

TrafficAlgebra: Short Introduction in Testing with Scripts

Simone Jandt

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1 Existing operators of Traffic Algebra

1. **trafficflow**: $\text{rel}(\text{tuple}(\text{mgpsecunit})) \rightarrow \text{rel}(\text{tuple}(\text{int}, \text{int}, \text{int}, \text{mint}))$
Computes the number of cars in the defined section part and direction of the network as mint.
2. **trafficflow2**: $\text{stream}(\text{mgpsecunit}) \rightarrow \text{rel}(\text{tuple}(\text{int}, \text{int}, \text{int}, \text{mint}))$
Computes the number of cars in the defined section part and direction of the network as mint.
3. **traffic** : $\text{stream}(\text{mgpsecunit}) \rightarrow \text{rel}(\text{tuple}(\text{int}, \text{int}, \text{int}, \text{mreal}, \text{mint}))$
Computes the number of cars in the defined section part and direction of the network as mint and the average speed of the cars in the defined section part as mreal.
4. **traffic2**: $\text{stream}(\text{mgpoint}) \rightarrow \text{rel}(\text{tuple}(\text{int}, \text{int}, \text{int}, \text{mreal}, \text{mint}))$
Computes the number of cars in the defined section part and direction of the network as mint and the average speed of the cars in the defined section part as mreal.
5. **heavytraffic**: $\text{rel}(\text{tuple}(\text{int}, \text{int}, \text{int}, \text{mreal}, \text{mint})) \times \text{real} \times \text{int} \rightarrow \text{rel}(\text{tuple}(\text{int}, \text{int}, \text{int}, \text{mreal}, \text{mint}))$
Shrinks the traffic relation to the times and places where the average speed is lower than the parameter real and the number of cars is higher than the parameter int.

Example queries for all operators can be seen in the files:

- /secondo/Algebras/Traffic.examples
- /secondo/Algebras/Traffic/SecondoScripts/TestQueries.SEC

2 Test Scripts for Traffic Operators

In /secondo/Algebras/Traffic/SecondoScripts you can find 3 SECONDO-Scriptfiles. You should move them into /secondo/bin-directory to use them without problems.

The `Traffic_DataGenerator.SEC` is a adaption of the `BerlinMOD_DataGenerator.SEC`. You need the files `streets.data`, `workRegion.data` and `homeRegion.data` in your /secondo/bin - directory to use this script¹. You can edit the script to set the amount of cars observed and the length of the observation period by the parameters: `SCALEFCARS` and `SCALEFDAYS` in lines 143 and 144 of the script. The number of observed cars is `2000*SCALEFCARS` and the number of observation days is `28*SCALEFDAYS`. The script generates a new database `berlinmod` with the histories of cars moving in German capital Berlin for the observation time. The interesting generated data is stored in relation `dataScar`.

The second script `Traffic_CreateNetworkObjects.SEC` uses the output of the first script as input. It creates a network object of the streets data and translates the generated mpoint values into mgpoint values of this new network in a relation called `dataSNcar`.

The last script `Traffic_TestQueries.SEC` contains some queries using the TrafficAlgebra-Operators measuring the different execution times in `rttraffic`. If you want to run the test several times you have to remove the results from your database before you start the new test run. The resulting objects may be saved on disk by uncommenting the lines starting with `save` in the script.

¹You can find the files in /secondo/Algebras/Network/DataSourceBerlinMOD.