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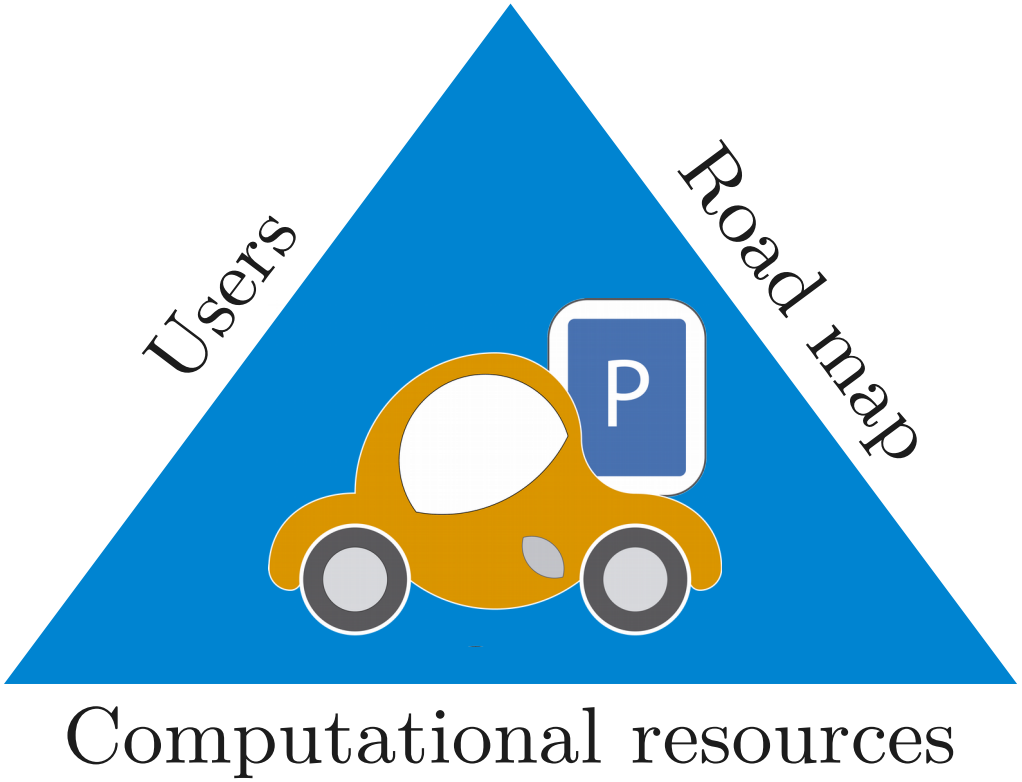
Tile Map Size Optimization for Real World Routing by Using Differential Evolution

Andrés Camero andrescamero@uma.es,
Javier Arellano-Verdejo javerdejo@lcc.uma.es,
Christian Cintrano cintrano@lcc.uma.es and
Enrique Alba eat@lcc.uma.es

IEEE Congress on Evolutionary Computation 2017

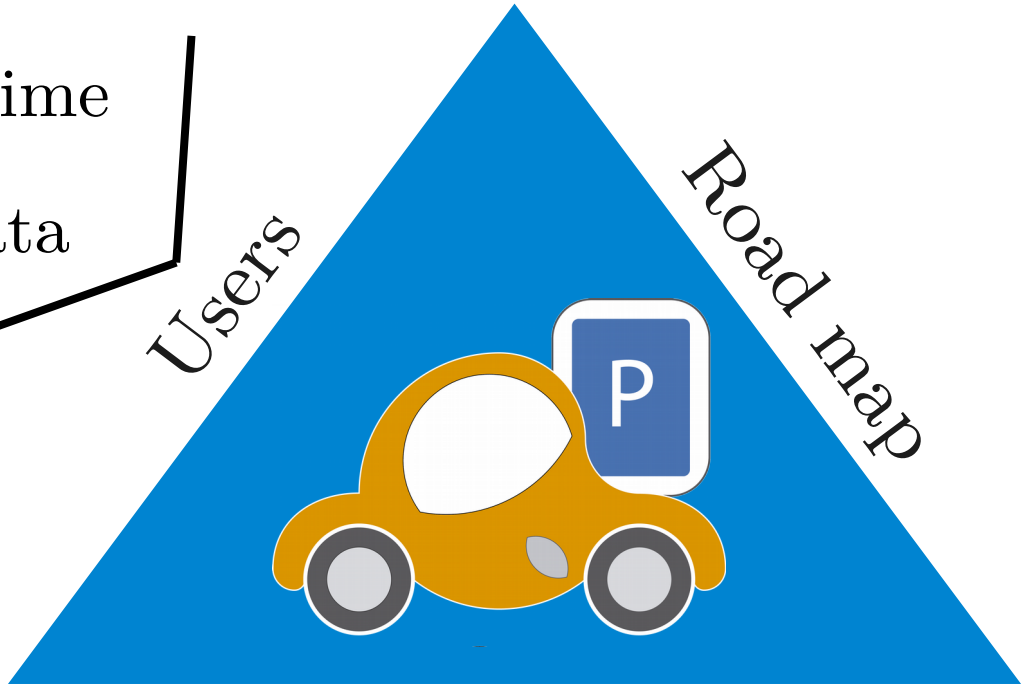
Contents

Why are we doing this?



Why are we doing this?

- high req. rate
- near real-time
- up-to-date data



Computational resources

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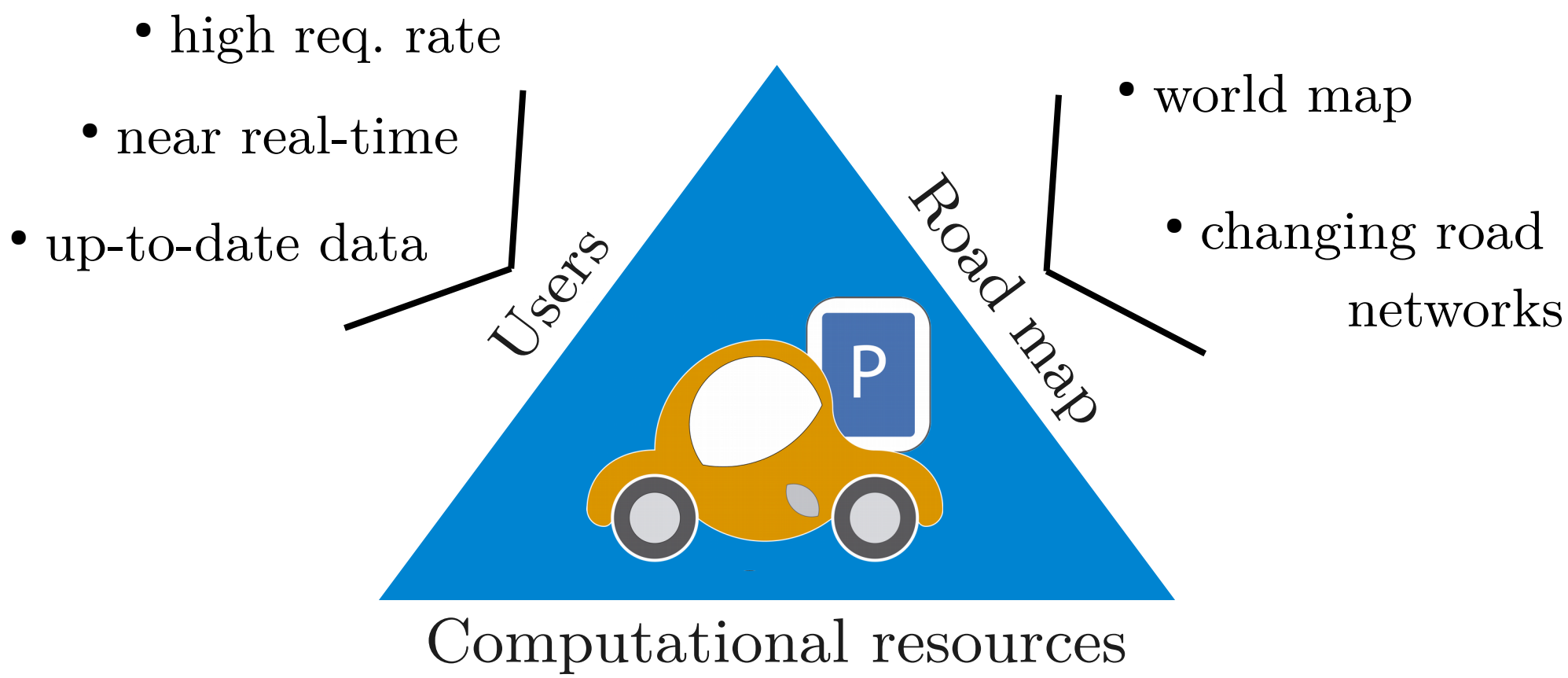

Why are we doing this?

- high req. rate
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Users

Road map

- world map
- changing road networks

Computational resources

Constrained

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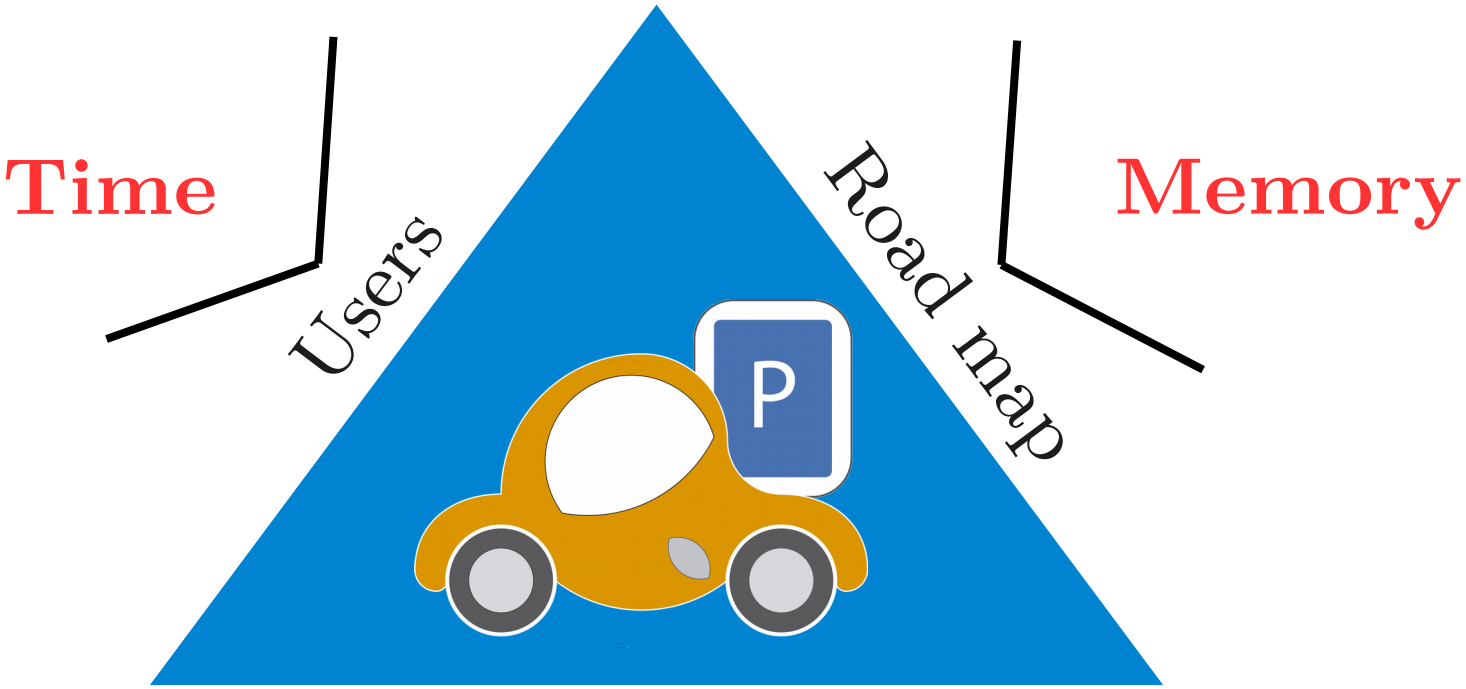

Computational resources

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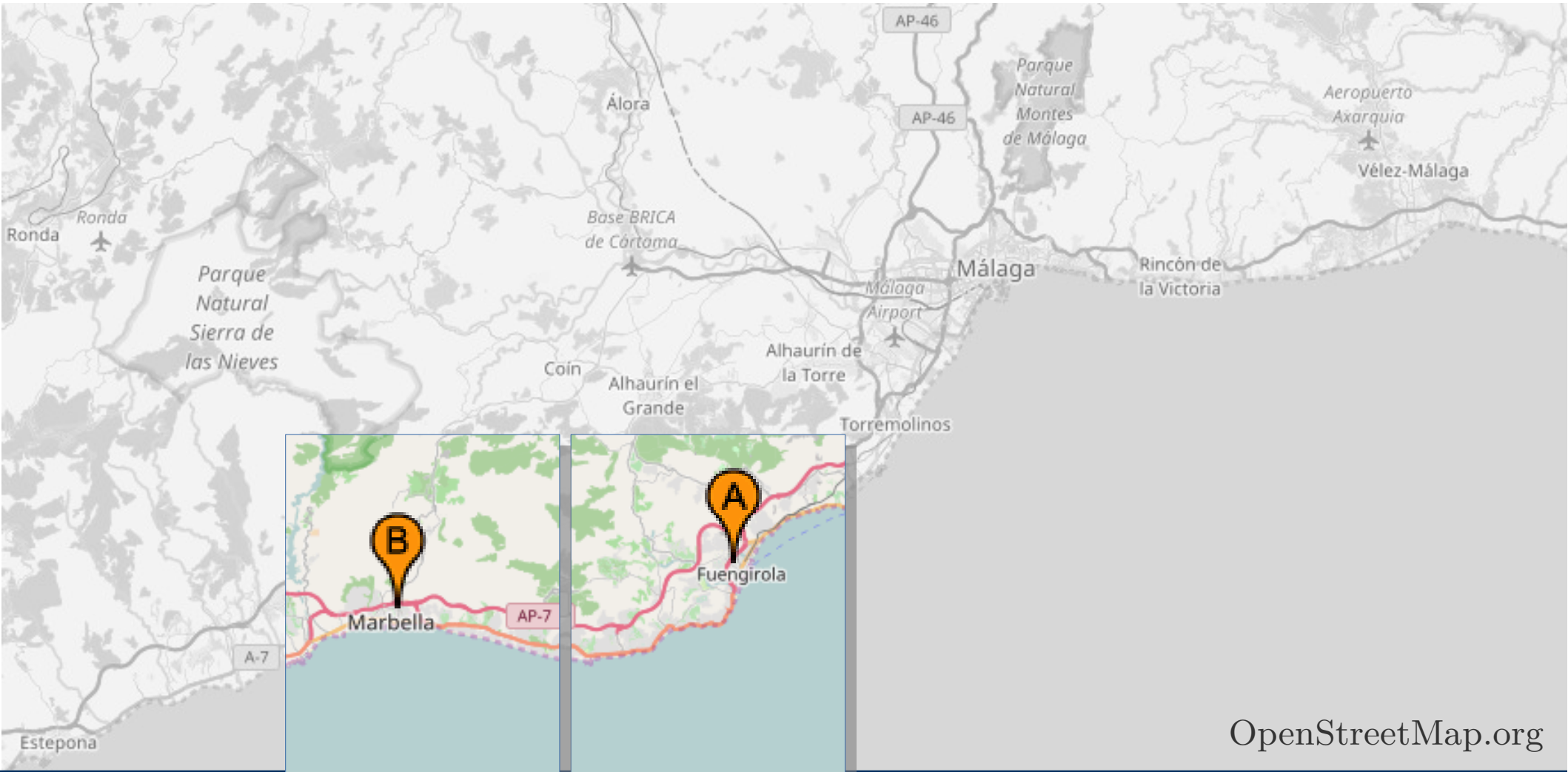
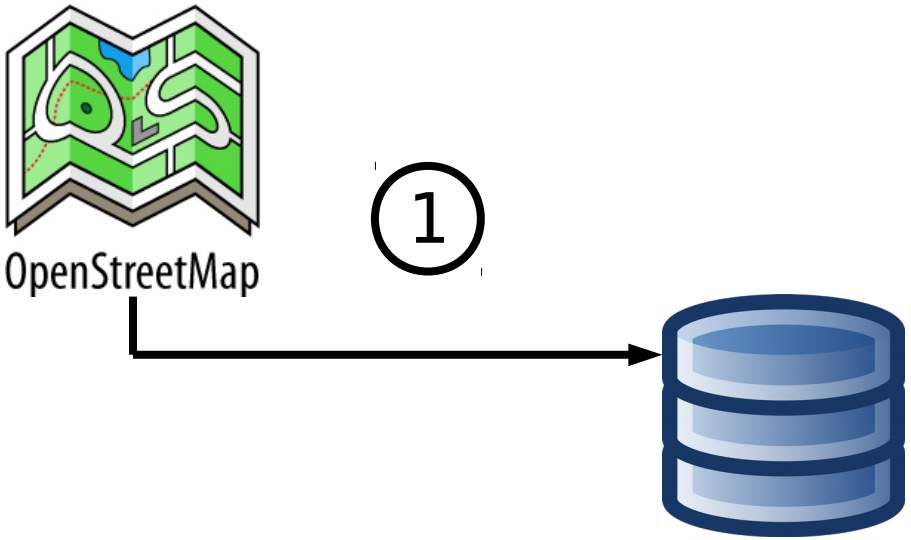
What are we proposing?



Self-adjusted routing tiles



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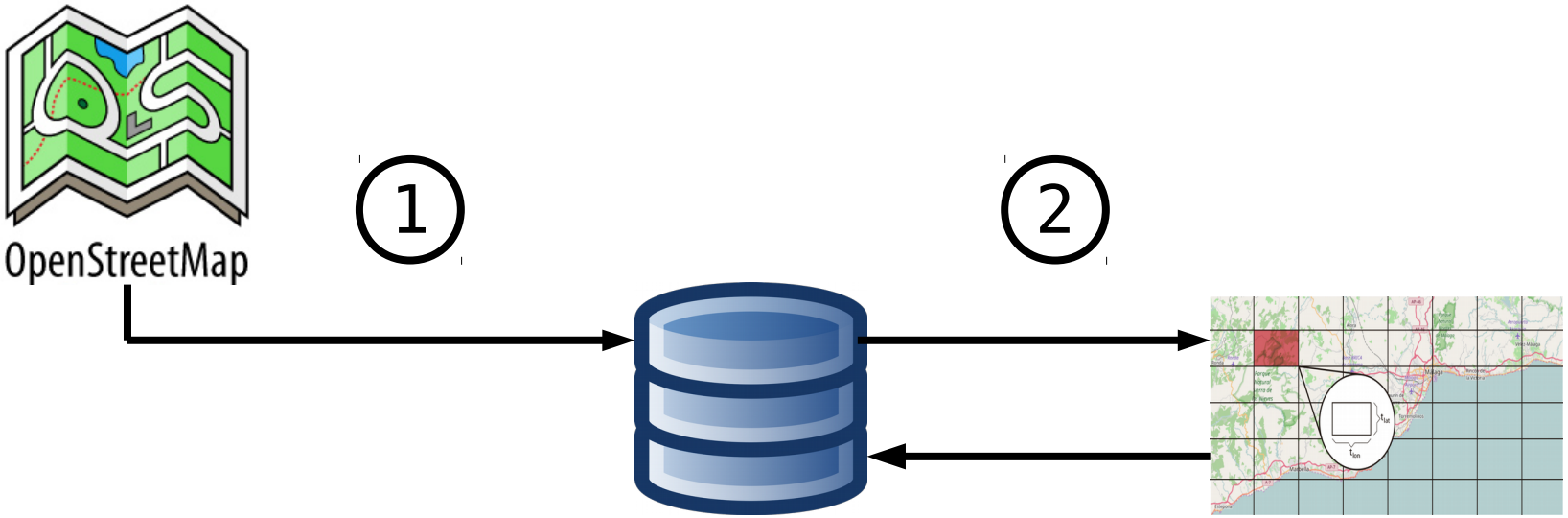

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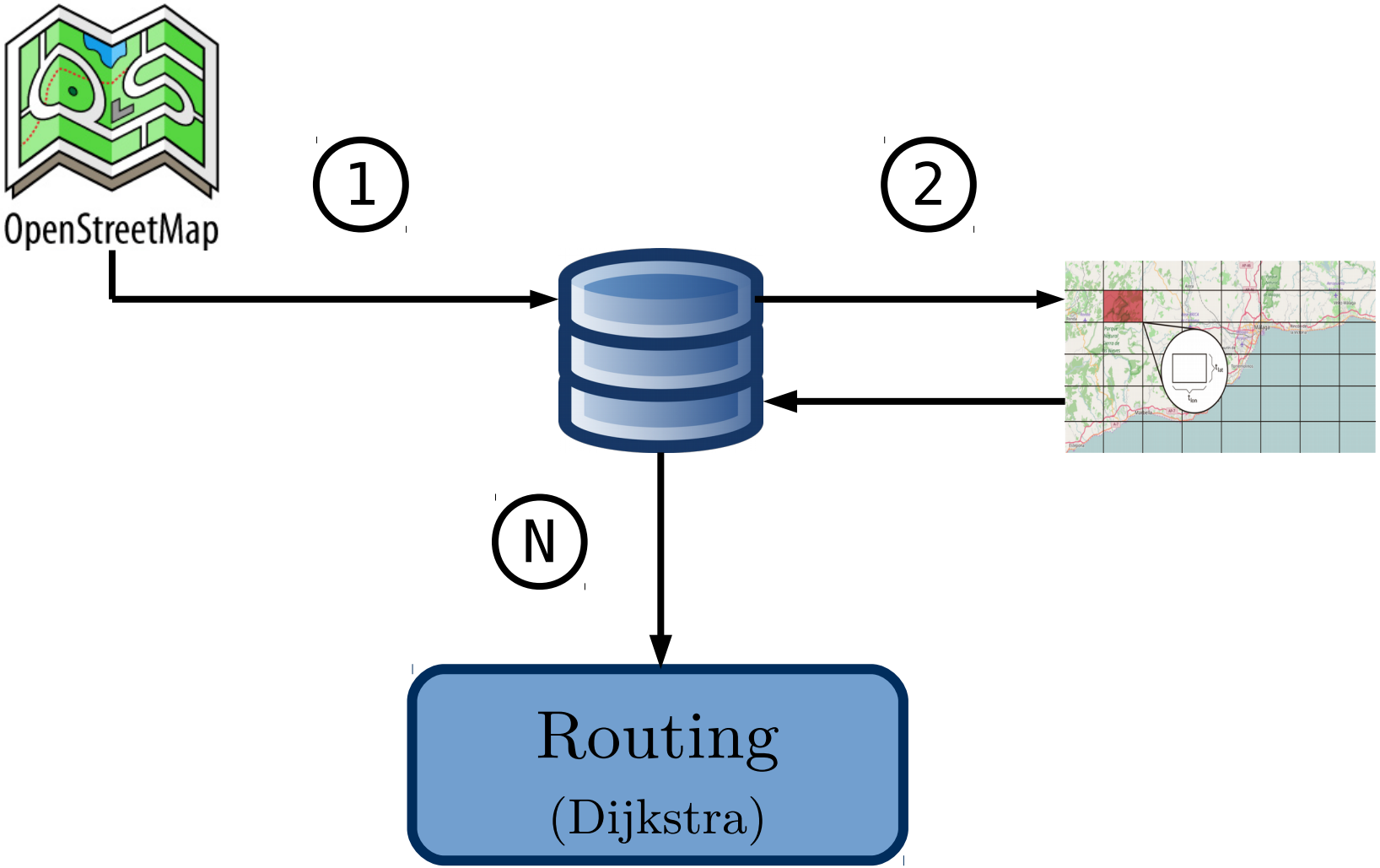

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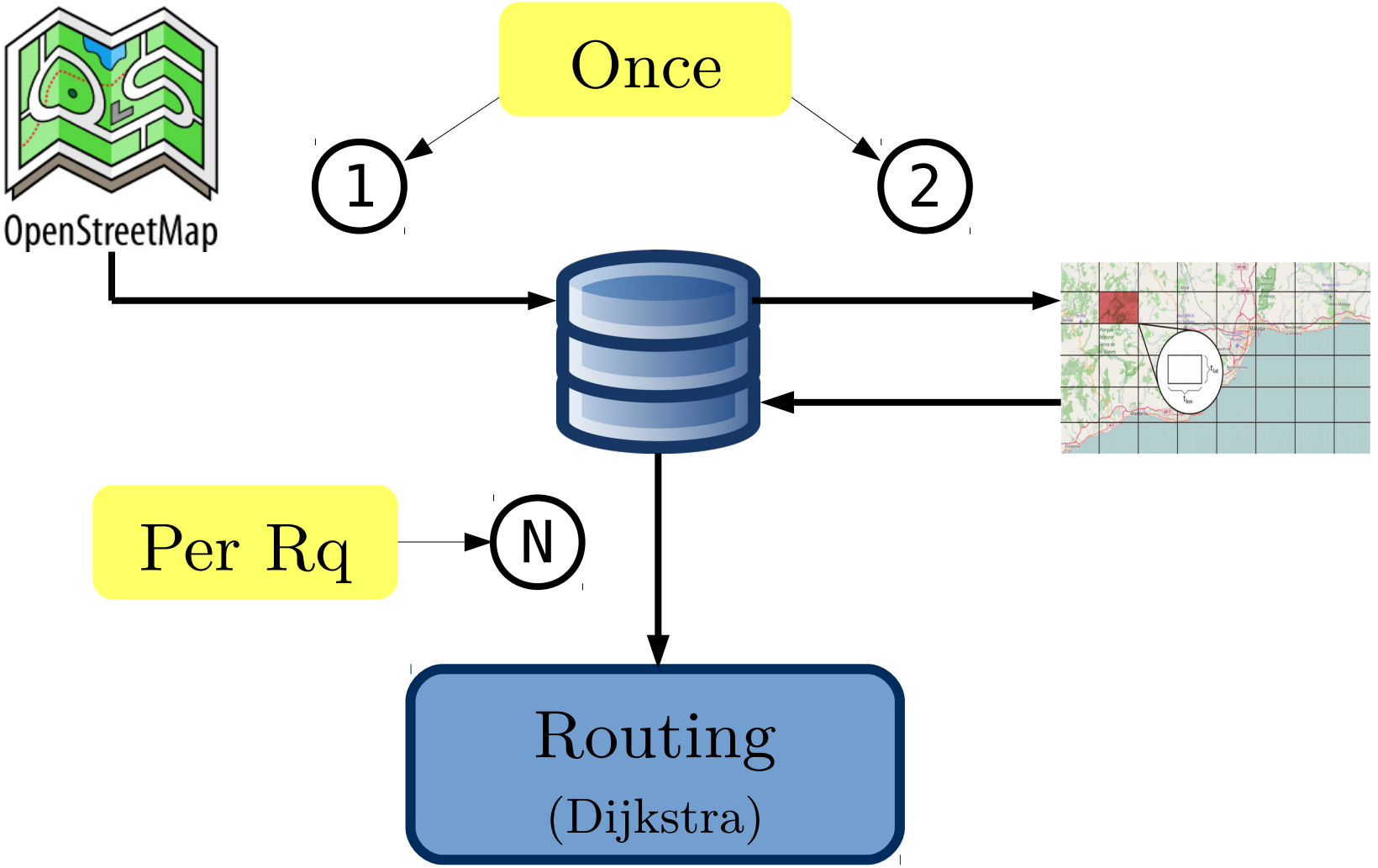

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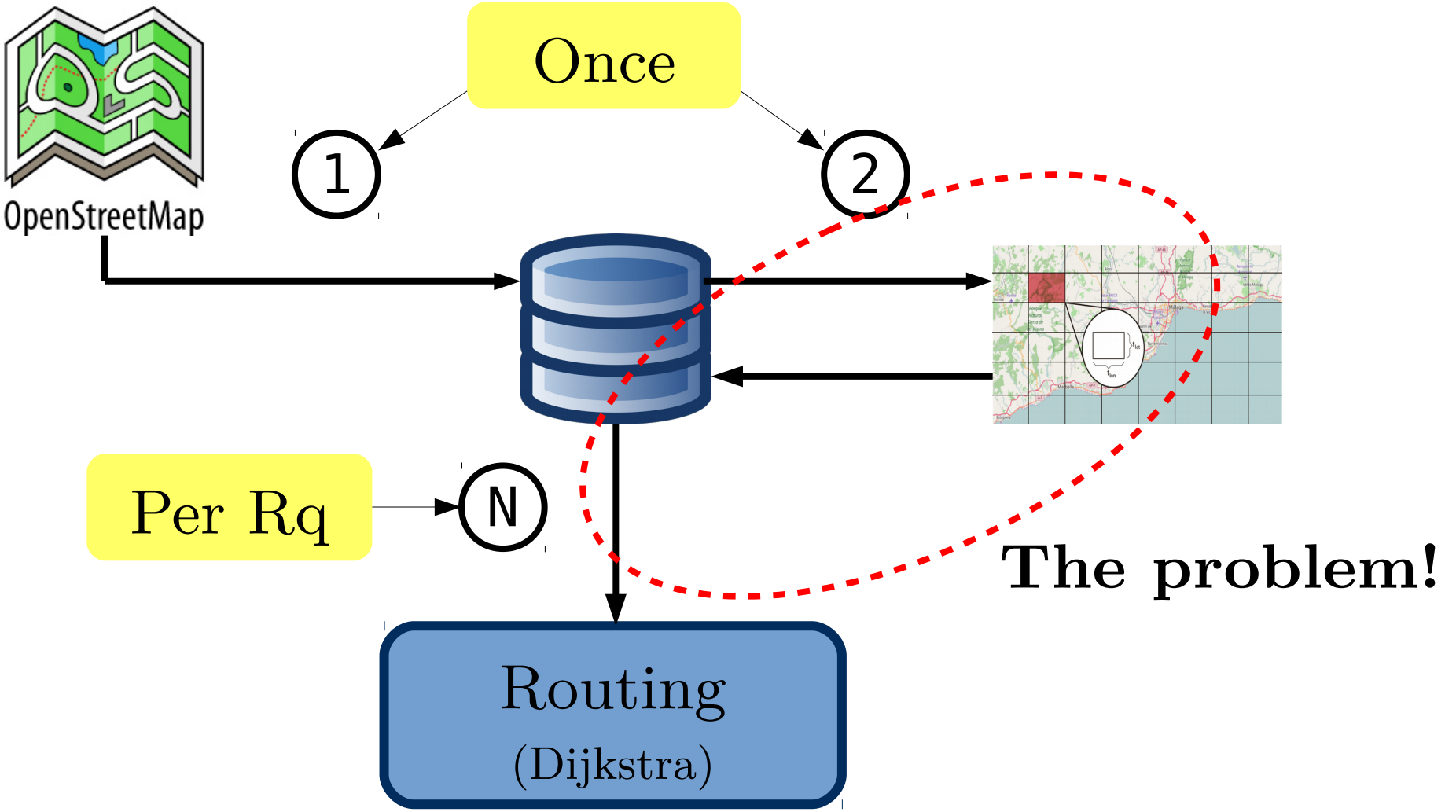

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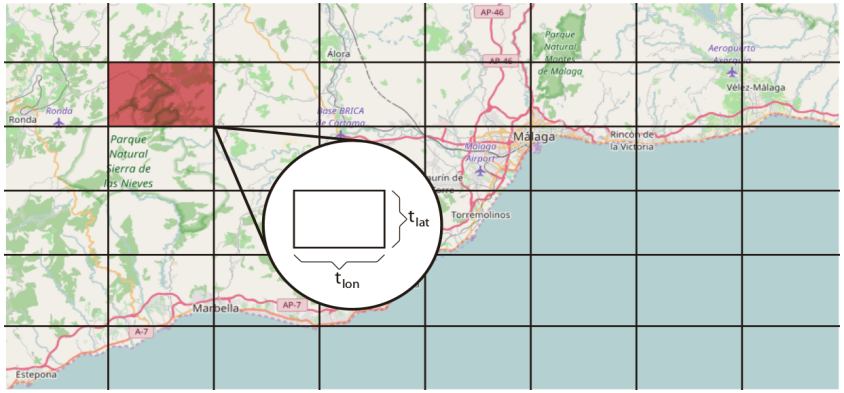

$$x = \{t_{lat}, t_{lon}\}, t_{lat}, t_{lon} \in \mathbb{R}^+$$

$$\text{minimize } \frac{1}{N} \sum_{k}^{N} (\phi(P_k) + \rho(P_k))$$

routes

k-th route

Prep. time

SP time

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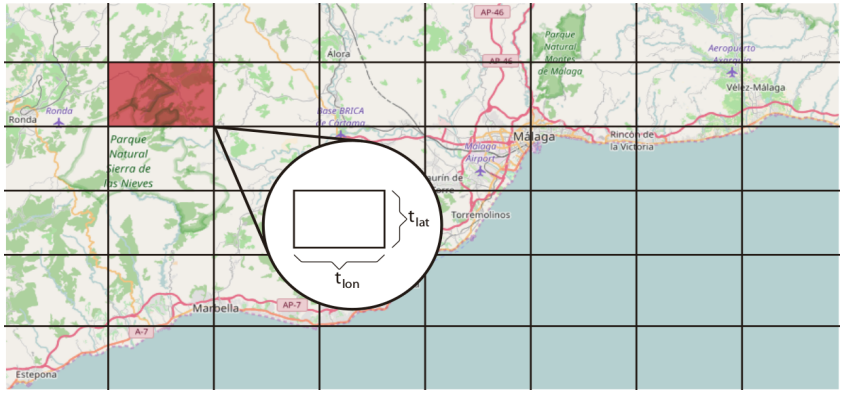

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routes

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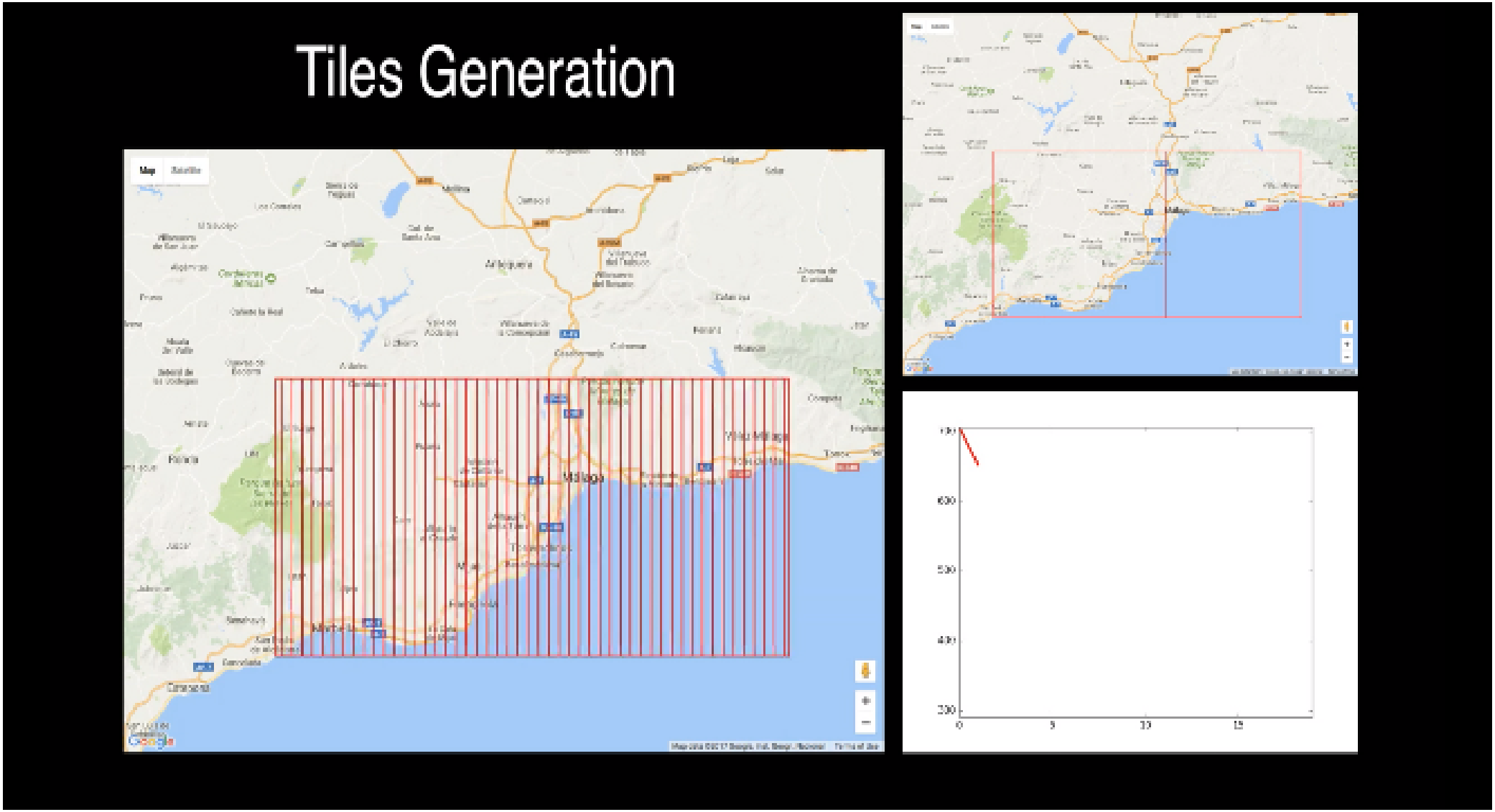
Search by using a

Differential Evolution

algorithm

What is going on?



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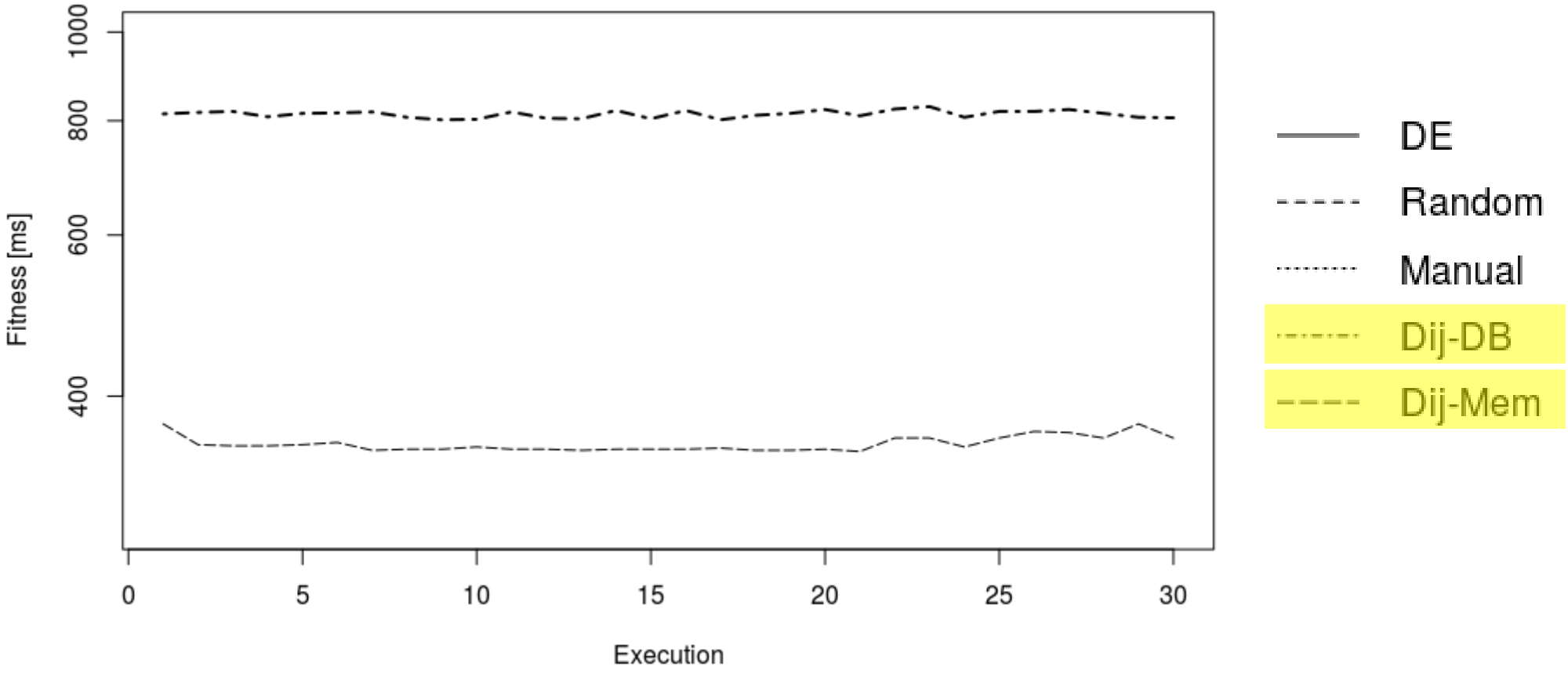
Experimental results



The Province of Malaga, Spain	Area	4,500 km^2	Streets	64,000
	Routes	182	Intersections	46,000

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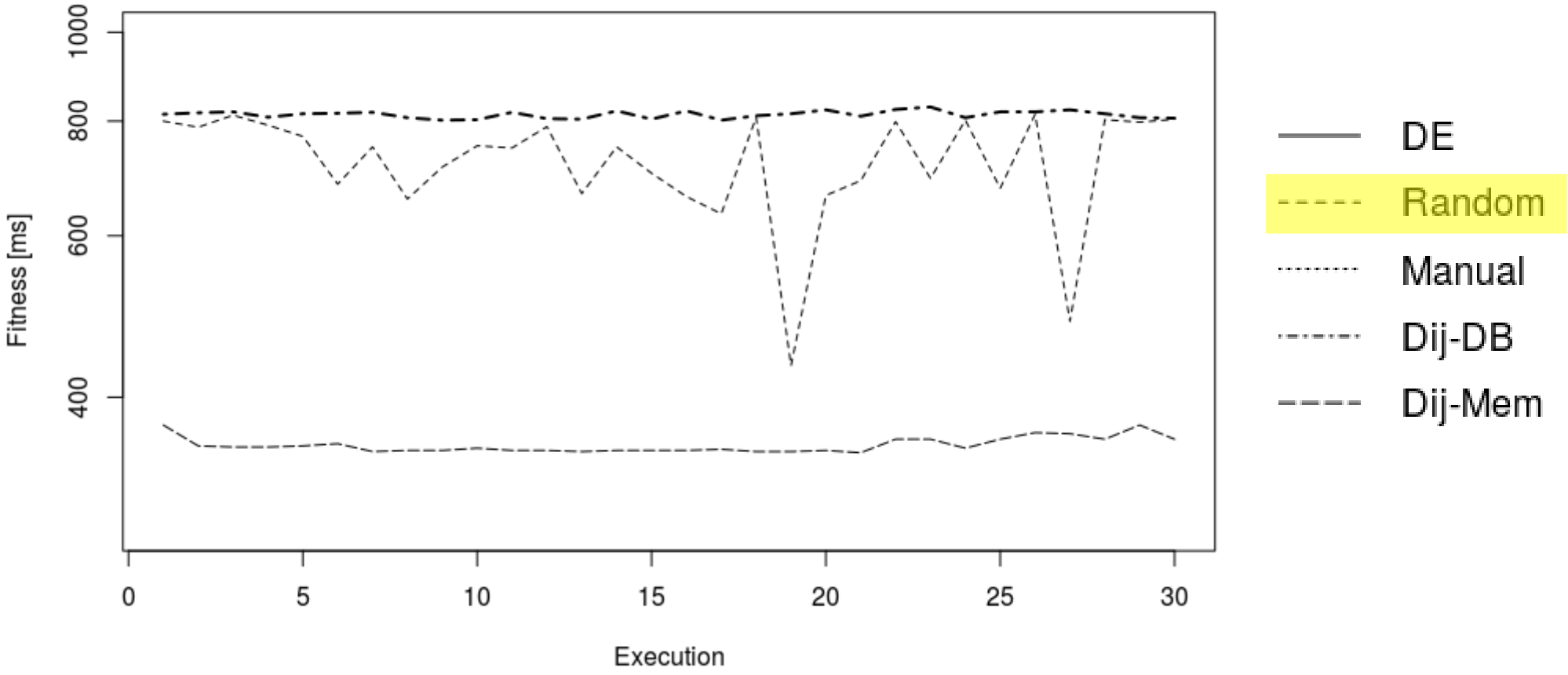

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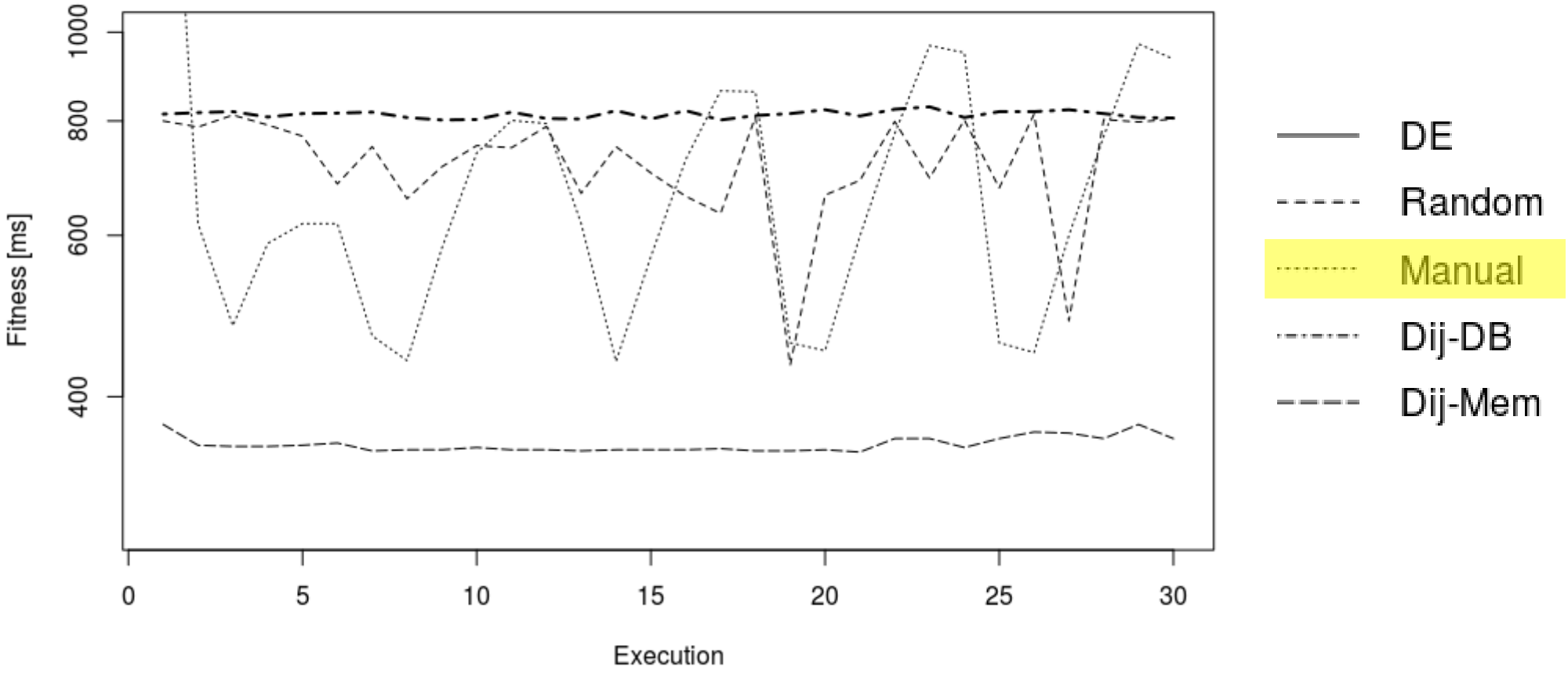

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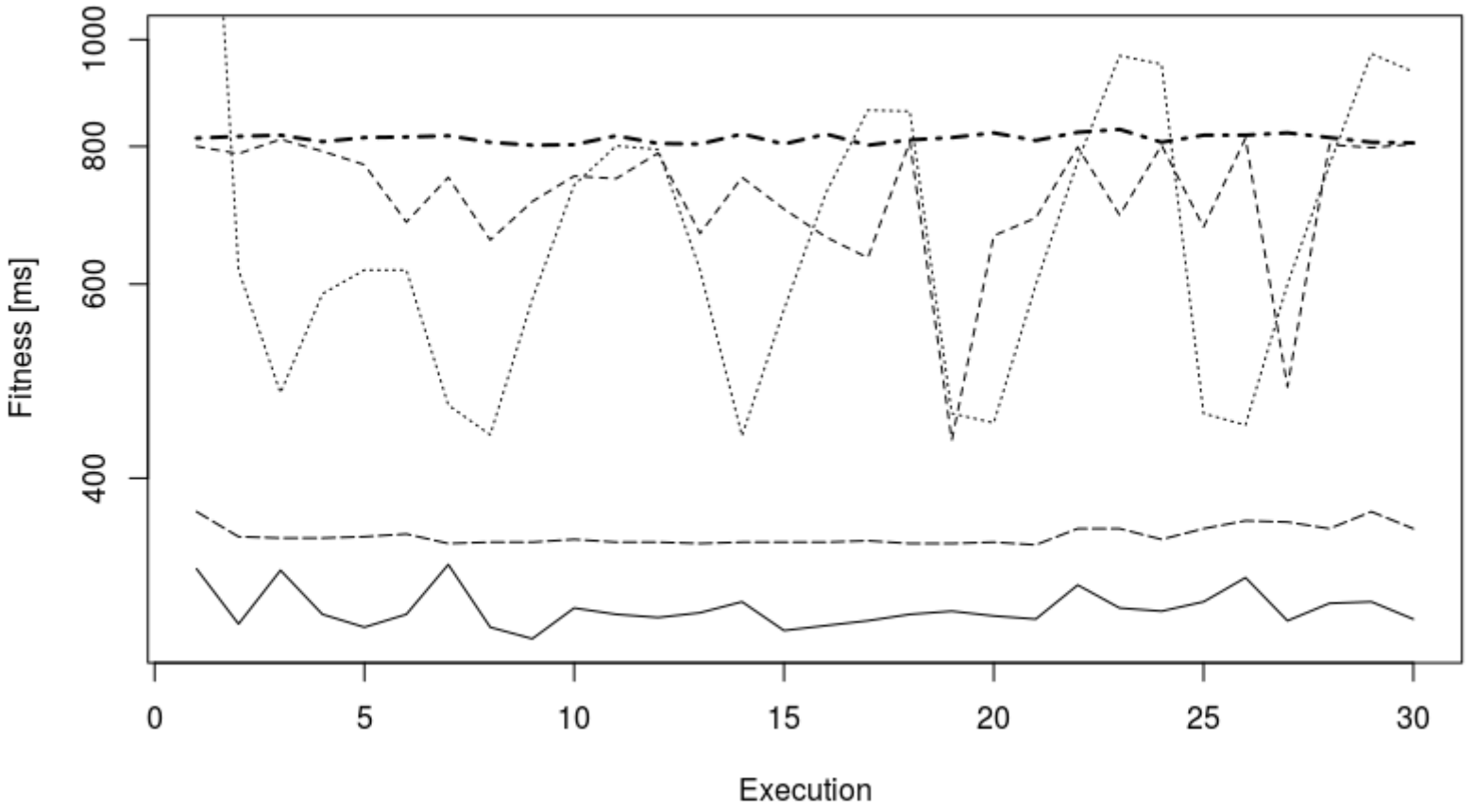

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Conclusions and future work

- Selecting the right partitioning size is a key factor.
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In the future...

- *Improve the approach → "heterogeneous tiles".*
- *Explore the relation between the map and the tiles.*

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Heterogeneous tiles