



Real-time Transfer Synchronization of Public Transport Services Using Passenger Data

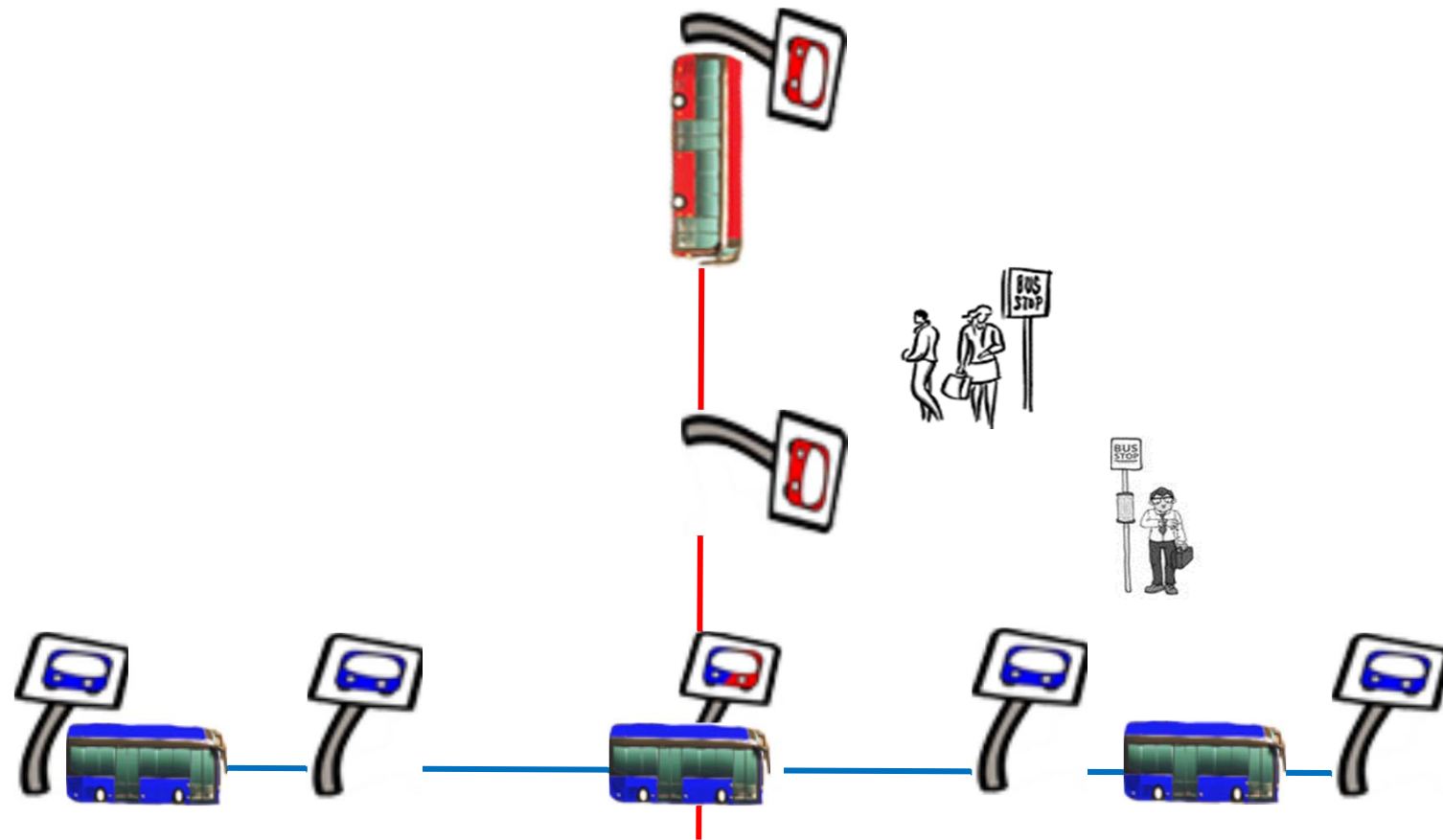
Oded Cats
Alexandra Gavrilidou

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ADAPT-IT seminar;
Stockholm,
June 16, 2017



Workshop on Advances in Public Transport Control and Operations
Conclusions and Lessons from ADAPT-IT

Problem description





Approach

- Real-time transfer synchronization
- Rule-based holding
- Single transfer stop
- Different types of real-time transfer data

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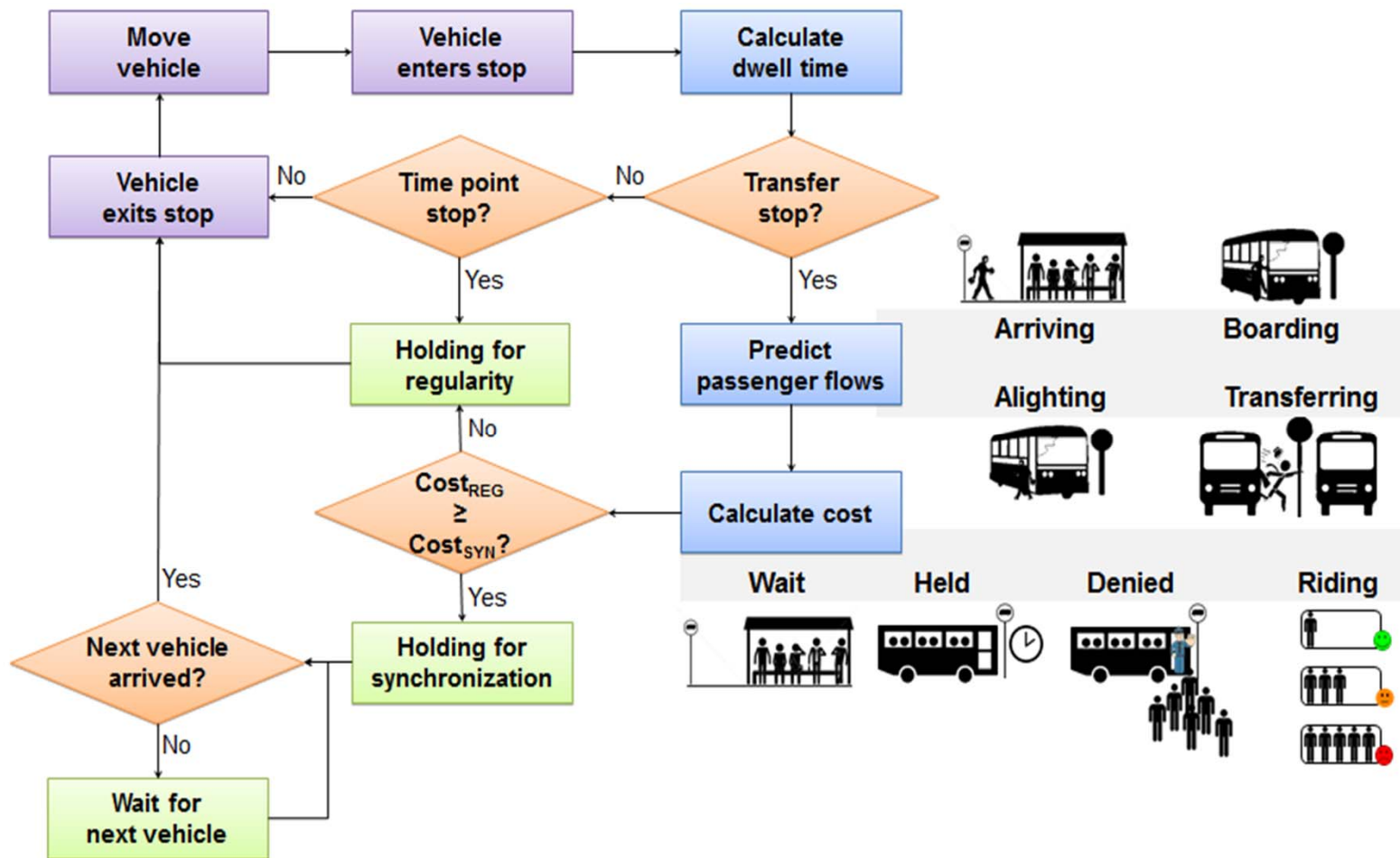
Key features

- Passenger-oriented decision rule
 - Trade-off between user groups
- Applicable in real-time
- Able to use different passenger data sources
- Considers crowding and capacity
- Hybrid: single-line regularity vs. transfer sync.

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Workflow

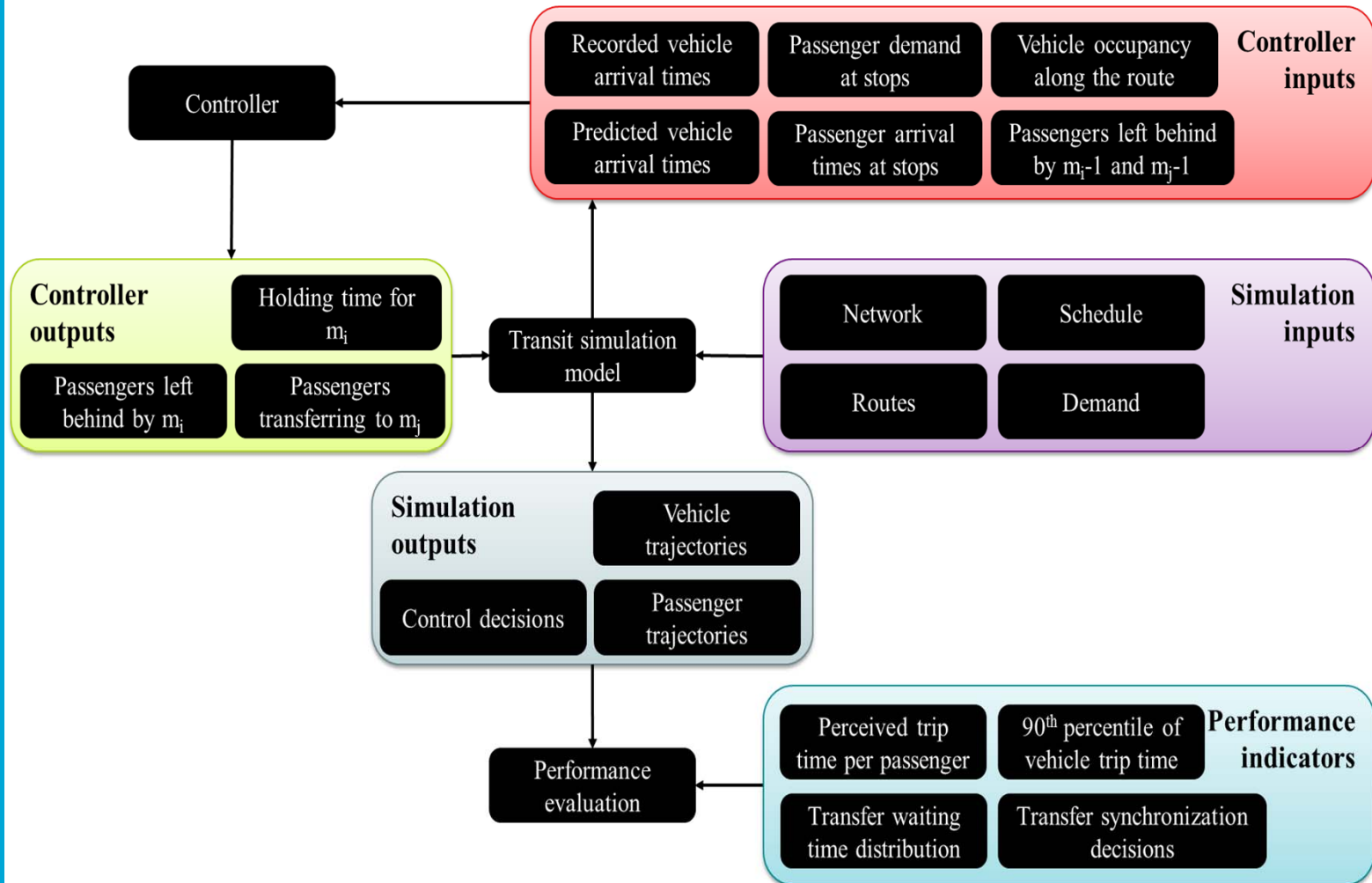


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Implementation



Case study

- Tram <-> LRT
- Timetable planning for sync
- $H=10$ min per line





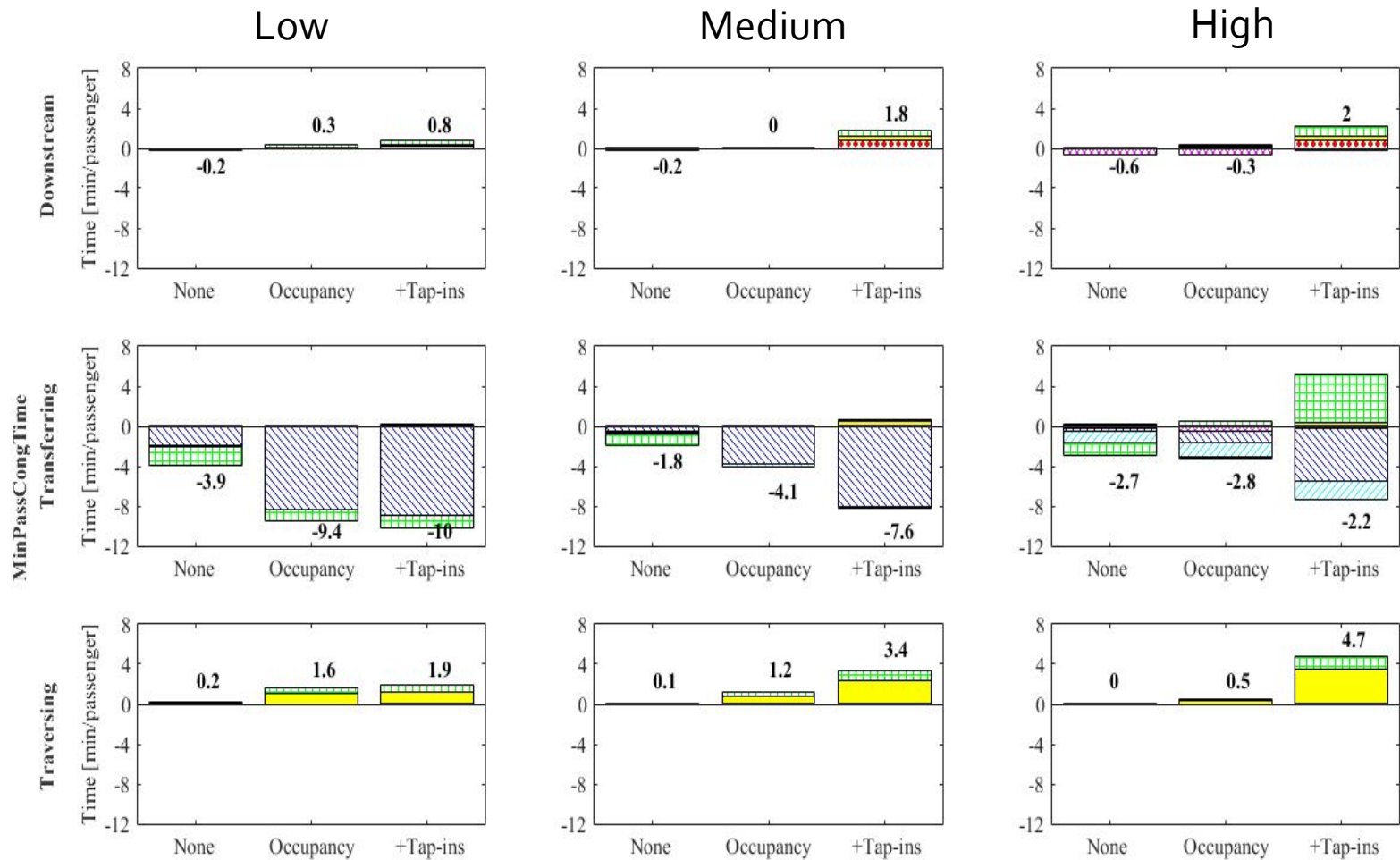
Scenarios

- Controller type: single-line, basic, +capacity, +crowding
- Demand levels: Low, Medium, High
- Real-time passenger data
 1. None
 2. APC only
 3. Tap-ins only
 4. APC and Tap-ins





Effect on passenger travel times

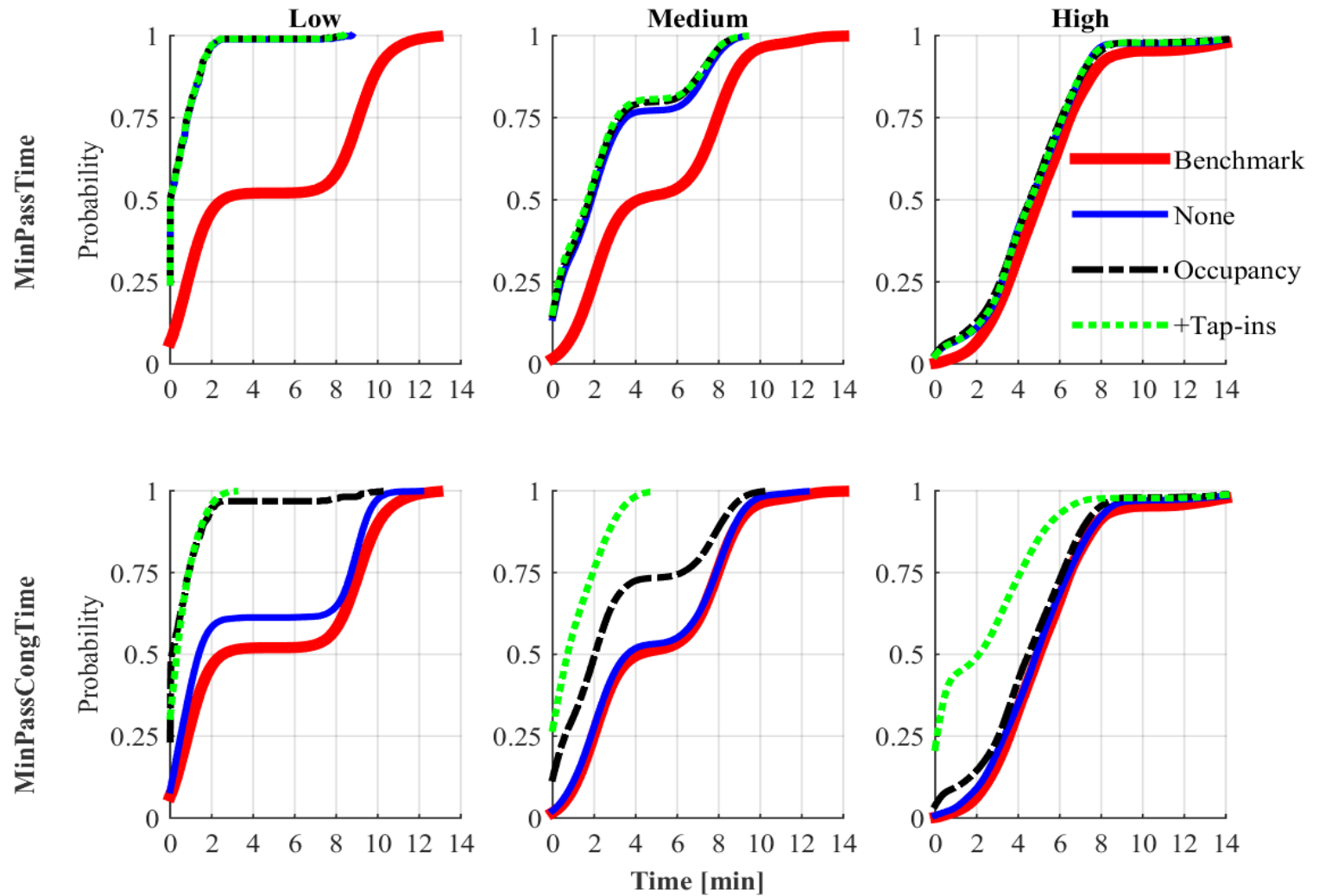


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Passenger transfer times



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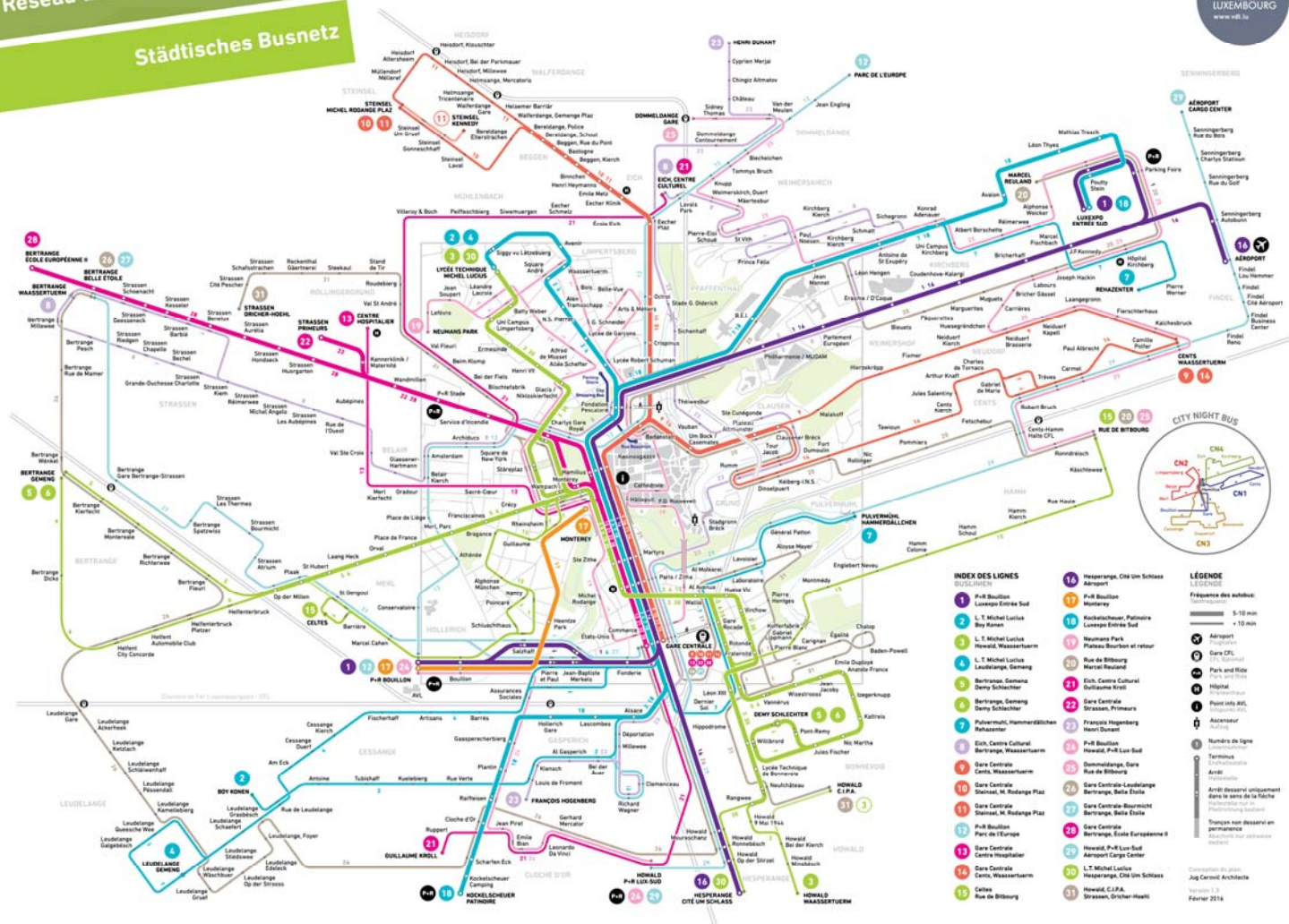
Key findings

- Transferring passengers save 2-10 minutes
- Other passenger groups lose 0-3 minutes
- Benchmarking strategy: more savings (X2.5), fewer delays (/1.5)
- Highest benefits for low demand , more sync
- With tap-in: more sync, better for transferring, worse for traversing
- Most benefits from APC in real-time
- Long horizon when demand level is high
- Sensitive to user group composition
- Applicable in real-time




Extensions

Réseau des autobus municipaux
Städtisches Busnetz



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A high-angle photograph of a busy transit station. In the foreground, a row of ten turnstiles is visible, with several people passing through them. The floor is made of large, patterned tiles. In the background, many people are walking in various directions, some carrying bags or luggage. The lighting is bright, typical of an indoor public space.

Thank you! Questions?

odedcats.weblog.tudelft.nl



Line properties

Property	Line 3	Line 17
Number of stops	40	35
Location of TP in route	38%	20%
Operating time [min]	64	51
Headway [min]	10	10
Vehicle capacity	214	188
Seat capacity	84	76

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Results

Vehicle arrival headway at the transfer stop

