



# “Simulation of Urban MObility”

Michael Behrisch, Daniel Krajzewicz, Ronald Nippold, Yun-Pang Wang

## Summary

The “**Simulation of Urban MObility**” (SUMO) package is a suite of **open source** applications for microscopic simulation of road traffic. Besides the simulation itself, it includes applications for network generation/import, for importing O/D-matrices, and for computing routes, including the support for computing a dynamic user equilibrium.

The suite comes with a fast simulation visualisation.

## Open Interfaces

### Native XML Files

XML is used throughout the suite for describing the applications’ input data. XML is also used when generating outputs. Using this technique, ensures a high portability and code reuse and allows to validate the correctness of a file. Using additional tools, these files can be reformatted to common formats (CSV, TXT) or visualised.

### Import Capabilities

The application suite allows to import road networks from Vissim, VISUM, Open Street Map, or ArcView shape files. Points-of-Interests or Polygons can be imported, too.

It also allows to import O/D-matrices or routes from VISUM, and Vissim.

## Example Applications



Simulation of a part of the City of Bologna, including induction loops, and bus-stops.

Visualisation of current CO2 emissions.



Part of the free TAPAS Cologne scenario, with the network being imported from Open Street Map.



## Features

- no limitations in road network size and vehicle number
- full microscopic traffic model, including personal routes
- multi-lane traffic and different intersection controls
- support for networks and routes import
- additional tools for data handling
- open formats allowing interaction with other applications
- open source

## Online Interaction

Thanks to the TU Lübeck the simulation is capable to interact with other, external applications during the execution time.

The implemented interfaces allow to retrieve states of simulated objects, such as induction loop measures, traffic light states and programs, road topology, or the vehicles’ positions or speeds.

This interface also allows to change the behaviour of simulated objects, for example by changing the states or programs of simulated traffic lights, forcing vehicles to change the lane, or advise drivers on speed.

## Current State and Development

The current version can be obtained as portable (Linux, Windows, MacOS) source code and as binaries (executable applications) for Windows from the suite’s web pages located at:

<http://sumo.sf.net/>

In addition, a SUMO-Wiki website is available for obtaining documentations, updated information, installation information and tutorials.

The current work can be divided in following subtopics:

- sub-seconds simulation
- extension of the on-line interface
- route choice and generation

We highly appreciate collaborations with other institutions and offer topics for diploma and other academic works.

