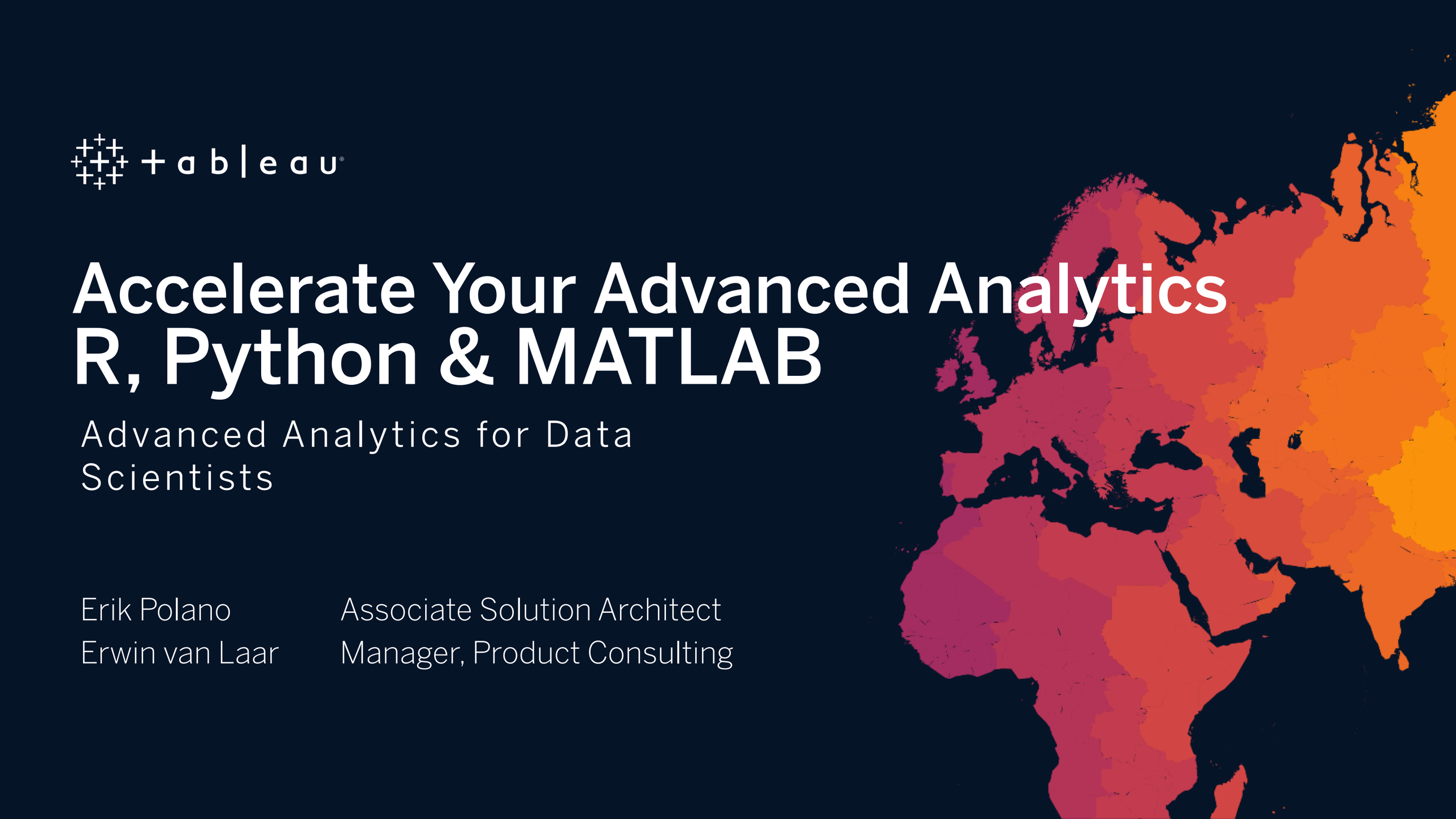


Accelerate Your Advanced Analytics R, Python & MATLAB

Advanced Analytics for Data Scientists

Erik Polano — Associate Solution Architect
Erwin van Laar — Manager, Product Consulting

Agenda

Tableau's Built in Analytics

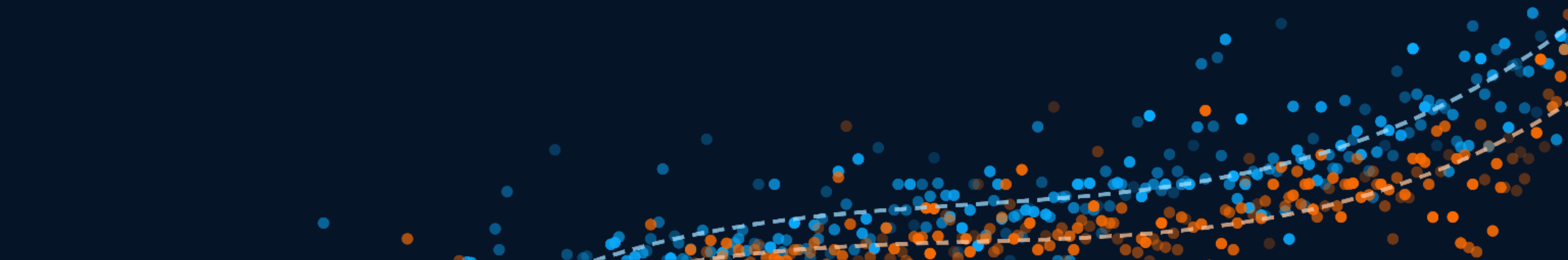
External Services Connection

Live Calculations

Materialized Calculations

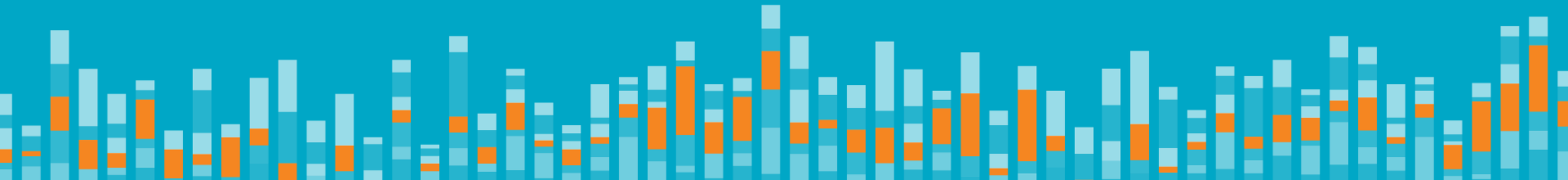
Summary

Introduction



Erwin van Laar
Team Lead, Product Consultancy, Tableau

Erik Polano
Associate Solution Architect, Tableau



Objective

Create interactive dashboards…

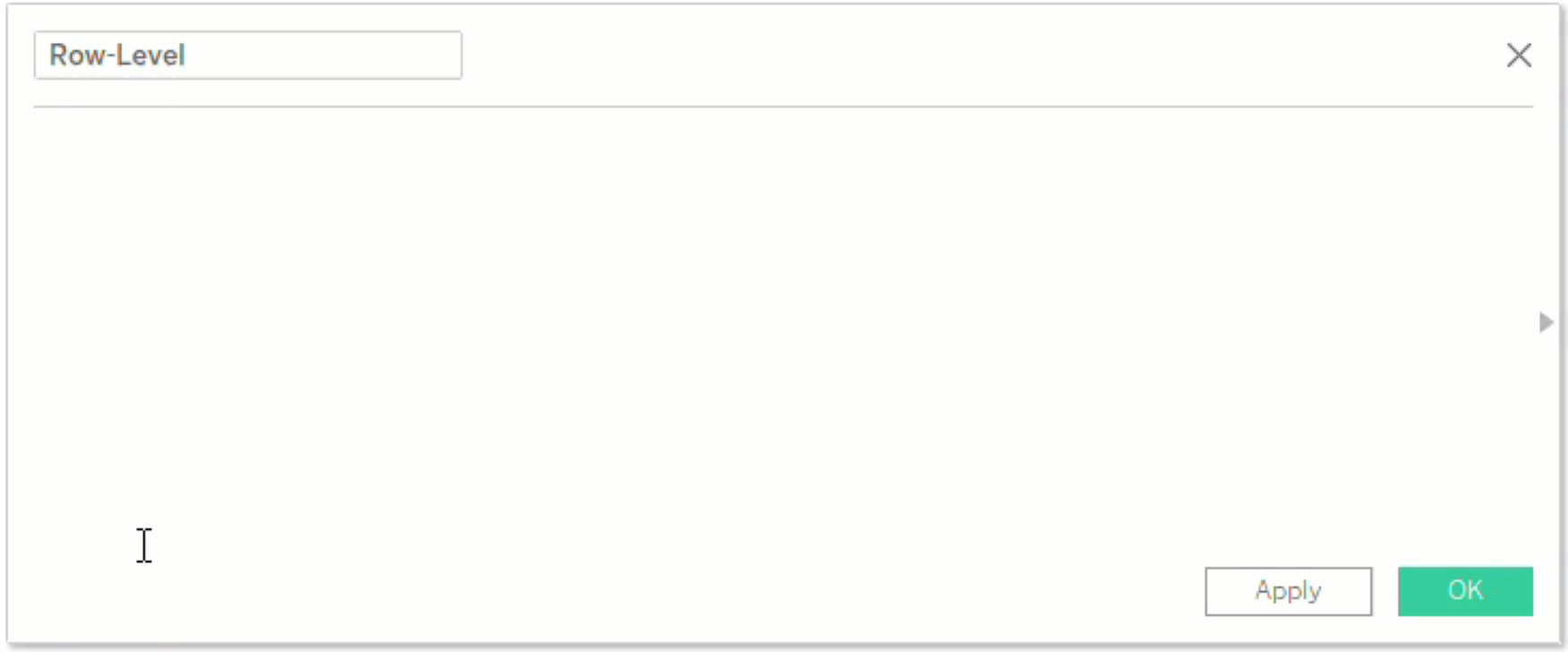
Without the end user needing to understand code…

That enables them to answer questions…

That are not contained in the underlying data source

Built In Analytics in Tableau

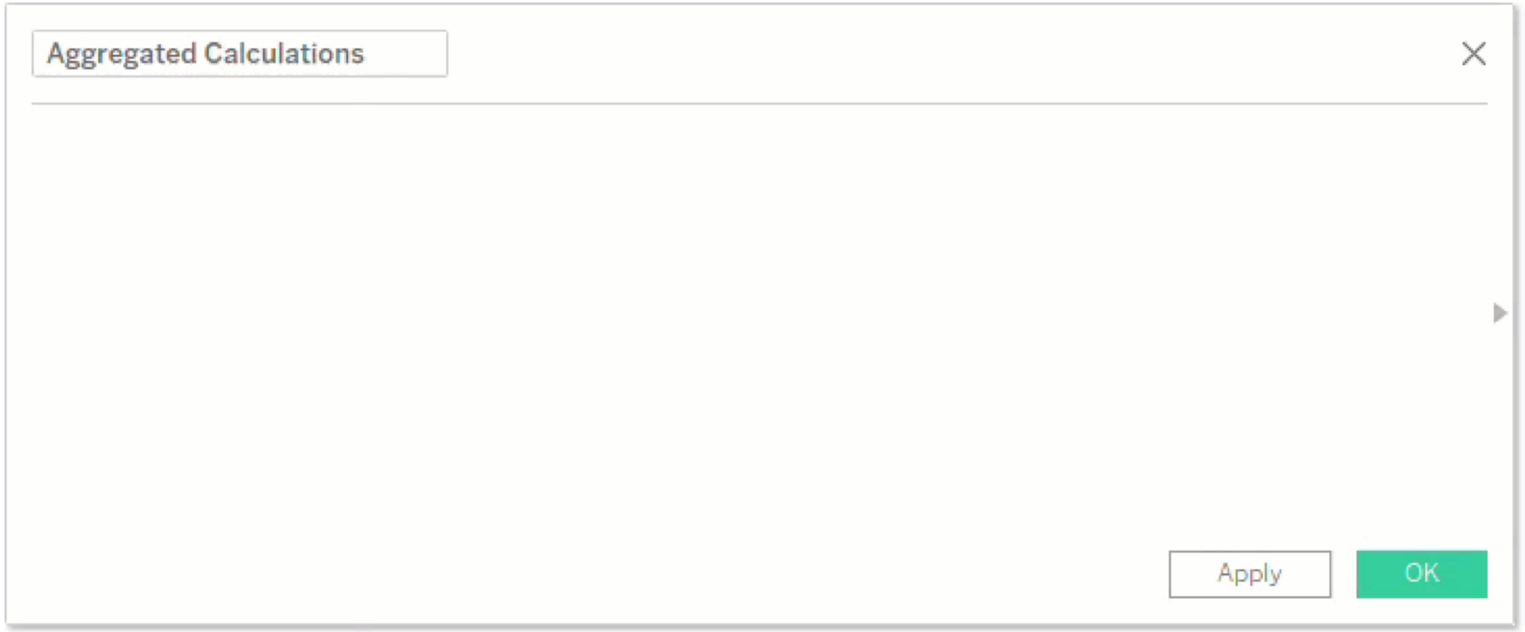
Row Level Calculations



Built In Analytics in Tableau

Row Level Calculations

Aggregated Calculations

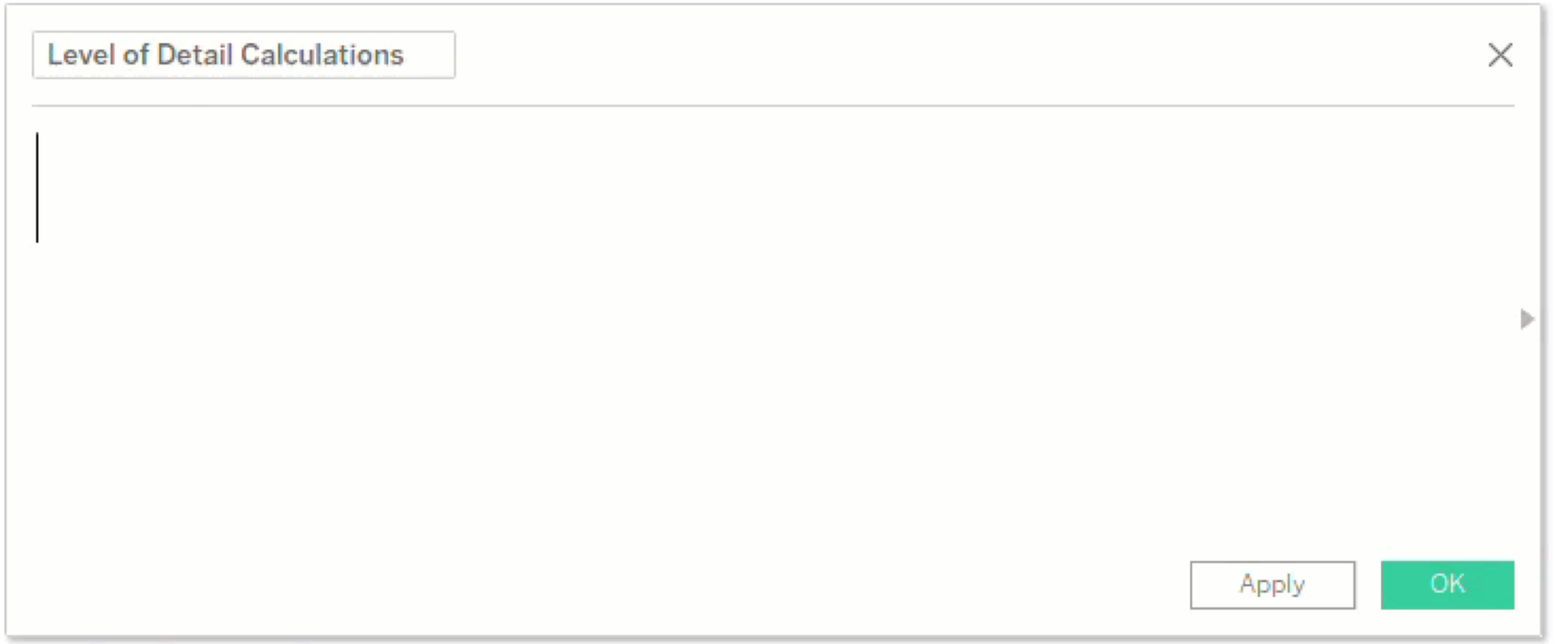


Built In Analytics in Tableau

Row Level Calculations

Aggregated Calculations

Level of Detail



Built In Analytics in Tableau

Row Level Calculations

Aggregated Calculations

Level of Detail

Table Calculations

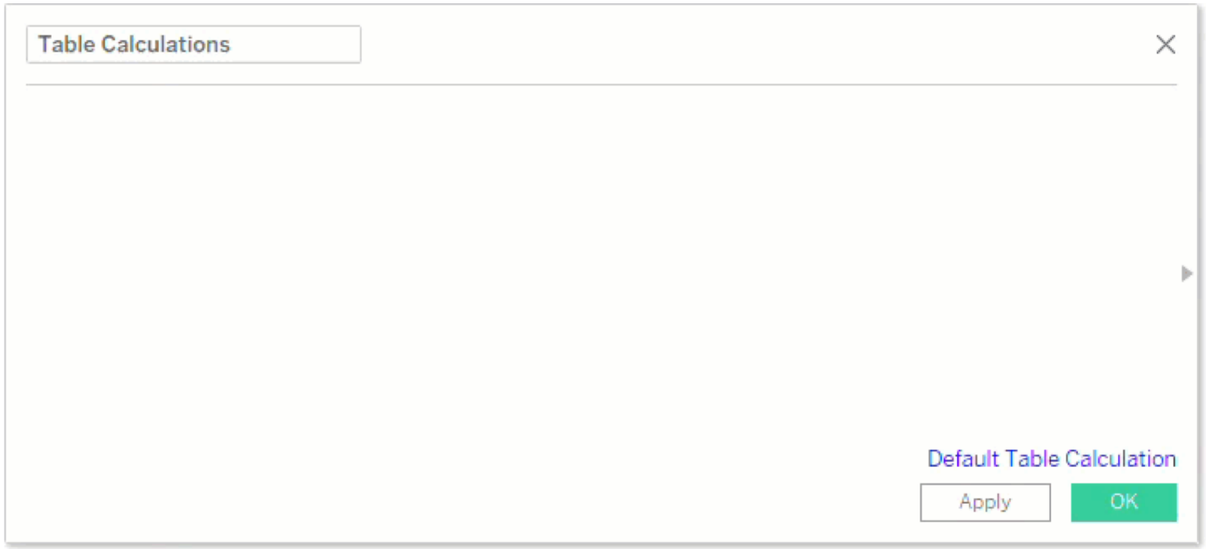
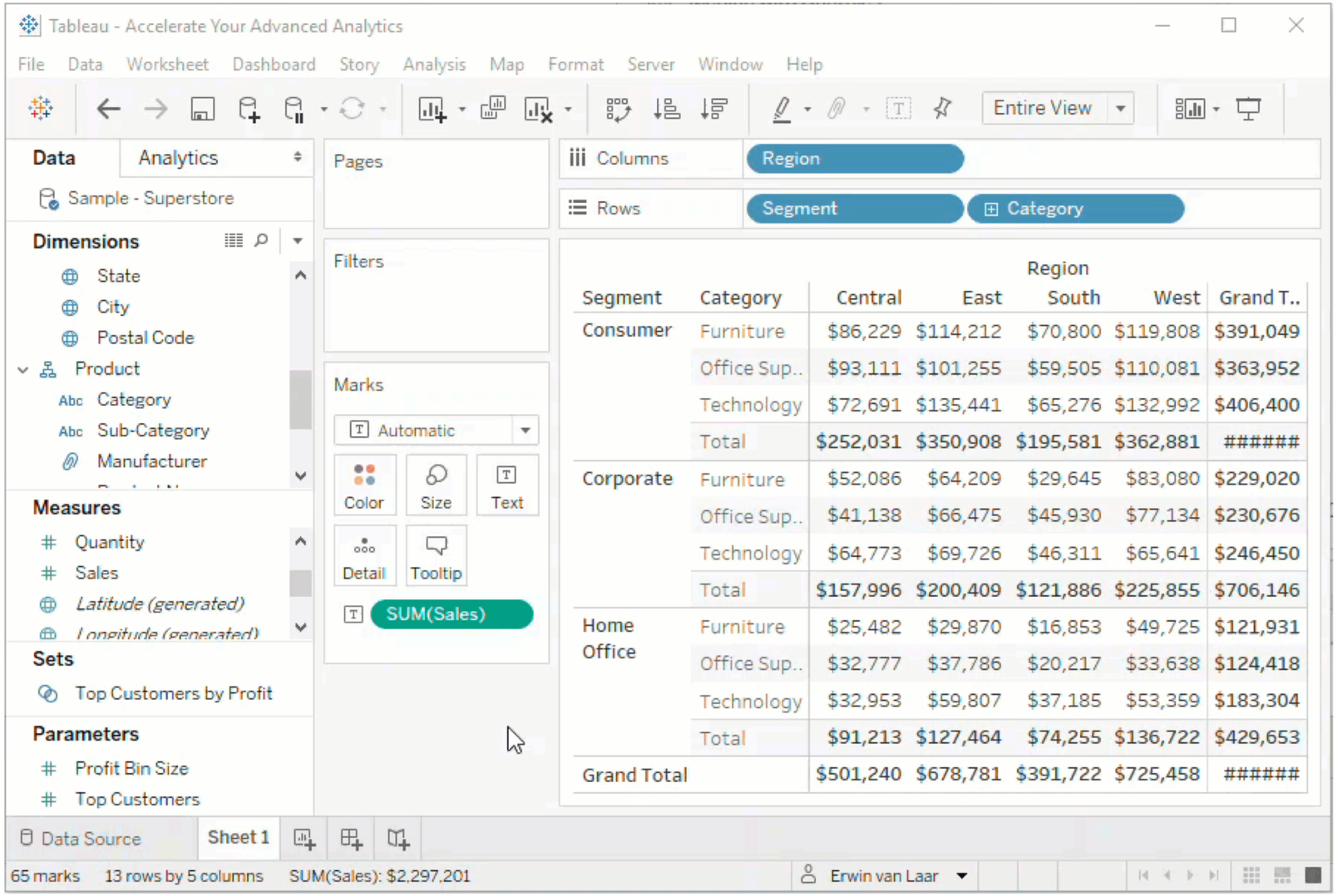


Tableau Calculations

Based on the Level of Aggregation in the View



Built In Analytics in Tableau

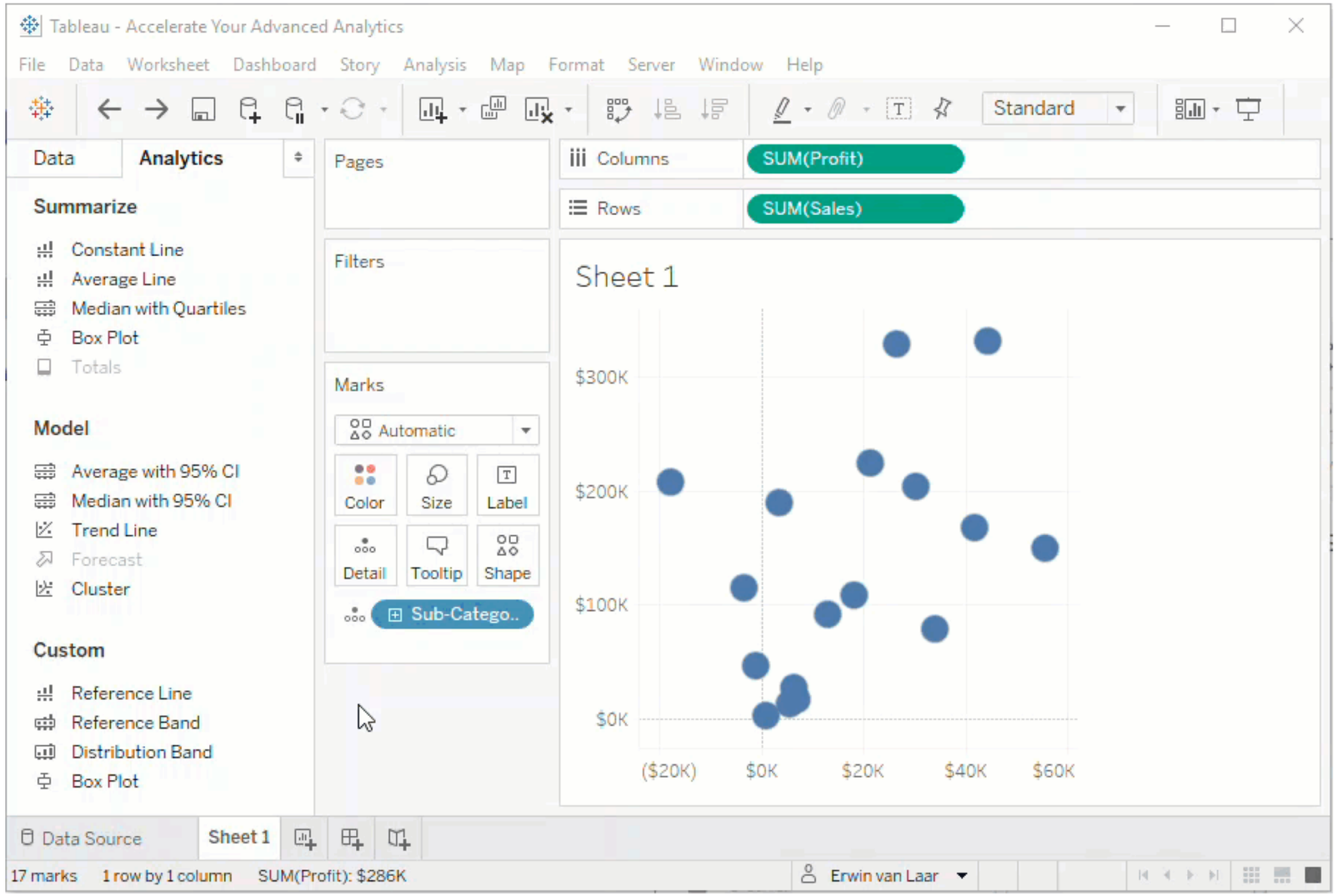
Row Level Calculations

Aggregated Calculations

- Level of Detail Expressions
- Table Calculations
- Analytics Objects (ref lines, trend lines, forecast, clusters)

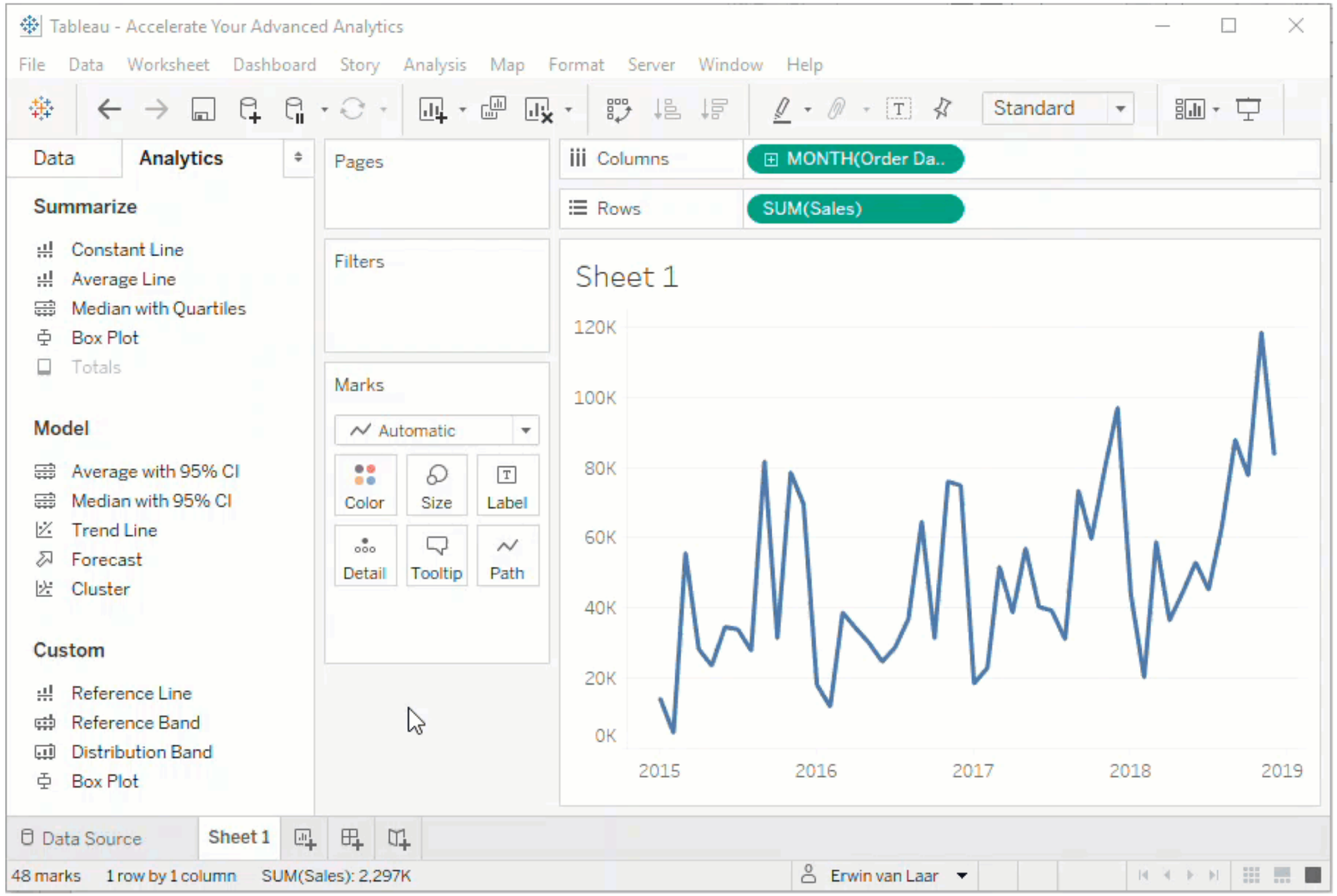
Analytic Objects

Drag & Drop Analytical features



Analytic Objects

Drag & Drop Analytical features



But What If I Want More?

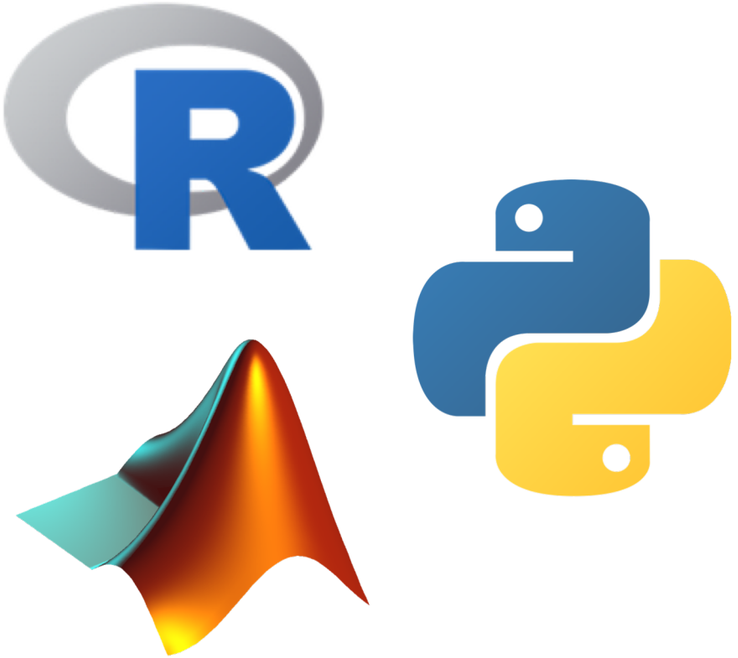
Different Model than Standard Tableau Functions

More complex models

Models trained on your data

Need more flexibility

External Services



Objective

Create interactive dashboards…

Without the end user needing to understand code…

That enables them to answer questions…

That are not contained in the underlying data source

By leveraging an Advanced Analytical Language

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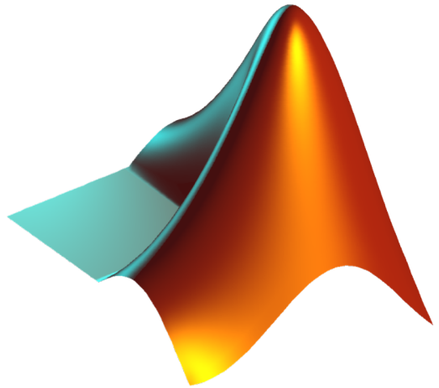
External Services

External Services Connection

R (8.1+)

Python (10.1+)

MATLAB (10.4+)

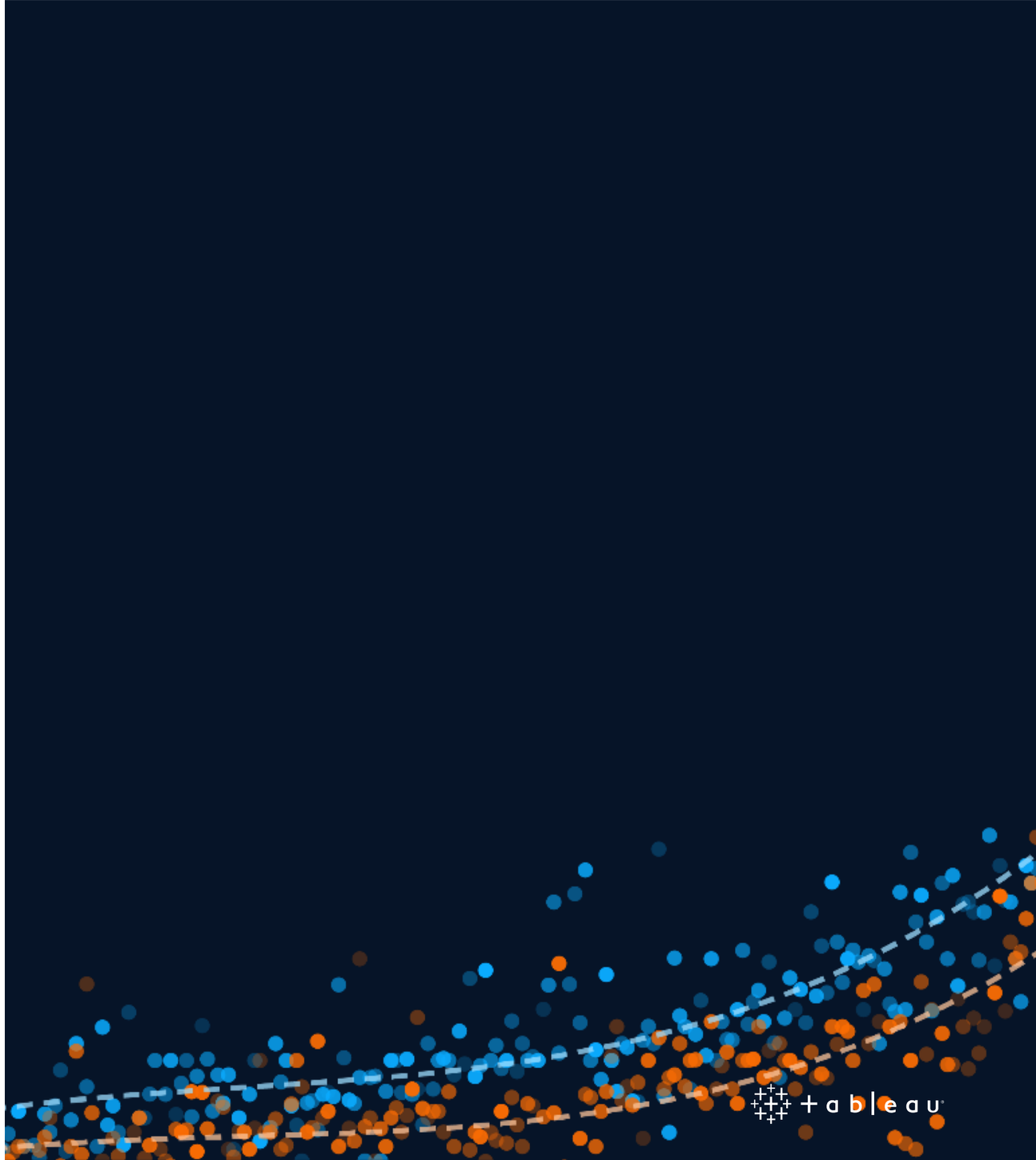


SCRIPT Functions

SCRIPT_BOOL
SCRIPT_INT
SCRIPT_REAL
SCRIPT _STR

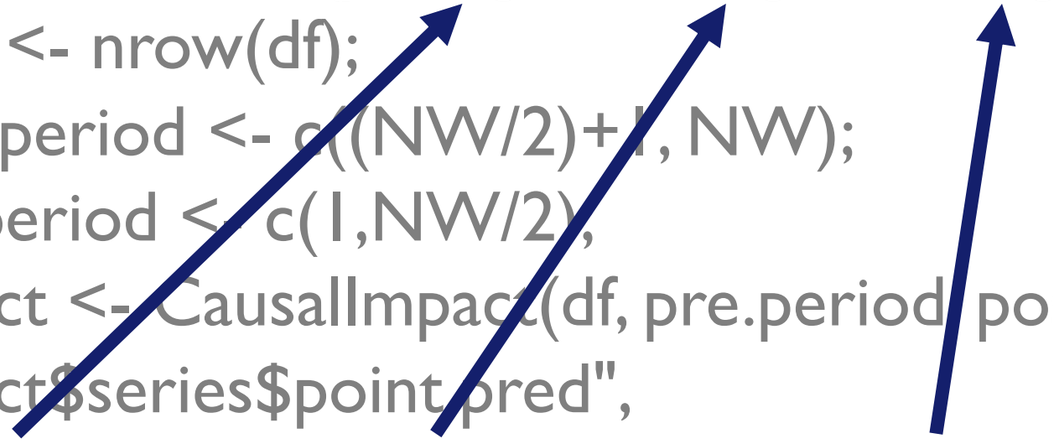
Script defines the type of outcome that Tableau expects

They will be run as a Table Calculation

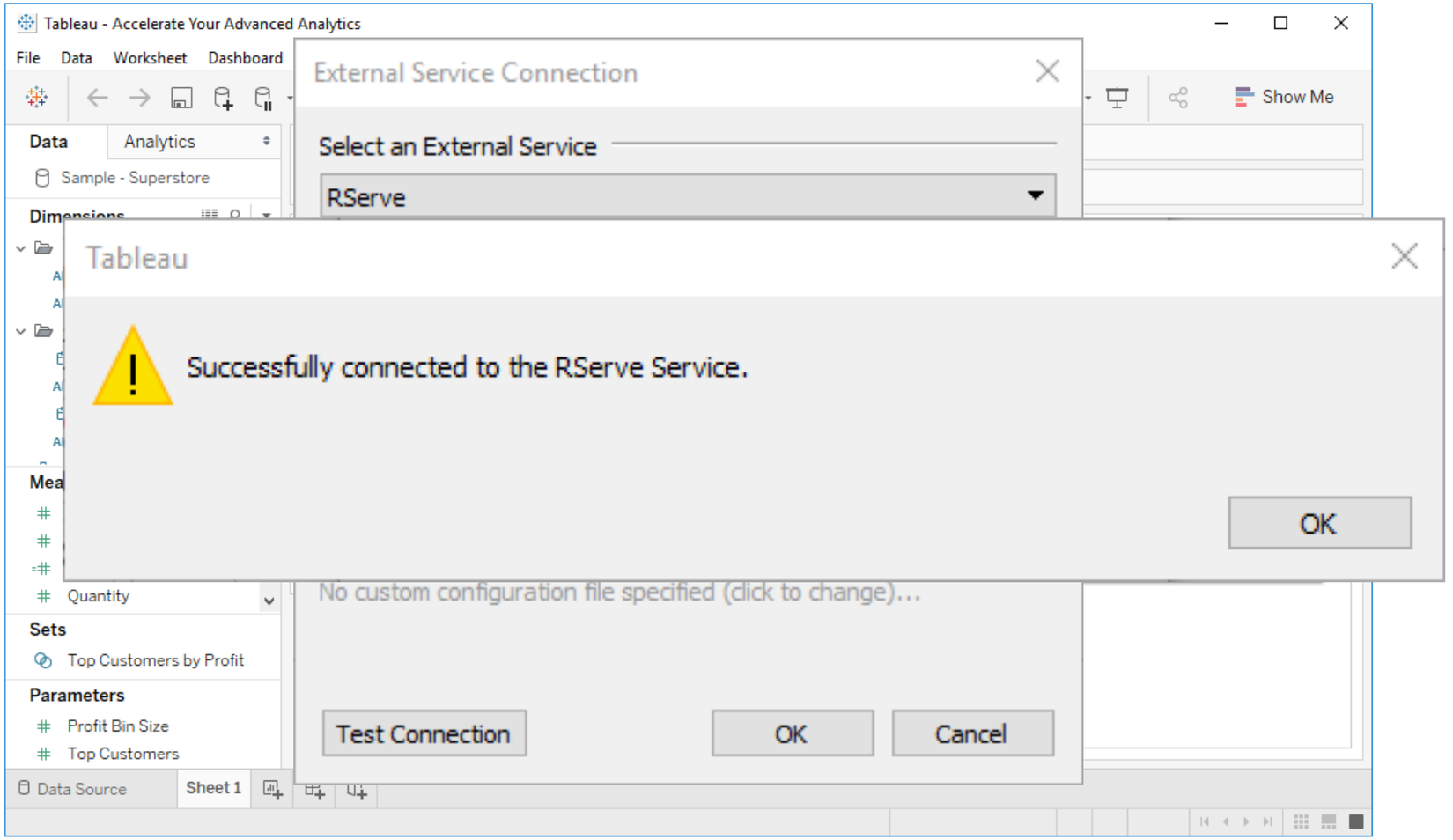


Example

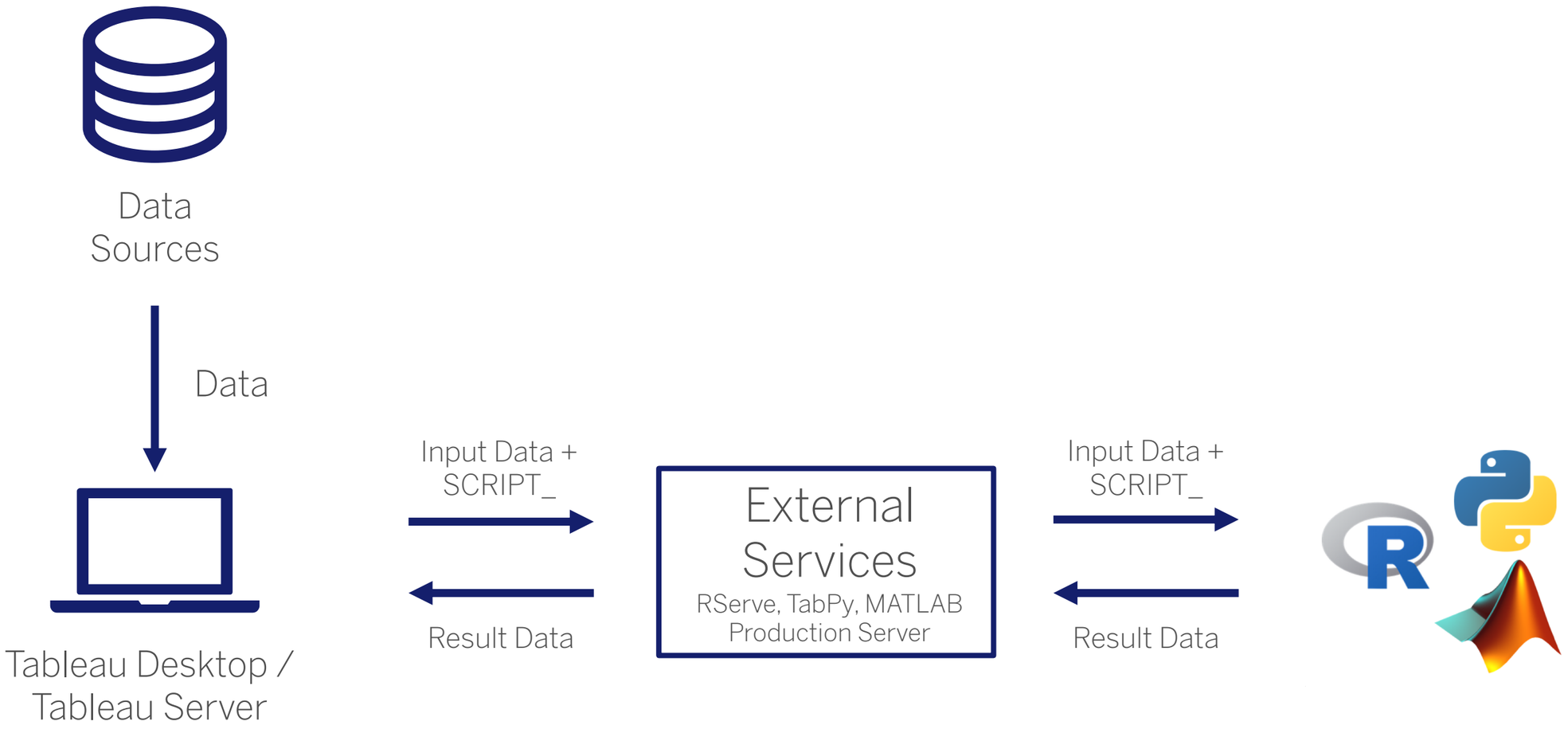
```
SCRIPT_REAL("library(CausalImpact);
df <- data.frame(y=.arg1,x1=.arg2,x2=.arg3);
NW <- nrow(df);
post.period <- c((NW/2)+1, NW);
pre.period <- c(1,NW/2);
impact <- CausalImpact(df, pre.period, post.period);
impact$series$point.pred",
SUM([Profit]), SUM([Quantity]), SUM([Sales]))
```



Manage External Services Connection



Connecting Tableau to an External Service



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R

R - RServe

TCP/IP server

Allows other programs to use facilities of R

Examples

Tableau helps you visually identify pattern in data

But are those patterns significantly different?

→ T-Test

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Python

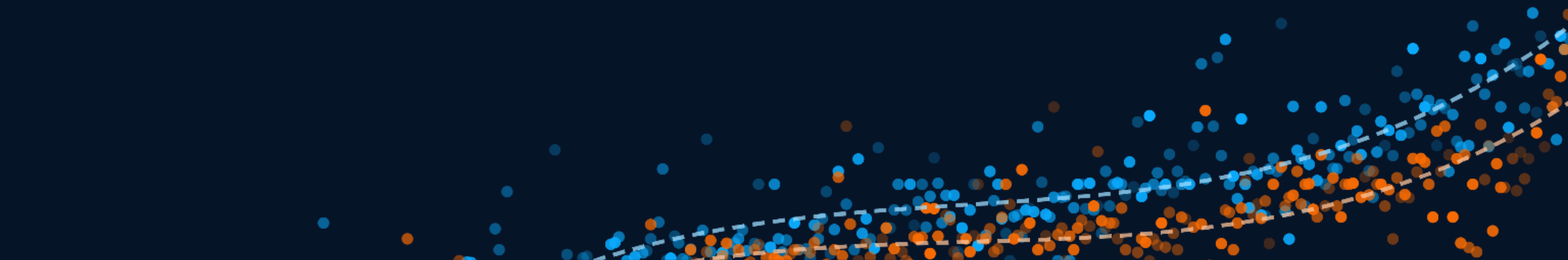
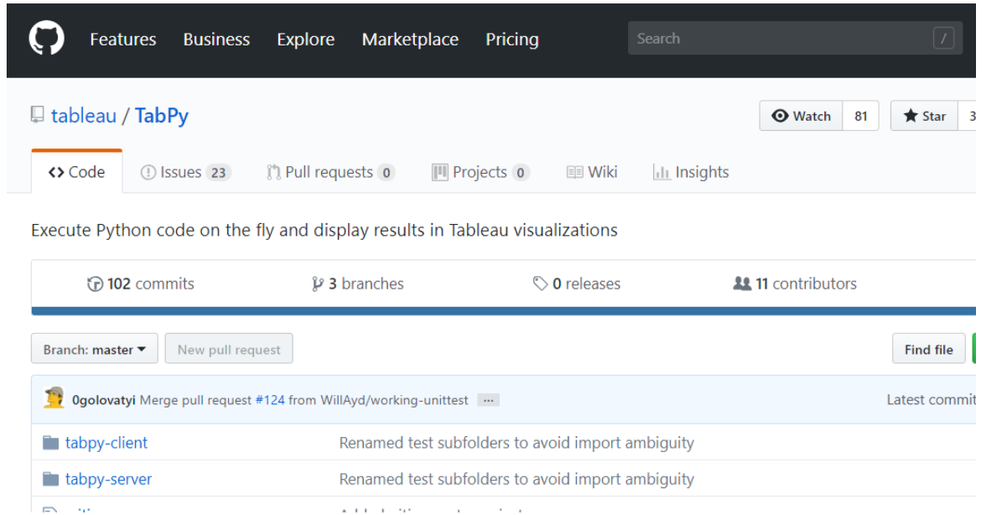
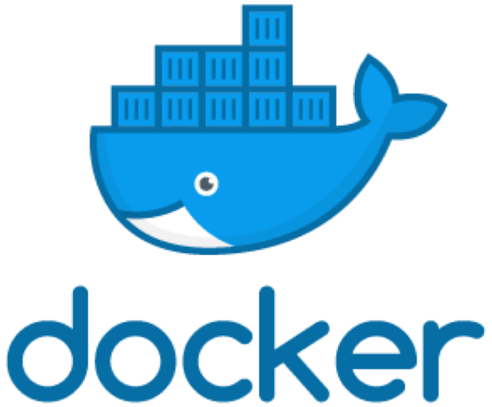


Tableau Python Server (TabPy)

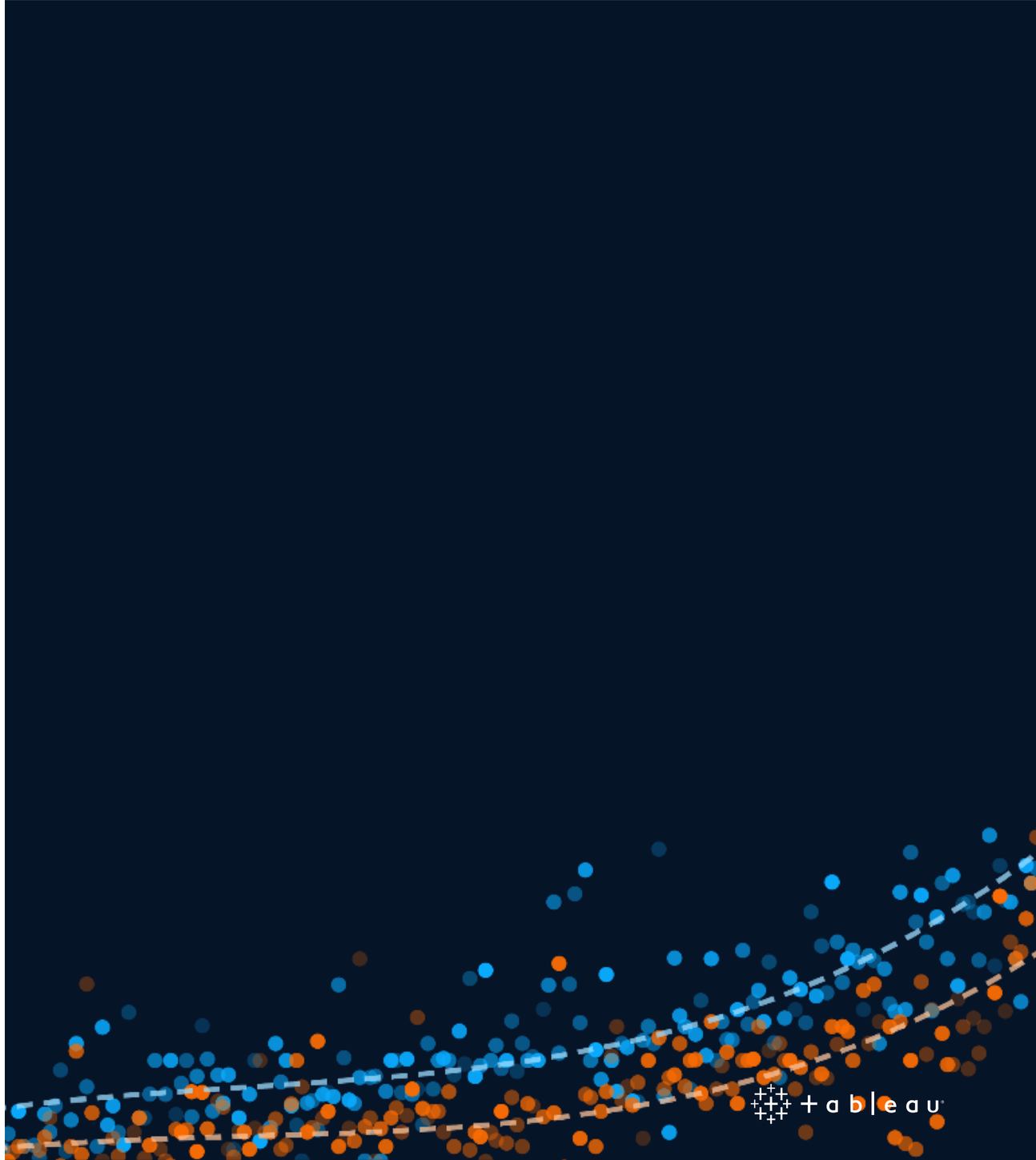




numpy (1.11.2)
pandas (0.19.1)
scikit-learn (0.17.1)
scipy (0.18.1)
textblob (0.11.1)
nltk (3.2.1)
vaderSentiment (0.5)
geopy (1.11.0)
requests (2.12.4)
reverse_geocoder (1.5.1)

Python - Example

Twitter Sentiment Analysis



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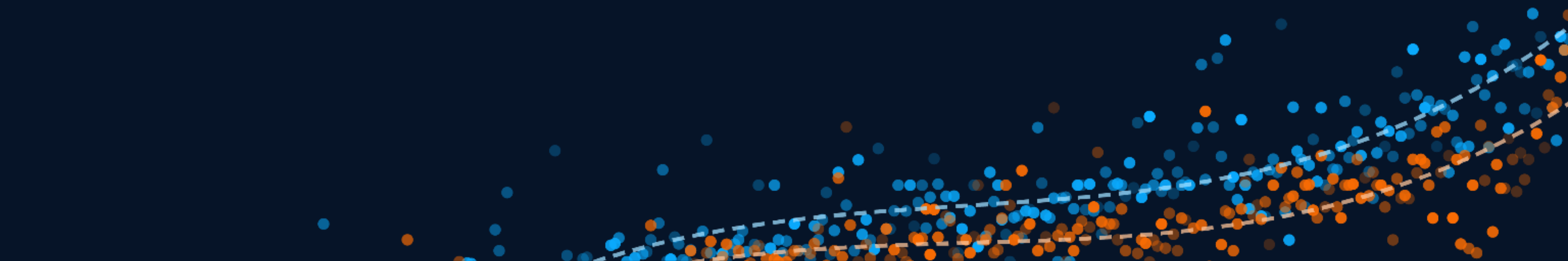
MATLAB



MATLAB – Two Different Options

MATLAB allows to connect to models in two different ways:

External Service Connection

Web Data Connector

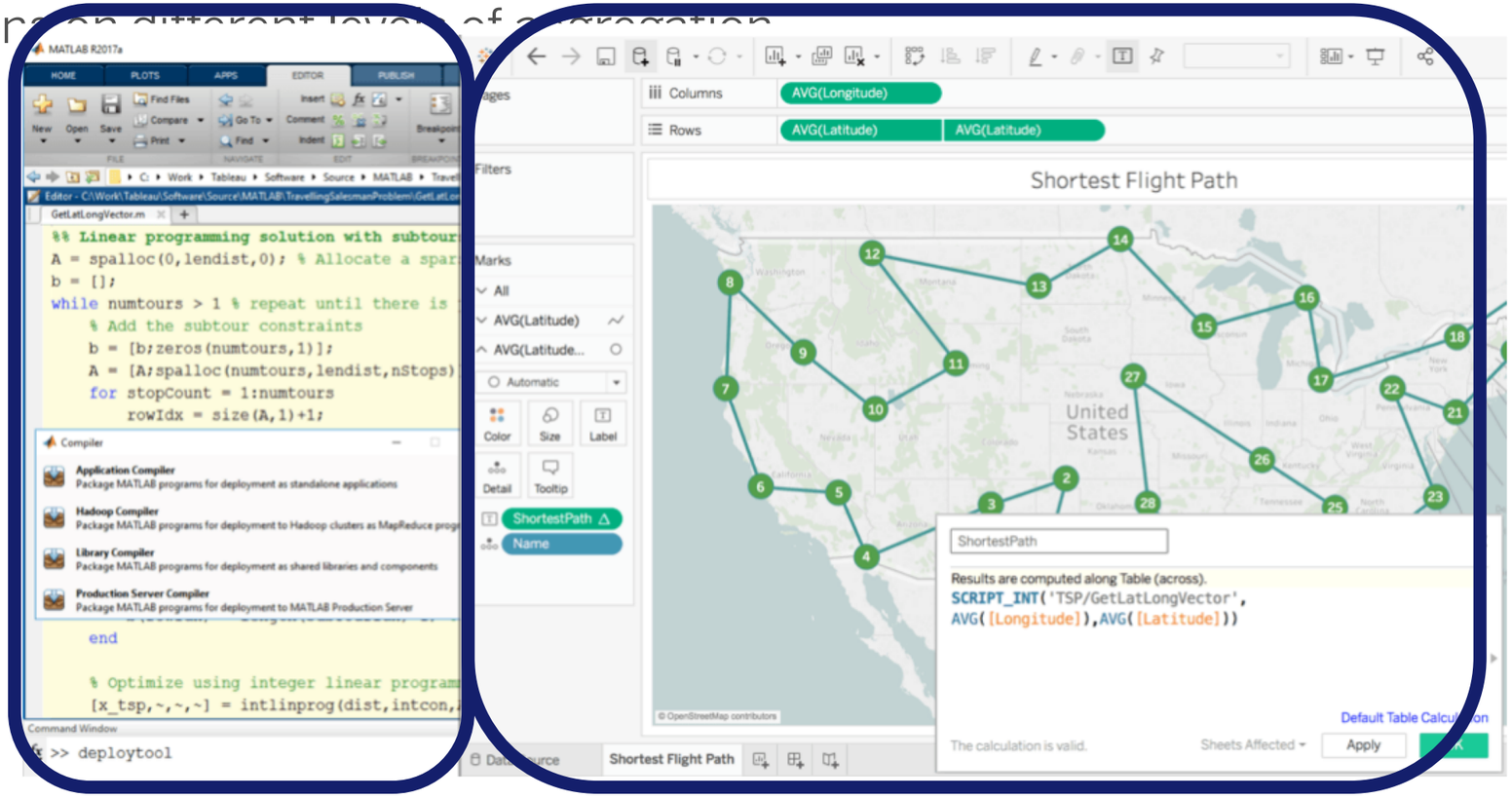
Option 1: External Service Connection

Define Functions in MATLAB Production Server

Call Functions through Calculated Fields

Possible to filter and re-run calculations on different level of aggregation

Advantage: Flexibility.



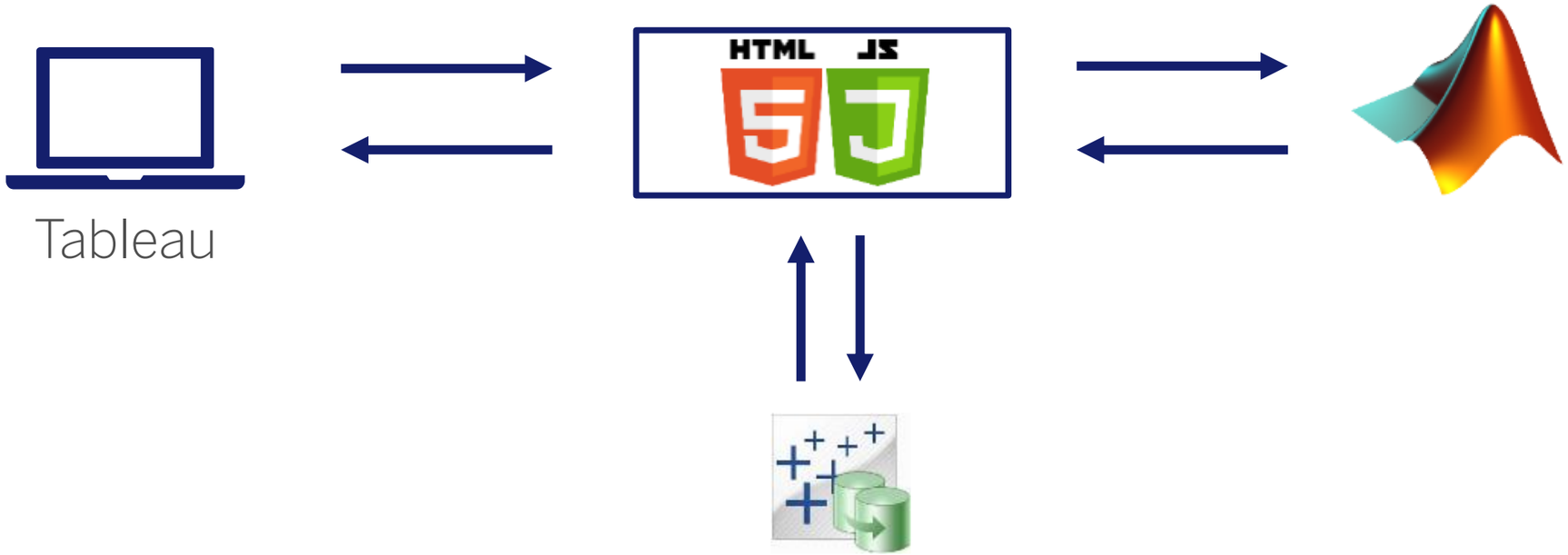
Option 2: Web Data Connector

Request Data Source at Initial Data Source Stage

Request sent once to MATLAB and all results written on row level into extract

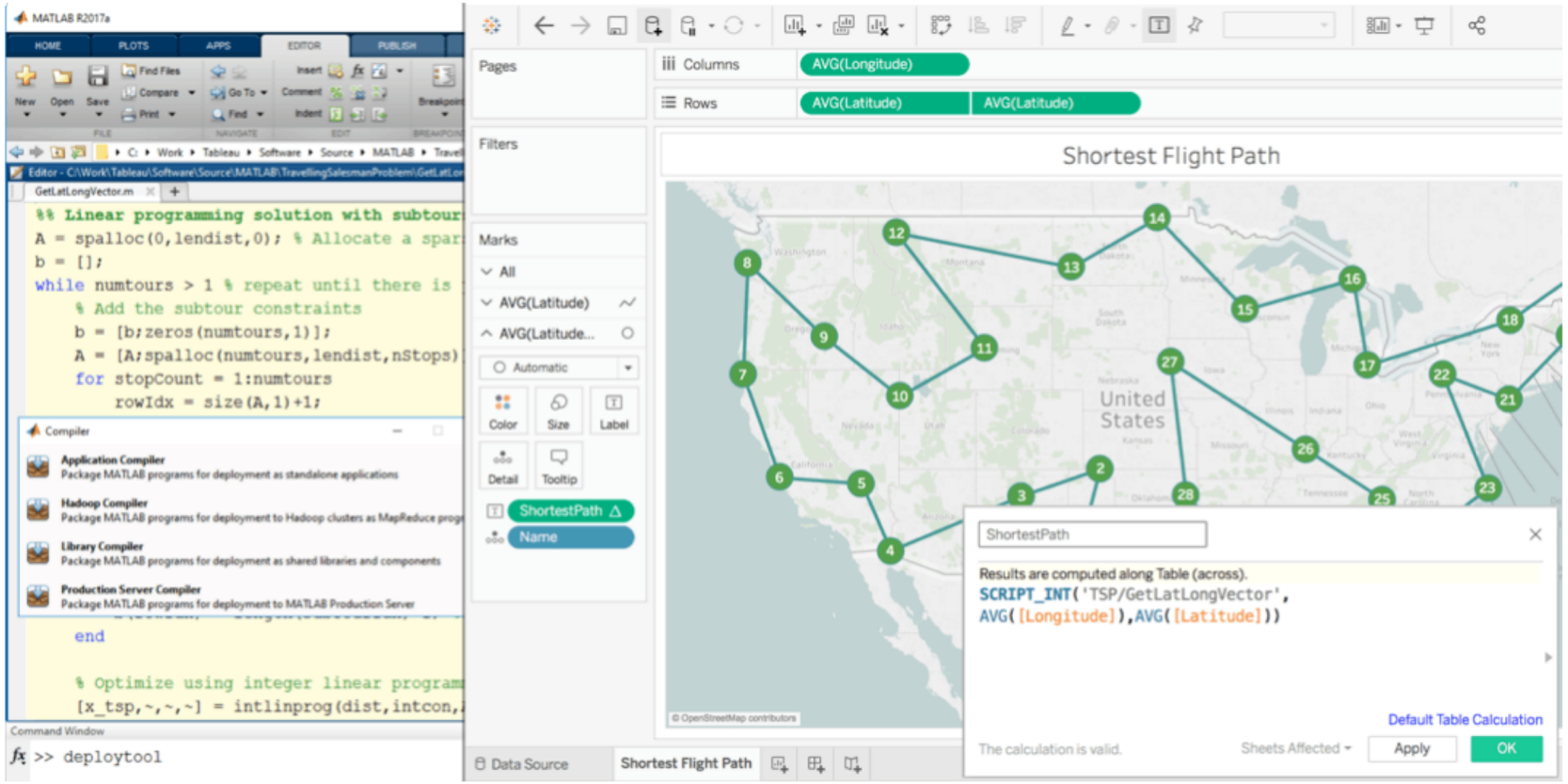
Advantage: Performance

Advantage: All data can be used regardless of aggregation level



MATLAB - Example

Shortest Salesperson Route



Materialized Calculations

Categorization

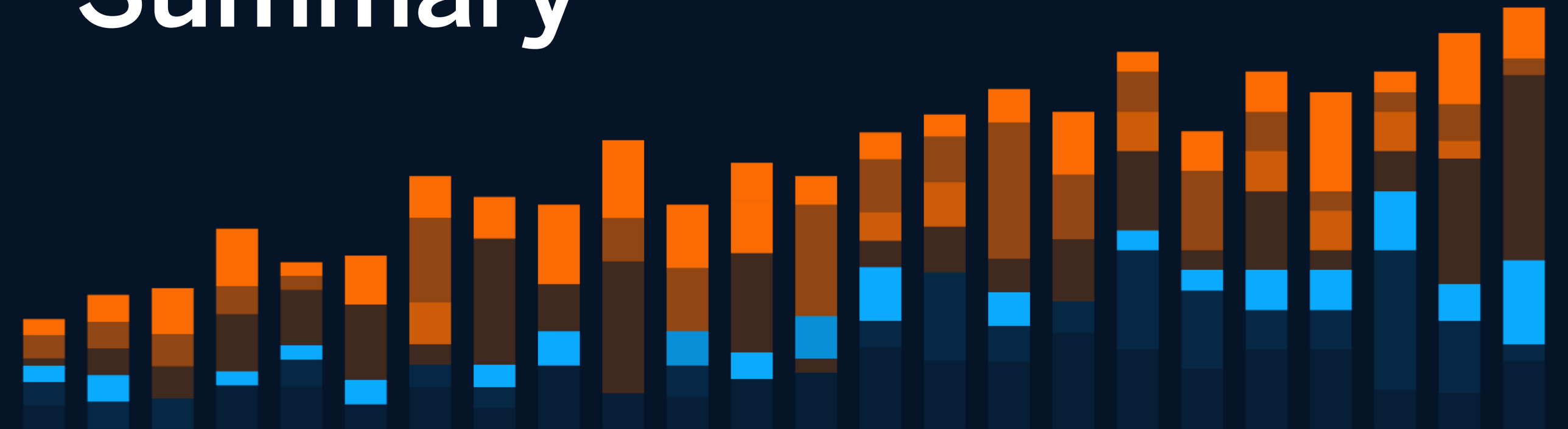
Twitter Sentiment Analysis

Customer Identification

Reclassification

Row-Level Calculations

Summary



What Do External Services Bring to Tableau?

Deeper Statistics

Machine Learning

Productionalize Predictive Modeling

More Expressive Power

What Does Tableau Bring to External Services?

Data Connectivity

Explore at the Speed of Thought

Interactive Visual Storytelling

Any Questions?

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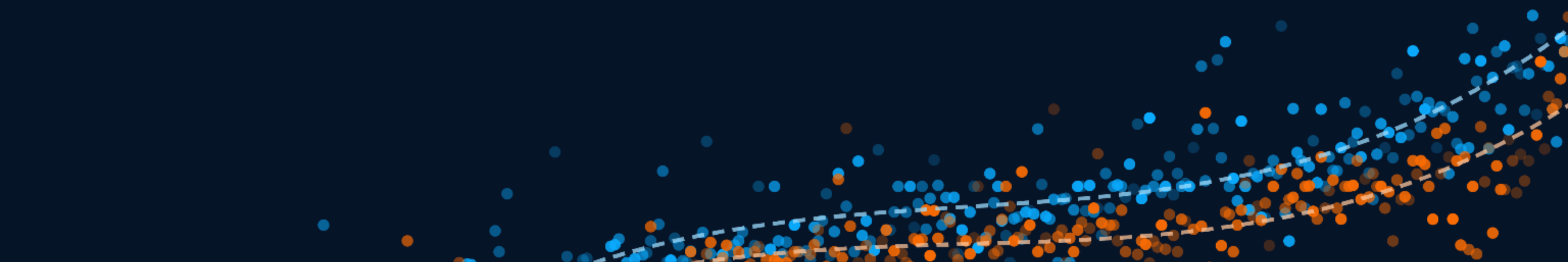
THANK YOU!

Erik Polano & Erwin van Laar



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