inspire 2026

Routing Simulation

May 20th, 2026

Corp Ecom Planning Engineer

Larry Speights

ROUTING SIMULATION

Introduction

- Larry Speights
- Role, Kroger business & Alteryx journey
- High level overview of available tools

	Online Routing Tool	Alteryx
Large Data Import	X	✓
Flexible number of stops	X	✓
Flexible number of routes	X	✓
Custom user adjustments	X	✓
Tradeoff asesment	X	✓
Custom Report	X	✓

- Alteryx can process thousands of records in minutes with no limits.

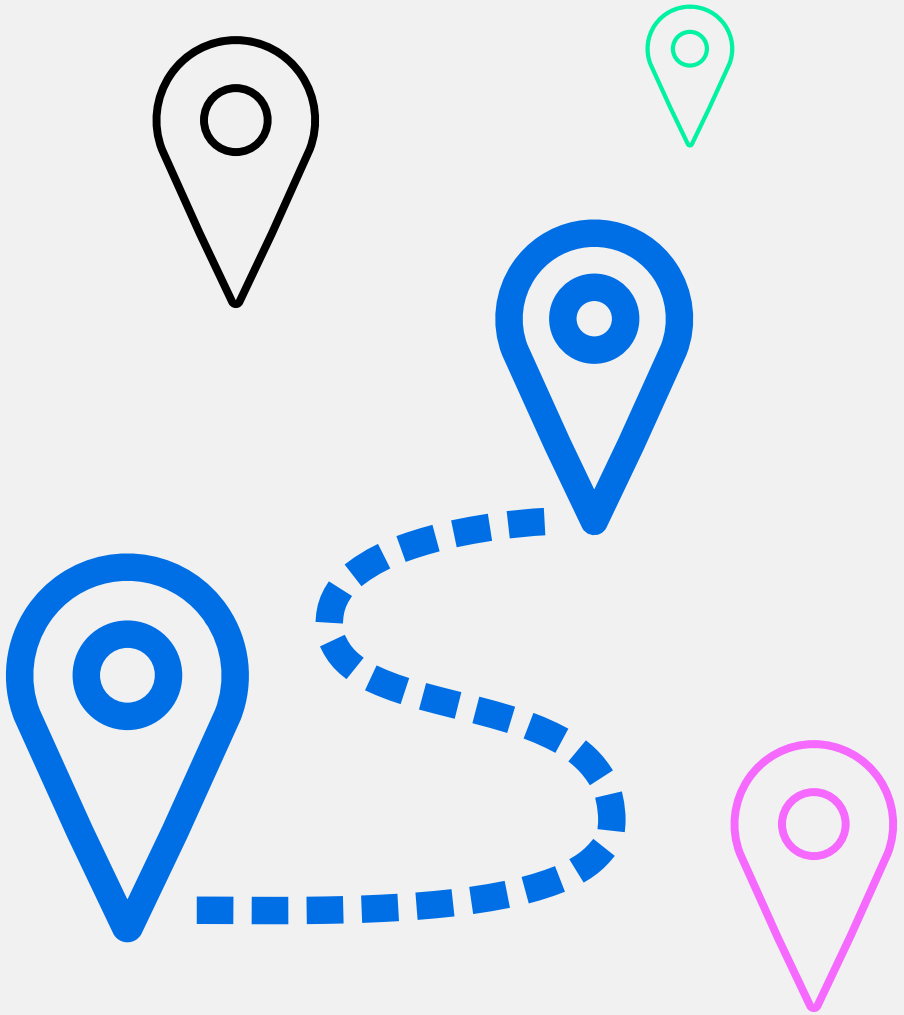
Home delivery in select States

- Ohio (Cincinnati, Columbus)
- Kentucky (Florence, Louisville)
- Indianapolis (Indiana)
- Colorado (Denver, Ft Collins, Colorado Springs)
- Texas (Dallas)
- Georgia (Atlanta)
- Alabama (Birmingham)
- Michigan (Detroit)

ROUTING SIMULATION

Agenda

1. Core problem to solve
2. Build Catchment area
3. Cover route simulation adjustments
4. Baseline simulation and Results
5. Cover simulation flow setup
6. Simulate with adjustments to route configuration
7. Cover additions to flow and new concepts
8. Q & A



Core problem to solve

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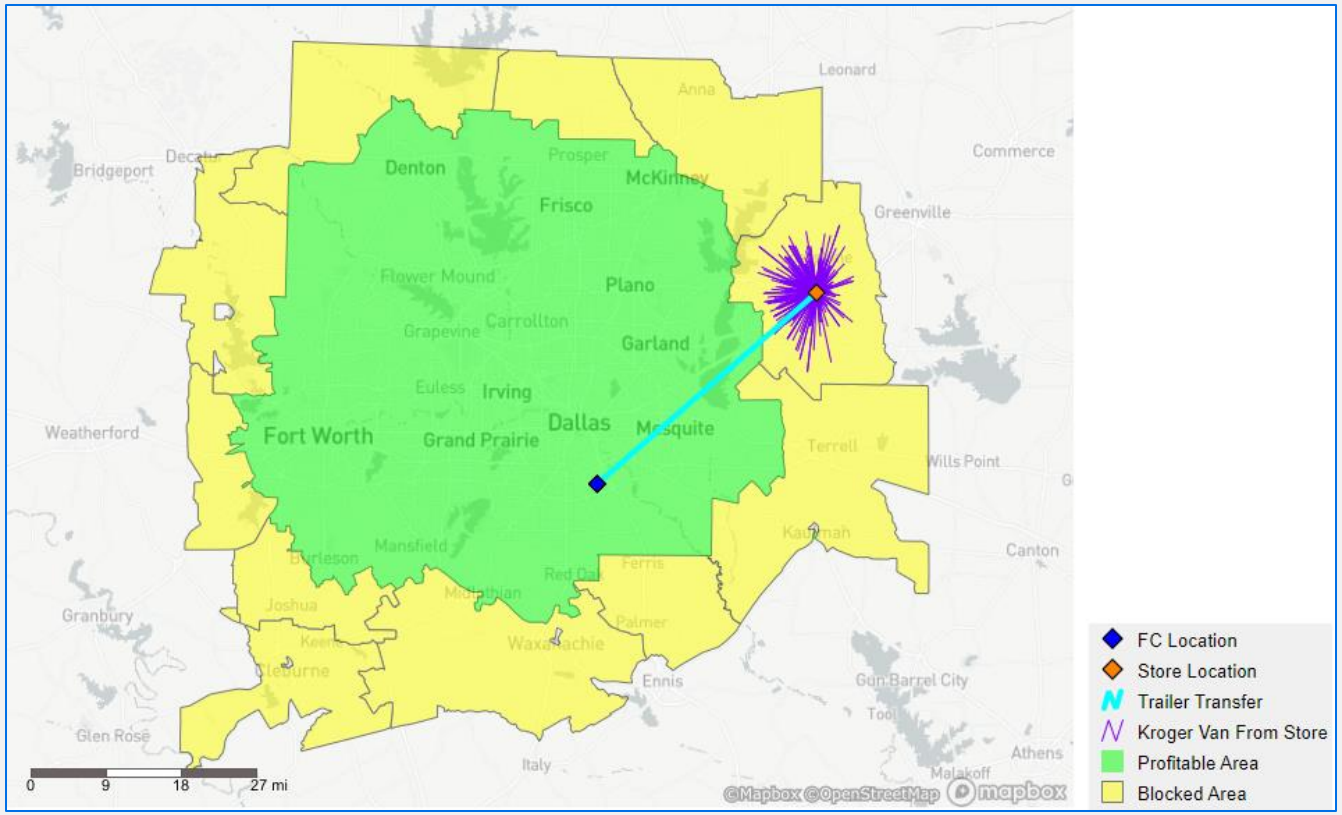
Core Problem

- Can I improve my Last Mile cost by routing from store locations compared to our current routing setup?
- How many routes should I plan?
- Will van density improve routing from the new locations?
- How well can route performance be predicted using historical order behavior?
- How do operational constraints affect route quality from new locations?

Last Mile total annual cost can range between **$13.2M- $31.2M** depending on catchment size and site maturity.



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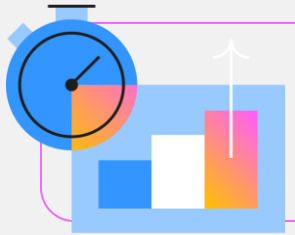
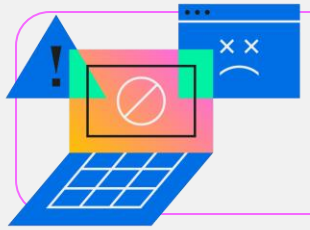
What the solution solves

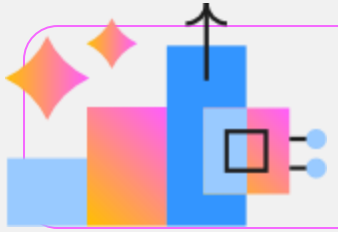
- Multi-purpose tool to simulate routing from new locations or current location.
- Focusing on scenario testing independent and multiple adjustments to routing features.
- The use of historical orders to simulate routes allowing the end user to adjust routing features.
- Output of the simulation tool highlights tradeoffs before making operational decisions.



Cost



Risk



Benefit

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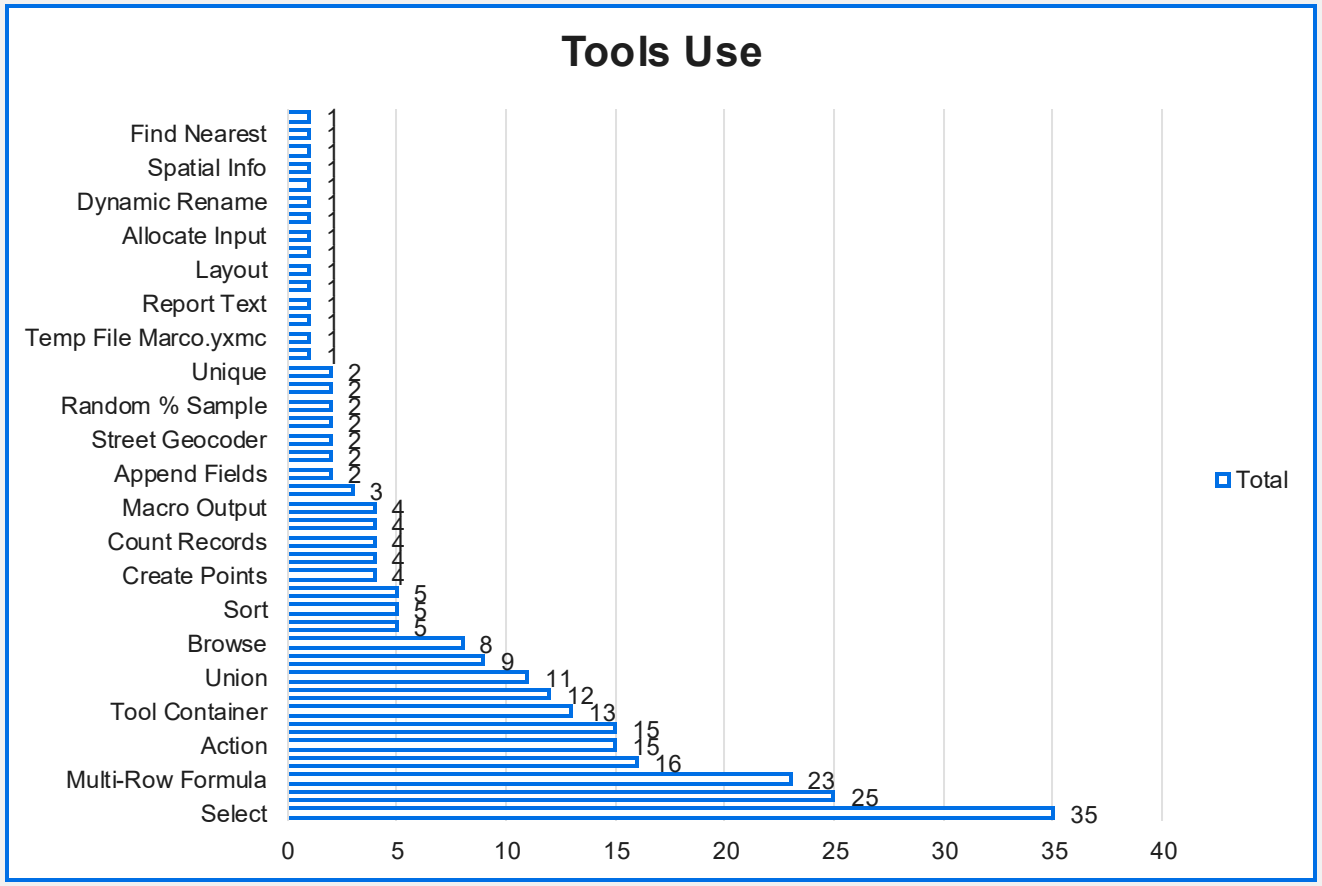
Alteryx Solution

249 Alteryx tools used to create this flow ranging from Filters, control containers, joins, etc…

- Marco used (iterative , batch, and standard) all used within flow
- Highlight of tools Alteryx already provides and some key functions (Ex: Drive time tool and adjustments for peak traffic and off peak)
- Location optimizer in Alteryx help to build catchment
- Designer type and packages (Locations Insights, Cass tools, Demographic Analysis tools)
- Alteryx Token use



Build the Catchment

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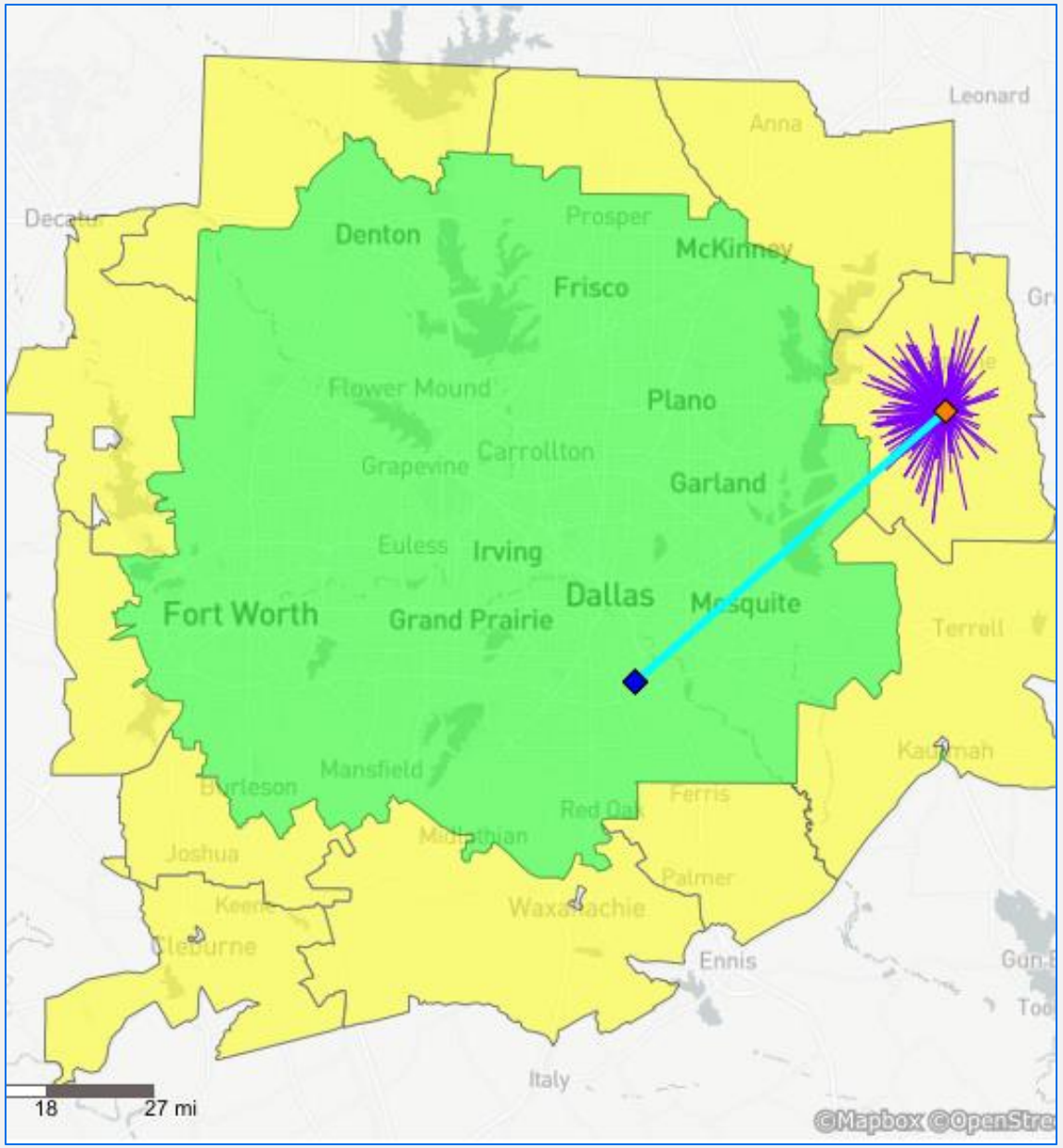
Build the catchment

- Show where the location optimization tool exist.
- Demonstrate how it builds a catchment for you in currently serviced areas.
- Leverage existing locations, historical orders, and all protentional locations.
- This also shows how the demand should be allocated for each service area.

The locations optimization tool has helped identify **~ $8M in last mile savings,** reducing distance to demand, finding new optimal locations across our network.



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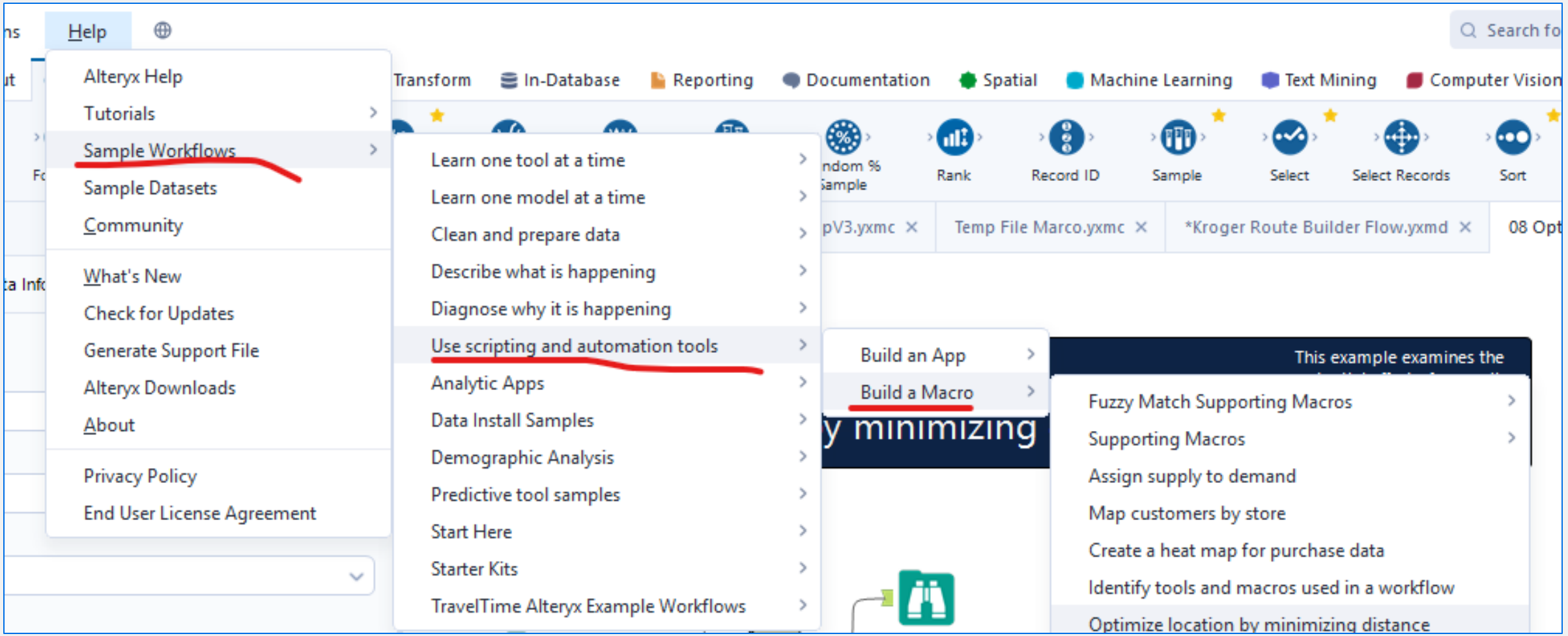
Location Optimization tool in the help area



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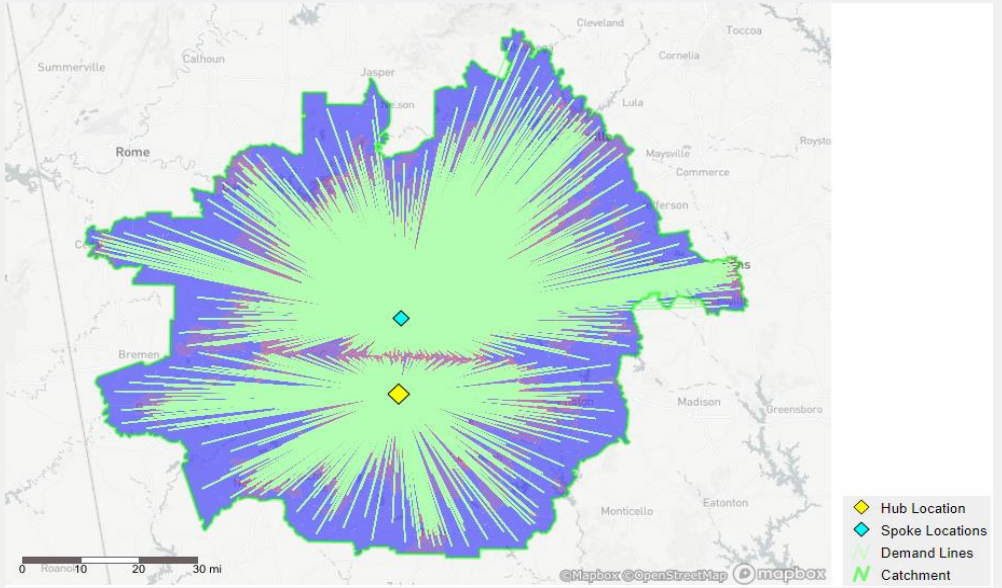
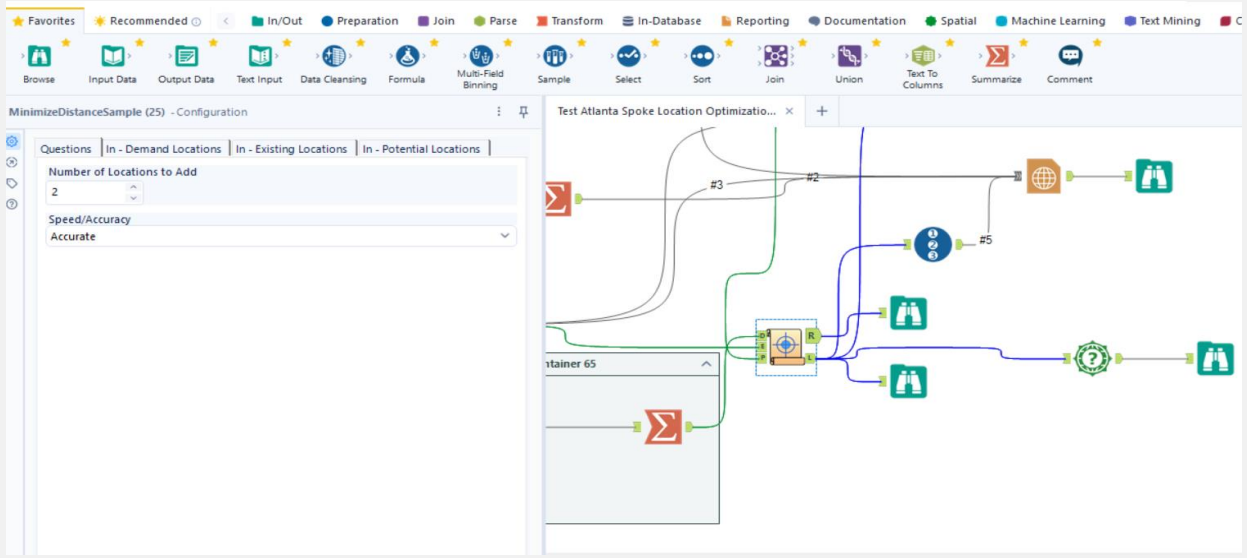
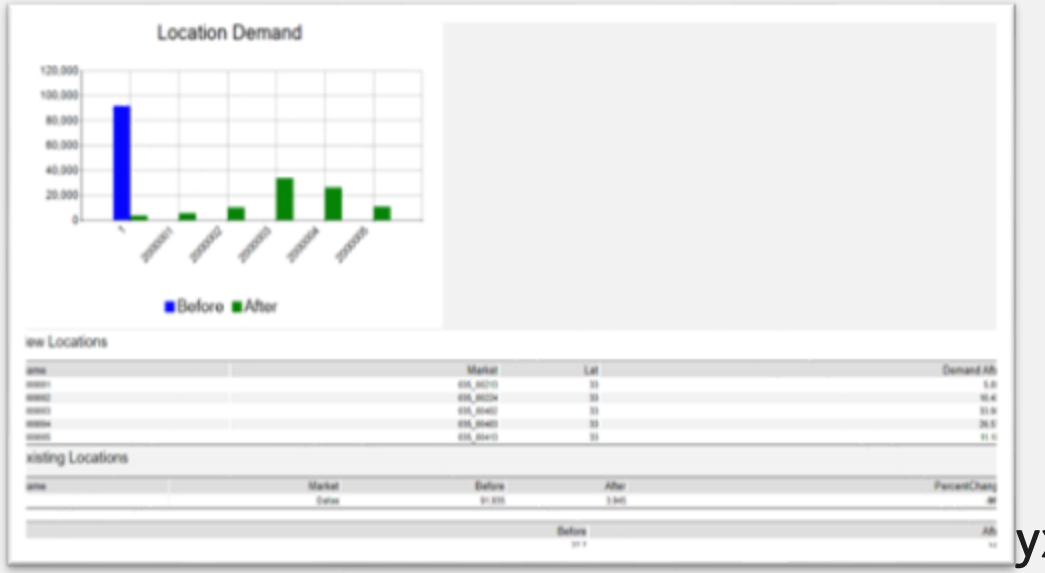
Build the catchment and Demand allocation

- Outputs how the demand is allocated
- Displays the reduction in mile to the demand before, after
- The historical demand can now be assigned to the new locations and routes can be simulated.
- You can select the number of locations to review the change in mileage to demand.
- You will have to create centroids and spatial objects for the Marco. (Locations Insights required)







Route Simulation and Adjustments

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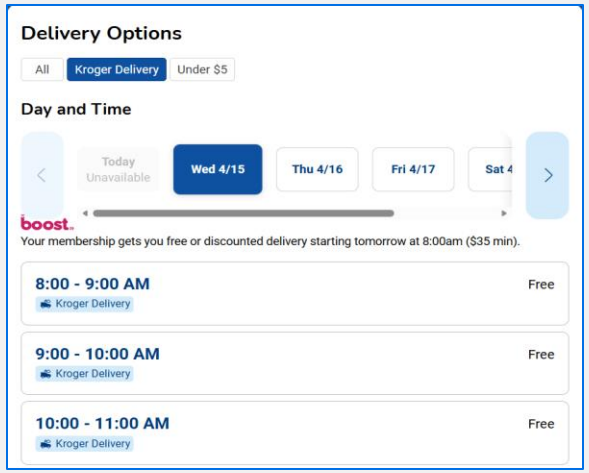
Routing User adjustments to simulate



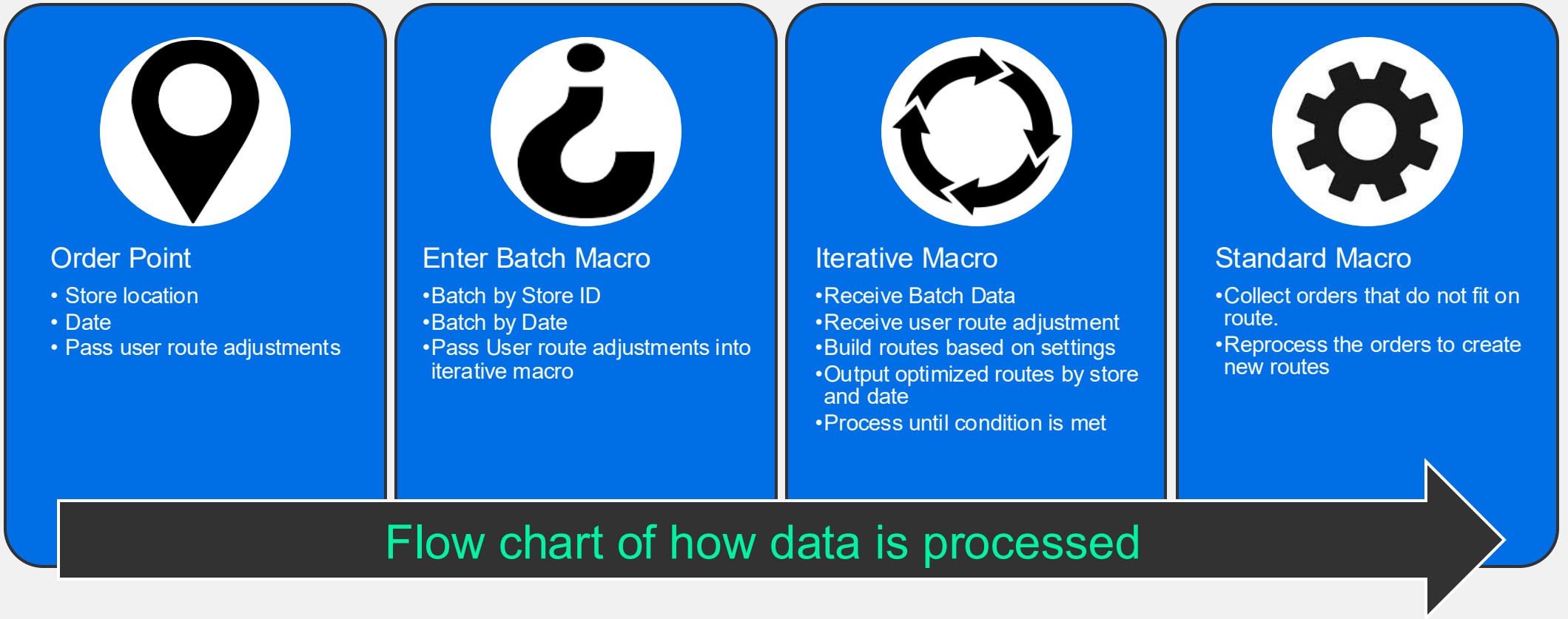
- Delivery window are set to a one-hour window as a delivery constraint
- Historical order data will have the slot hour the customer selected for the order.

- We have a set max number of order for the delivery van which accounts for space
- Route time length
- Speed of Van Adjustment

- Actual delivery time to deliver the order to doorstep (parking and completing transaction)

ROUTING SIMULATION

Overview of flow logic



Baseline Simulation and Results

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Tradeoff and savings

- Simulated DP8 efficiency dropped due to Gap %
- Miles between drops not a big change
- Inter-drop time decreased
- STEM minutes decreased
- Total Drive miles decreased
- Just servicing from a new location close to demand reduce CPO (Cost/Order) by **$2.02** annual savings of ~ **$1.1 M** one market out of 11 markets with stores effecting 150~200 orders/day from 10 stores.
- Correction to Gap annual savings of ~ **$2.8M**

Metrics	Current	Simulated	Gap Correction
DP8	18.06	16.01	20.25
Gap %	4.63%	26.78%	4.63%
MPS	5.05	5.49	5.49
Inter Drop	11.9	8.64	8.64
STEM Minutes	**40.35**	**11.60**	11.60
Drive Miles	**134.48**	**78.76**	78.76
Total Route Minutes	402.9	337.99	263.13
CPO	$ 17.88	$ 15.86	$ 12.62

Metrics definition

- DP8 = order/8-hour route
- Gap % = Wait Time/Total Time
- MPS = Miles per Stop
- Inter-Drop time = Drive minutes between stops
- STEM Time = 1st and last segment of route
- Total Drive Time = Total route minutes

$1.1M - $2.8M savings

Simulation Setup

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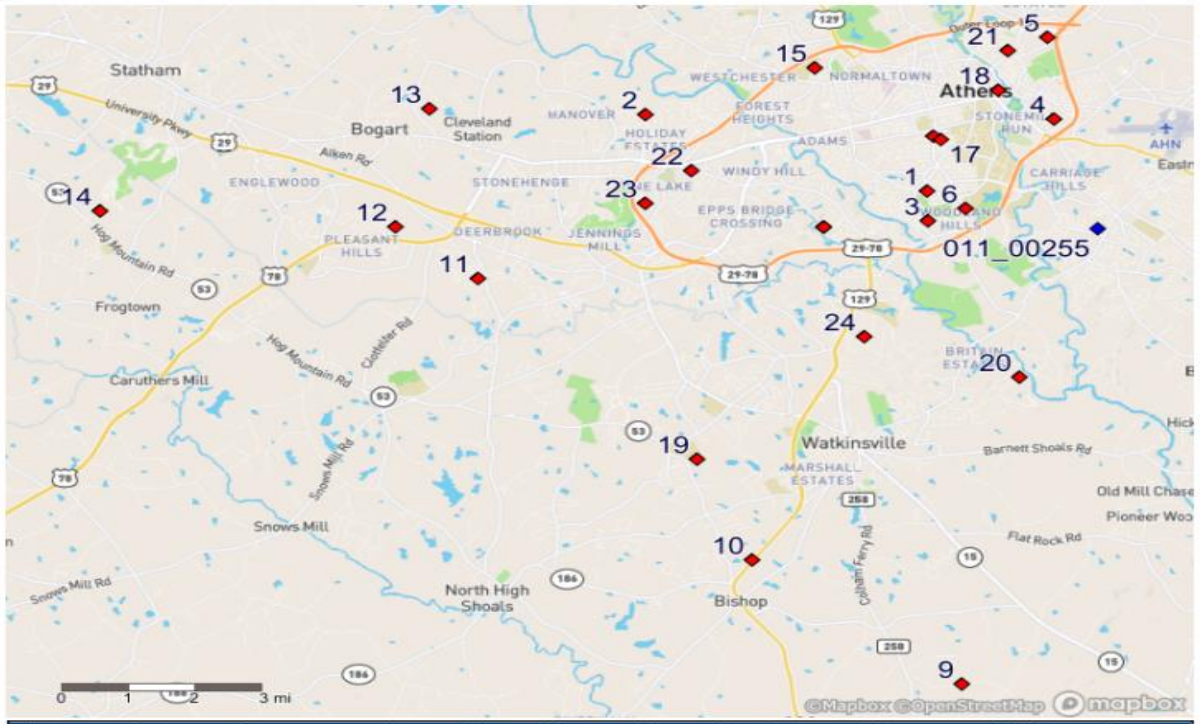
Walk through the Flow and setup

- 1st page
- Why a batch macro (Helps with the timing of data processing and process efficiency. Only want to process relevant data)
- Key features
- Additional touch to flow with icons
- Reports to map routes

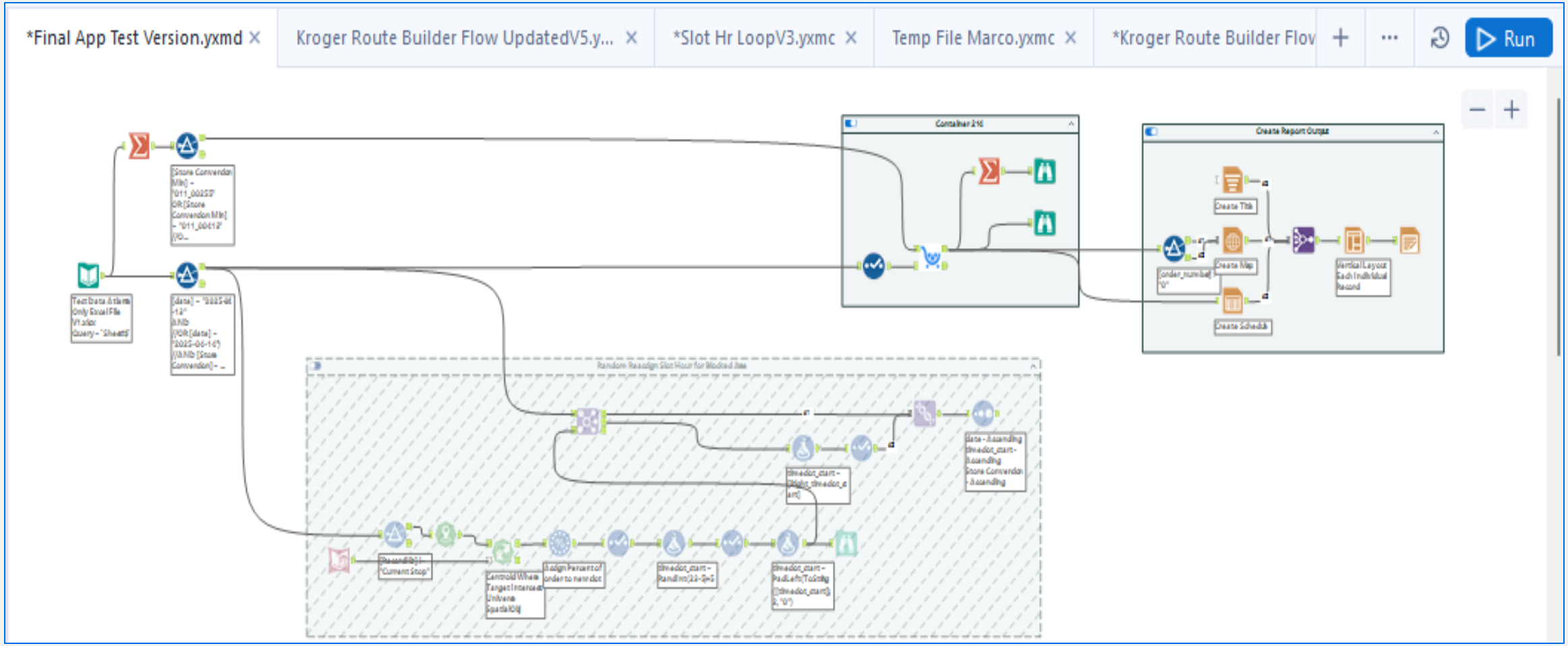
Route Schedule



date	market_ area	Store Conversion	order_number	Transaction Timestamp	timeslot_ start	Stop Number Count	Total Elapse Time	Route Number
2025-04-13	Atlanta	011_00255		00:00:00	00	0	0.00	87
2025-04-13	Atlanta	011_00255	1251026600127550702	08:06:00	08	1	15.81	87
2025-04-13	Atlanta	011_00255	1251027749854790302	08:27:00	08	2	37.35	87
2025-04-13	Atlanta	011_00255	1251027797086993402	09:06:00	09	3	75.81	87
2025-04-13	Atlanta	011_00255	1251026027178322302	09:20:00	09	4	90.37	87
2025-04-13	Atlanta	011_00255	1251026236517913302	09:33:00	09	5	103.77	87

ROUTING SIMULATION

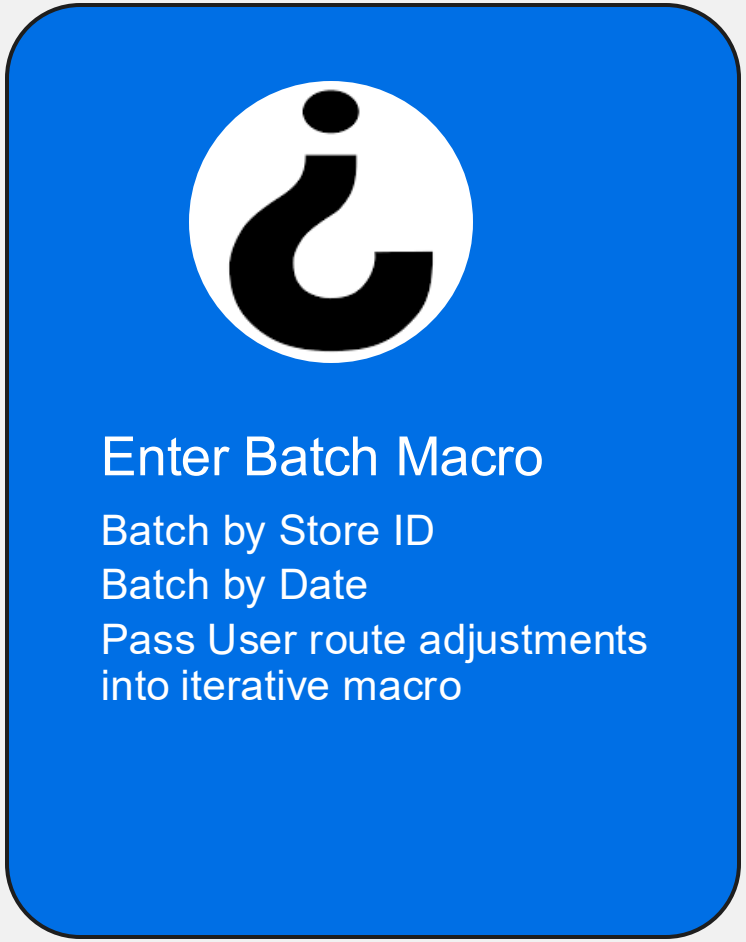
Walk through the Flow and setup



ROUTING SIMULATION

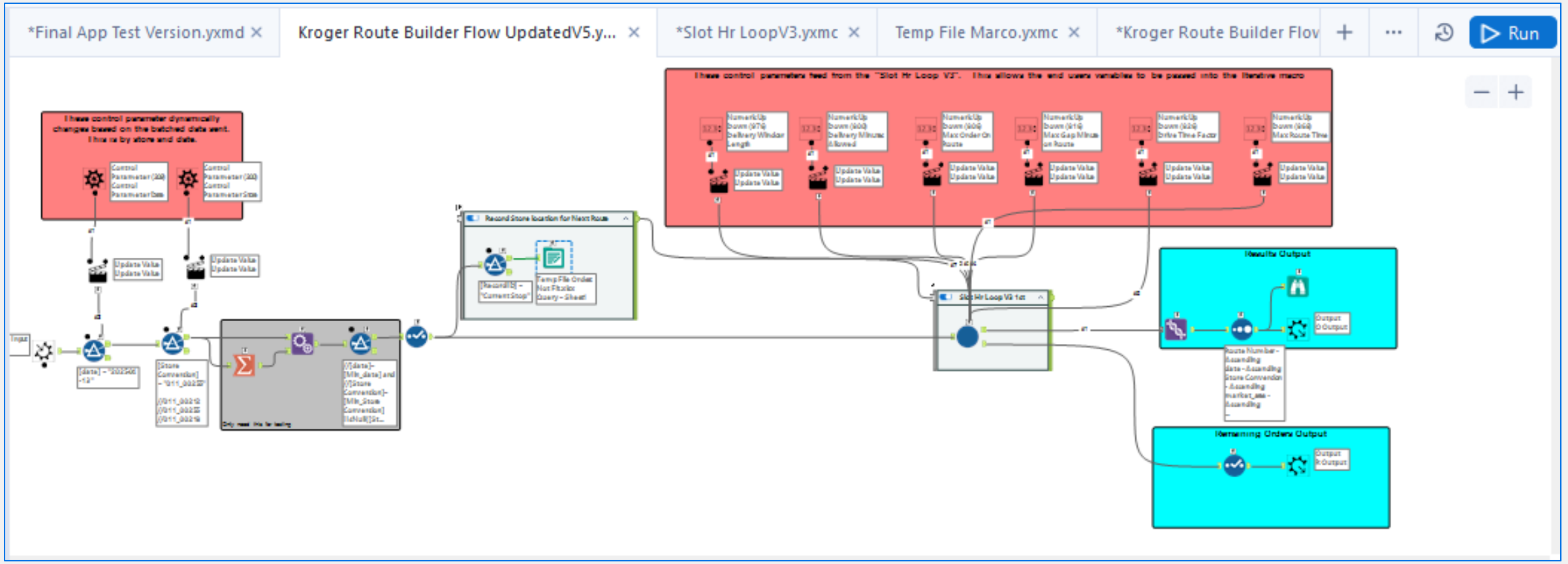
Walk through the Flow Batch Macro

- Receiving the batched data
- Cover the control parameters
- Cover the temp file creations and logic behind it (Control Container)
- Control parameters going into iterative macro
- Batch Macro outputs



ROUTING SIMULATION

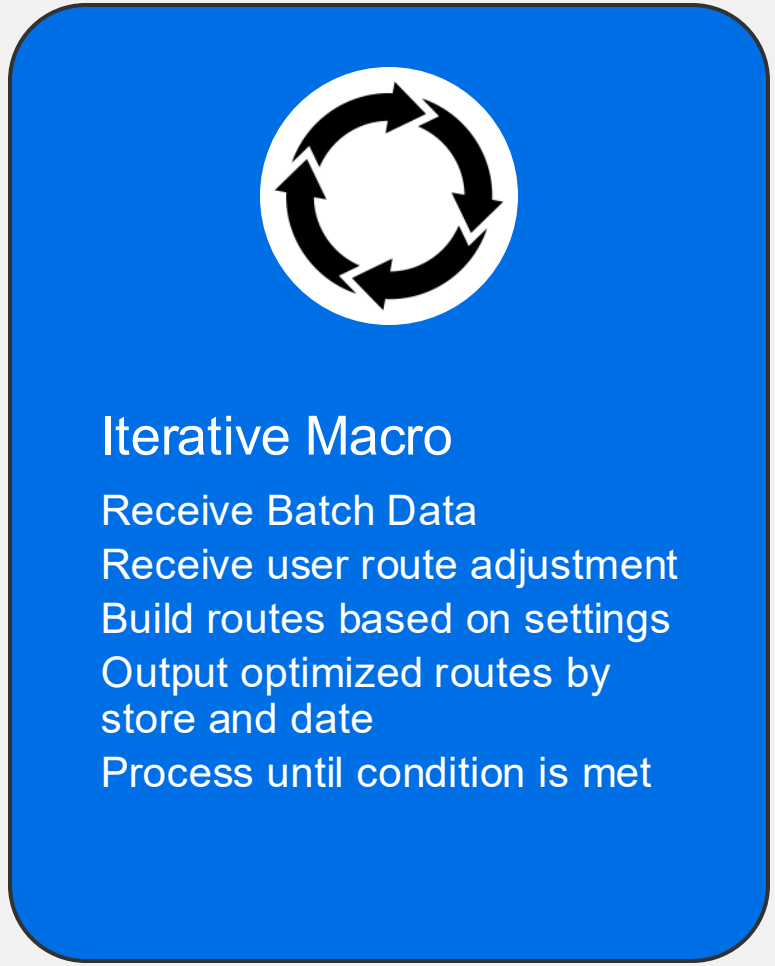
Walk through the Flow Batch Macro



ROUTING SIMULATION

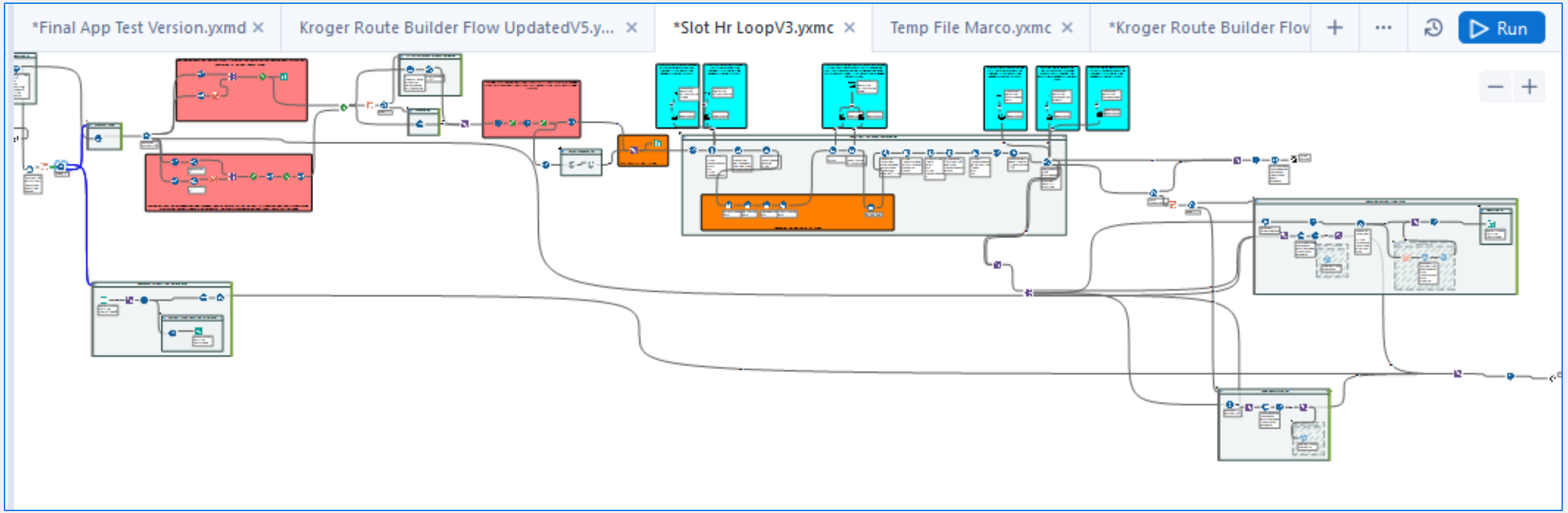
Walk through the Flow Iterative Macro

- Receiving the batched data
- Cover the control parameters
- Cover the temp file creations and logic behind it
- Control parameters going into iterative macro
- Iterative Macro outputs



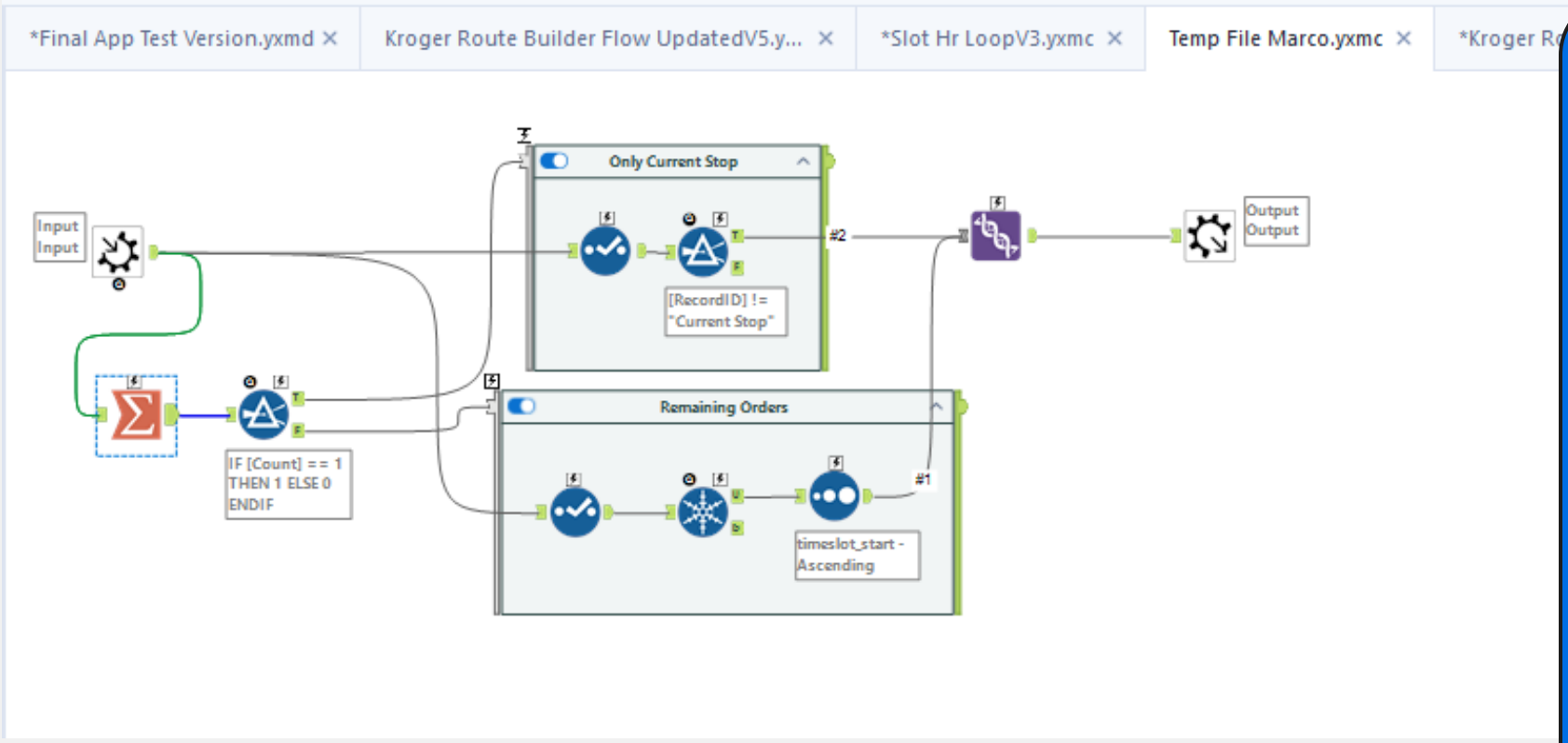
ROUTING SIMULATION

Walk through the Flow Iterative Macro



ROUTING SIMULATION

Walk through Standard Macro



Standard Macro

Collect orders that do not fit on route

Reprocess the orders to create new routes

Simulate with adjustments to route configuration

ROUTING SIMULATION

Simulate with Single Adjustments

- Review effects on routes having 4-hour (240 minutes) windows for a single route
- What are the tradeoffs?

Metrics	Simulated Baseline	Simulated 4 Hr.
Route Count	4	3
DP8	20.98	21.76
Van Orders	18.27	19.25
Gap %	13.73%	5.86%
MPS	7.73	8.67
Inter Drop Minutes	12.45	13.55
STEM Minutes	12.97	12.45
Total Drive Miles	144.14	179.66
Total Drive Minutes	410.52	428.06
CPO	$ 17.57	$ 18.31

Tradeoffs of opening slot windows to 4 Hr. include:

1. Efficiency improvement on the route from 20.98 to 21.76
2. Gap Reduction from 13.73% to 5.86%
3. Overall increase in mileage and time metrics
4. Cost increase from $17.57 to $18.31

ROUTING SIMULATION

Simulate with multiple adjustments

- Review effects on routes having 4-hour (240 Minutes) windows for a single route
- Faster Route Speeds (0.80)
- What are the trade offs

Metrics	Simulated Baseline	Simulated 4 Hr. Slot	Simulated 4 Hr. Fast Route Speed
Route Count	4	3	3
DP8	20.98	21.76	24.58
Van Orders	18.27	19.25	21.25
Gap %	13.73%	5.86%	7.80%
MPS	7.73	8.67	8.48
Inter Drop Minutes	12.45	13.55	10.76
STEM Minutes	12.97	12.45	14.29
Total Drive Miles	144.14	179.66	197.67
Total Drive Minutes	410.52	428.06	412.58
CPO	$ 17.57	$ 18.31	$ 16.68

Tradeoffs of opening slot windows to 4 Hr. and faster van speeds include:

1. Efficiency improvement on the route from 20.98 to 24.58
2. Gap Reduction from 13.73% to 7.80%
3. Mileage total mileage increased 144.14 to 196.67
4. Inter-drop time decreased 12.45 to 10.76
5. Cost decreased from $17.57 to $16.68

Cover additions to flow and new concepts

ROUTING SIMULATION

Features I’m adding

- Have a percent of orders reassigned to a new slot time based on a specific part of the catchment.
- Driver schedule template to let the flow use the driver schedule I have available then route from that using driver start times.
- Percentage of late delivery allowance to prevent single order routes.

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