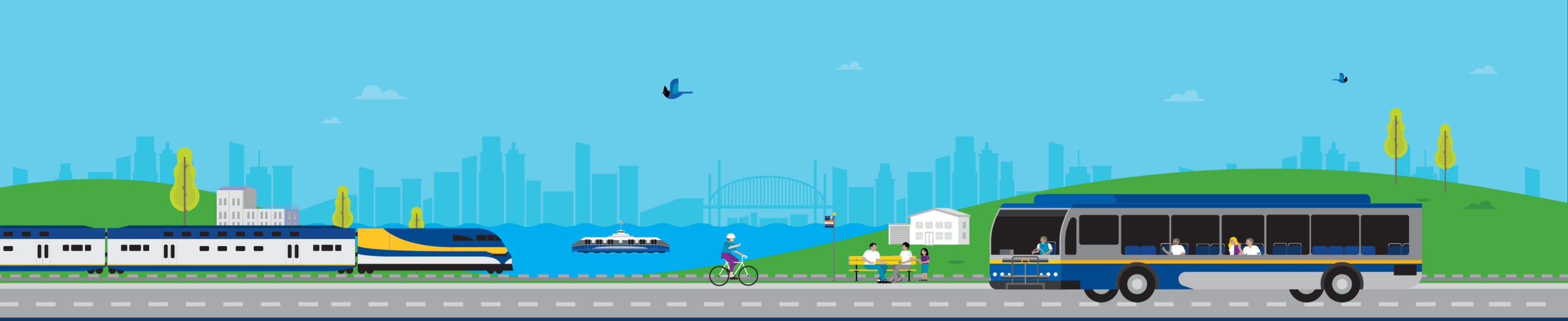


New RTM Tools

TransLink Forecasting

May 27, 2021

Together all the way

TRANSLINK

Model Validation Tools

Sumit Bindra, TransLink Forecasting

Together all the way

Coast Mountain Bus Company
Metro Vancouver Transit Police
West Coast Express
SkyTrain
TransLink

Objectives

- Validating RTM's outputs using (close to) real time data
- Use Compass, Google API and Streetlight data
- Focus on both Transit and Vehicular trips

Data Sources

- **Compass** - TransLink's Transit Smart Card data of ridership by route

- **Google API** – Data downloaded from Google about speeds on most major roadways in the region

- **Streetlight** – Volume by direction at 50+ locations

Steps

- Working with consultants at ISL, we worked on attaching a sample data to the network
- Developed scripts to compare this data with model outputs
- Outputs are figures and tables comparing model outputs and validation data

Additional steps

- Extract and attach complete datasets to the network

- Ensure the scripts are compatible with RTM 3.5 (with Python 3.7+)

Objectives

- Quick testing and deployment of model structure and code changes
- Condensing region's 1700+ zones to ~100 zones
- Prepare summary of base and edited model runs

Steps

- Prepare minimum viable zone structure
- Edit existing network and centroid connectors for the new zones
- Run scripts for comparison of base and new run and visualize differences by model steps (generation, distribution, etc.)

Progress

- Project is complete for RTM 3.4

- Update scripts to work with RTM 3.5

Transit Select Link

Xu Han, TransLink Forecasting

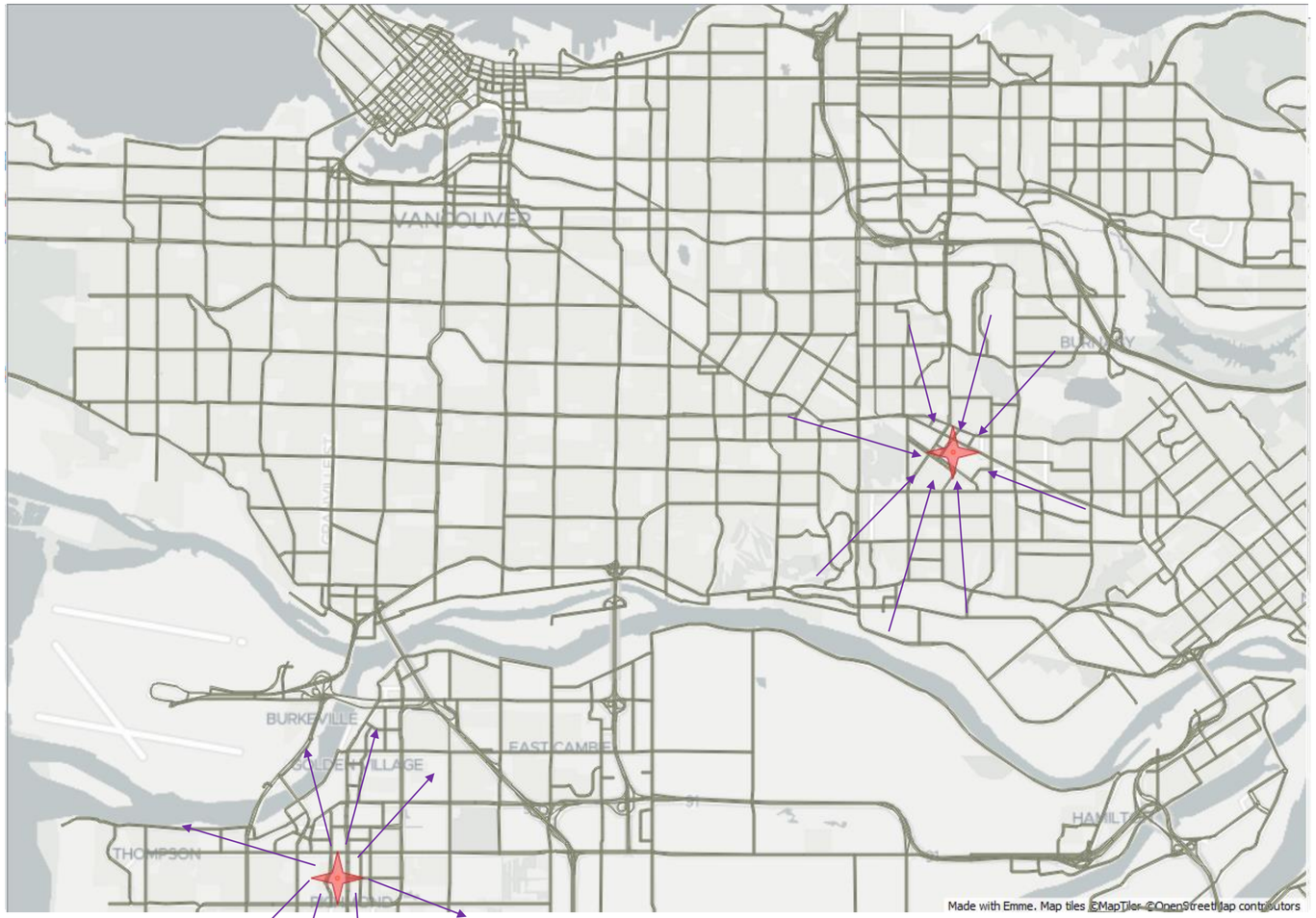
Together all the way

Coast Mountain Bus Company
METRO VANCOUVER TRANSIT POLICE
WEST COAST EXPRESS
SkyTrain
TRANSLINK

Questions

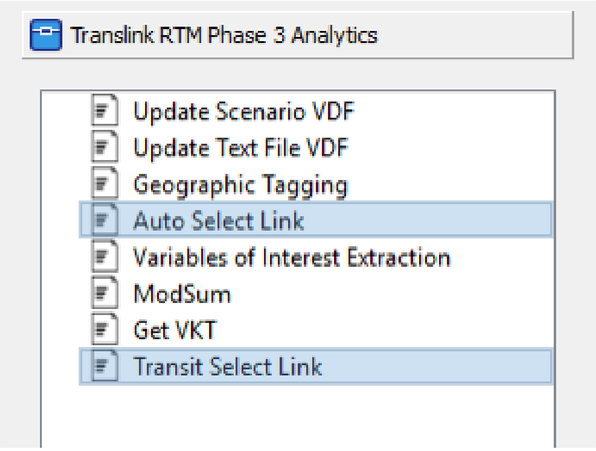
From Metrotown to Richmond Centre, in AM

- How many passengers are traveling by transit?
- How many passengers are taking Skytrain vs Bus?
- If taking bus, which bus routes do passengers take, and what is the share?
- Where are people from before getting into the transit system, and where are they going to after getting out of the transit.



Select Transit Toolbox

Available in RTM 3.5



Before using the tool

- Increase the databank dimension to be enough for the interim extra attribute (2.5m is recommended)
- Finish full model run or transit assignment
- Recommend to copy AM, MD, and PM scenario to prevent from overwriting the original scenario
- Create the extra attribute(s) and set the appropriate value in all three scenarios
    - link or segment level
        - @selectsegment
        - @selectline
        - @selectlink
    - Node level
        - @selectinboanode
        - @selecttrboanode
        - @selecttralinode
        - @selectfialinode
- Set the select segment(s)/link(s)/line(s)/node(s) attribute value as 1
- Configure the criteria and run the tool

Configurations

Select trip components:

Selection of in-vehicle trip component:

- (•) Segment - The segment is selected by setting @selectsegment = 1
- ( ) Line - The line is selected by setting @selectline = 1
- ( ) Link - The link is selected by setting @selectlink = 1
- ( ) None

Selection of auxiliary transit trip component:

- [ ] Link - The link is selected by setting @selectlink = 1

Selection of initial boarding trip component:

- [x] Node - The node for Initial Boarding is selected by setting @selectinboanode = 1

Selection of transfer boarding trip component:

- [ ] Node - The node for Transfer Boarding is selected by setting @selecttrboanode = 1

Selection of transfer alighting trip component:

- [ ] Node - The node for Transfer Alighting is selected by setting @selecttralinode = 1

Selection of final alighting trip component:

- [x] Node - The node for Final Alighting is selected by setting @selectfialinode = 1

Path selection thresholds:

Lower:

1

A threshold is used to determine which paths are selected.
If multiple elements are selected, a lower threshold of 1 is analogous to the 'OR' operator.
A lower threshold that equals the number of selections is analogous to the 'AND' operator.

Upper:

1

If multiple elements are selected, an upper threshold that equals
the number of selections is usually used.

Outputs

1. new matrices and save the O-D results:

ID	Name	Descritption
mf110	AMBUSsline	AM Bus Select transit O-D
mf111	AMRALsline	AM Rail Select transit O-D
mf112	AMWCEsline	AM WCE Select transit O-D
mf113	AMTOTsline	AM TOT Select transit O-D
mf130	MDBUSsline	MD Bus Select transit O-D
mf131	MDRALsline	MD Rail Select transit O-D
mf132	MDWCEsline	MD WCE Select transit O-D
mf133	MDTOTsline	MD TOT Select transit O-D
mf150	PMBUSsline	PM Bus Select transit O-D
mf151	PMRALsline	PM Rail Select transit O-D
mf152	PMWCEsline	PM WCE Select transit O-D
mf153	PMTOTsline	PM TOT Select transit O-D

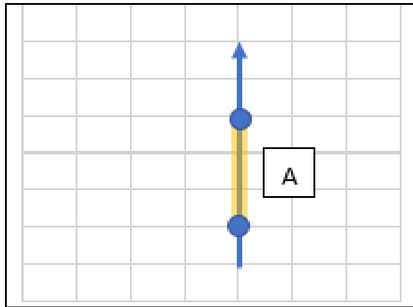
2.new extra attributes and save network results:

Name	Descritption	Name	Descritption
@voltr_bussline	Transit Volume BUS	@board_bussline	Boardings BUS
@voltr_ralsline	Transit Volume RAL	@board_ralsline	Boardings RAL
@voltr_wcesline	Transit Volume WCE	@board_wcesline	Boardings WCE
@voltr_totsline	Transit Volume TOT	@board_totsline	Boardings TOT
@volax_bussline	Aux Transit Volume BUS	@alight_bussline	Alightings BUS
@volax_ralsline	Aux Transit Volume RAL	@alight_ralsline	Alightings RAL
@volax_wcesline	Aux Transit Volume WCE	@alight_wcesline	Alightings WCE
@volax_totsline	Aux Transit Volume TOT	@alight_totsline	Alightings TOT

3.Aggregate O-D result matrices and export to CSV: **\rtm\RTM<databank>\Outputs\transit_sline_gy.csv)**

Examples

Case 1 - The people who are in-vehicle in segment A

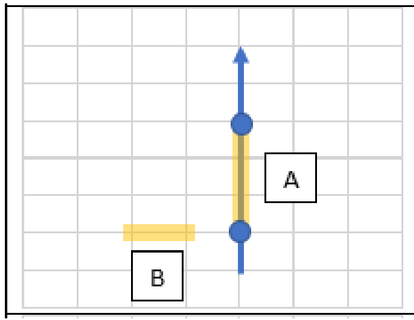


Return:
- The people who are in-vehicle in segment A

Trip Components:
- In-vehicle @selectsegment = 1 (segment A)

Path Selection:
- Lower = 1
- Upper = 1

Case 2 - The people who in-vehicle in segment A **OR** walk on link B



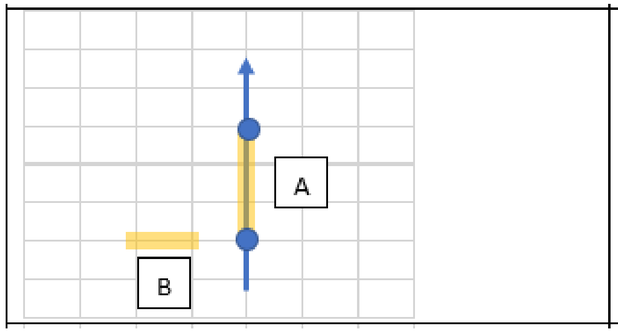
Return:
- The people who in-vehicle in segment B **OR** walk on link A

Trip Components:
- In-vehicle @selectsegment = 1 (segment A)
- Aux transit @selectlink = 1 (link B)

Path Selection:
- Lower = 1
- Upper = 2

Examples

Case 3: The people who in-vehicle in segment A **AND** walk on link B

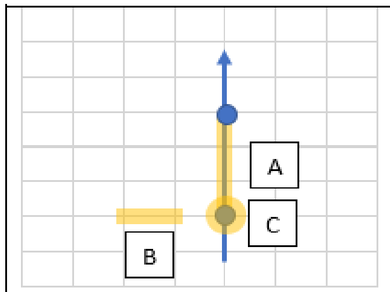


Return:
- The people who in-vehicle in segment A **AND** walk on link B

Trip Components:
- In-vehicle @selectsegment = 1 (segment A)
- Aux transit @selectlink = 1 (link B)

Path Selection:
- Lower = 2
- Upper = 2

Case 4: The people who in-vehicle in segment A **AND** walk on link B **AND** transfer boarding at node C



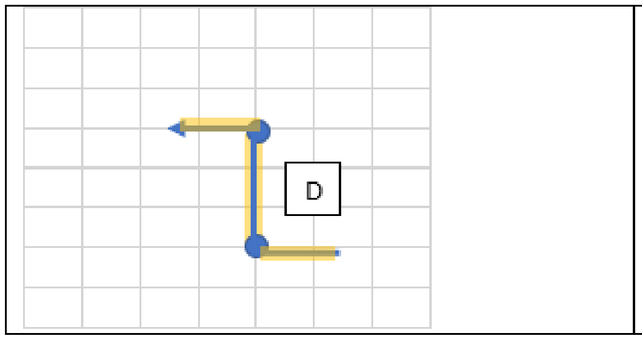
Return:
- The people who in-vehicle in segment A **AND** walk on link B **AND** transfer boarding at node C

Trip Components:
- In-vehicle @selectsegment = 1 (segment A)
- Aux transit @selectlink = 1 (link B)
- Transfer boarding @selectnode = 1 (node C)

Path Selection:
- Lower = 3
- Upper = 3

Examples

Case 5: The people who take any segment D of a transit line

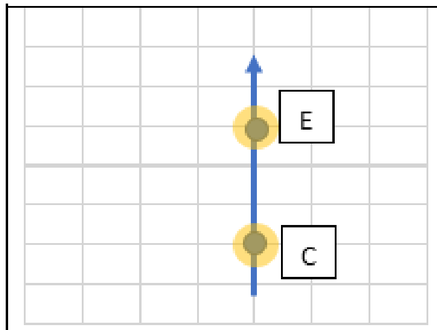


Return:
- The people who take any segment of a transit line

Trip Components:
- In-vehicle @selectline = 1 (transit line D)

Path Selection:
- Lower = 1
- Upper = 9999 (larger than total no. of segments)

Case 6: The people who initially board at node C **AND** finally alight at node E

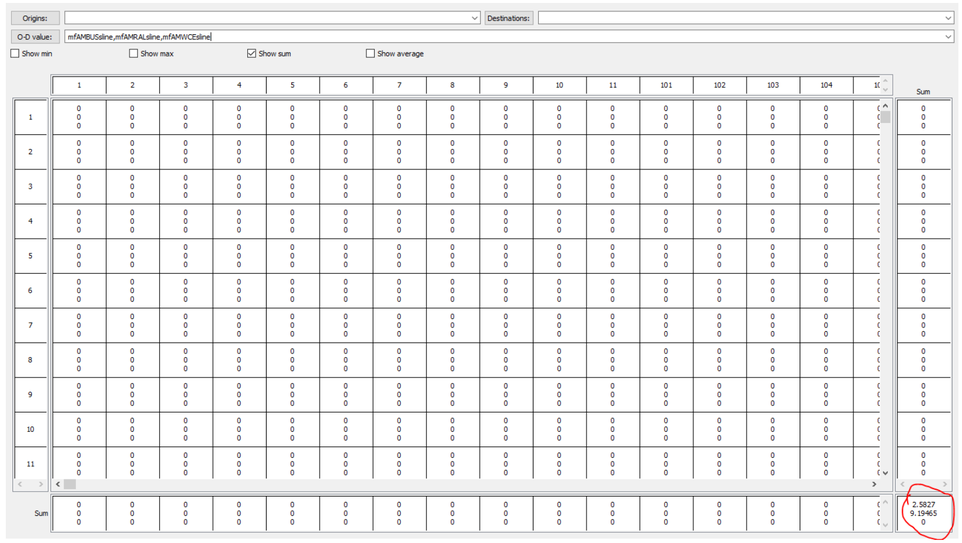


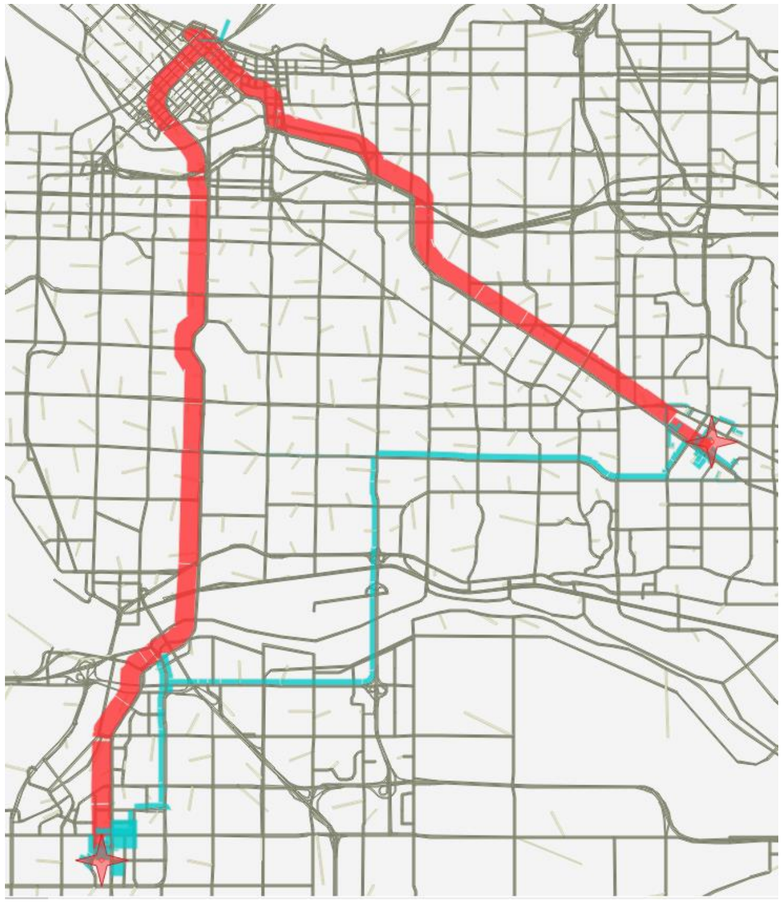
Return:
- The people who initially board at node C and finally alight at node E

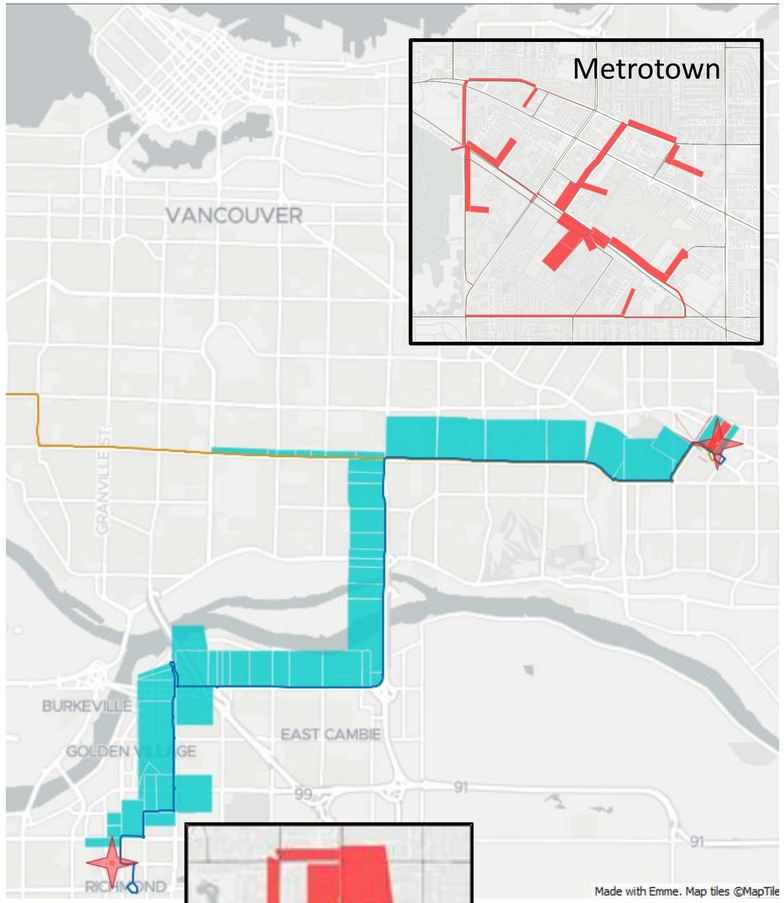
Trip Components:
- Initial boarding @ selectinboanode= 1 (node C)
- Final alighting @ selectfialinode= 1 (node E)

Path Selection:
- Lower = 2
- Upper = 2

Answer for the question in beginning







More Instruction

https://translinkforecasting.github.io/rtmdoc/data_analysis/#post-processing-tools

Acknowledgement

Billy Kwok, P.Eng.

Senior Transportation Planner

ISL Engineering and Land Services Ltd.

Economic Evaluations

Reid Keller, TransLink Forecasting

Update of the Economic Evaluation Tool

- Tool to extract RTM data to perform economic benefits analysis

- Presented at the last user group meeting
  - https://github.com/TransLinkForecasting/rtm-workshops/blob/master/2019-Oct/6.Economic_Benefits.pdf

Conventional Benefit Accounts

Type	Account	Description	Source of Measurement
Conventional Benefits	Transit travel savings	Time and cost savings	Direct RTM Output (Logsum Method)
	Auto travel savings	Time and cost savings	Direct RTM Output (Logsum Method)
	Transit Fares	Incremental Transit Fares	Direct RTM Output
	Truck travel savings	Time and cost savings	Direct RTM Output (Rule of Half)

Wider Benefit Accounts

Type	Account	Description	Source of Measurement
Wider Benefits	Auto Reliability	Time and cost savings	TransLink Forecasting Tool Using RTM Outputs
	Transit Reliability	Time and cost savings	Included in Transit travel savings account*
	Safety	Reduction in collisions	VKT based measure
	GHG emissions	Increase/Decrease in CO2 emissions due to reduction in VKT	VKT based measure
	Wider Economic Benefit	Agglomeration	RTM travel time output with employment data from demographics file

*Included in mode choice logsum. Can be estimated separately and removed from transit travel savings account

Data Extracted in Raw Form

- Extracted in base units of measure
  - Time (transit, auto), VKT, $ (fare, vehicle operating), etc.

- Left for the analyst to monetize later using most current assumptions
  - Value of time, GHG/vkt, $/GHG, etc

Updates in Progress for 3.5

- Short term
  - Python 2 -> Python 3 conversion
  - Update with new 3.5 file structure
  - Code cleanup and refactoring

- Longer term
  - Post processing excel -> python conversion

RTS Visualization Tools

Bo Wen, TransLink Forecasting

Project Goals

- Assess a range of policy plans
- Evaluate multiple KPIs
- Address future transportation challenges
- Communicate findings effectively

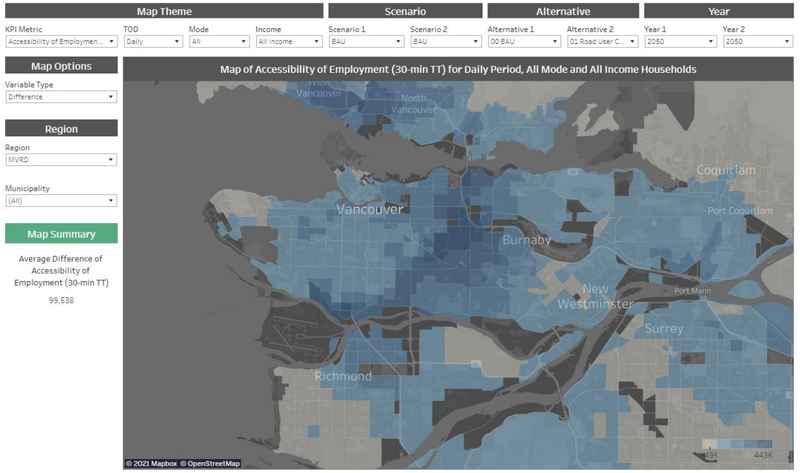
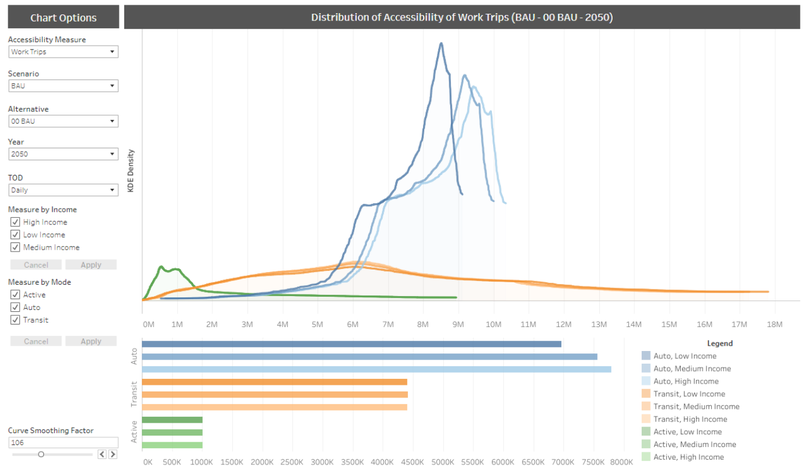
Visualization Tool

- Requirements
  - Interactivity for fast-paced iterative review
  - Long term trends
  - Equity impact on congestion cost and accessibility
    - Geographical disparity
    - Income disparity

- Implementations
  - Backend (Model)
    - RTM runs with scenarios outputs
    - SQL Server with aggregated results from all runs
  - Frontend (Tableau Viz Tool)
    - Map by Traffic Zone
    - Distribution of accessibility by Income Group

Demo

- Traffic Analysis Zone Map



- Distribution of Accessibility