A Modeler's Perspective on Using Big Data

Ben Nault

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Modeling is about telling a story

Big data is a useful tool for building a story

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Overview

Advantages

Challenges

Future

|

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Overview
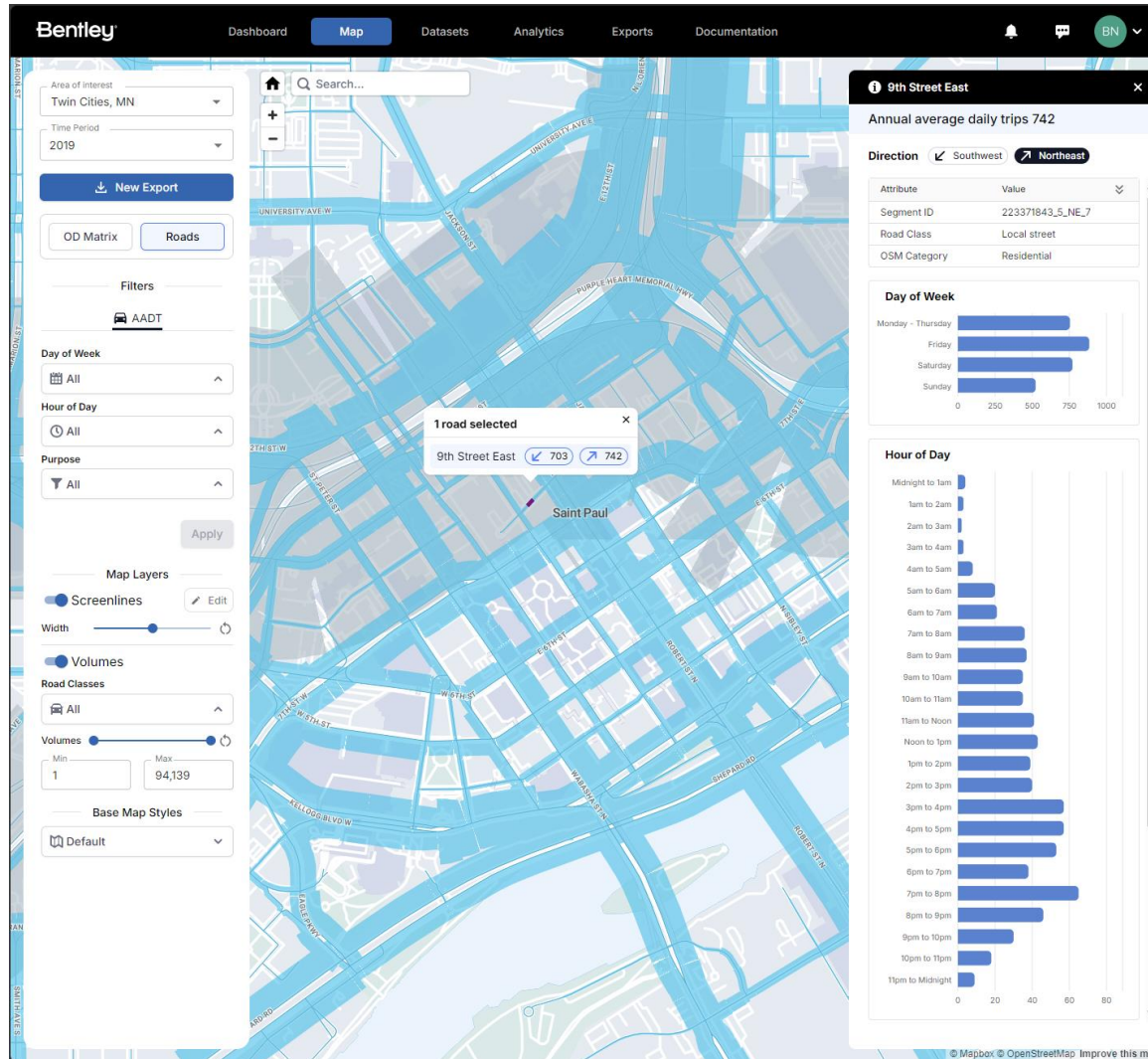
Advantages

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Advantages to Big Data

High Number of Observations
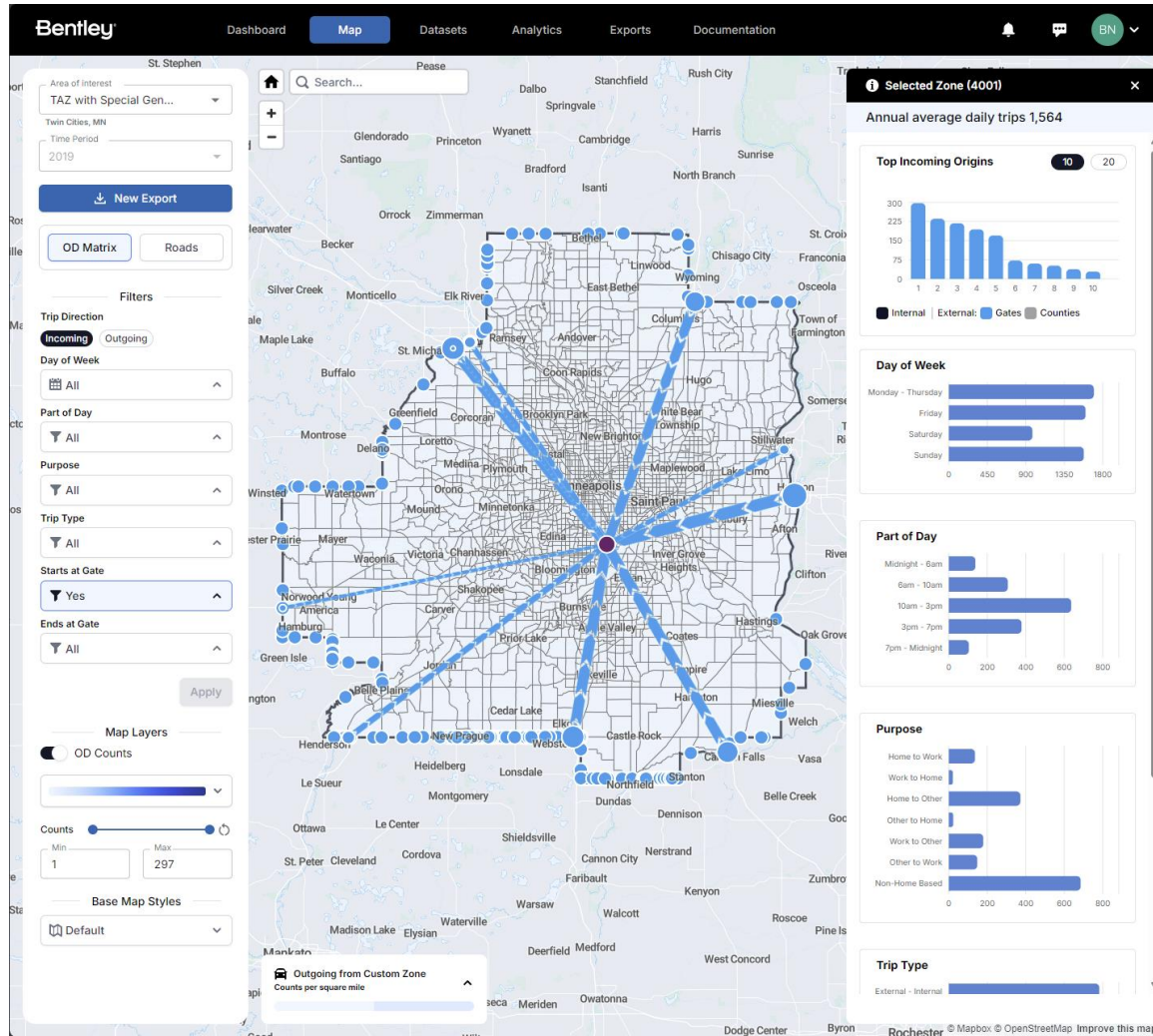– 10% - 15% of daily travel for 365 days per year

Trips Everywhere
– Every road, alley, part of US

Detailed Information
– When (date & time)
– Where (start, end, route)

Example – Airport Trip Tables

Advantages

- Comprehensive trip table for MSP

- Average travel pattern

  - Great for modeling!

  - Cut many ways (AADT, AWDT, AM Peak, etc.)

Even Better

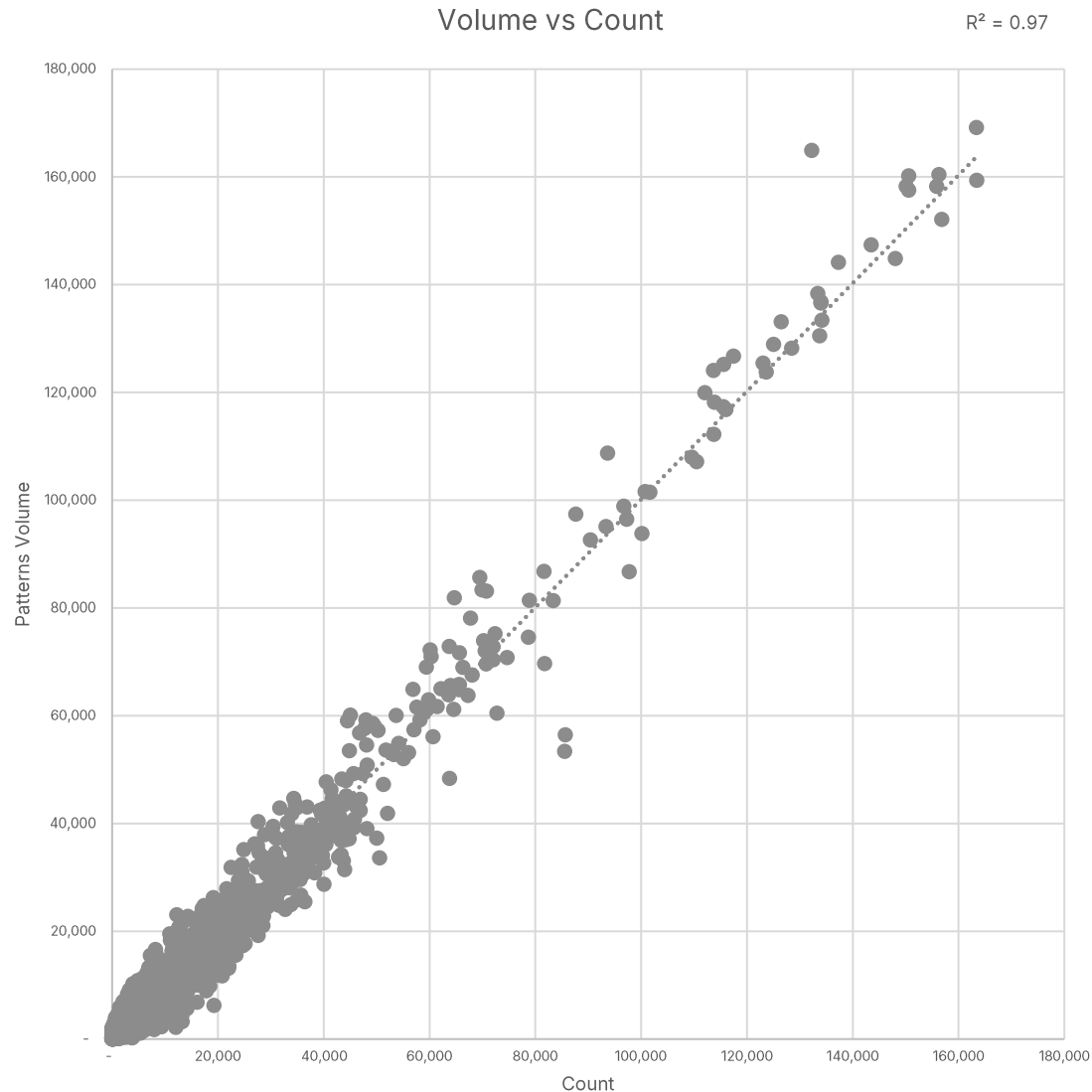- Expand household travel survey findings with comprehensive trip table

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Challenge - Quality

Volume vs Count   R² = 0.97
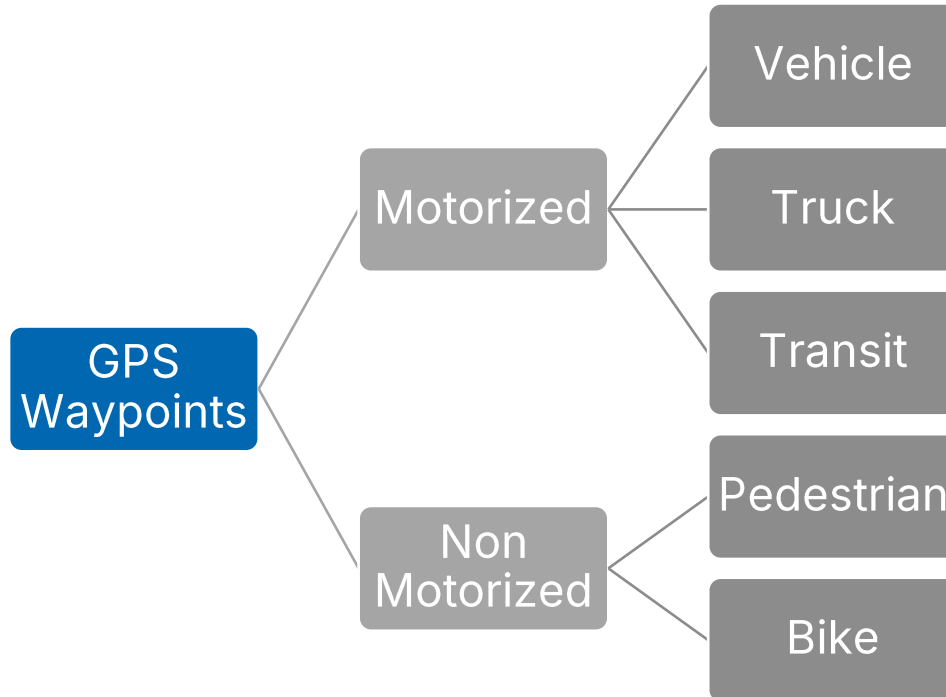

Difficult to interpret
- Volumes are not counts

Unique assumptions

Look into many aspects
- Methodology
- Volume vs Counts
- Volume to Capacity
- VMT
- Trip length frequency
- etc.

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Challenge - Modality

```
                           ┌─────────────┐
                           │   Vehicle   │
                           └─────────────┘
              ┌───────────┐ ┌─────────────┐
              │ Motorized │─│    Truck    │
              └───────────┘ └─────────────┘
┌─────────────┐            ┌─────────────┐
│     GPS     │            │   Transit   │
│  Waypoints  │            └─────────────┘
└─────────────┘            ┌─────────────┐
              ┌───────────┐ │ Pedestrian  │
              │    Non    │─└─────────────┘
              │ Motorized │ ┌─────────────┐
              └───────────┘ │    Bike     │
                           └─────────────┘
```
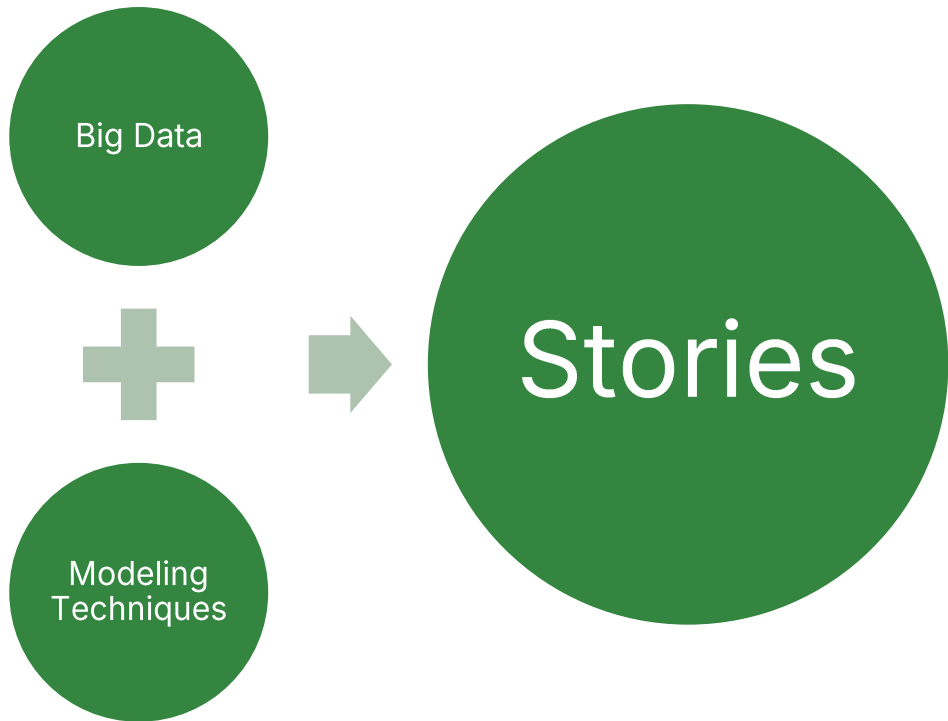
Mode isn't inherent in data

Sources imply modes, but can be biased

- [Most bike data from Strava](#)

Modes can be interpreted from routes, speeds, etc.

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Challenge - Hype

Big Data

+

Modeling
Techniques

→

Stories

If it sounds too good to be true, it is

Observation rate varies across geographies and time

Need blend of big data and modeling

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Future - Where is big data taking us?

Let modelers model
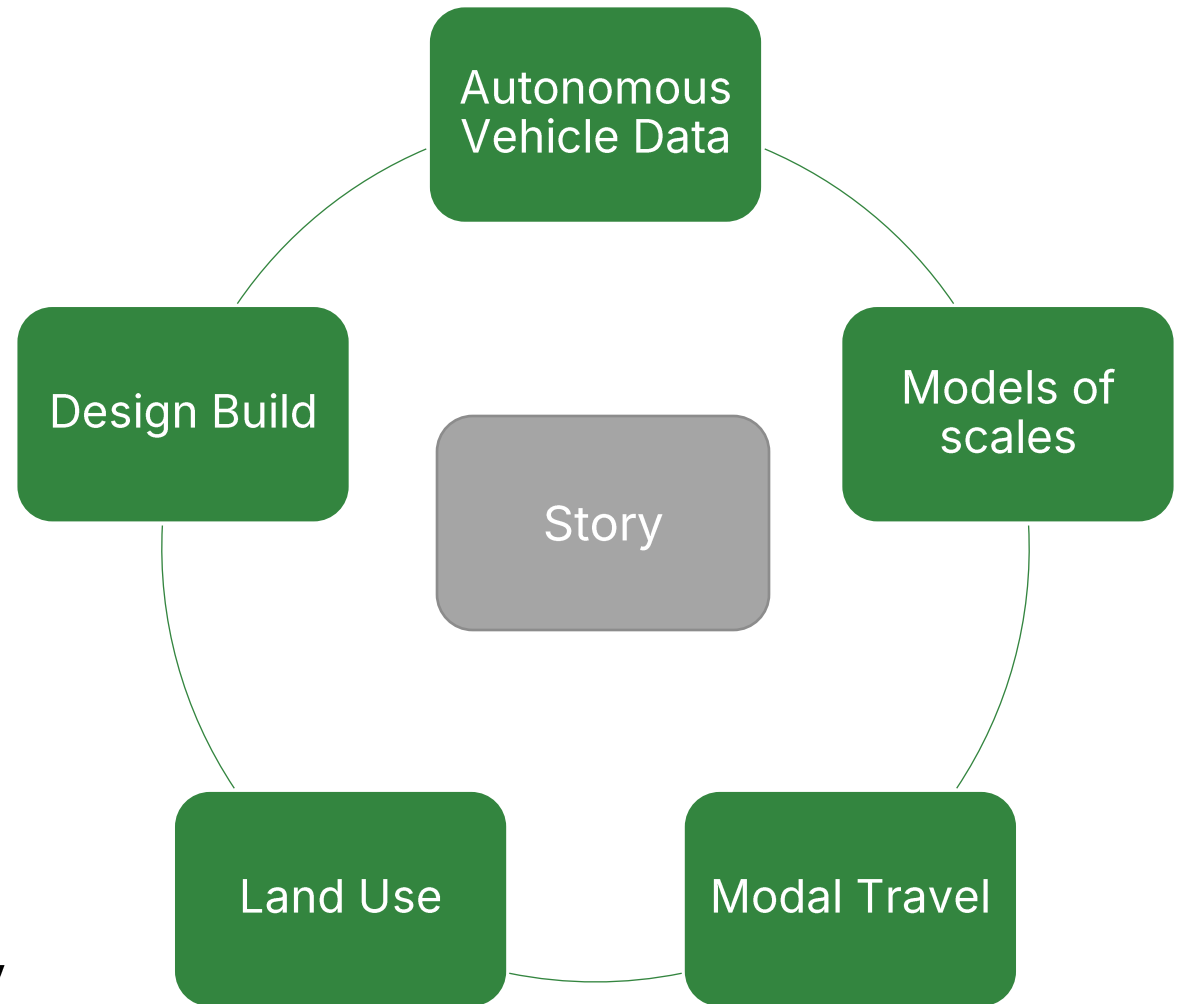– Automate calibration and coding

Annual Calibration

Seamless Data Transfer
– Macro <> Meso <> Micro
– Direct data feeds

On-Demand Modeling
– Combine models across regions
– Extract subarea models seamlessly

Autonomous Vehicle Data

Models of scales

Story

Design Build

Land Use

Modal Travel

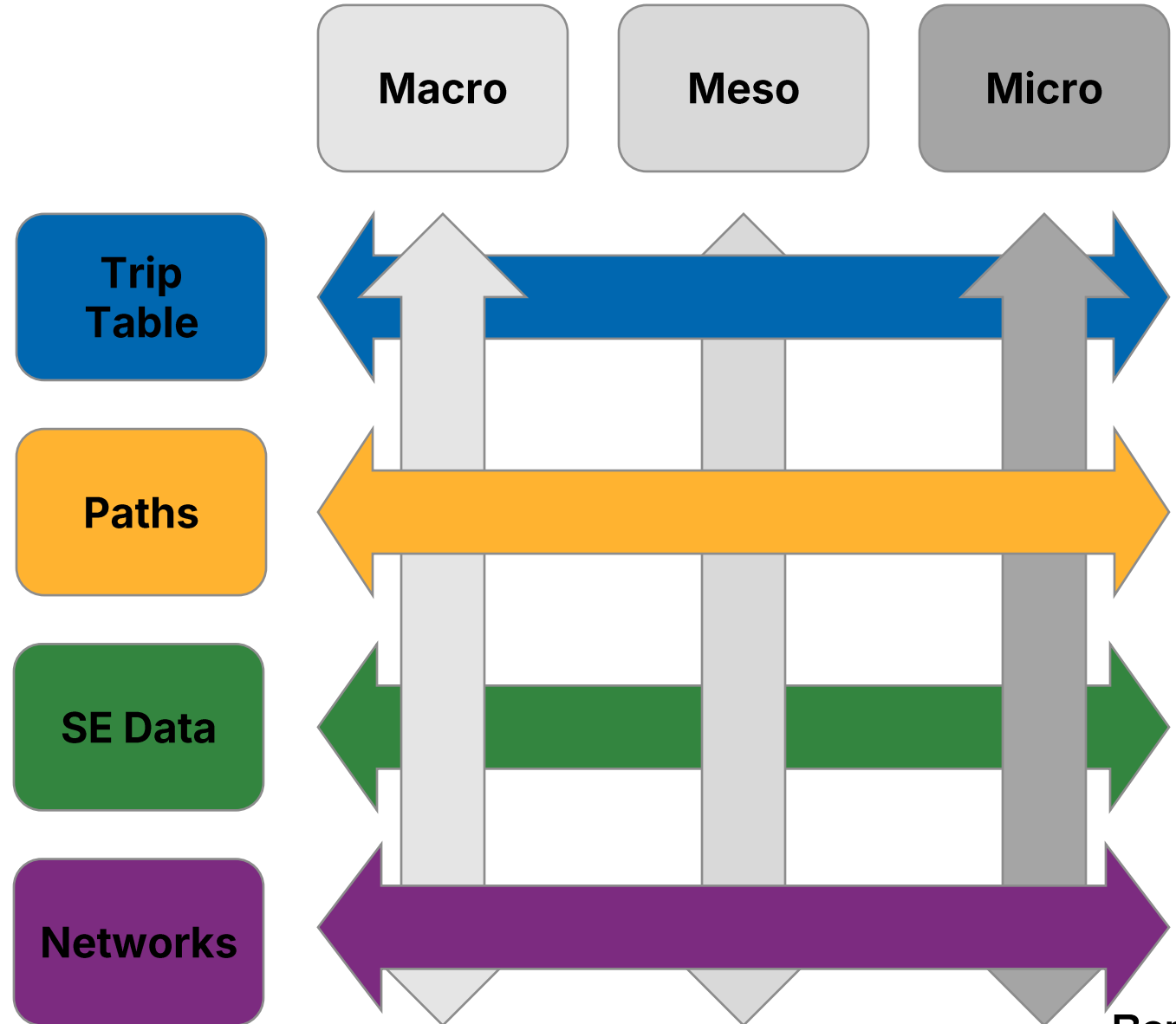# Future – Ex. Better & More Models

High Value Data

- Applies across model types
- Same output used many places

Allows for Models On-Demand

- Avoid duplicate work
- Build off each other

Questions

ben.nault@bentley.com

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