# Collaborative Mobility Digital Platform

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CMDP
COLLABORATIVE MOBILITY DIGITAL PLATFORM

# Transport models in Switzerland - Business as usual

- In Switzerland, planning offices on city, cantonal and national levels, use four-step models to forecast impacts of infrastructure, policy or transport service changes
- Engineering offices are contracted to develop these models
- Small updates are sometimes made
- Big updates happen every 5-10 years
- Little coordination in data structures or model development

# Agent-based alternatives in Switzerland

SBB develops and maintains an activity-based, agent-based model of Switzerland

ETH has been developing and maintaining an agent-based model for Switzerland and Zurich over the last 20 years

**Pros:** Mature technology and models, applied in many research and applied projects, good understanding of benefits

**Cons:** Still difficult to use in practice (i.e., low trust/acceptance, previous investments, academic project, open-source), developing new/regional models is a lengthy process, there is little automation, and standards and visualization needed in practice are lacking

# Collaborative Mobility Digital Platform

- Research meets practice in a unique collaboration that brings academics, practitioners, government offices, and engineering firms together to develop the new generation of transport models.
- **CSFM, ETH** – Innovation partner; **tpg**, **tl**, **Ville de Lausanne** - implementation partners
- 10+ strategic advisory board members coming from academia, startups, engineering firms, and government offices to join in the co-creation of the digital twins of Geneva and Lausanne.
- Focus on public transport and its integration with other modes.
- State-of-the-art mobility data
- (Full) automation

# Main Tools

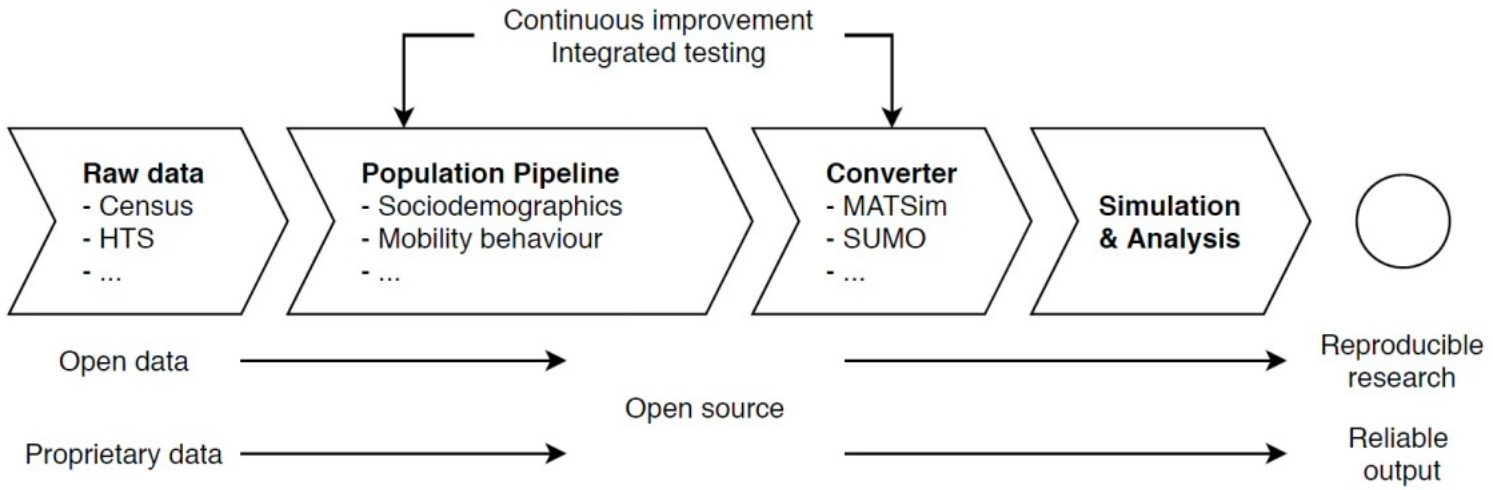
eqasim

MATSim

ODTP

# Main Tools - eqasim

- An integrated Python-based pipeline from raw data to agent-based simulation based on straightforward statistical methods
- Available models: **Ile-de-France**, Sao Paulo, San Francisco, Los Angeles, Jakarta, **Switzerland**, Bavaria, Cairo, and other
- Available at https://github.com/eqasim-org



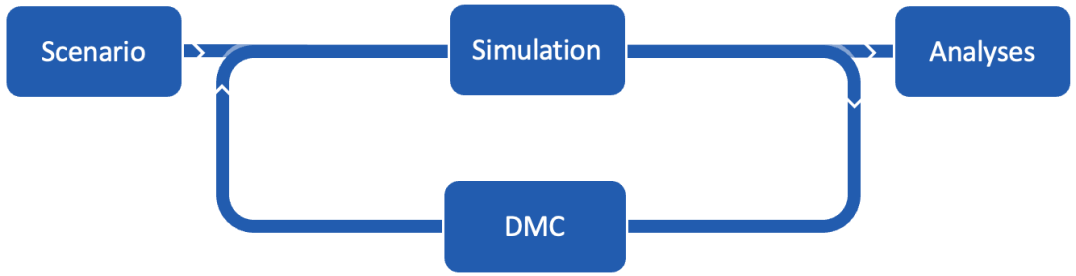
# Main Tools – MATSim + (DMC)

We use the Discrete Mode Choice extension of MATSim, which we feed with econometric mode-choice models estimated from RP or SP data.

The model chooses mode alternatives for every trip for every agent on a tour level, ensuring consistency in mode decisions and vehicle locations.

Allows for faster convergence and integration of econometric models at the expense of higher complexity, increased skill requirements, and the need to ensure variables are properly incorporated into mode-choice decision-making.

Code and literature: https://github.com/matsim-org/matsim-libs/tree/main/contribs/discrete_mode_choice



# Main Tools - ODTP

CSFM and SDSC developed a collaborative open digital twin platform (ODTP) to store, combine, and run digital models and data.

ODTP should:

- Fuse and evaluate mobility data, test algorithms, build transport models, compare them, and visualise policy impacts.

- Reduce redundancy, increase efficiency, ensure traceability and reproducibility, open new research avenues, and increase accessibility to mobility data and model outcomes.

Code, literature and tutorials: https://github.com/odtp-org

# What will CMDP bring

CMDP will:

- Pair eqasim, MATSim, and ODTP - https://gitlab.ethz.ch/ivt-vpl/populations/ch-zh-synpop
- Allow seamless generation of agent-based models, from model creation to calibration and model use.
- Allow scenario-based model development using the longitudinal data source (i.e., traffic counts, passenger counts, GPS tracking studies).
- Allow detailed modeling of public transport services.
- Allow policy-related visualization for eqasim.
- Develop the first agent-based models for Geneva and Lausanne, which public agencies will use (hopefully) for their planning.

# What are we working on at the moment

Supply side:

- Better modeling of dedicated lanes, *interaction of trams with cars* – pt2matsim
- Fare structures
- Feedback realized schedule

Demand side:

- Better demand modeling on all levels, from persons (i.e., day excursions (2% of pt pkm) , cross-border commuters) to vehicles (i.e., size, fuel type)

WIP: Calibration of Supply and Demand

WIP: eqasim visualization: validation of the models, comparisons of policies…

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