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Optimal traffic Deviation System

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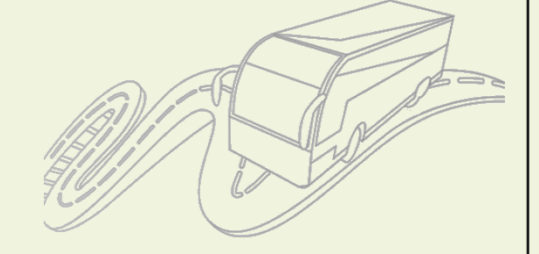
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Optimal traffic Deviation System



Key Characteristics

- Collaborative project with industry, researchers and a real traffic control center
- Urban transportation network
- Short and long term disruptions management
- Traffic management
- Predictable versus unpredictable events
- Efficient optimization
- Decision support system



Motivation & Objectives

Motivation

- Many cities in the world are facing difficulties in managing and improving their urban network infrastructure
- The urban population is already higher than the rural population
- The urban sprawl and its network cannot be extended indefinitely
- The organization of urban areas remains a big challenge

Major objectives

- Develop a system to manage and mitigate traffic congestion efficiently whenever disruptions occur on the road network
- Address different type of disruptions such as
 - Predictable : road construction, maintenance, public events, etc.
 - Unpredictable : accidents, road damage by bad climate, etc.
- Generate specific deviations for cars, trucks and buses
- Provide efficient solution on the strategic and tactical levels

Methodology

Integrate data from complex and heterogeneous systems

- Geographical Information Systems (GIS)
- List of predictable blockages from external database(s)

Develop optimization methods

- Sophisticated algorithms
- Heuristics and metaheuristics

Visualization and Monitoring modules

- Depict blockages and deviations
- Provide blockages' timetable

Perform analysis

- Performance indicators
- Statistics

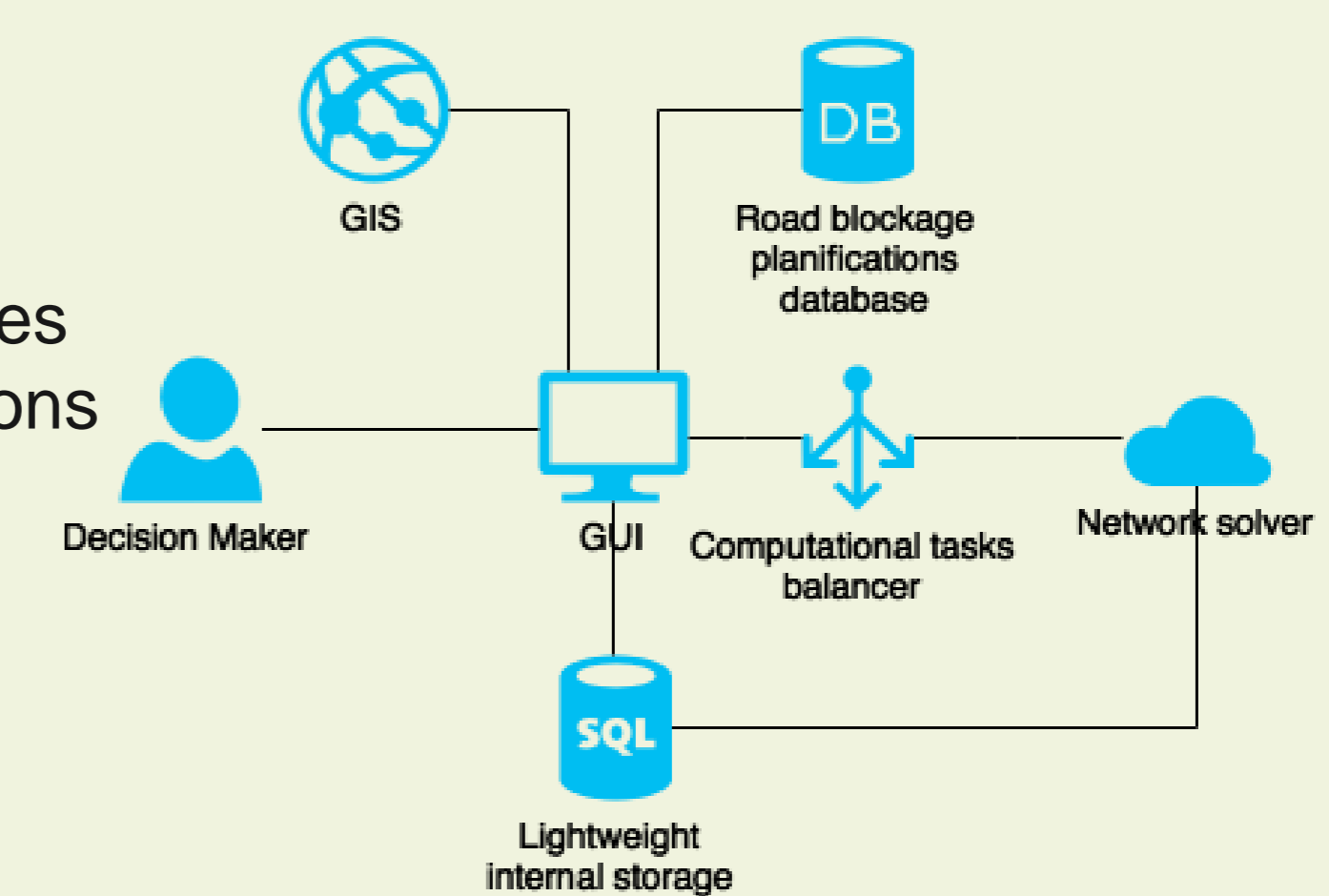
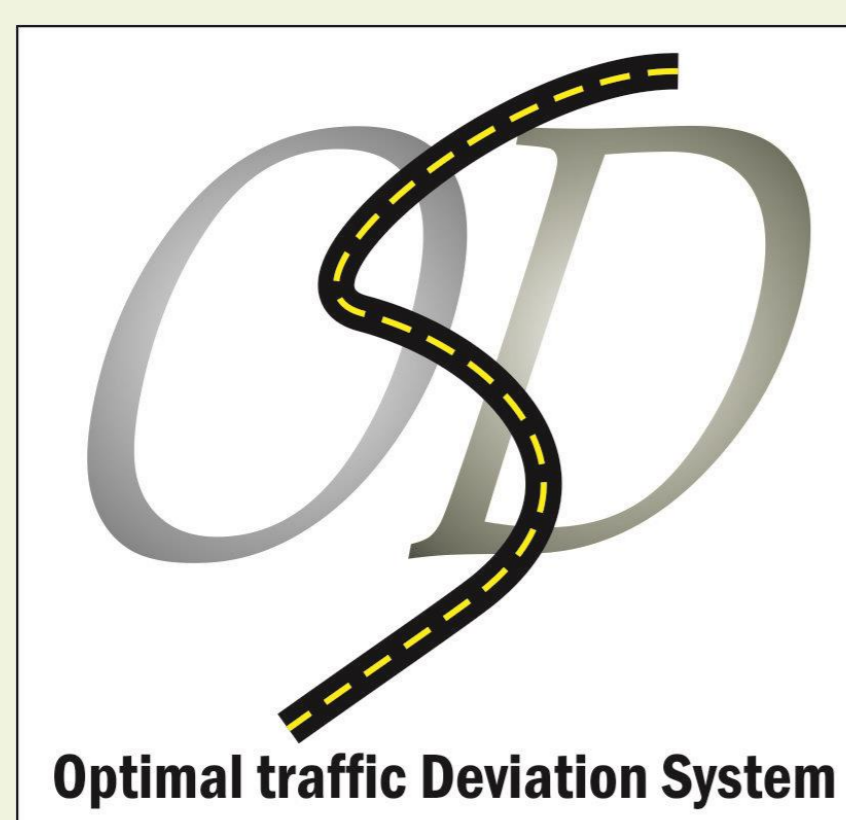


Figure 1: ODS system architecture

Results

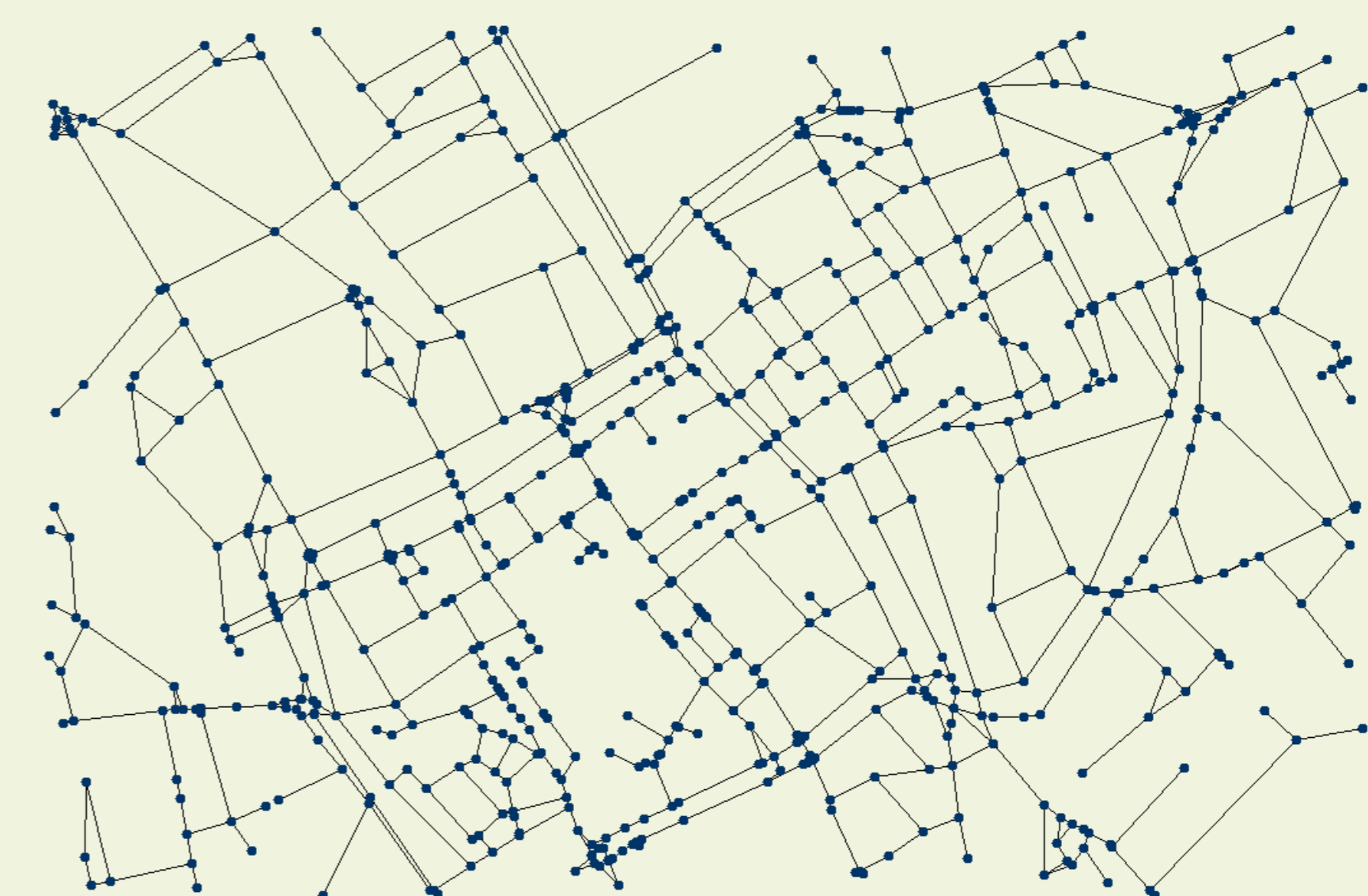
Key result of the project : Optimal traffic Deviation System (ODS)



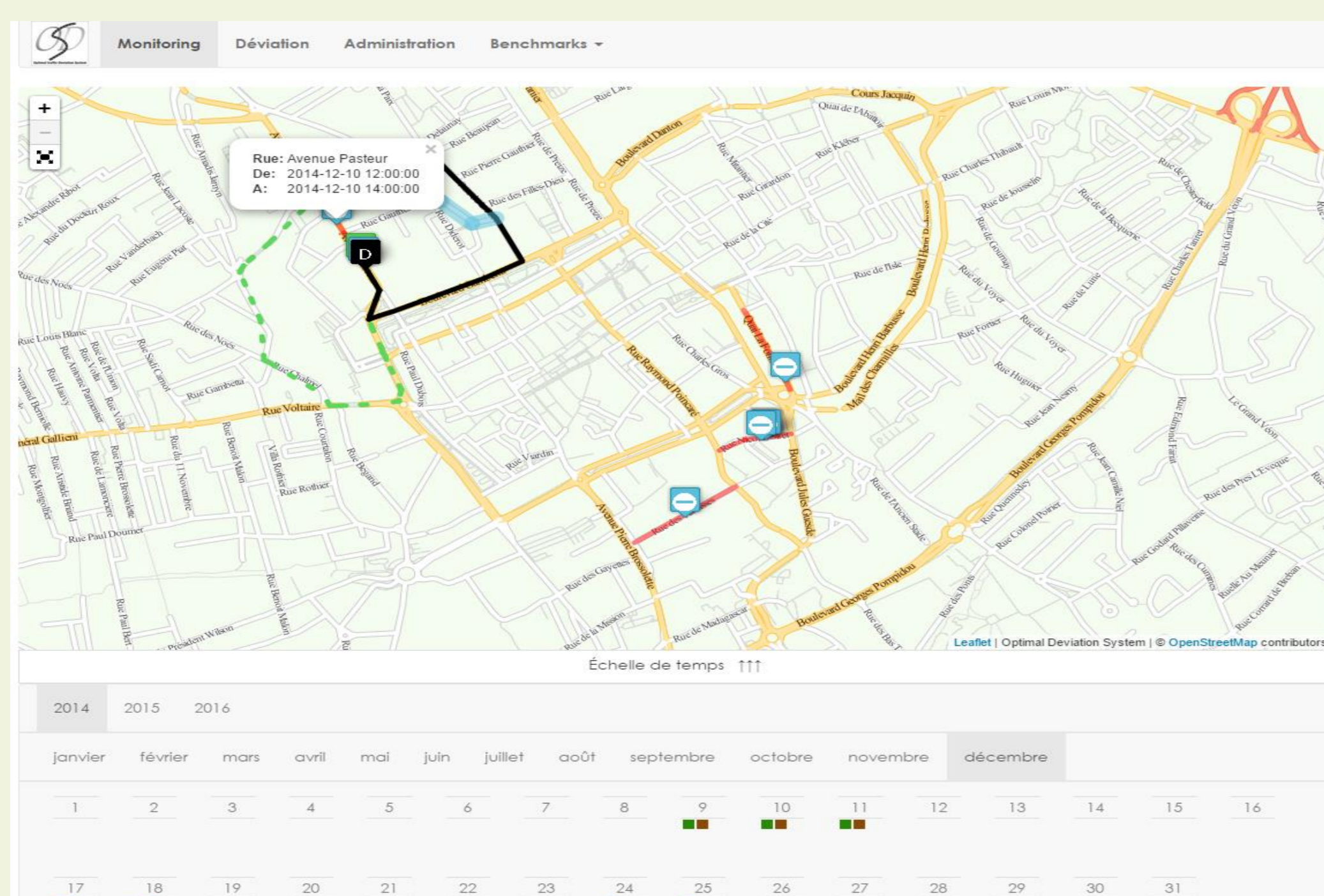
ODS is currently able to:

- Compute deviations using different optimization criteria
- Monitor deviations over time
- Depict solutions for different types of vehicles
- Show solution details
- Provide analysis for the computed solutions

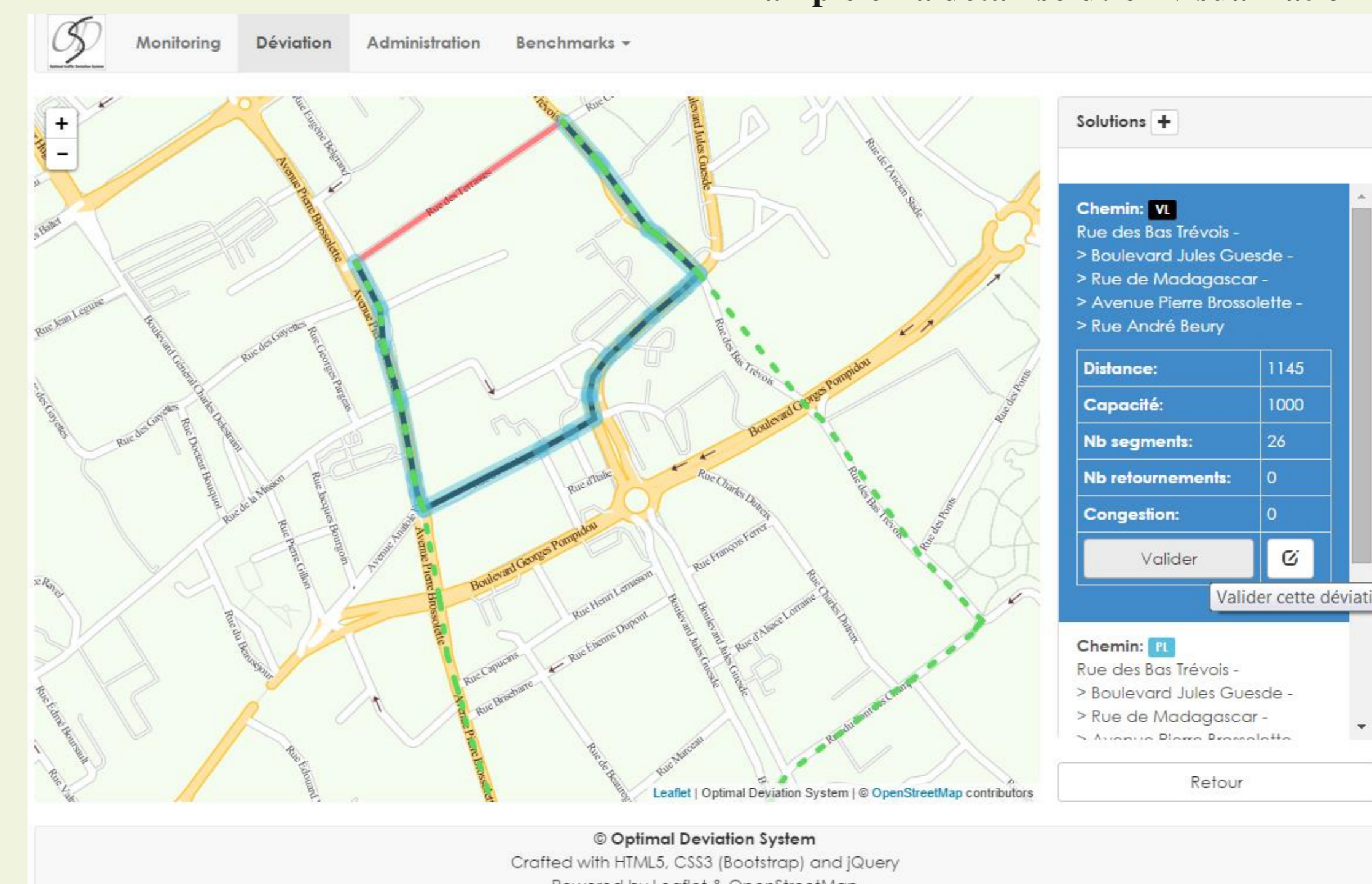
Graph of the road network from the town of Troyes (France)



Schedule monitoring screen for the town of Troyes (France)



Example of a detail solution visualization



Research Outlook

A system to manage traffic deviations on road networks

Import a list of predictable blockages

Extract and handle data from heterogeneous systems

Change direction of pathways

Address alternating traffic

Models to manage congestion

More sophisticated heuristics and metaheuristics

Collection of accurate data on the network infrastructure (sensors)

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