

A basic collaborative city logistics' solution: the Urban Consolidation Centre

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- ▶ The proposed approach
- ▶ An application of the methodology
- ▶ Conclusion and prospects

The context: which motivations?



[Roca-Riu et al. 2012], [Dablanc 2007]

The context: which motivations?

- ▶ **City logistics:**
 - ▶ 28% of the total transport cost
 - ▶ Between 16% and 50% of global pollution due to transport activity in the city
 - ▶ Noise
 - ▶ Attractiveness of city center

- ▶ **How to concept sustainable and innovative logistics schemes ?**

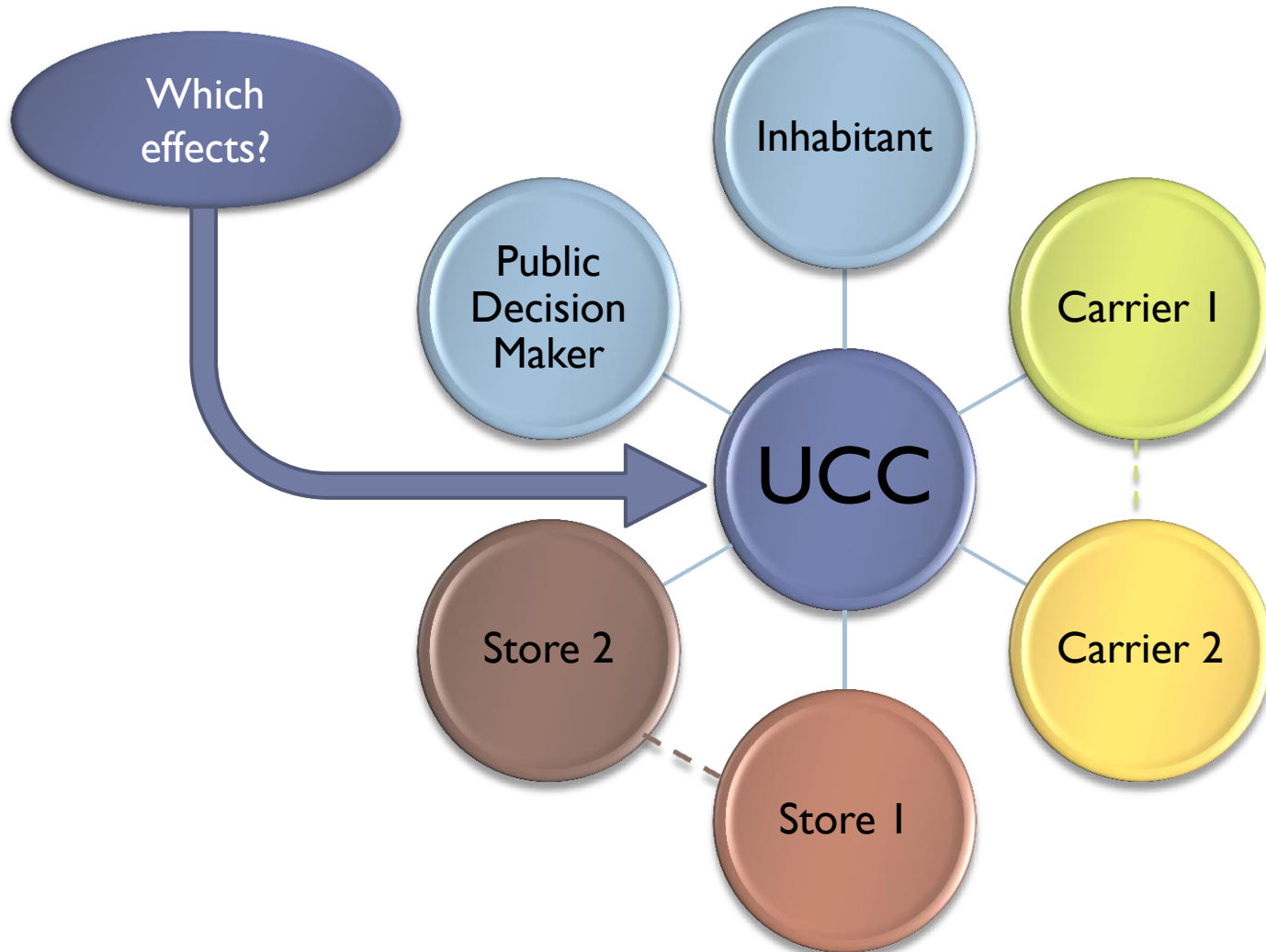
[Roca-Riu et al. 2012], [Dablanc 2007]

The context: A lack of tools to help decision makers

- ▶ Lots of solutions are empirical and do not allow to provide sustainable models to public Decision Makers (DM)
- ▶ A need to establish ex ante assessment models to predict more precisely the impact of city logistics measures
- ▶ Urban Consolidation Center: most common city logistics measure

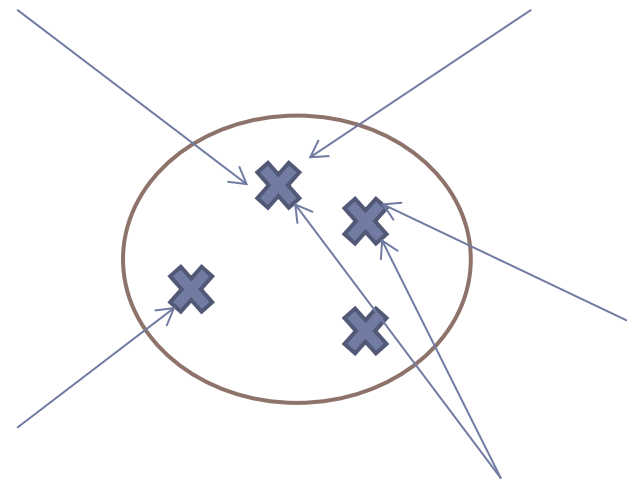
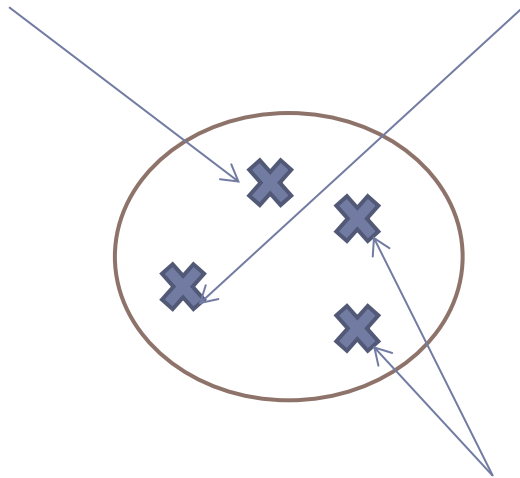
[Taniguchi et al. 2003], [Russo and Comi 2011], [Chwesiuk et al. 2010]

The context: The key role of interoperability



Our approach: the system under study

- ▶ **Multi-sources and multi-destinations logistics:**
 - ▶ Multi-sources: more than one carrier deliver the city



- ▶ Multi-destinations: one delivery point can receive freight from more than one carrier

Our approach: the KPIs choice

- ▶ How to quantify the performance with the angle of sustainability ?

- ▶ The accumulated travel distance = cost and traduction of mobility

$$D_{Total} = \sum_{i=1}^n D_{Truck}^i$$

- ▶ The total time = cost and service quality

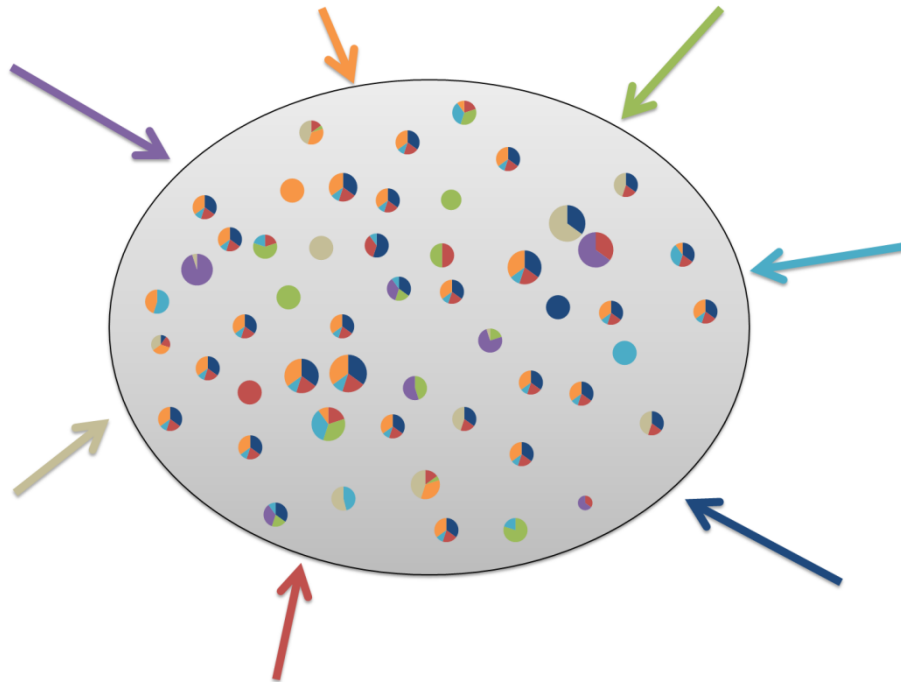
$$T_{Total} = \sum_{i=1}^n T_{Truck}^i$$

- ▶ The CO₂ emissions quantity = first source of greenhouse gas
For each vehicle type

$$E_{CO_2} = \sum_i D_{Total}^i \times EF_i$$

[Patier and Browne 2010], [Henriot et al. 2008], [Van Rooijen and Quak 2010]

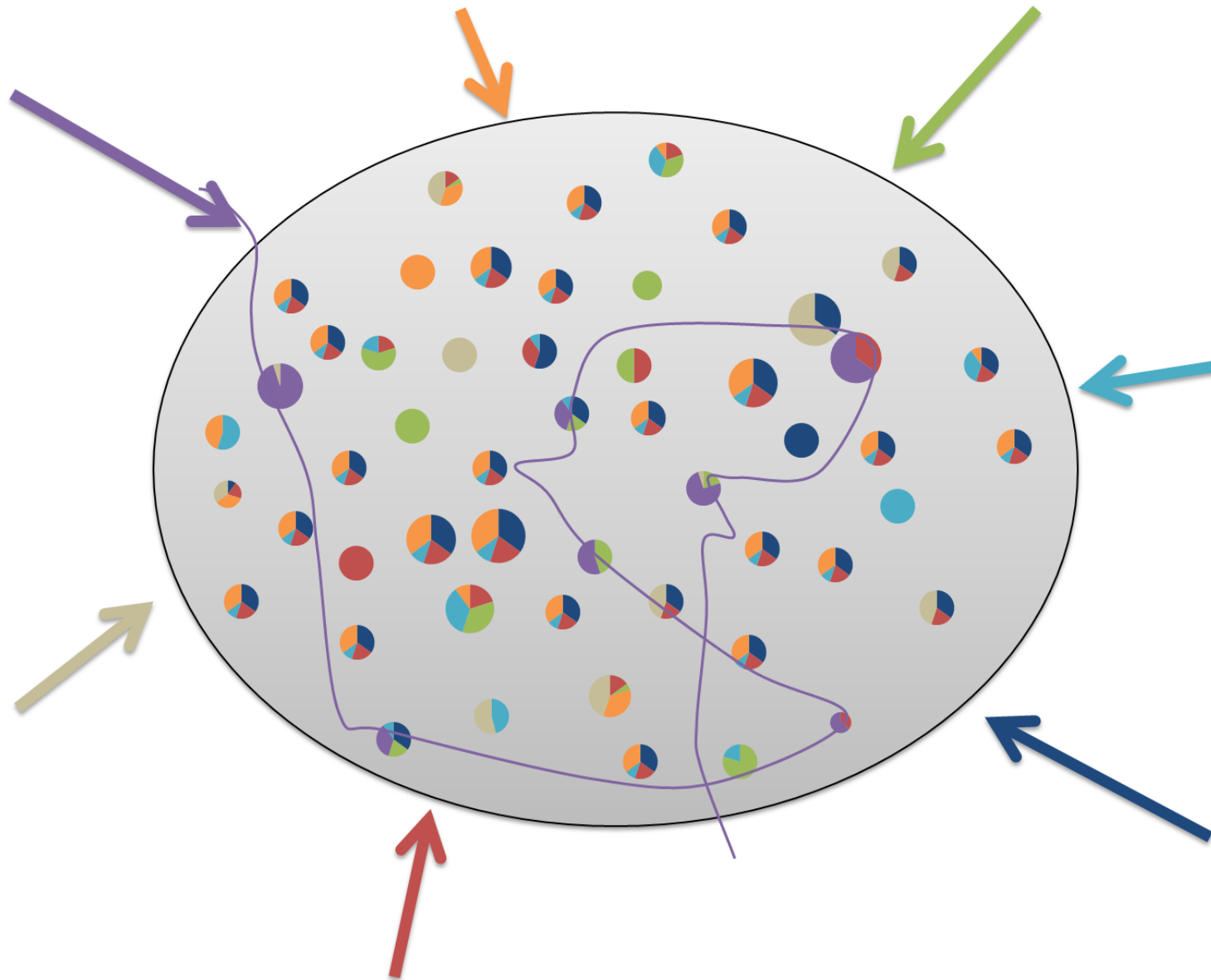
An illustrative case



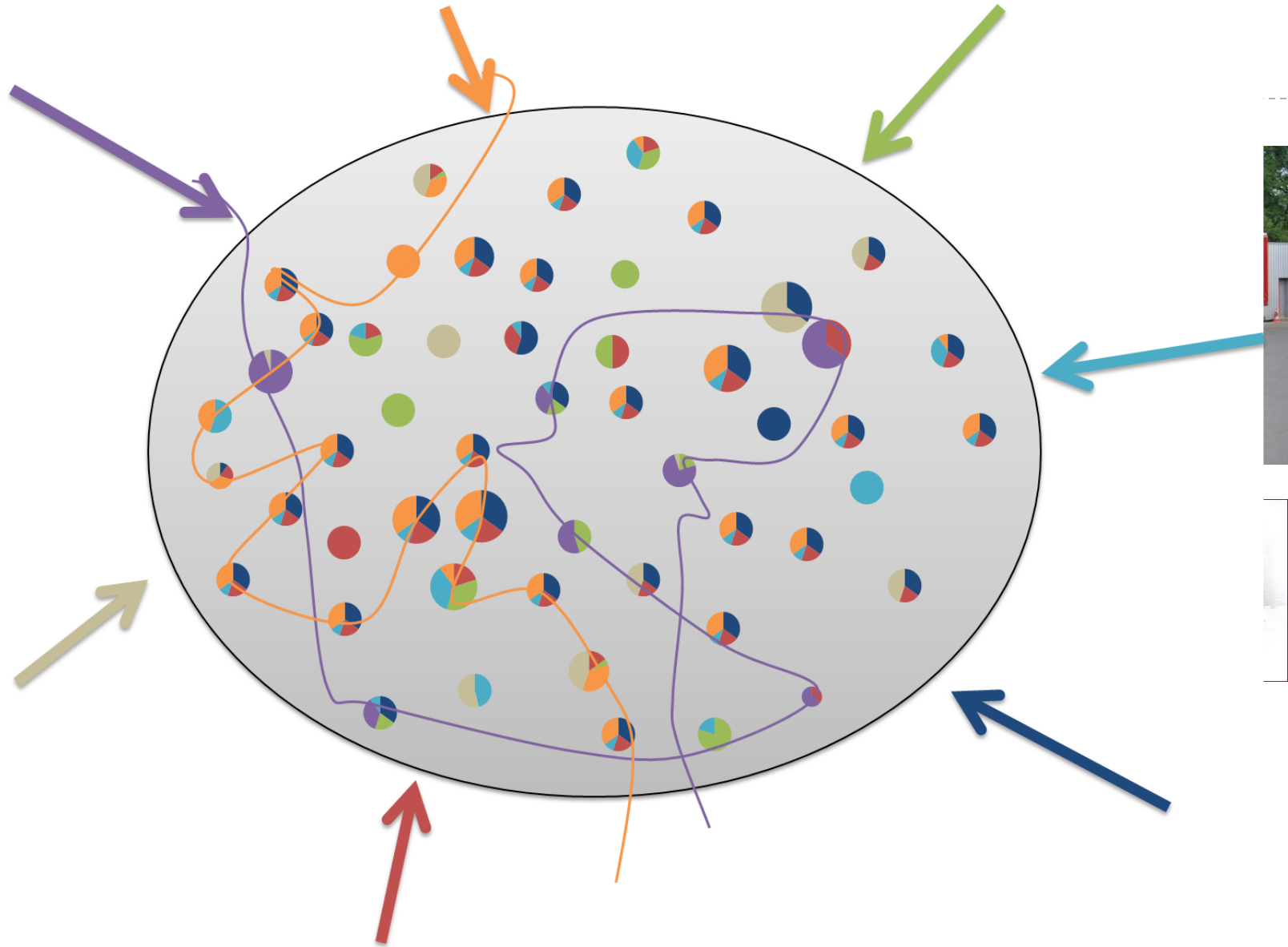
- ▶ 2 types of vehicle:
 - Semi 26t, 94m³, 34 parcels
 - Truck 5t, 40m³, 16 parcels

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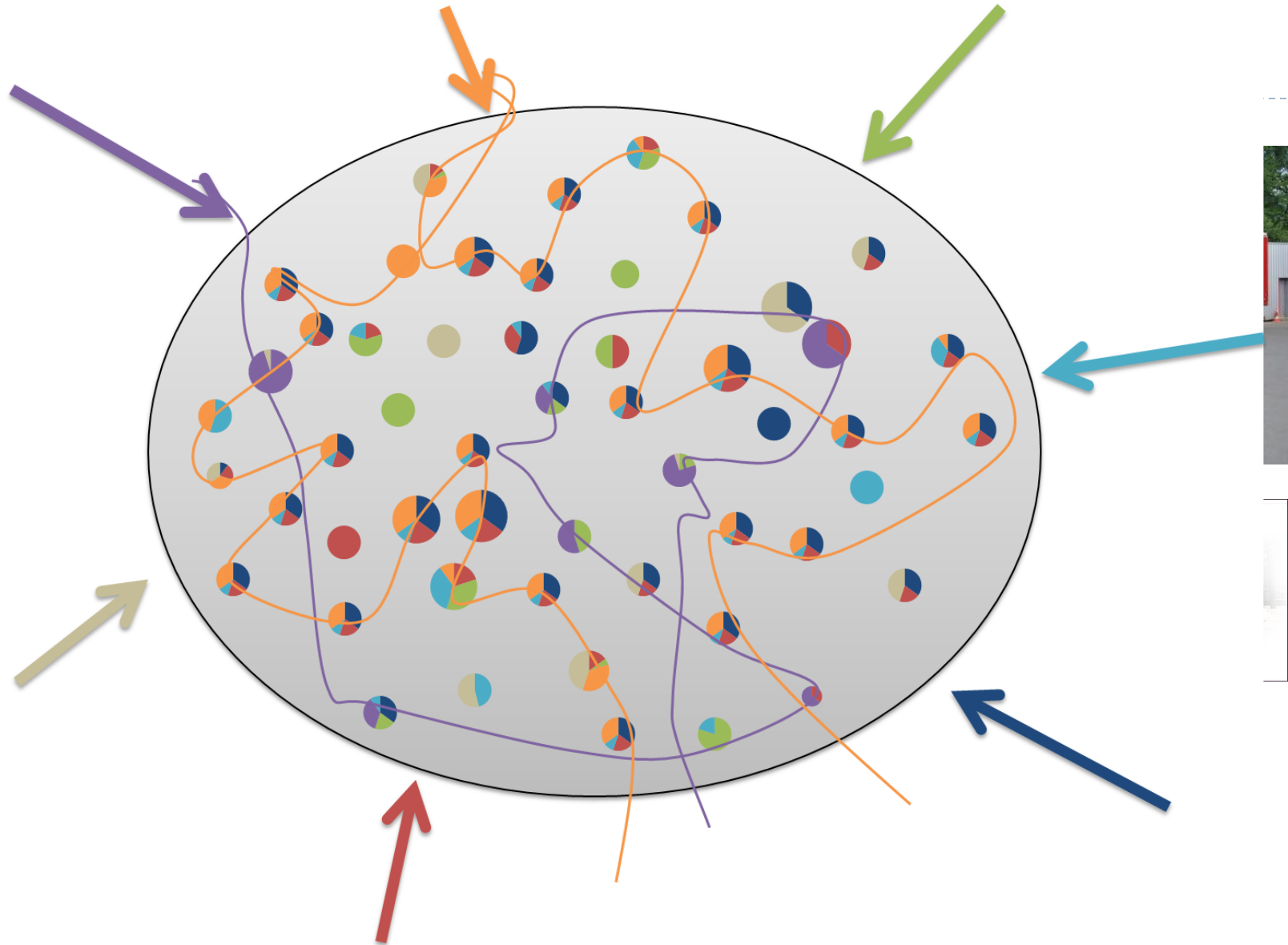
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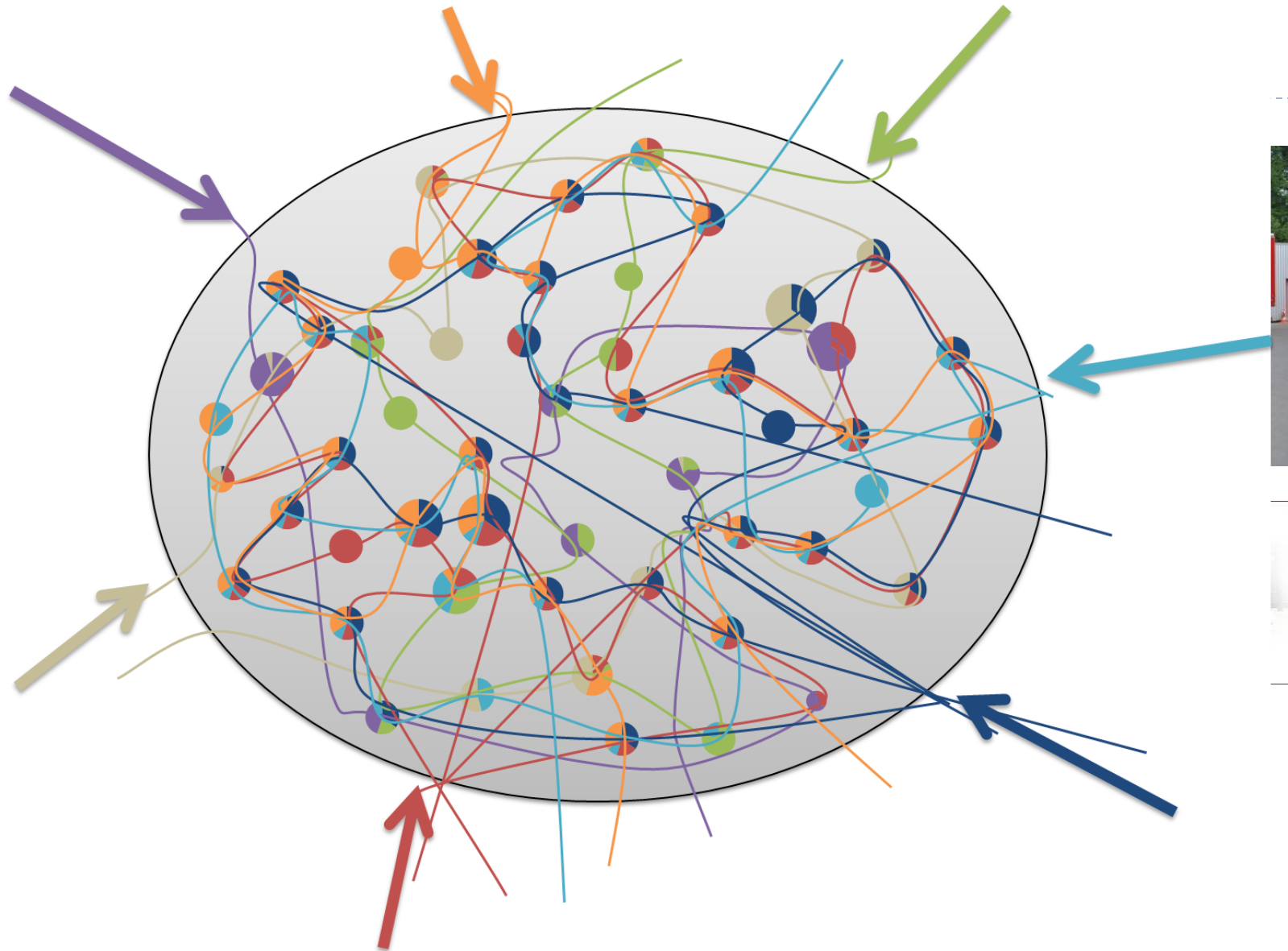
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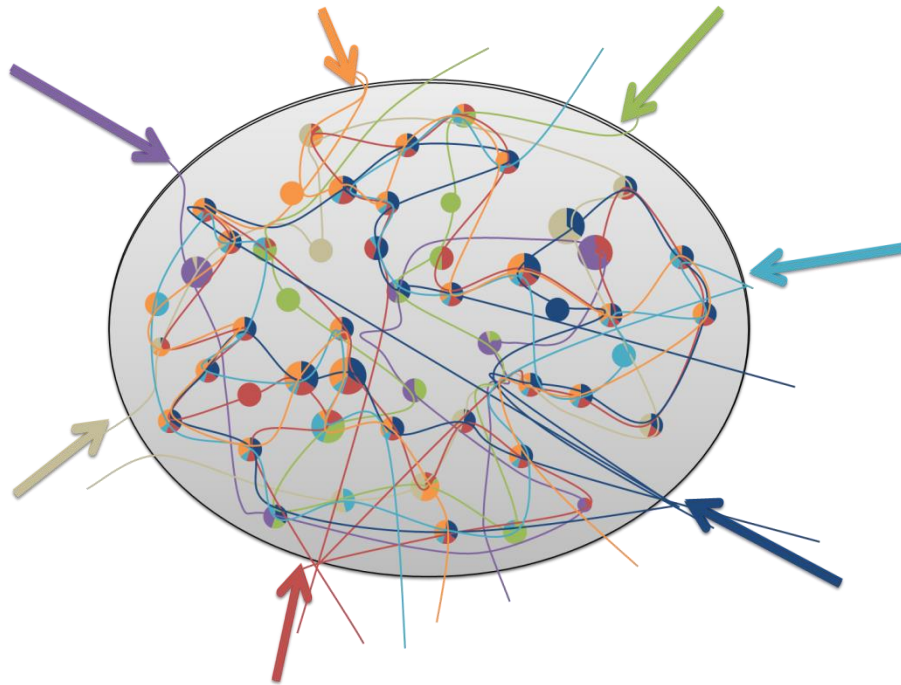
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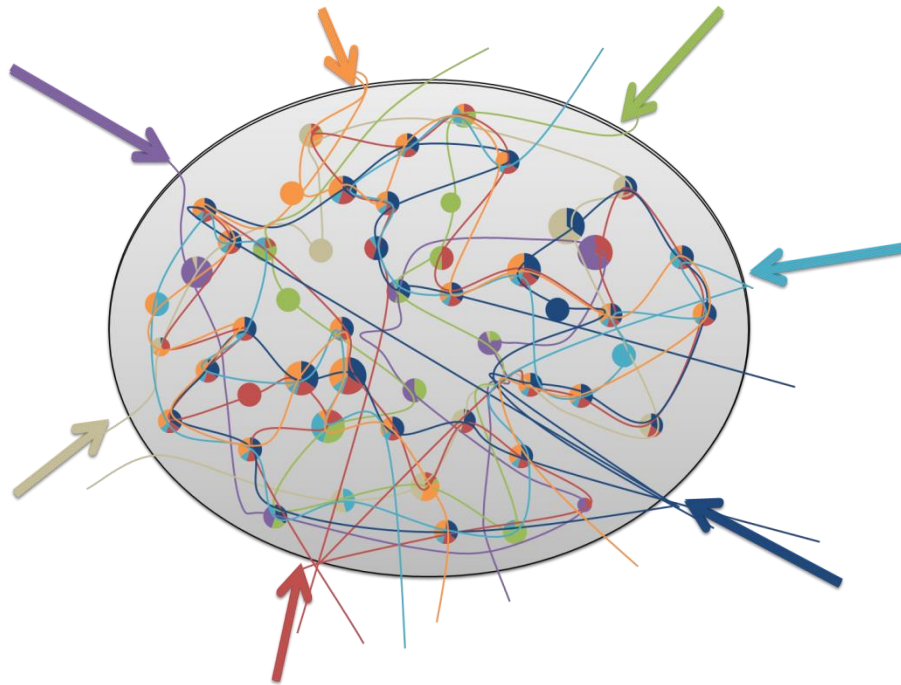


An illustrative case



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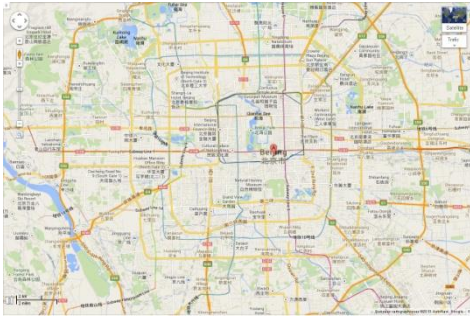
An illustrative case



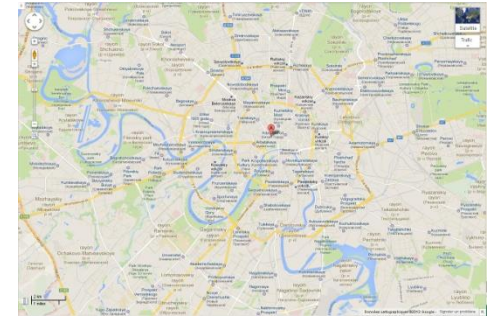
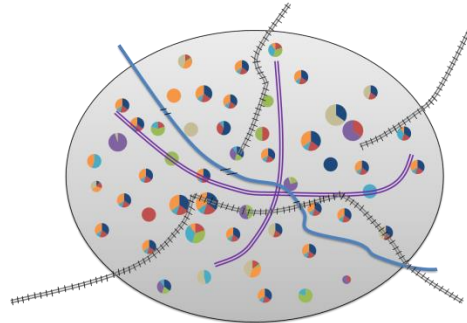
- ▶ 2 types of vehicle:
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Travelled distance : 347 km
Total delivery time: 14,5 h-vehicles
CO₂ emissions: 247 kg

From the concept to real cities



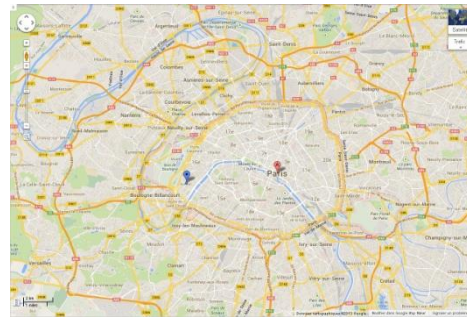
Beijing



Moscou



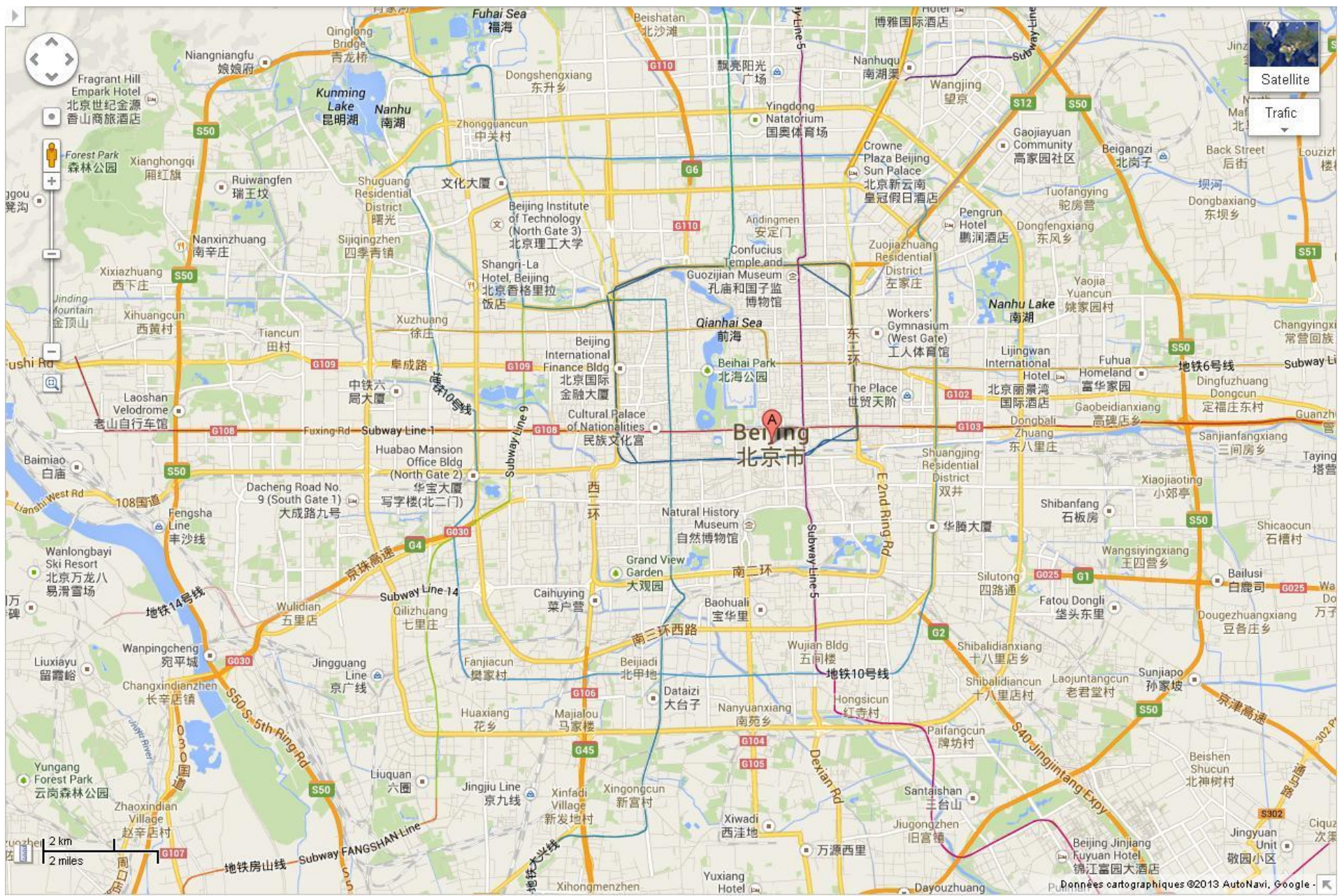
New Dehli



Paris



Québec



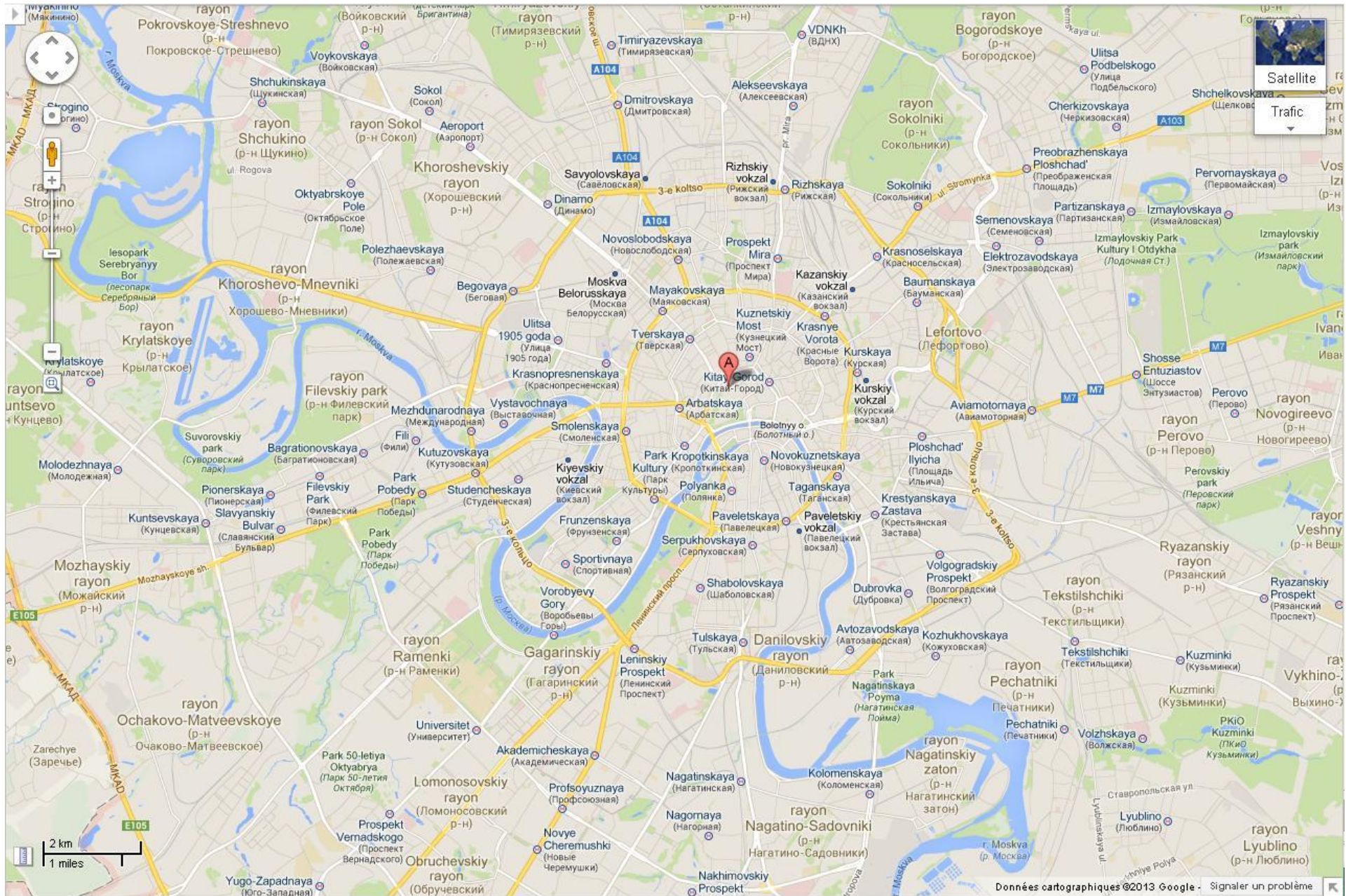
Satellite

Traffic

Beijing
北京市



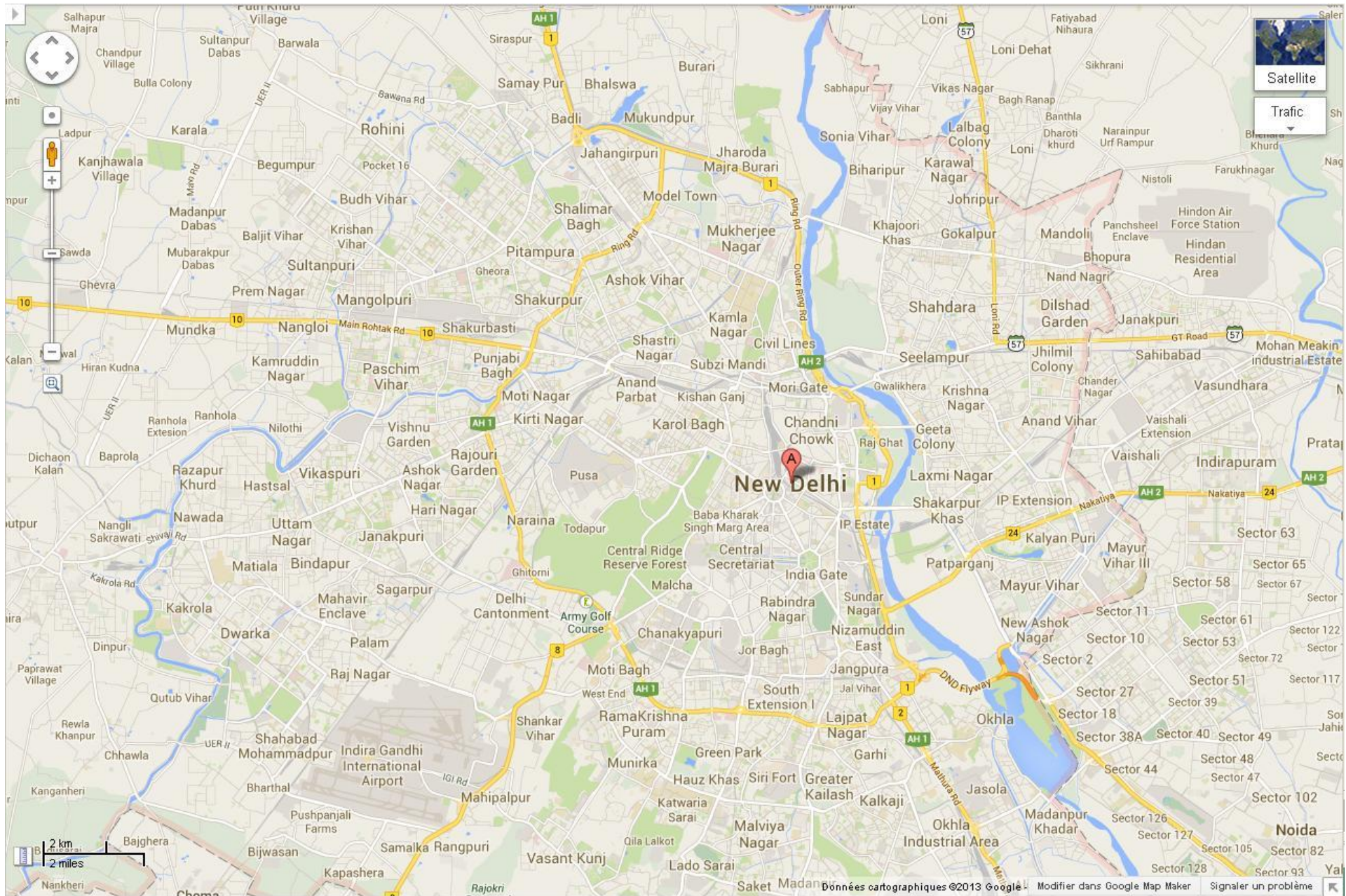
2 km
2 miles



Satellite
Trafic



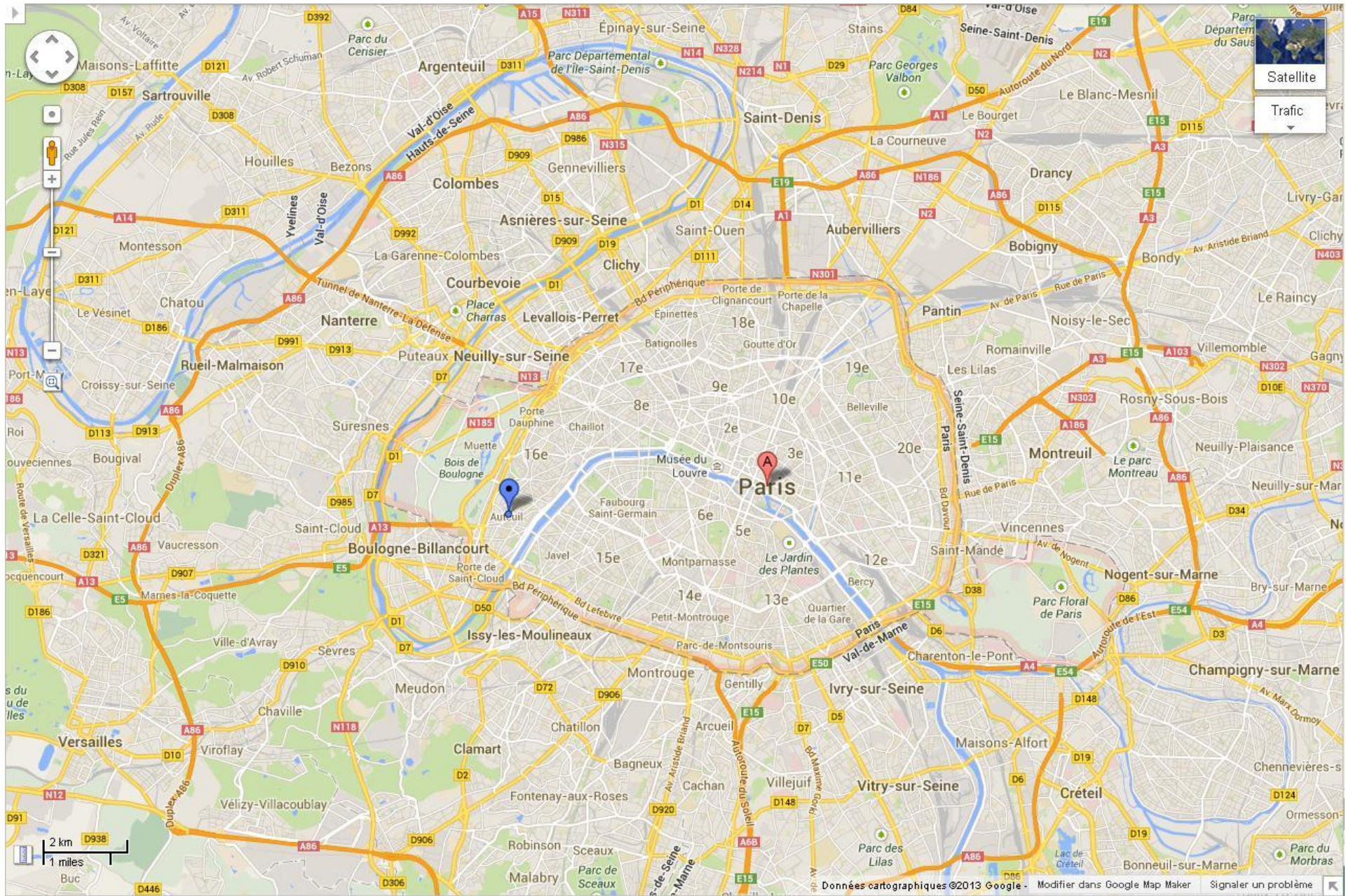
2 km
1 miles

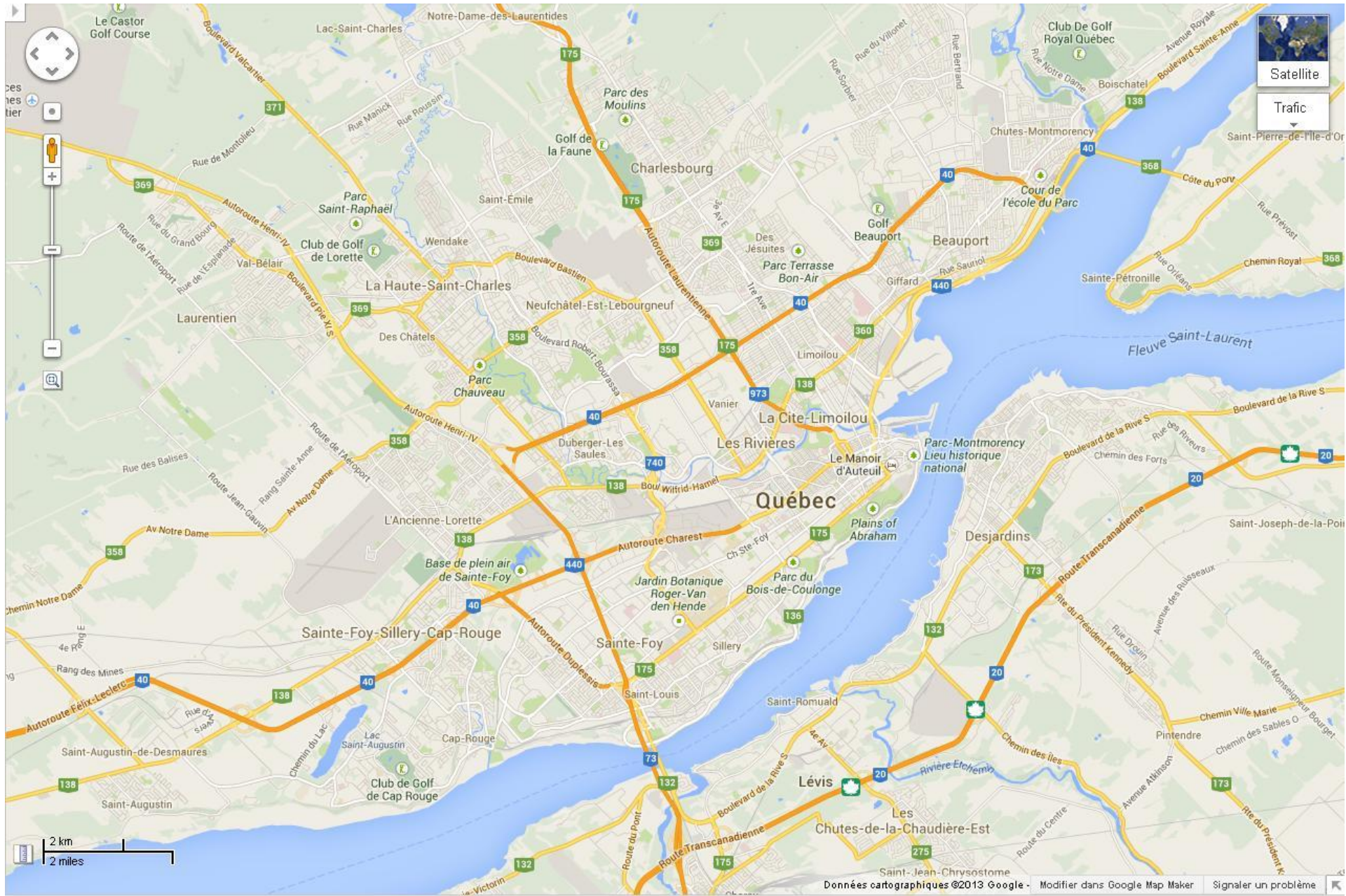


Satellite
Traffic

New Delhi

2 km
2 miles



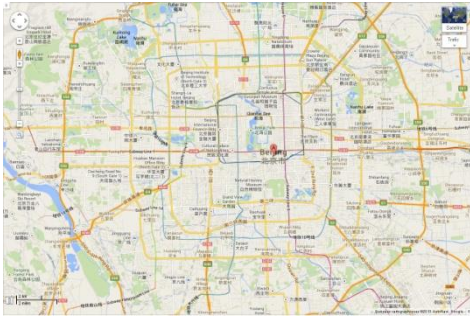


Satellite

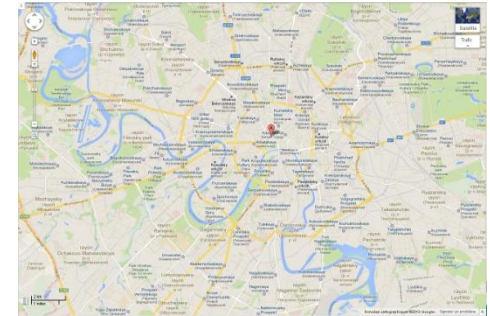
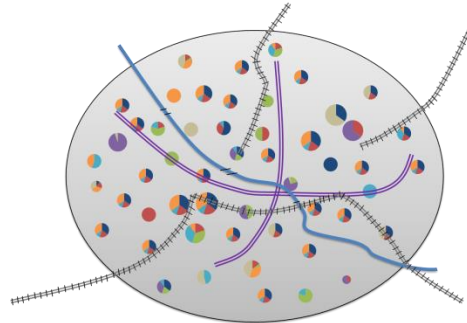
Traffic



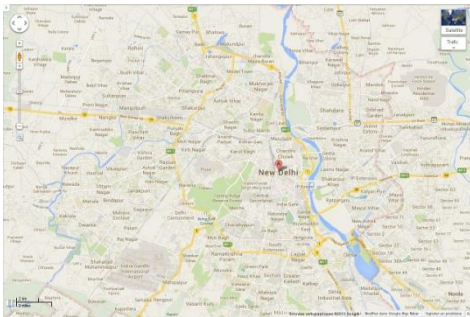
From the concept to real cities



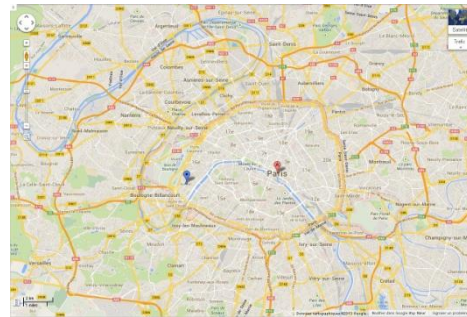
Beijing



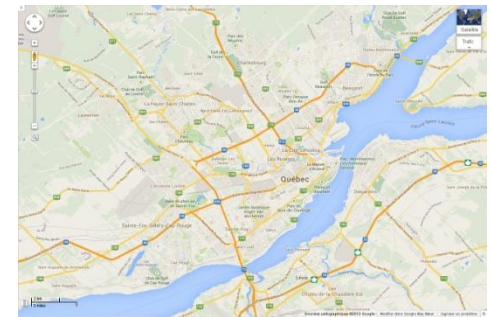
Moscou



New Dehli



Paris

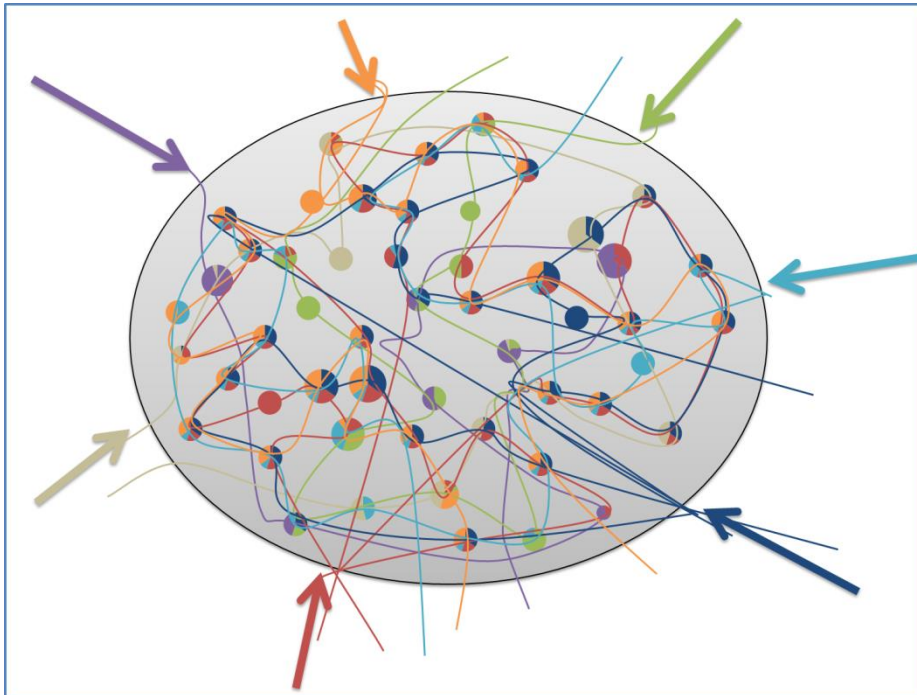


Québec

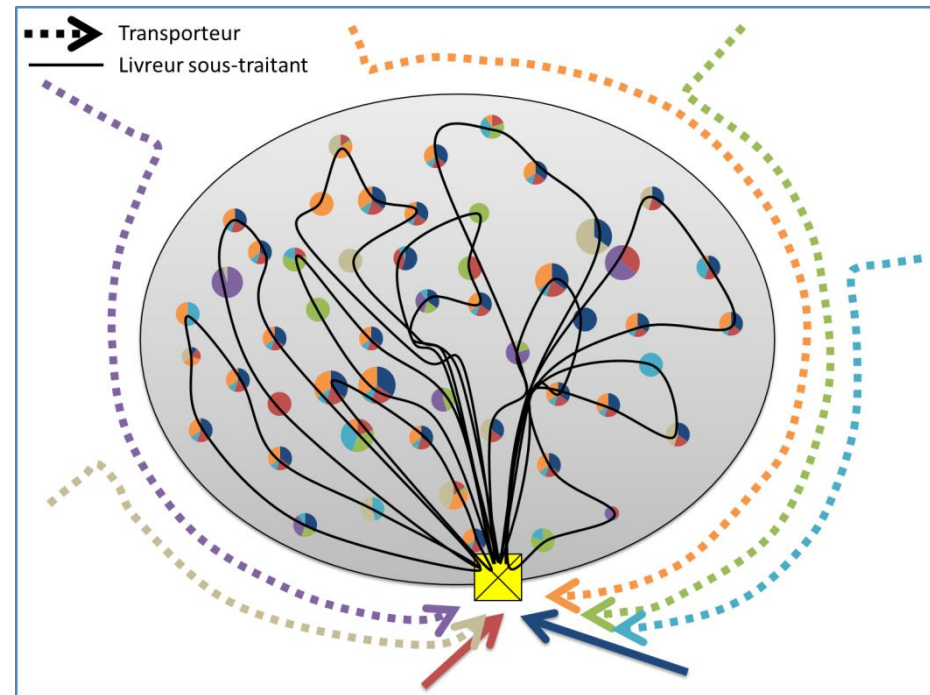
An illustrative case

► Implantation of one UCC

Current situation



Situation with one UCC



Travelled distance : -33%
Total delivery time: -52%
CO₂ emissions: -32%

Conclusion

- ▶ An approximation of the potential gain of a collaborative city logistics network
- ▶ One proposition of conceptualization and modeling of city logistics

Prospects

- ▶ Applied the method to a real case
- ▶ Extend the study to others city logistics actions: delivery areas but also other UCC ?
- ▶ Use results into the future tool developed in the ANR project “ANNONA”

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