SATURN User Group Meeting: Leeds November 28 2019

Presentation by Dirck Van Vliet

BATTING ORDER

- Specific Program Upgrades in 11.5
- Important new 11.5 Features
- Extensions to TAC Modelling
- DVV's Ideas and Objectives for 2020
- Some final small rants

SATNET (11.5)

- Table of Actual vrs Maximum Dimensions
- Tests/corrections on NITA_S removed
  - Useful option for specific operation but be careful !!!
- Blocking-back chain rules improved for signals
- Factors set to convert total PCU flows to vehicles

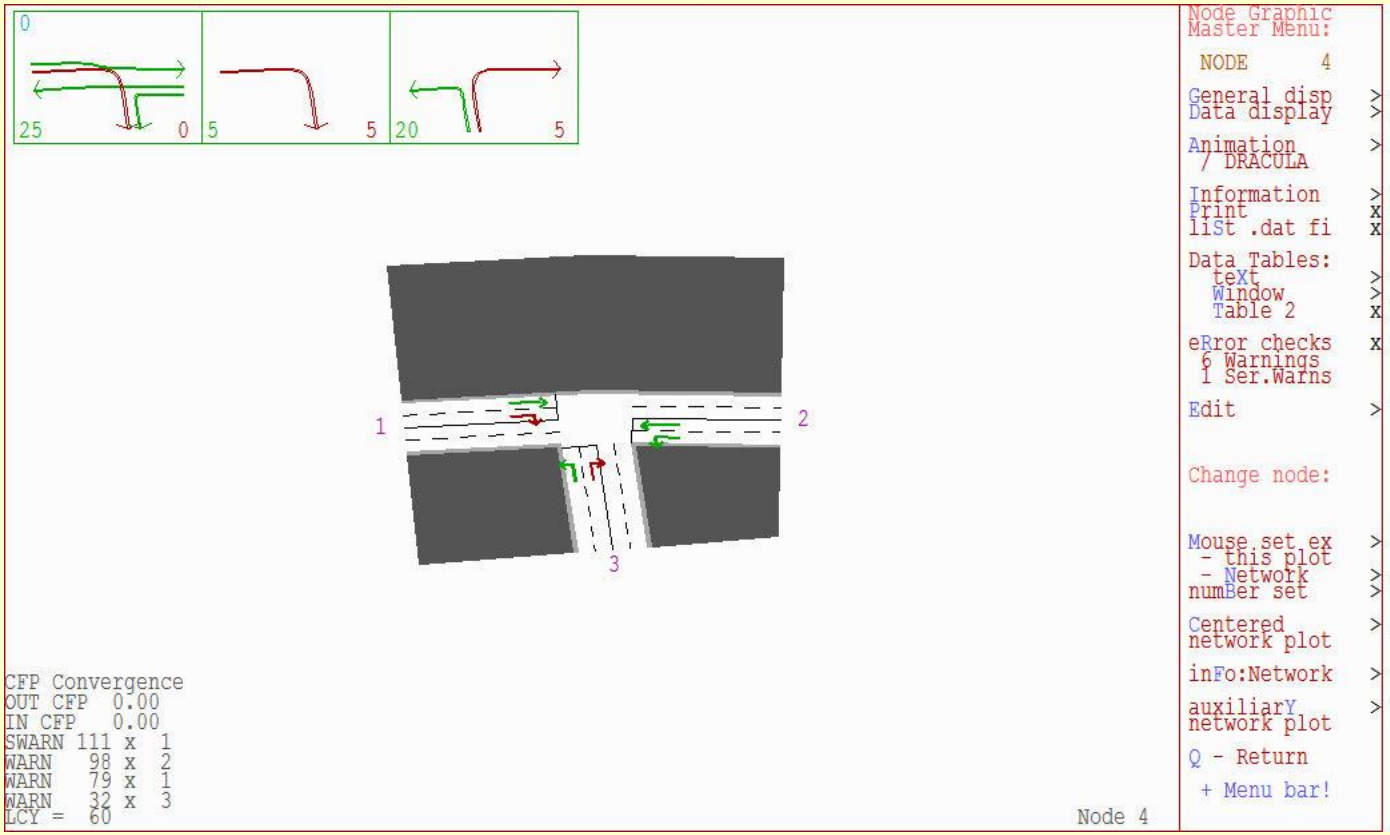
SATALL (11.5)

- Output UFO files now only contain spider data as (default) FLY = T (10 times smaller)
- Path-based assignment only in smaller levels (under consideration)
  - Reduce array space requirements
- Tables of FW iteration weights provided

Simulation (11.5 Updates)

- Several long-standing corrections have been made:
  - Extra TAX after late cut-off/extended green
  - Changes to Q-node delays
  - Signalised X-turns with clear exits
  - Random delays dependent on lane choice
  - All may be ignored by setting SIM114 = T (in Beta but probably removed for Final release)

Adding TAX at late cut-offs



Changes to Q-node Delays

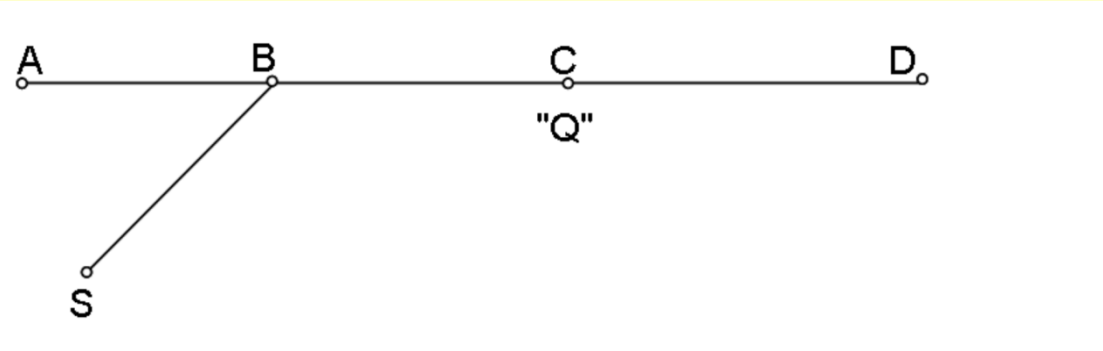
- Revisions to calculating the node capacity ’C’ at the Q Marker

$$D = 226 (V/C – 0.75)$$

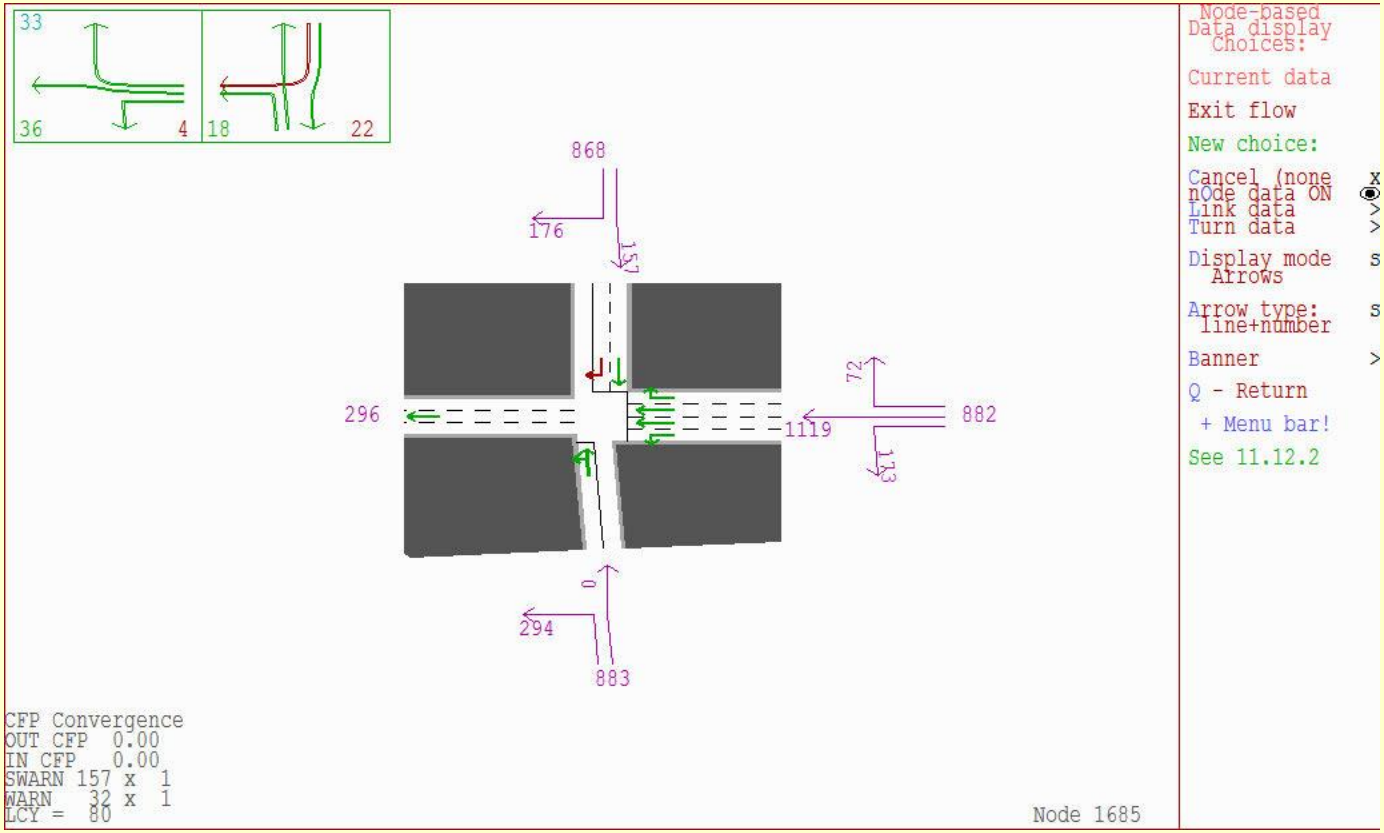
where d = delay (in seconds)

V = total volume on traffic on upstream merge link BC

C = motorway capacity ‘downstream’



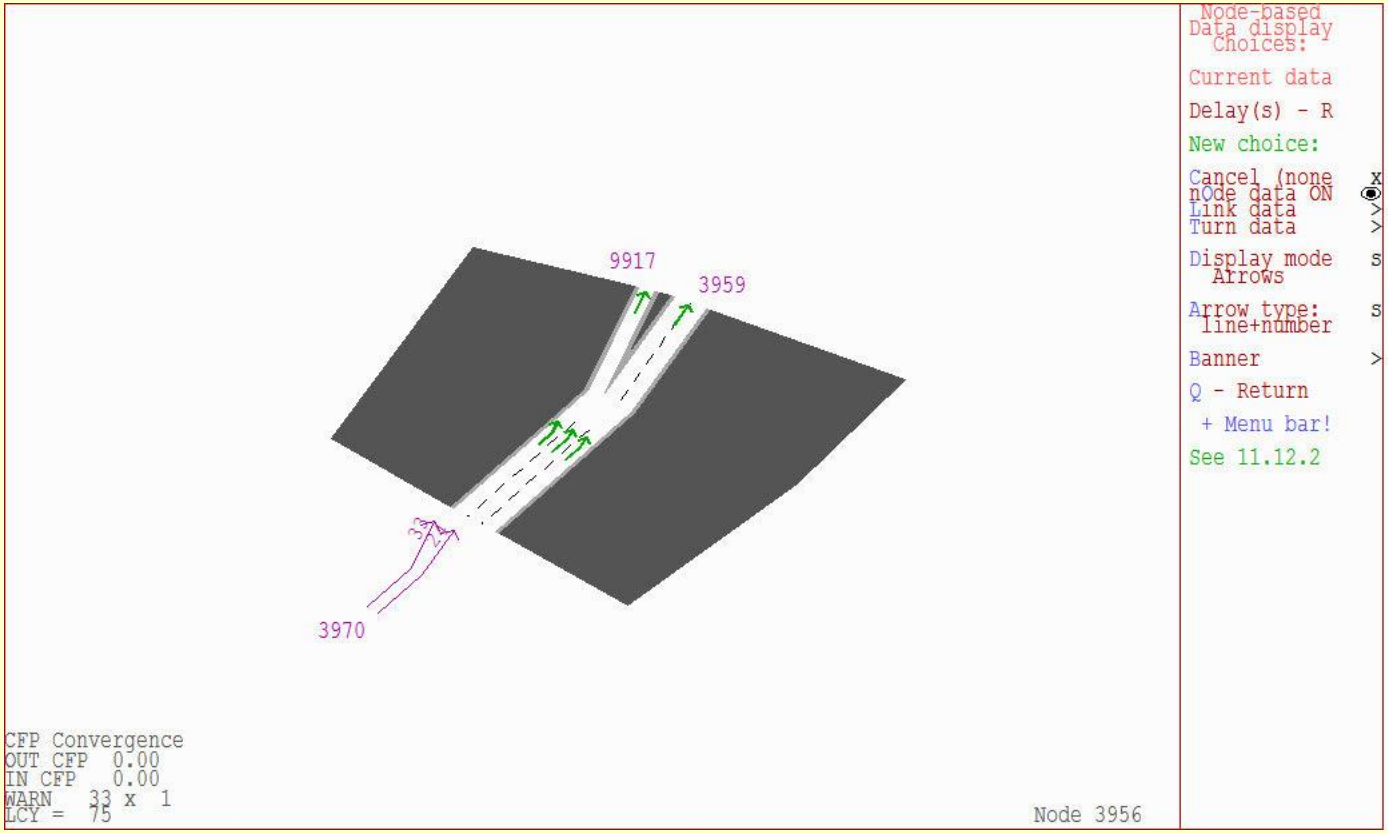
X-turns with Clear Exits (i)



Clear Exits (ii)

- Normally the N-W X-turn has zero gaps during the initial green period when the opposing turns from S are clearing and are assumed to be at saturation flow.
- However the turn S-W does not interfere if there is a clear exit, only S-N.
- For which the flow is very small so that we should ignore the rule and explicitly look for gaps in the S-N flow only

Random Delays and Lane Choice



Random Delays & Estuaries

- If turns share lane allocations they constitute an “estuary” and random delays are based on total flows and capacities and are equal for all turns.
- If they are in separate lanes random delays are set individually.
- Estuaries avoid discontinuities but …
- … they may be counter-intuitive if the actual choice is effectively separate lanes

Random Delays & Estuaries

- A better method might be to have a “sliding scale” between an estuary delay and a separate delay dependent on lane choice but still maintaining continuity.

P1X (11.5)

- Multiple new link annotation choices
- Extended options to display vehicle flows as opposed to PCUS
- Flows by bus company
- New options to suppress “bus lane triangles”
- SLA flows factored to match assigned flows

QUICK N Forests

- Build one or many trees rather than the full "SAVEIT-loop" forest
- QUICK – final cost tree only
- QUICK N – N "best" iterations
- Choice of N a compromise between accuracy (large N) and minimum CPU (small N)
- Applications: SLA in P1X, SKIMDIST etc., SKIMTAC, SATPIJA, SATRAP, SATUFO ..

SATDB (11.5)

- SATRAP /One Song use spider networks and Dijkstra/d'Esopo – much faster
- Works for TAC networks with selection by O/D charge areas and/or discretionary charges paid

MX (11.5)

- Various efforts to deal with ginormous LOHAM matrices
- Maximum number of levels now 11 from 9
  - For internal MX and interactive handling but …
- Most batch files such as MXAGG do not use internal storage so are effectively size independent

General 11.5 Features

- Increased use of Dijkstra rather than d'Esopo tree build algorithms
- More spider-based analysis options added
- Namelist parameters allow >6 characters

New Features in TAC modelling

- Full multi-core facilities in SATALL
- “Twinned” user classes (e.g. compliant and non-compliant) assigned simultaneously
- Almost all SLA options work under TAC
- ‘SKIMTAC ALL’ skims all cost components plus trips

Ideas/Objectives: 2020

- Remove “impossible” spider links at the network build stage and/or …
- … selectively by origins within traffic boroughs
- Part of demand-supply loops / UPDATE
- Signalised roundabouts etc. defined as “Super-nodes” or “Interchanges”
- Extra weights to congested (V>C) delays

Concluding Rants: Signals

- Please, please consider realistic signal timings in future year networks:
- A good scheme with bad signals is often worse than a bad scheme with good signals.
- Possible use of incremental changes to observed base year settings

Linked Supply and Demand Models

- Using skimmed cost components to define alternative demand costs is dangerous:
  - Process inherently non-convergent
  - Component skims are not unique
  - Min (Demand) Cost as good as / better than average cost
  - Full skimming is CPU expensive

Minimizing CPU: Variable Parameter Values

- Consider use of “relaxed convergence” techniques such as CASSINI for supply-demand loops
- Set NITA = 10, not 100!
- Use Dijkstra for mega-networks
- Set MASL to the point where convergence improvements have dried up
- If you’re not sure, ASK!