

Extending the DRT module to enable simulations of pre-booked MoD services

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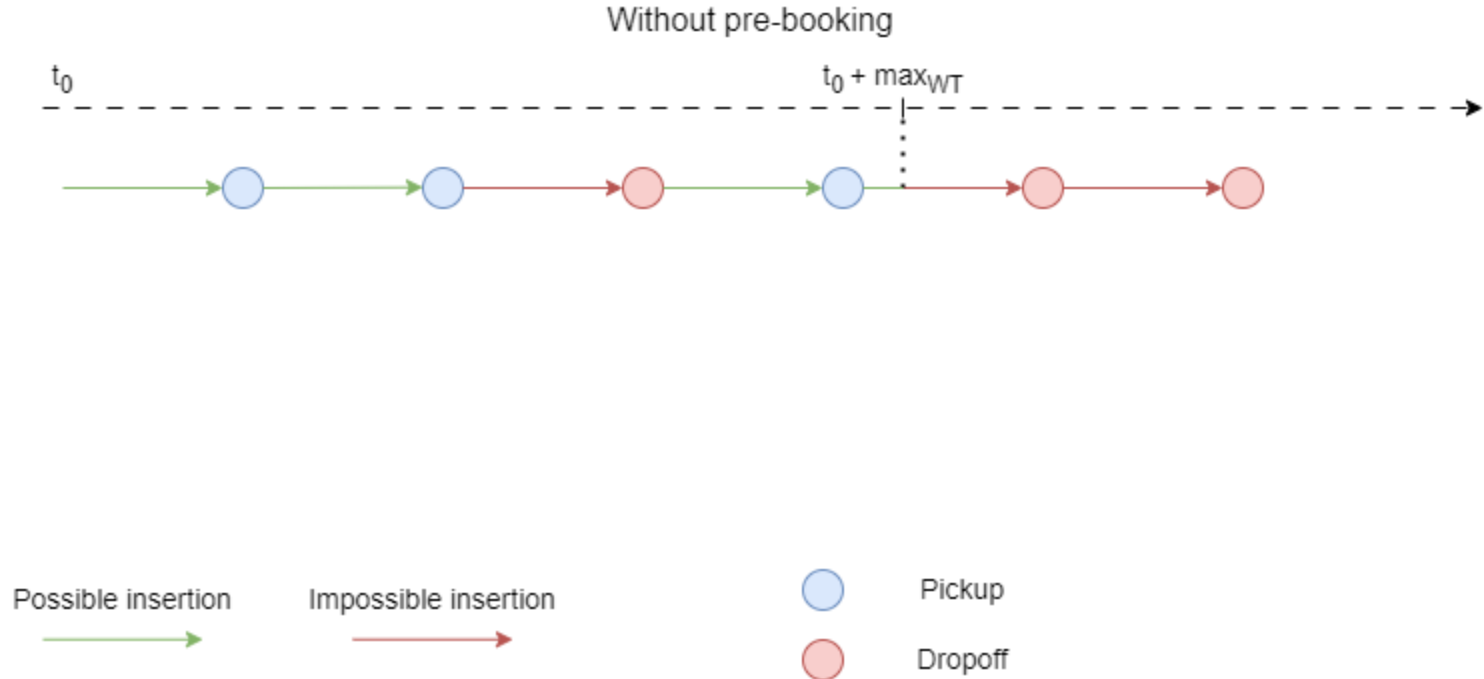
Summary

- **Introduction**
- **Implementation**
- **Case study and results**
- **Conclusion and perspective**

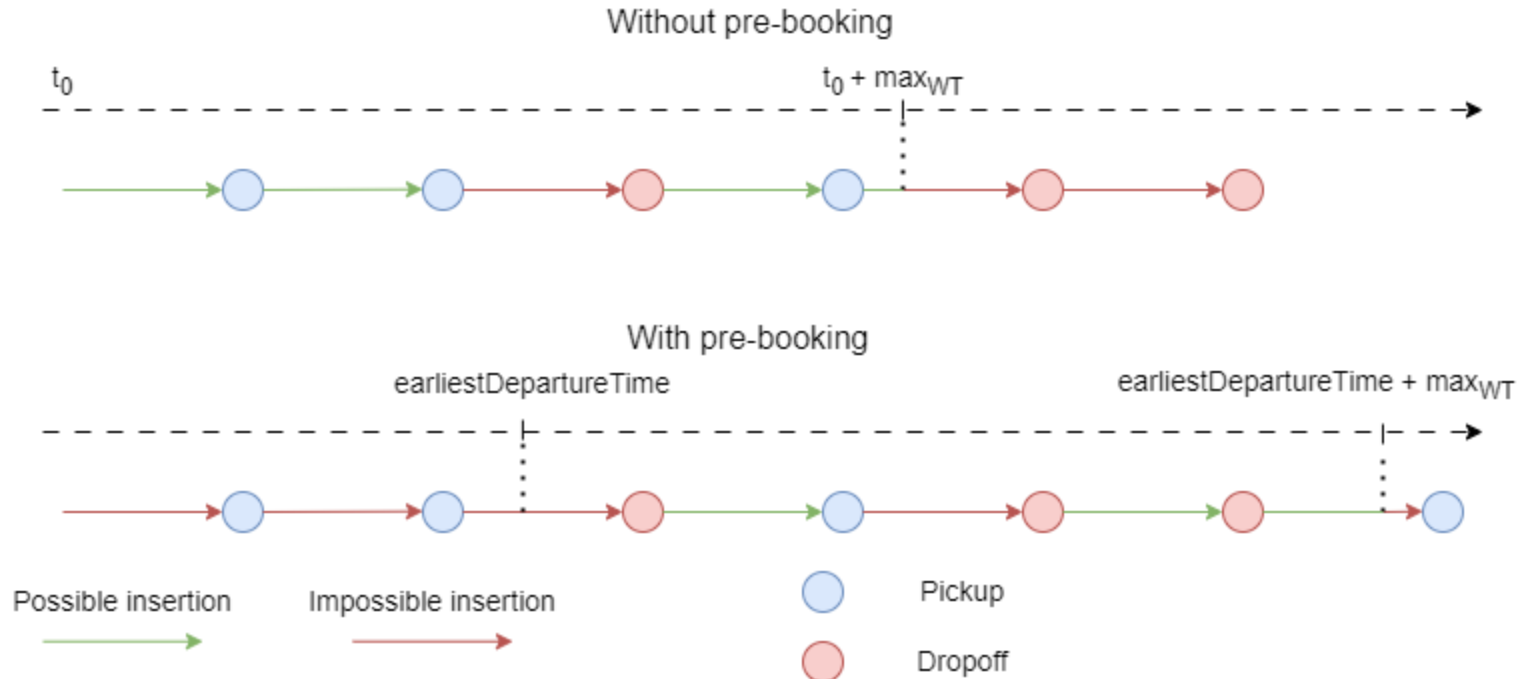
Introduction

- **Context - the DRT module**
 - Trip requests handled in an online manner
 - Passengers are supposed to be ready to start their trip at request submission
- **Objective**
 - Support pre-booking of requests at the beginning of the day / in advance
 - Support a mix of pre-booked and online requests
 - Investigate the impact of pre-booking on the performance of DRT services
 - Spoiler alert: it's not just about setting a large horizon

Implementation – insertion finding

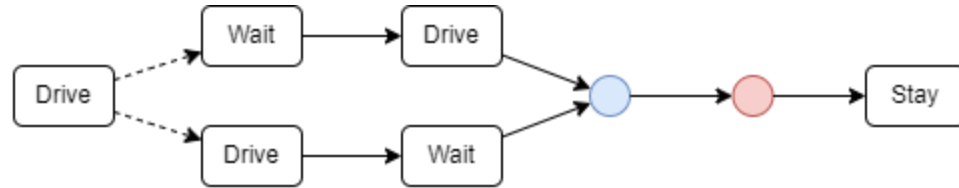


Implementation – insertion finding



Implementation – scheduling

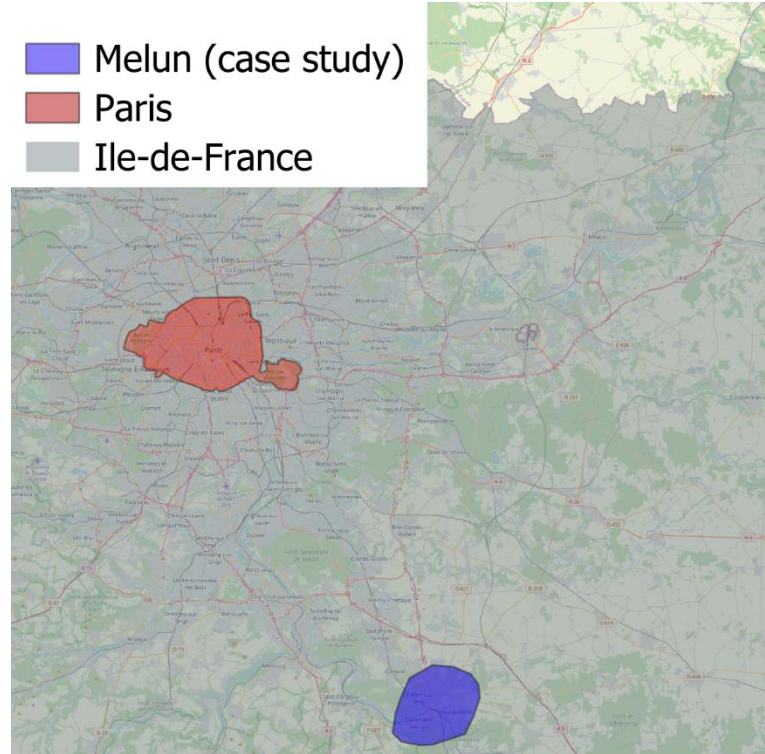
Wait before or after driving to the next pickup location



- The two methods are implemented and compared in this study

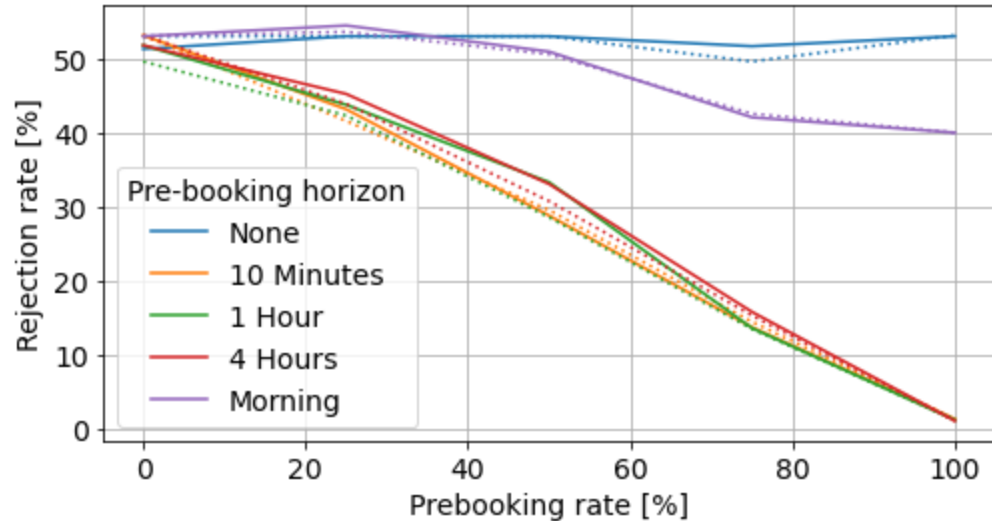
Case study

- **Synthetic population**
 - Open-source pipeline for Ile-de-France
 - 10% sample
 - Cut around the city of Melun – 14k requests
- **DRT service specification**
 - 20 vehicles
 - Prebooking rate between 0% and 100%
- **KPIs**
 - Rejection rate
 - Mean wait time
 - Fleet empty distance share



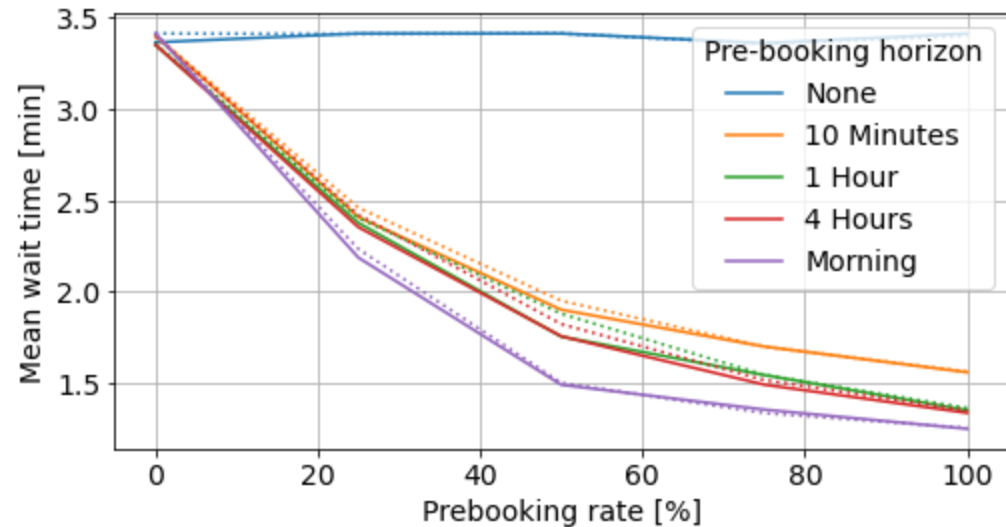
Results – Rejection rate

- A pre-booking horizon of 10 minutes renders the least rejected requests
- When all requests are pre-booked during the morning, the order in which they are processed becomes relevant. Requires more dedicated investigations



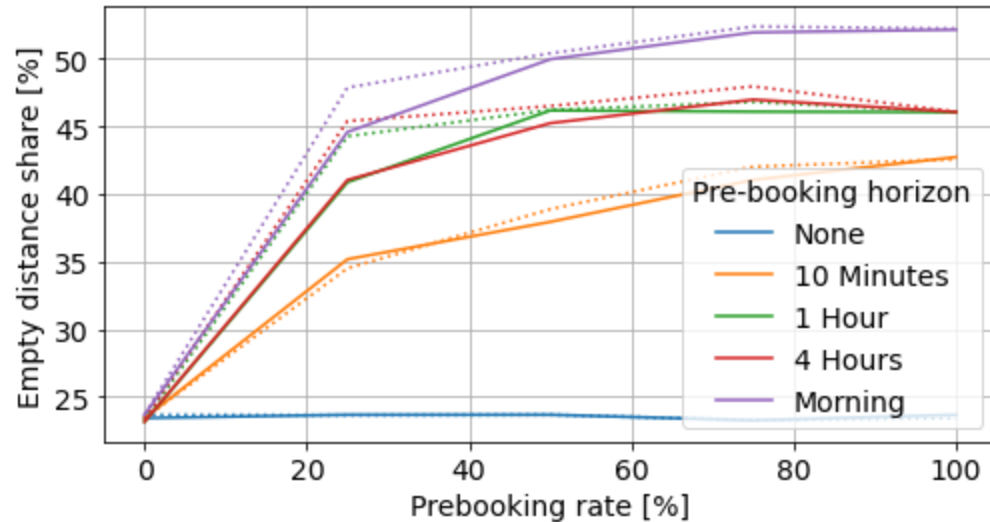
Results – Mean wait times

- Pre-booking allows to significantly reduce wait times
- In future investigation, mean wait times will be averaged across many simulations



Results – Fleet empty distance


- In this study, pre-booking has a negative impact of empty driven distances
- Waiting before driving to next location generate less empty driven distances
- More investigations are necessary to assess if it is a general impact of pre-booking or a use case related phenomenon




Conclusion and perspectives

■ Conclusion

- A readily usable pre-booking feature integrated in the DRT module
- Pull requests on the way

 feat: avoid short wait times in drt ✓

#2730 opened 3 weeks ago by sebhoerl

 feat: improve stop timing in drt (towards prebooking) ✓

#2723 opened last month by sebhoerl

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■ Perspectives

- Pay more attention to the order in which requests are processed
- Wait time constraint on pre-booked requests should be different than wait time constraint for online requests

Thank you for your attention

Any question ?

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