TABLEAU
CONFERENCE
Calculation Methods

What? When? And Why?

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Get To Know Us!

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Get To Know Us!

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- NCAA DIII Swimmer
- Biomedical Engineering
- Music Junkie
What’s the Session About?

Tableau has multiple calculation types:
- Basic calculations
- Table calculations
- Level of Detail calculations

You will learn how to select the best calculation approach for different problem types.
Key Concepts

1. There is no silver bullet. It depends...

2. The layout of the viz matters

3. There are scenarios where different solutions perform differently

4. There are always trade-offs to consider (performance vs. flexibility vs. simplicity)
Agenda

Basic expressions vs. table calculations
• 1 example and 1 hands-on exercise

Basic expressions vs. level of detail expressions
• 1 example and 1 hands-on exercise

Level of detail expressions vs. table calculations
• 1 example and 3-4 hands-on exercise

Sometimes only table calculations will do
• 1 example and 1 hands-on exercise
Session Expectations

This is an ADVANCED level session. You should be comfortable with:

- Building visualisations
- Writing calculations—basic, table, LOD

You have lots of help:

- Starter workbook—use this for the activities
- Finished workbook—shows the completed solutions
- Guided Website—click-by-click guide
- Room assistants—put your hand up for help
Meet the Data...

Superstore!

<table>
<thead>
<tr>
<th>Category</th>
<th>City</th>
<th>Country</th>
<th>Customer ID</th>
<th>Category Code</th>
<th>Customer Name</th>
<th>Product ID</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture</td>
<td>Henderson</td>
<td>United States</td>
<td>12345</td>
<td>CA-001</td>
<td>Jane Doe</td>
<td>F123</td>
<td>0.99</td>
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<tr>
<td>Furniture</td>
<td>Los Angeles</td>
<td>United States</td>
<td>67890</td>
<td>CA-002</td>
<td>John Smith</td>
<td>F456</td>
<td>1.23</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>Los Angeles</td>
<td>United States</td>
<td>11111</td>
<td>CA-003</td>
<td>Sarah Jones</td>
<td>S789</td>
<td>2.45</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>New York</td>
<td>United States</td>
<td>22222</td>
<td>CA-004</td>
<td>Michael Lee</td>
<td>L234</td>
<td>3.67</td>
</tr>
</tbody>
</table>

*Summary:*
- [Tableau Conference](www.tableauconference.com)
- [Superstore](www.superstore.com)
Example 1

What is the 90\textsuperscript{th} percentile of sales at the row level of detail by sub-category?
Exercise 1—Comparison

Table calculation advantages:
- Easy: No need to write formula
- Fast: Calculation is performed over just 24 values
- Recursive: Works for N years

Basic expression advantage:
- If you have specific formatting requirements (generally for tabular reports) this can sometimes make you feel less unhappy
Example 2

What are the 90th percentiles of sales per row and per order for each sub-category?
Exercise 2—Comparison

Basic expression advantages:
• Fast: The simple aggregations required for basic expressions are generally fast

LOD expression advantage:
• Flexibility: Easy to change the average to a median, minimum, maximum, etc.
Example 3

What is the 90th percentile of sales per order for each sub-category?
What is the trend of order value vs. percentile of order value by region?
Table calculations are the only solution for problems that require:

- Ranking
- Recursion (e.g. cumulative totals)
- Moving calculations (e.g. rolling averages)
- Inter-row calculations (e.g. period vs. period calculations)

This is because **table calculations can output multiple values for each partition of data**, while **LOD and basic expressions output a single value for each partition/grouping of data**.
Basic Expressions & LOD Expressions

Calculated as part of the query on the underlying data

Table Calculations

Calculated using the results from the query
Do I already have all the data values I need on the visualization?

- Yes: Use a table calculation.
- No:
  - Yes, granularity of the viz: Use an aggregate expression.
  - No:
    - Yes, granularity of the data: Use a row-level expression.
    - No: Does the granularity of the question match either the granularity of the data source or the viz?
      - Yes, granularity of the data: Use a row-level expression.
Do I already have all the data values I need on the visualisation?

Yes

Use a table calculation.

No

Does the layout of the viz permit me to use a table calc?

Yes

Use a table calculation.

No

Does the granularity of the question match either the granularity of the data source or the viz?

Yes, granularity of the data

Use a row-level expression.

Yes, granularity of the viz

Use an aggregate expression.
Do I already have all the data values I need on the visualisation?

- Yes
  - Use a table calculation.

- No
  - Does the layout of the viz permit me to use a table calc?
    - Yes
      - Use a table calculation.
    - No
      - Does the granularity of the question match either the granularity of the data source or the viz?
        - Yes, granularity of the data
          - Use a row-level expression.
        - Yes, granularity of the viz
          - Use an aggregate expression.
        - No
          - Use a level of detail expression.
Does my problem require the use of ranking, recursion, moving calculations or inter-row calculations?

No

Do I already have all the data values I need on the visualisation?

No

Does the layout of the viz permit me to use a table calc?

Yes

Use a table calculation.

No

Yes, granularity of the viz

Does the granularity of the question match either the granularity of the data source or the viz?

Yes

Use a row-level expression.

No

Yes, granularity of the data

Use an aggregate expression.
Viz Level of Detail

Totally Aggregated

SUM(Sales) @ Country

INCLUDE: Order ID

Totally Disaggregated
(granularity of data source)

SUM(Sales) @ Country + Order ID

PCT90(SUM(Sales) @ Country + Order ID)

SUM(Sales) @ Country

INCLUDE: Order ID
AVG(Profit)
The SUM of Profit is the result across the Order IDs.

The AVG is then the average of these Order ID SUM values per Country.

Multi-level aggregation!

<table>
<thead>
<tr>
<th>Region</th>
<th>State</th>
<th>Order ID</th>
<th>Row ID</th>
<th>Profit</th>
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<tbody>
<tr>
<td>Central</td>
<td>Illinois</td>
<td>CA-2011-101147</td>
<td>6252</td>
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<td>$1.64</td>
</tr>
</tbody>
</table>
The Filtering Pipeline

LOD expressions are part of the query whereas table calculations are applied after the query.
Takeaways

1. There is no silver bullet. It depends…
2. The layout of the viz matters
3. There are scenarios where different solutions perform differently
4. There are always trade-offs to consider (performance vs. flexibility vs. simplicity)
Calculation Methods
What? When? And Why?

- Thursday Nov. 14  |  10:30 AM–12:30 PM | Level 2—Mandalay Bay J
- Thursday Nov. 13  |  1:15 PM–3:15 PM | North Convention Center—Islander G
- Friday Nov. 13  |  10:30 AM–12:30 PM | Level 2—Mandalay Bay J
Get Your FIX with This Level of Detail Session!

- Thursday Nov. 14 | 10:30 AM–12:30 PM
- Thursday Nov. 14 | 1:15 PM–3:15 PM
- Friday Nov. 15 | 10:30 AM–12:30 PM
Advanced Calculations:
IF [you attend] THEN “Calculations Master” END

• Thursday Nov. 14  |  10:30 AM–12:30 PM
• Thursday Nov. 14  |  1:15 PM–3:15 PM
• Friday Nov. 15  |  10:30 AM–12:30 PM
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