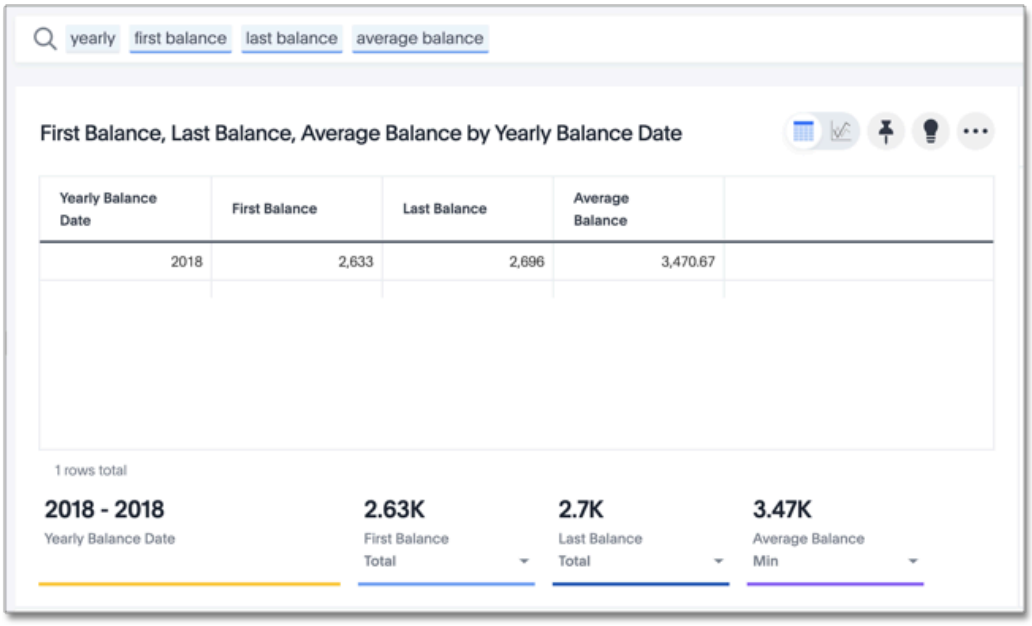
Scenario 3: Average period value for semi-additive numbers I

Semi-additive numbers may be aggregated across some, but not all, dimensions. They commonly apply to specific time positions. In this scenario, we have daily position values for home loans, and therefore cannot aggregate on the date dimension.

Valid solution

A valid query that meets our objective may look something like this:

```
average(group_aggregate(sum(loan balance),
                        query_groups() + {date(balance date)},
                        query_filters()))
```



Resolution

1. The `sum(loan balance)` function aggregates to the following attributes:
    - `{date(balance date)}` and `query_groups()`

      Add additional search columns to this aggregation. Here, this at the `yearly` level.
    - `query_filters ( )`

      Applies any filters entered in the search. Here, there are no filters.

2. The `sum(loan balance)` function returns a result for each row in this virtual table.

3. The outer `average()` function reaggregates the final output as a single row for each `year` value.

Scenario 4: Average period value for semi-additive numbers II

Semi-additive numbers may be aggregated across some, but not all, dimensions. They commonly apply to specific time positions. In this scenario, we have daily position values for home loans, and therefore cannot aggregate on the date dimension.

Here, we consider a somewhat different situation than in Scenario 3 [See page 8]. In some financial circumstances, the average daily balance has to be calculated, even if the balance does not exist. For example, if a banking account was opened on the 15th of June, business requirements have to consider all the days in the same month, starting with the 1st of June. Importantly, we cannot add these 'missing' data rows to the data set; note that the solution used in Scenario 3 [See page 8] returns an average only for the period that has data, such as June 15th to 30th, not for the entire month of June. The challenge is to ensure that in the daily average formula, the denominator returns the total days in the selected period, not just the days that have transactions:

```
sum(loans) / sum(days_in_period)
```

To solve for this, consider the data model:

- The fact table `transactions` reports the daily position for each account, and uses a `loan` column.
- The dimension table `date` tracks information for each date, starting with the very first transaction, all the way through the most recent transaction. This table includes the expected `date` column, and `days_in_period` column that has a value of 1 in each row.
- Worksheets use the `date` column with keywords such as *weekly*, *monthly*, *yearly* to change the selected period.
- When users run a search with the *monthly* keyword, the denominator must reflect the number of days in each month.

Valid solution

A valid query that meets our objective may look something like this:

The following code *in the denominator definition* returns the total number of days for the period, regardless whether there are transactions, or what filters apply:

```
group_aggregate (sum(days_in_period),{Date},{})
```

Resolution

1. The **`sum(days_in_period)`** function aggregates to:
    - **`{Date}`**

      No other search columns appear.
    - `{}`

      We require the entire period, so there are no filters.

    Note that the `date` keywords *yearly*, *quarterly*, *monthly*, and *weekly* apply because we use the same column in both the search and the aggregation function. So, the function will result in the following output when it runs with the *yearly* keyword in search:

Year	Result
2016	366
2017	365
2018	365
2019	365
2020	366

2. This data is not reaggregated because we want to return the result at the appropriate `date` level.

Alternate Solution

To return only the number of days that have existing transactions, use the following code in the denominator:

```
sum(days_in_period)
```