

Investigating Disruptions and Diversions in Tram Networks

Using Simulation Scenarios Constructed from Open Data

Project

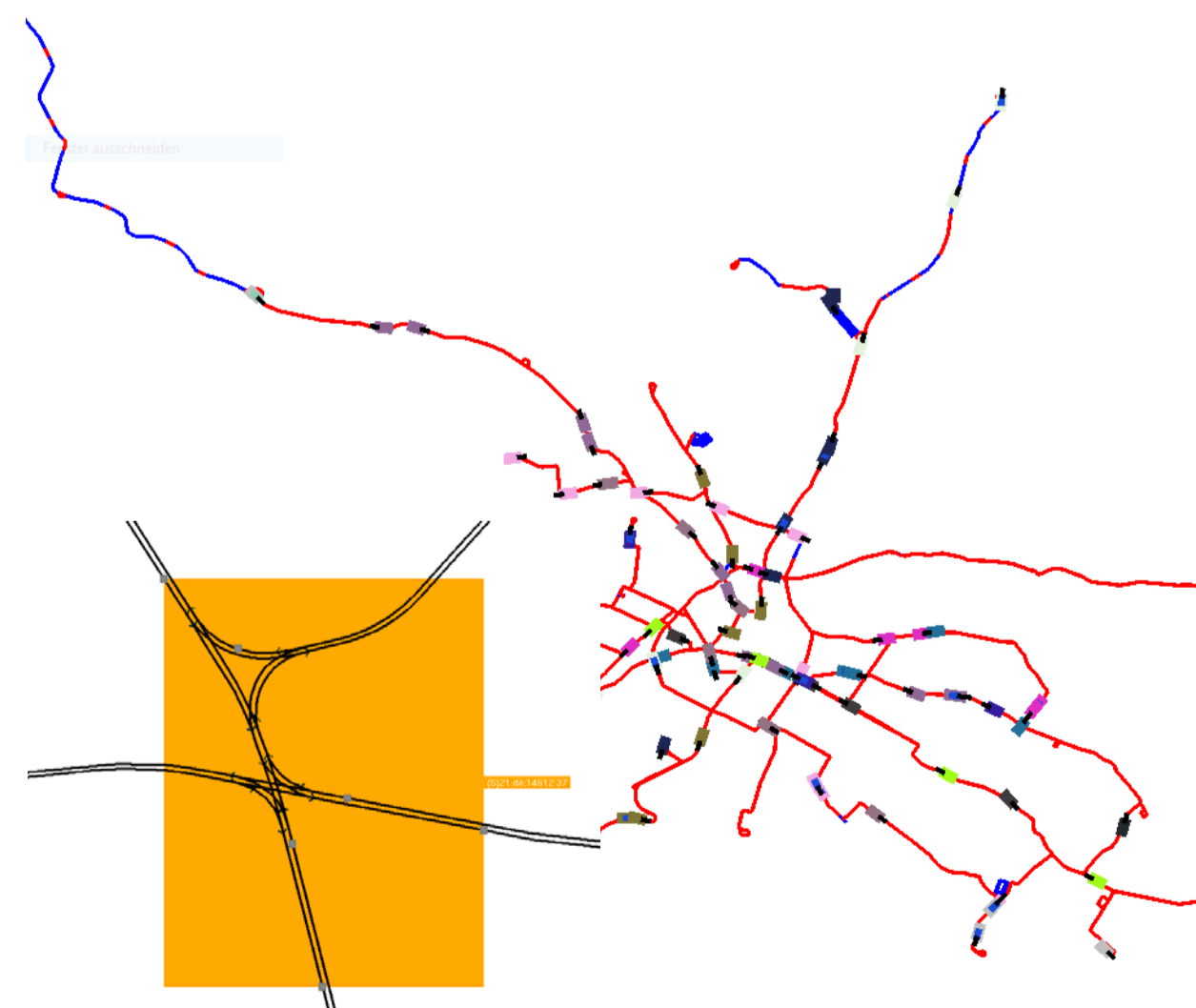
- How to quantify impacts of disruptions in tram systems?
- How to quantify impacts of diversions as countermeasures?
- Finding adequate key performance indicators (KPI)
- KPI-evaluation and „applications“ in simulation experiments
- Simulation scenarios as realistic as possible with open data only?

Research Questions

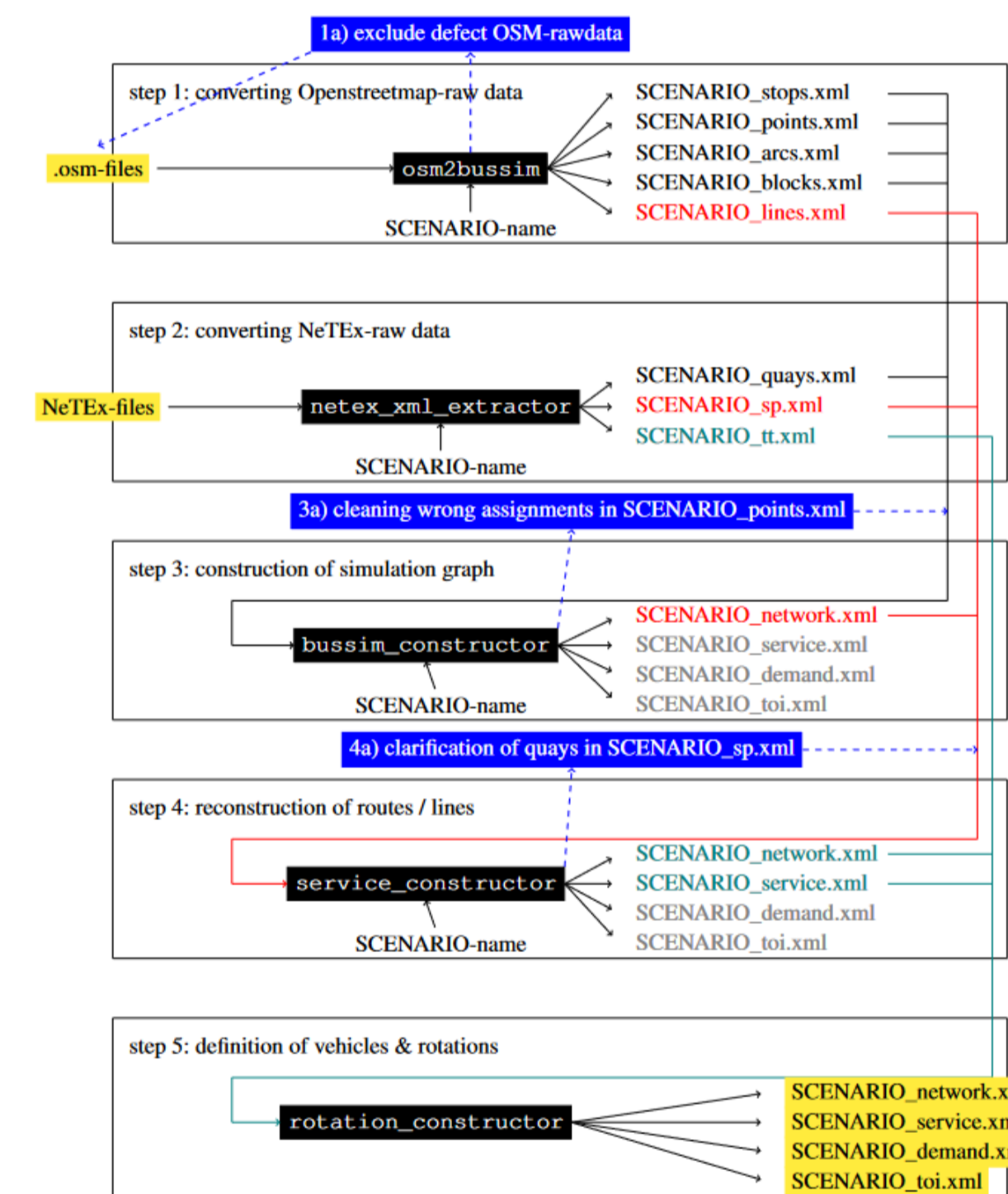
- (How) can we consolidate different open data sources to sufficiently detailed simulation scenarios?
- Verification of scenario adequacy?
- How good are diversions?

B-u-S-SIM Software

- Own open source development
- Multi-agent micro-simulation of tram operations
- Detail level: individual tracks
- Semi-automatic scenario specification with open data input
- Openstreetmap (OSM) track data*
- NeTEx: service specification*



Scenario Construction



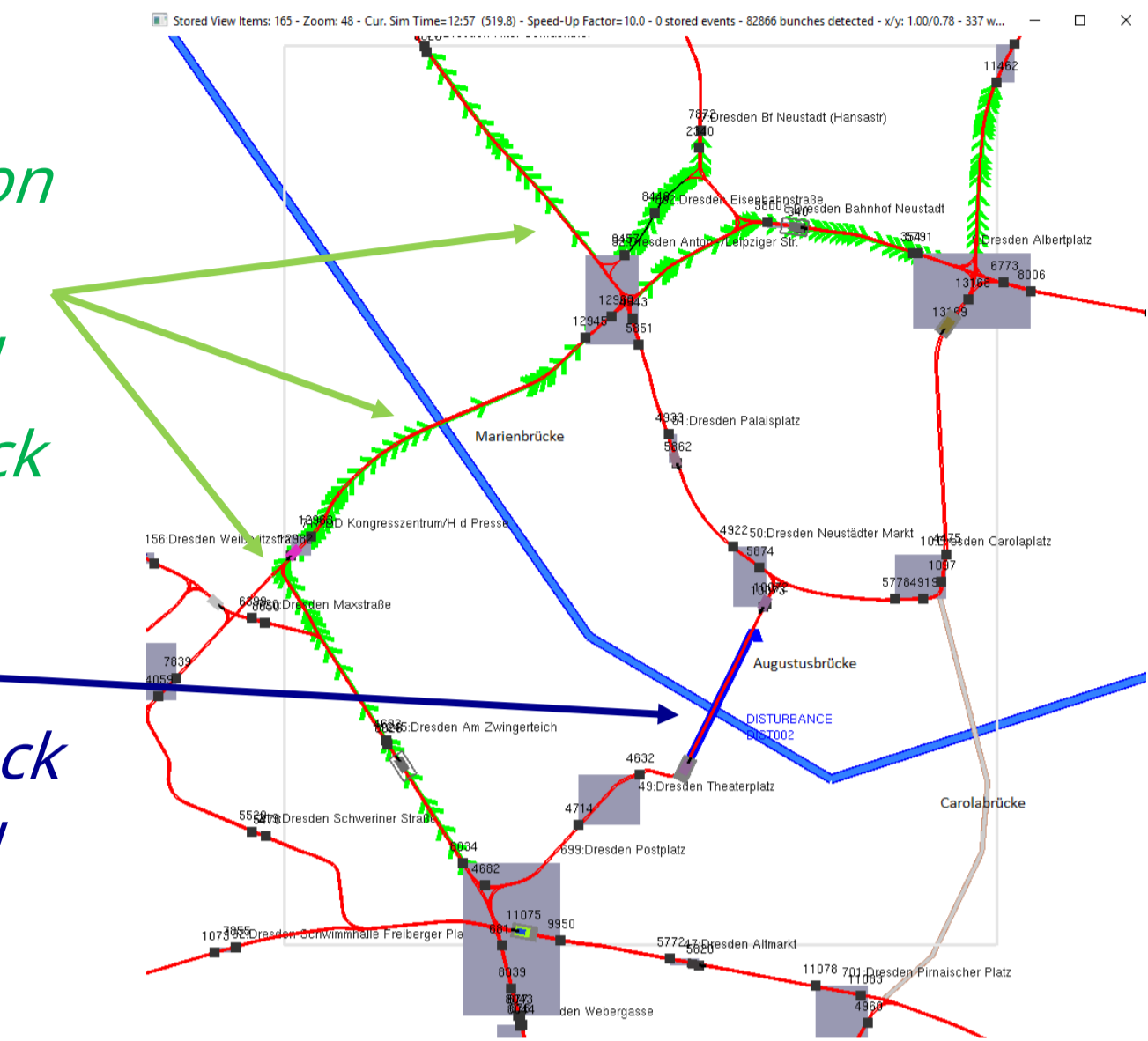
Investigated Scenarios

network	stops	nodes	arcs	routes
Dresden (old)	260	13258	16210	132
Dresden (new)	262	13385	16311	203
Leipzig	253	16454	19082	937
Bremen	166	10726	12612	219

Case Study Dresden

Disruption „DIS“:
temporary reduction
of allowed travel
velocity of selected
arcs (disturbed track
segment)

Diversion „DIV“:
route to bypass track
segment disturbed
by DIS



Can a diversion cope with a disruption?

Simulation 1: no disruption (reference)

Simulation 2: disruption but no diversion („do nothing“)

Simulation 3: disruption and activated diversion

KPI „Nervousness“: percentage of delayed departures from stops caused by DIS

