

## **Cooperative proactive traffic management in the Metropolitan Region Amsterdam**

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### **Abstract**

In the European project SOCRATES<sup>2.0</sup>, a consortium consisting of public and private organisations has been challenged to try different ways of working together to realise smart traffic and navigation services, which will be tested by at least 9,000 users in the regions of Amsterdam, Antwerp, Copenhagen and Munich. One of the Amsterdam services consists of smart route advice by means of the use case Optimising Network Traffic Flow. The pilot has started in December 2019 and includes motorways, regional roads, urban-interurban interfaces and urban roads. It is expected to lead to more business opportunities for the private partners, a more cost-effective traffic management for the public authorities and better service for the road users.

All SOCRATES<sup>2.0</sup> partners believe that by cooperating more business opportunities for private partners can be developed, more effective traffic management for public authorities achieved and better services for road users provided. The goal of SOCRATES<sup>2.0</sup> is to test if this added value is actually created by a closer cooperation and find out how this can lead to a sustainable business cases for all stakeholders. To facilitate this, the SOCRATES<sup>2.0</sup> partners created a Cooperation Framework consisting of a set of cooperation models. The cooperation models are based on the level of communality of the collaboration. The first level comprises of agreements for sharing public and private traffic data, based on agreed data exchange formats (“Exchanged data”). One cooperation step further, partners can create a common view of current and/or predicted traffic situations on a network, based on the exchanged data (“Shared view”). The most elaborate level of cooperation arises when based on the created shared view, partners develop and implement coordinated actions and services towards communities of travellers (“Coordinated approach”). For the Amsterdam use case Optimising Network Traffic Flow, the latter cooperation model was chosen and implemented.

The issue at hand is that the densely populated Metropolitan Region Amsterdam suffers severely from congestion. Service providers usually start re-routing when congestion already has established itself. Ideally, re-routing would commence pro-active: re-routing when the chance on congestion is increasing but traffic is still flowing. This will, however, go against private short-term goals of service

providers. The proposed solution consists of a public-private partnership where all partners cooperate and where public and private goals are reconciled as much as possible. The partners build a common (predicted) operational picture based on both public and private collected data and determine common goals, KPI's, and conditions for re-routing. To make this orchestration of cooperative proactive traffic management succeed, well-established intermediary roles are necessary. This is piloted within the SOCRATES<sup>2.0</sup> project.

In the Amsterdam region and as part of this ONTF use case, there are three TMC's in operation (Rijkswaterstaat, Province of North-Holland, Municipality of Amsterdam), four Service Providers active (Be-Mobile, BrandMKRS, BMW, TomTom) and all four Intermediary roles implemented (Strategy Table coordinated by MAPtm and NDW, NDW acts as Network Monitor, Rijkswaterstaat and Technolution together act as Network Manager and MAPtm acts as Assessor). During the preparation phases, all systems were (re)designed, build/adjusted, reconfigured, connected and implemented at operational level in order to construct one integrated ecosystem.

The objective of this use case is to test possible scalable solutions to optimise the traffic flow on the MRA network. It also should lead to new business opportunities for private partners and better services for road users. The pilot is in operation as of December 2019, however, the current Corona lockdown has resulted in some complications since the traffic flow is severely lower than usual. All partners keep their systems in hibernation and will follow-through the pilot once the traffic situation is back to normal.

### **Highlight innovation**

The most challenging and innovative part of the use case is the orchestrated and coordinated execution of traffic management services by traffic management centres (by means of roadside equipment) and service providers (by means of in-car navigation). Four new intermediary roles were deemed necessary to achieve this; the Strategy Table, the Network Monitor, the Network Manager and the Assessor. All available data sources from public and private Data Providers (e.g. loop data, floating car data, activated traffic management measures, predictions of flow and speed) are collected and fused at the Network Monitor (intermediary role) and forwarded to the Network Manager (intermediary role), where, based on collectively agreed goals and KPI's at the Strategy Table (intermediary role), the most appropriate traffic management services are selected and distributed to Traffic Management Centres and back-offices of Service Providers. The TMC's and Service Providers will activate traffic management services (reroute information) at roadsides and in-car. The Assessor (intermediary role) frequently analyses the impact of each public and private partner within this cooperation framework and this information will be used to adjust goals and accompanying KPI's, if necessary.

### **Results achieved**

We distinguish between technological, functional and organisational results. Although the pilot is in operation since 6 December 2019, most current results are attributed to technology and organisation.

Technical chains were implemented by defining uniform and easily transferable messages, applicable to TMC's as well as Service Providers. We introduced DATEX-II based Service Requests that are available in two types, either an 'avoid'-SR or 'reroute'-SR type. An 'avoid'-SR means that services should be activated to avoid a specific network link, while 'reroute'-SR means that services should be activated to rerouted traffic following a specific route (made up of several network links). The Service Requests are forwarded by the Network Manager to the (private) Service Providers, the (public) TMC's and the Assessor.

Organisational results are based on the cooperative manner in which all partners participate and the definition and implementation of the four new intermediary roles and the accompanying procedures to get the total scheme operational.

Functional results need more data and more end users to arrive at better validated conclusions. However, in addition to the technical and organisational results already described above, we expect to also have functional mid-term results available that will be shared during the POLIS conference.

### **Lessons learned**

SOCRATES<sup>2.0</sup> partners, international service providers, car manufacturers, ITS companies and road authorities, believe that new and better traffic management, traffic information and navigation services for road users can be realised by more cooperation and sharing of information. The partners in SOCRATES<sup>2.0</sup> are defining and experiencing sustainable public-private cooperation and gaining insight in business cases in cooperative traffic management. This is an important step in the direction of implementation of smart mobility services. The collaboration makes SOCRATES<sup>2.0</sup> a unique and valuable project, from which lessons can be drawn for all stakeholders in the traffic management chain. It is expected that SOCRATES<sup>2.0</sup> will learn from different approaches.

For the particular use case described in this abstract, the Corona lockdown period will be used to improve quality of the information chains and to implement a reward system to learn how end users will respond to small rewards offered to them by the service providers; these findings will also be presented during the POLIS conference.

### **Comments (e.g. presentation format)**

The results and lessons learned in this abstract are based on the first months of operational pilot period. Due to the Corona lockdown period, we will improve quality and implement new features. We expect to restart the pilot after the summer holidays and therefore new insights will be available to be

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presented at the POLIS conference in December 2020.

My preferred presentation format is a short presentation of the results and lessons learned, followed by discussions with the audience.

Rijkswaterstaat is responsible for the overall project management of SOCRATES<sup>2.0</sup> and also a partner with multiple roles in the described use case. The author is use case lead of the described use case, pilot site lead of Amsterdam and deputy project manager of the total SOCRATES<sup>2.0</sup> project.

