

BRUTUS

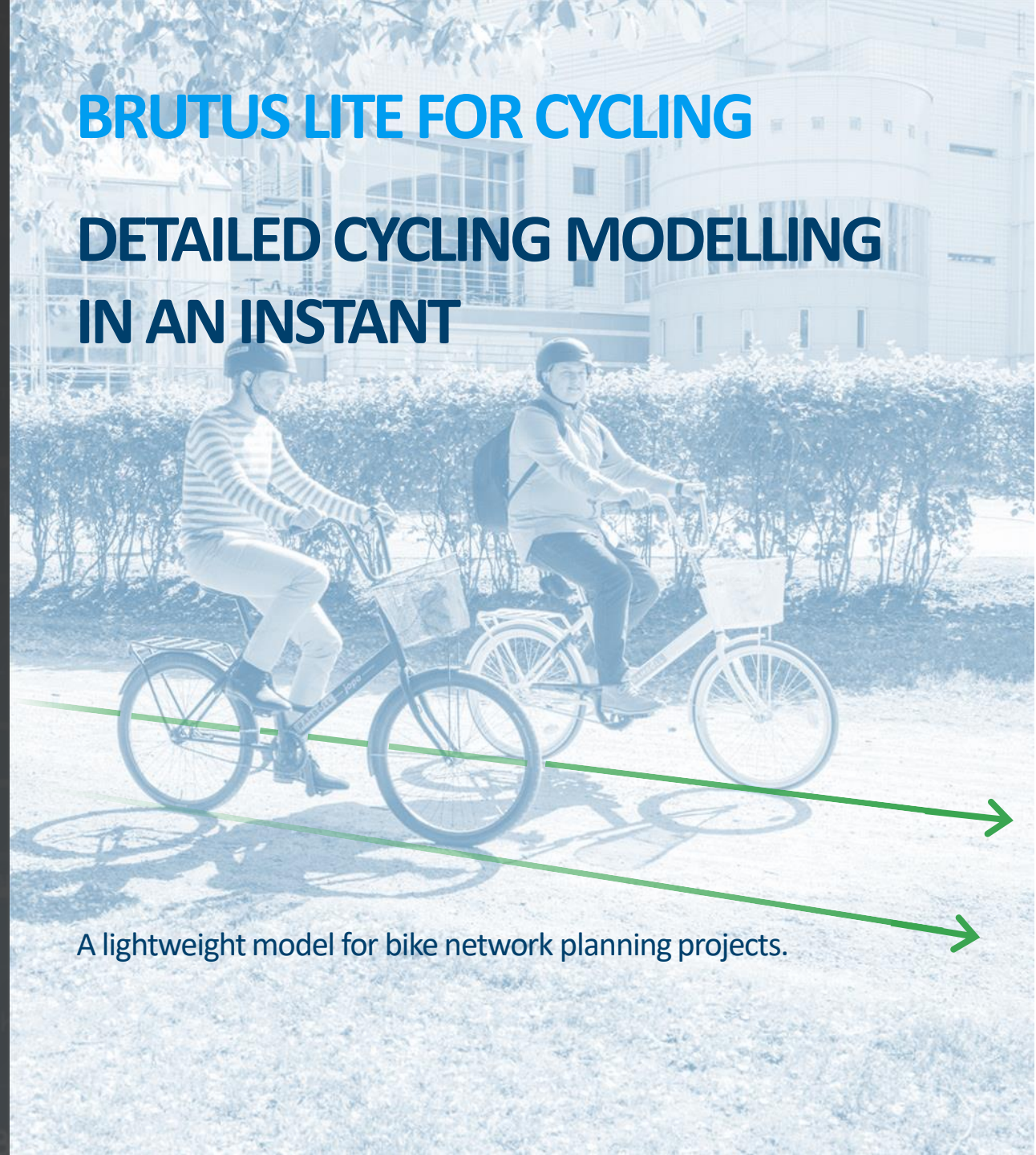
**BRUTALLY DETAILED
TRANSPORT MODELLING**

A state-of-the-art agent-based travel demand model

BRUTUS LITE FOR CYCLING

**DETAILED CYCLING MODELLING
IN AN INSTANT**

A lightweight model for bike network planning projects.



BRUTUS by Ramboll

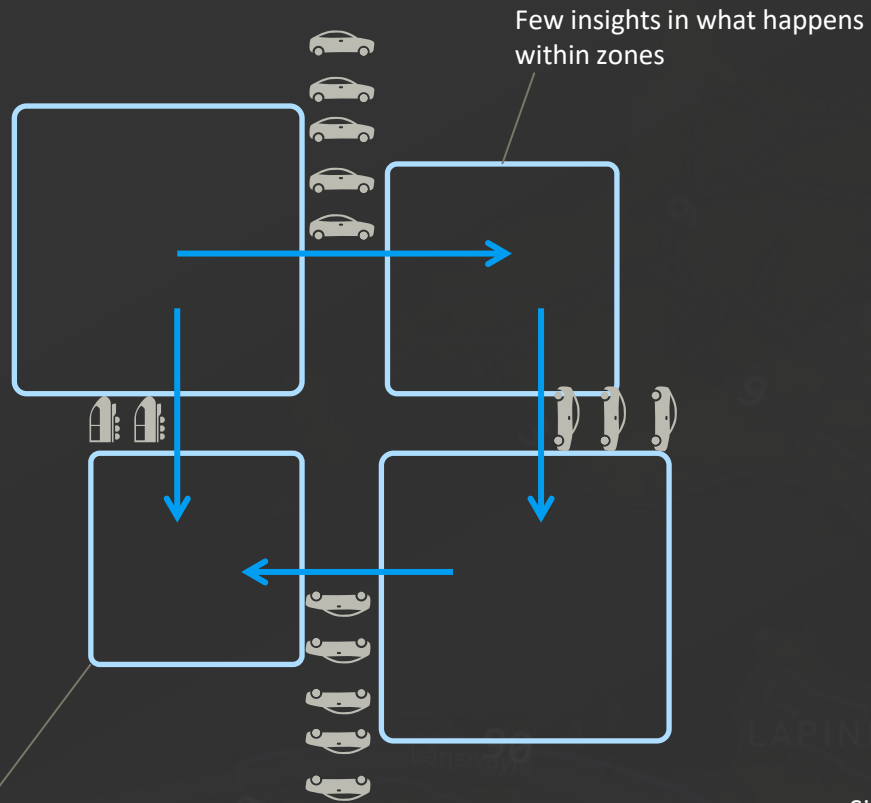
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Highly detailed analysis of the
socio-economic effects of
transport policies

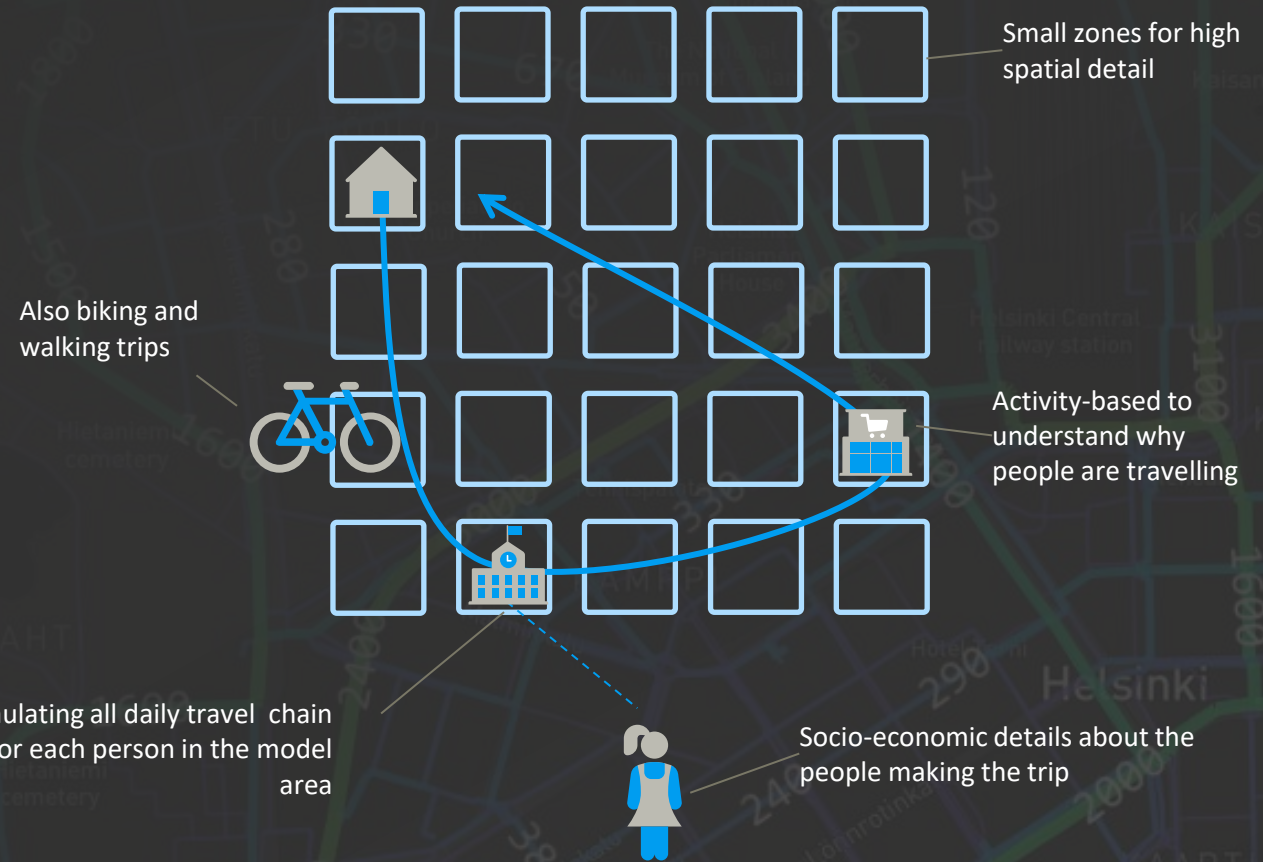
Since the 1950's modelling has been developed to answer questions around car traffic and building roads. Influencing travel demand is becoming more important than just adding supply to the transport system.

Transport planning today is about liveable places for people. Modern transport model solutions should support planners and policy makers to plan for sustainable and inclusive cities on the individual level.

Traditional model



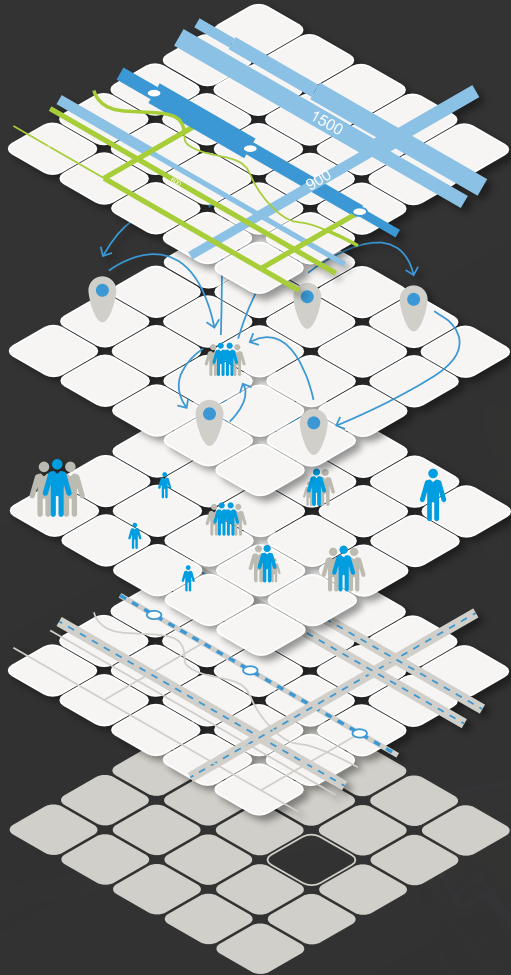
BRUTUS model



Transport between large areas

Anonymous, aggregate flows from A to B

A State-of-the-Art Agent-based Multi-modal Modelling Engine



Modern Modelling Engine

Brutus is a individual-level simulation model, which is designed to meet today's design problems, making use of modern technical solutions and computing capabilities. Empirical models are applied using Random Utility Modelling to simulate single households' and individuals' decision-making situations.

In some use cases, travel demand is simulated in Brutus whilst the assignment on the network is handled by other more traditional and well established (aggregate) transport models like Emme or VISUM. In these hybrid models we can integrate Brutus with external tools and show results through Brutus UI.

Cycling and walking trips can also be extracted from Brutus to detailed microsimulation models such as Vissim.

How it works?

1. Brutus represents land-use in a dense grid containing information about socio-economic activities and population. Synthetic agent population is generated to closely resemble the study area population.
2. The grid cells are connected via a multimodal transport network that contains car roads, public transport lines and bicycle and pedestrian paths.
3. An activity pattern is generated for each person in the model. For that, travel survey data or data from a MaaS platform is used.
4. Traveling between activities is modelled as travel chains simulating a detailed activity diary of each agent.
5. All trips are assigned to the travel modes and routes that are most attractive in terms of time, cost and level of service.

Wide range of applications on top of the Modelling Engine

Cycling Flows

High spatial resolution and detailed urban structure description makes Brutus very suitable for analysing cycling routes. This will be done of course on top of multi-modal demand analysis.



Pedestrian Flows to Transport Hubs

Pedestrian flows arriving to public transport hubs can be analysed with Brutus and detailed land-use data. When needed, with tailored data processing, we can refine the analysis to a city block or building level.



Strategic Transport System Planning

We have been able to cover most policy impacts like regulation, pricing, service provision and investments to be able to be estimated long into the future to provide a solid foundation for policy recommendations over this time horizon.



Road Works

Road works are an important sources of traffic hindrance and safety issues. With Brutus we can assess how different users changes their routes so that authorities can ensure safety during these roadworks.



Equity / User Group Analysis

The impact of measures can be evaluated for different segments of the population. For example, the health benefits for a bicycle measure for specific socio-economic groups can be determined



Accessibility / Location Analysis

The detailed multimodal network and dense land-use grid in Brutus, together with detailed population segments provide a strong basis for detailed and comprehensive accessibility/location analyses.



On-demand Mobility Demand Analysis

As the demand (density) for on-demand service impacts heavily on the service definitions and potential service quality and system efficiency, we combine Brutus with an on-demand simulation system and use an iterative approach.



EV Charging Network Analysis

Brutus can help policymakers and private companies to understand where the demand for charging facilities is highest and determine the best places are for charging locations.



Contact for More Information



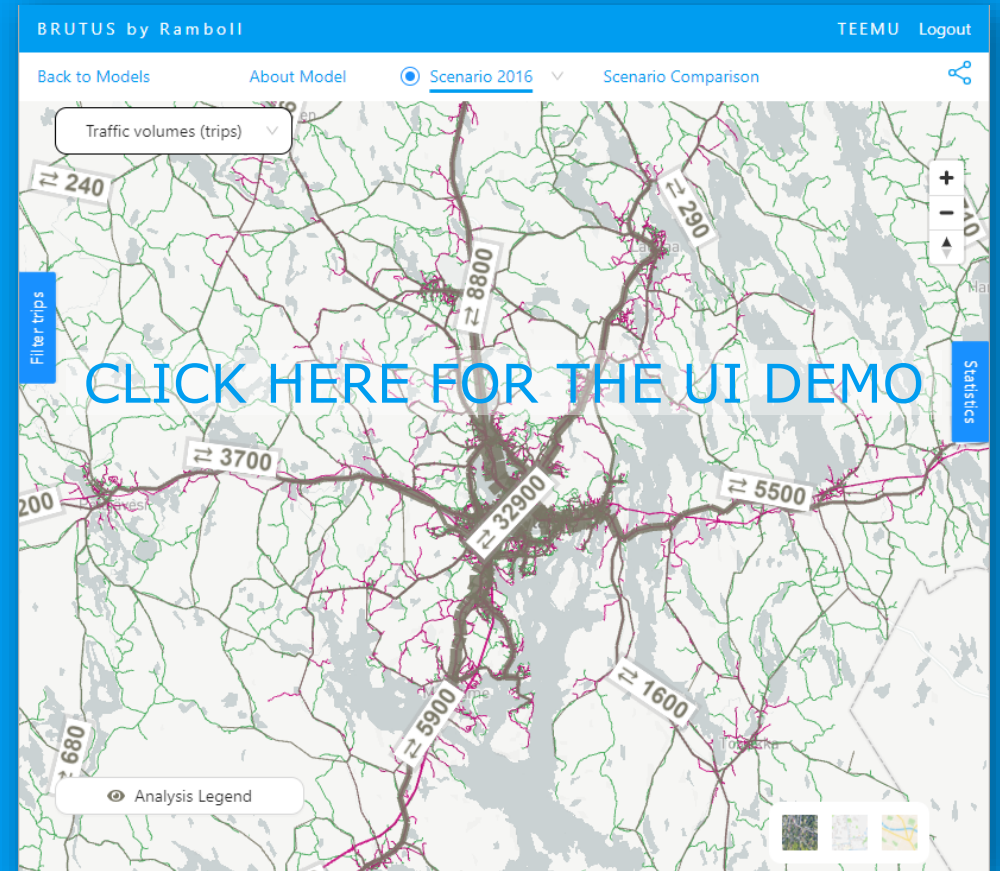
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Bright
ideas.
Sustainable
change.

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BRUTUS LITE FOR CYCLING

DETAILED CYCLING MODELLING

IN AN INSTANT



Traffic models are important tools in transport planning and forecasting to understand how people travel and the situation on the road network.

But..



Traditional models are made for analysing **car traffic** and anonymous, aggregated flows between large zones.



Often only larger metropolitan areas and regions meet the **data requirements** for developing a traffic model.



Traffic model **deployment is costly** and only a few smaller regions have resources for acquiring a model even if its benefits are clearly seen.



Traffic model **deployment takes time** while modelling results are often needed now or "yesterday".



BRUTUS Lite for Cycling enables detailed cycling modelling in an instant.



Detailed **cycling modelling** based on full BRUTUS methodology and multimodal modelling.



Use of **widely available and standardised data** makes application possible virtually anywhere.



Smaller regions without a traffic model and larger regions with only a traditional traffic model obtain cycling flow analysis capabilities.



BRUTUS Lite is almost **instantly deployable** and enables utilization of modelling results even in ad hoc project cases.



BRUTUS Lite for Cycling brings you..



Traffic flows on the network as a baseline information for bike network planning projects.



Link-analysis and through-traffic analysis capabilities to study cycling flows.



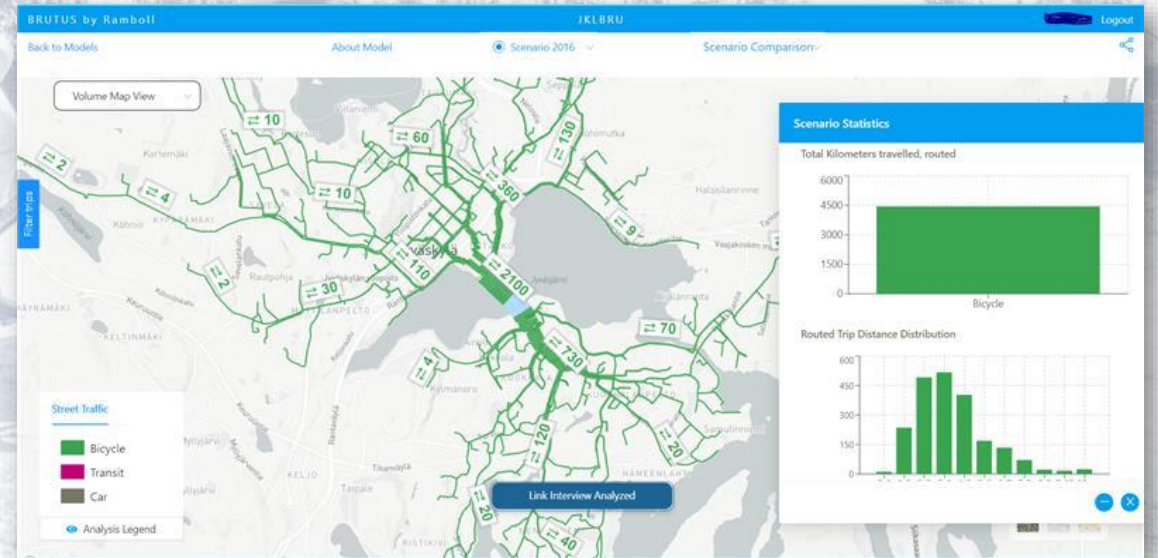
Impact analysis based on changes in the network structure and changes in routes taken by cyclists.



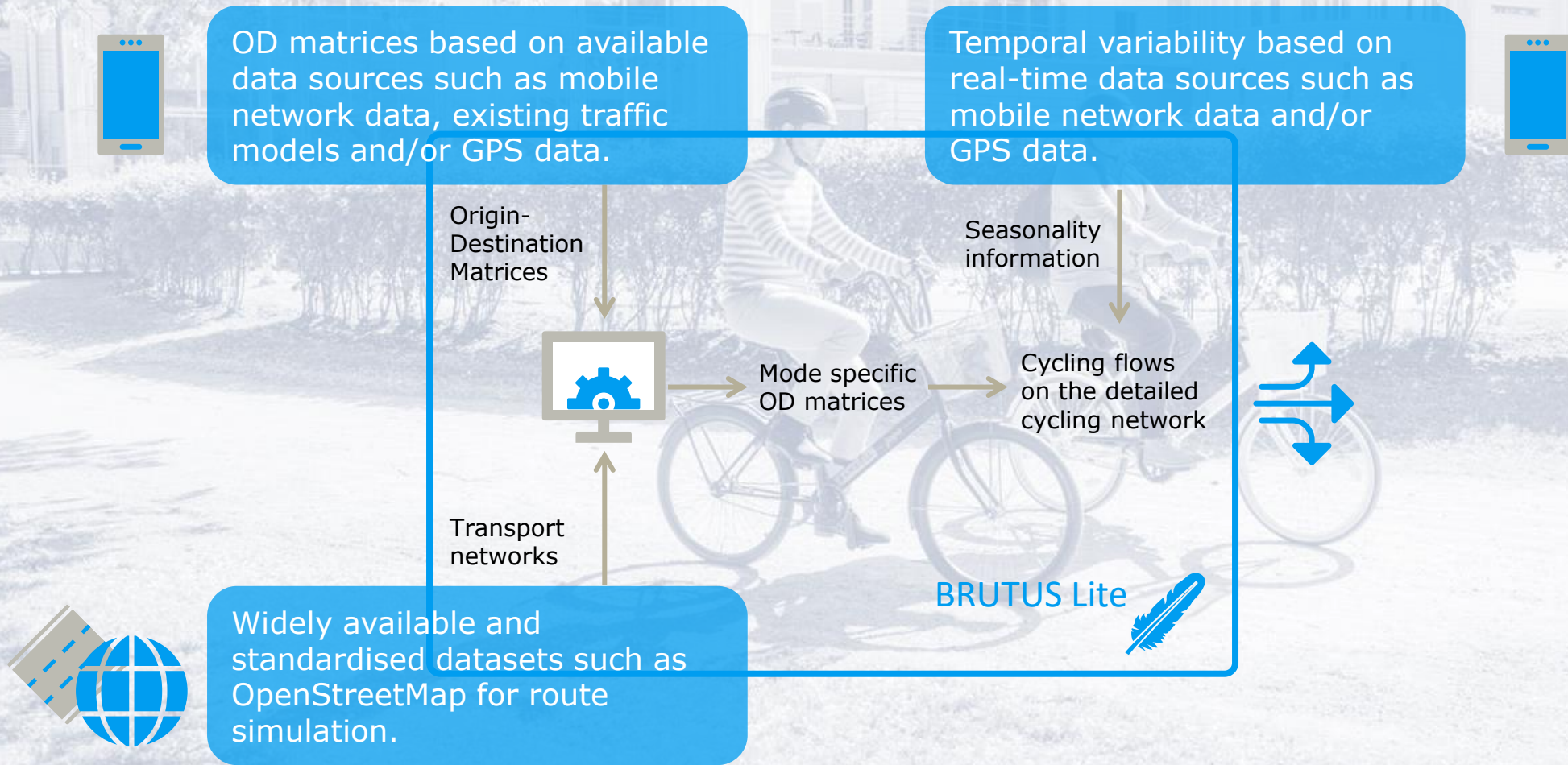
Results can be analysed through an easy-to-use web-based viewer. No expert knowledge needed.

Additional possibilities:

- Dynamically updating flows
- Socio-economic aspects
- Simple forecasts
- Upgrading to a full Brutus model



BRUTUS Lite Methodology



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