



RTM 3.3

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Together all the way



Hello!

- Discuss changes from RTM 3.2
- Most come from model application
 - Features we needed
 - Bugs we didn't
- Will list most of the changes here, larger changes will be discussed a bit while smaller changes are just noted.
 - Two of these changes have a separate a presentation later in the session so I will just mention them here.

Three Categories of Changes

- New features + functionality changes
 - Things the model can do now that it couldn't before
- Assumption changes
 - Generally changes to future infrastructure and demographic assumptions resulting from changes in policy or projects
 - Change in funding status, etc.
- Network and bug fixes
 - Repairs we find along the way
 - Some bigger changes - will be discussed today
 - Smaller changes implemented but not discussed, typically small network coding issues

The fun ones

New Features + Functionality



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Modeling for Unobserved Transit Sub-Modes (BRT + LRT)

- The gist, we observe bus and SkyTrain usage in the region (they exist)
- We are often asked to forecast or plan for other transit sub-modes
- These sub-modes are different than bus or SkyTrain and we want to properly account for these differences
- Separate presentation later on how this works



Tools

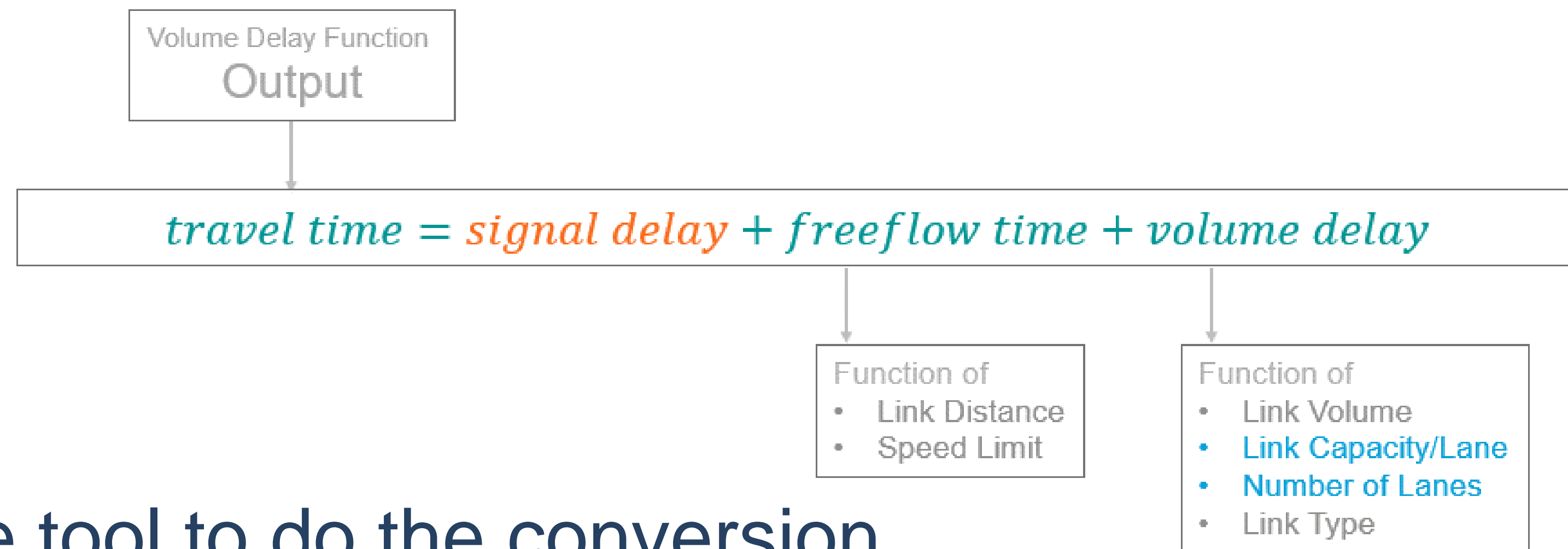
Added toolboxes with tools to process model outputs

- Economic evaluation
 - User benefits
 - Wider economic benefits (WEB)
- Select link analysis
- Data extraction tool
- P-A to O-D conversion tool
- VDF conversion (more on this later)

The screenshot shows a web interface for INRO TransLink. At the top is a red header with the INRO TransLink logo. Below the header, the title 'Export Data from Model Run' is centered. A message states: 'Please make sure mf9999 and mo9999 are not in use.' Below this is a light green section with the label 'Worksheet Name for Variables of Interest' and a text input field containing 'Sheet1'. A 'Run' button with a right-pointing triangle icon is positioned below the input field. Further down, there is a 'Recent history' link with a right-pointing triangle icon. The bottom of the interface features a light green footer with the INRO logo and the text '© 2018 INRO. All rights reserved.'

Re-specified Volume Delay Functions (VDF)

- All variables now held on the network
- Only 6 VDF formulations down from 22



- We have tool to do the conversion

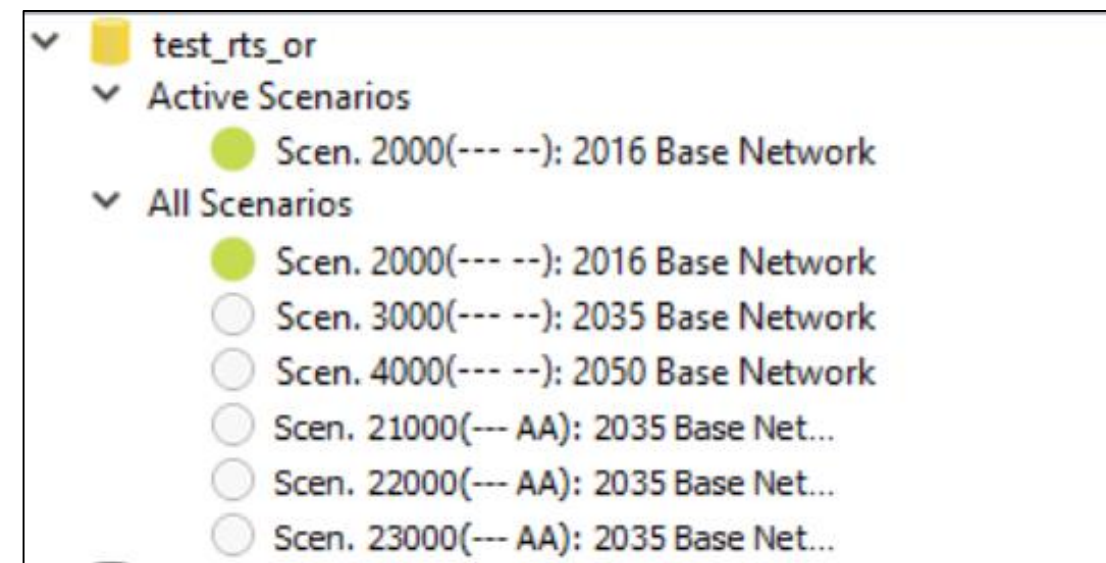
VDF Specifications

	VDF Code RTM3.2 → RTM3.3	RTM3.2	RTM3.3
Special Functions	VDF[1] → VDF[11] Connectors	SAME	
	VDF[2] → VDF[12] Bowen Island Ferry	SAME	
Merge Functions	VDF[3 to 7] → VDF[13] Highway Merge Sections	$\frac{length * 60}{speed} + 0.85 * \left(\frac{volume}{(600 \text{ to } 1400) * lanes} \right)^5$	$\frac{length * 60}{speed} + 0.85 * \left(\frac{volume}{capacity * lanes} \right)^5$
Controlled Intersection Functions	VDF[25 to 75] → VDF[14] Stop Sign & Signals	<small>TransLink RTM3.3 Release - VDF Update 8</small> $0.25 + \frac{length * 60}{speed} + 0.85 * \left(\frac{volume}{(400 \text{ to } 1400) * lanes} \right)^4$	$signal_delay + \frac{length * 60}{speed} + 0.85 * \left(\frac{volume}{capacity * lanes} \right)^4$
Free-Flow Links	VDF[85] → VDF[15] Free-flow (< 80 km/hr)	$\frac{length * 60}{speed} * \left(1 + 0.6 * 0.85 * \left(\frac{volume}{1600 * lanes^{1.05}} \right)^5 \right)$	$\frac{length * 60}{speed} * \left(1 + 0.6 * 0.85 * \left(\frac{volume}{capacity * lanes^{1.05}} \right)^5 \right)$
	VDF[88] → VDF[16] Free-flow (≥ 80 km/hr)	$\frac{length * 60}{speed} * \left(1 + 0.6 * 0.43 * \left(\frac{volume}{1600 * lanes^{1.05}} \right)^{5.25} \right)$	$\frac{length * 60}{speed} * \left(1 + 0.6 * 0.43 * \left(\frac{volume}{capacity * lanes^{1.05}} \right)^{5.25} \right)$

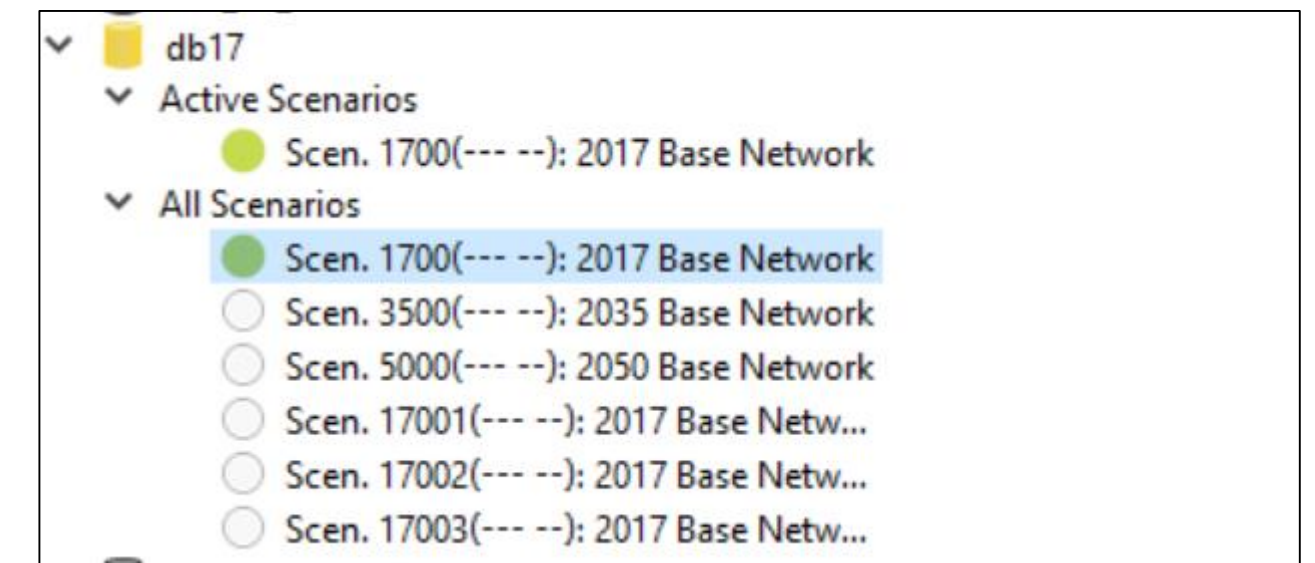
New Scenario Numbering

- Master scenario based on horizon year
 - 1000 -> 1100
 - 2000 -> 1700
 - 3000 -> 3500
 - 4000 -> 5000

RTM 3.2



RTM 3.3



- New AM, MD, PM pattern
 - Append 1, 2, or 3 to the master scenario number
 - 1700 -> 17001 (AM) / 17002 (MD) / 17003 (PM)

Transit Network Harmonization

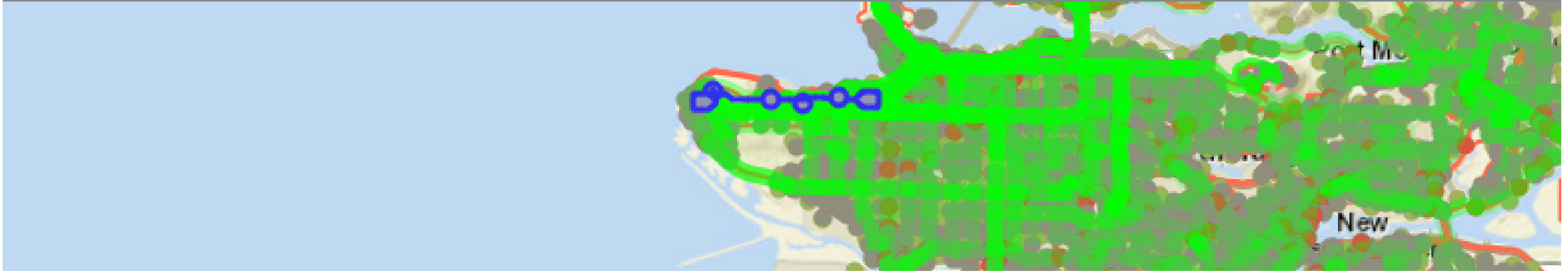
- Transit itineraries/routes for 2017, 2035 and 2050 are all exactly the same
 - Same Routes
 - Same ID
 - Same Description
 - Total number of lines for each year: 625
- The difference is in the headways
 - If a route exists in 2017 but not in 2035, headways are 'zeroed' out
 - Other than major future projects, background bus service increase indexed to population growth

Benefits of Harmonization


- Forces consistency in transit routes
 - Previous model versions would have slightly different stopping procedures or alignment for some routes
- If a proposed future service is cancelled reverting to existing conditions is simple
- Comparing between years in terms of service hours, difference plots, etc. is significantly easier
- Reduces 'repetition' when making changes to the network coding

Harmonization Example

- With Broadway Subway, 99 B-Line truncated
- Current itinerary (e.g. 099W1A) headways are 'zeroed out'



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 Filter: [cur

line	description	hdw	speed	lay1	@hdwyam	@hdwymd	@hdwypm
099EB3	99BL: UBC/Arbutus	3	35	5	3	3	3
099W1A	99BL: Commercial/UBC	5.45	35	5	0	0	0
099W1M	99BL: Commercial/UBC	4.62	35	5	0	0	0
099W1P	99BL: Commercial/UBC	3	23	5	0	0	0
099WB2	99BL: Boundary/UBC	5.45	35	5	0	0	0
099WB3	99BL: Arbutus/UBC	3	35	5	3	3	3

One-to-One Ensemble Mapping

- Introduce the gz ensemble providing a one-to-one mapping with the 1741 RTM zones
- Update input files to batch in using this ensemble instead of by zone number
- Makes supporting sub-area models or custom zone systems easier as all batch in files can still be applied only updating the ensembles

The necessary ones

Assumption Changes



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General Principles

- Include future projects that are approved and funded
- Do not include future projects that are only in planning stage
- And of course, remove future projects that were approved but have since been canceled
- Operational changes based on projected changes in population/revenue

Surrey Rapid Transit

- Remove Surrey-Newton-Guildford (SNG) LRT
- Bring back Rapid Bus on SNG corridor
- Add Fleetwood SkyTrain Expo line extension
- New 503 operations instead of Rapid Bus on Fraser Highway



Headways and Capacity

- Growth of bus service hours beyond investment plan index to population
- Updated SeaBus headways (new boat)
- Updated future SkyTrain headways
- Updated transit vehicle capacity assumptions
 - Increased capacity for rapid bus
 - New transit vehicles added (e.g. double decker buses)
 - Old unused transit vehicles removed



Massey Crossing

- Bridge Project Cancelled
- Returned to 4-lane crossing with counter-flow operations



Viaducts

- Viaducts removed
- Various local roadway changes per City of Vancouver plans



Various Roadway Changes

- Highway 1 widening between 216 and 264
- Closure of King George Station park-and-ride lot
- Highway 1 Lower Lynn interchange improvements
- Sunbury Interchange



The really necessary ones

Bug + Network Fixes



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Fix Unconstrained Transit Assignment

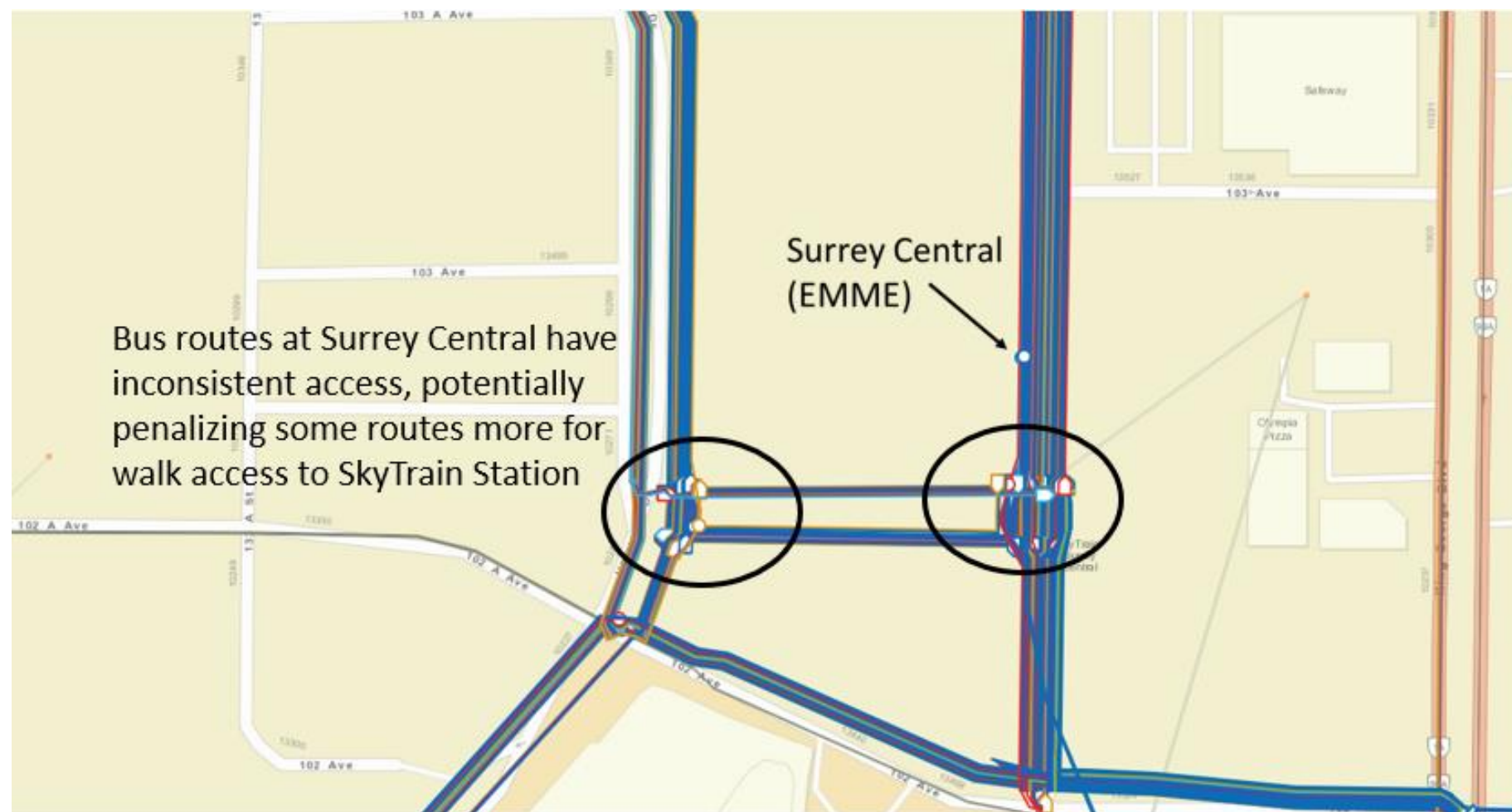
- Model still needs to iterate due to transit time function (TTF) specification including dwell time model
- Results were unstable in previous releases due to lack of iteration
- Congested/capacited transit worked fine as it already includes iteration



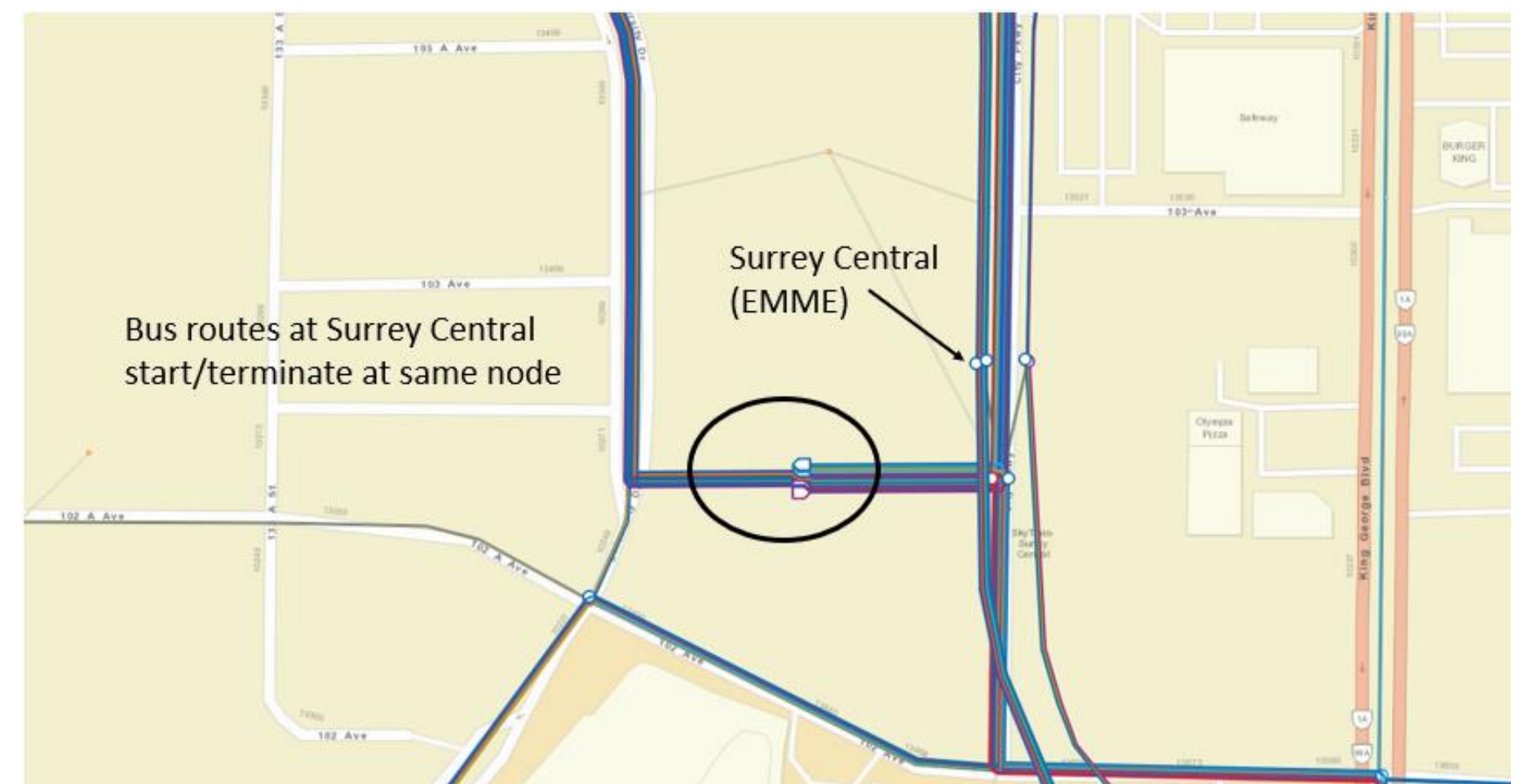
Transit Exchange Connections

All lines at transit exchanges now connect to the same node

- Avoid biasing certain lines due to network connectivity



RTM 3.2 (Before)



RTM 3.3 (After)

Park-and-ride Improvements

- Various Park-and-ride connection improvements
 - Carvolth exchange to 555 connection
 - Bridgeport lot to platform connection
 - Various others...
- Various other calibrations
 - Related to best lot selection. Needed to improve rail lot selection for lot's that require longer bus ride first (e.g. South Surrey)
 - Lougheed Town Centre lot not available 2016



Transit Network Fixes

- Various updated Rapid Bus routings
 - Loughheed / Maple Ridge
 - North Shore
- WCE not available for North Shore users

Various Network Coding Issues

- Lanes, speeds, patterns, etc.

Questions?



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