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# TMaaS, a new cloud-based, vendor-neutral multimodal traffic management solution

Traffic Management as a Service (TMaaS) is an innovative collaboration between eight public and private partner organisations, including the City of Ghent (main urban authority). This consortium has spent the past three years researching and developing a web application that provides a cloud-based, vendor-neutral multimodal traffic management solution for small and medium-sized cities. Urban mobility data from several stakeholders and public service providers are integrated and visualized in a clean, intuitive and customizable interface for traffic operators and citizens. TMaaS is a European project co-funded by the Urban Innovative Actions initiative.
The project aims to provide a new generation of interactive traffic management dashboards for traffic operators along with personalized mobility services for residents. It acts as a platform for real-time traffic monitoring, long-term mobility analysis and communications with residents. Thus TMaaS complements existing traffic control centres so that cities that already monitor or manage traffic can also use it to their advantage. TMaaS has already been implemented in the city of Ghent, Belgium. In the coming months the system will also go live in Antwerp (Belgium), Southwark (United Kingdom) and Duran (Ecuador).

## Target

The framework is primarily designed for small and medium-sized cities with a population between 50,000 and 250,000. These cities have several issues with the traditional approach to traffic management. In the first place, urban mobility has become quite complex; multimodality and sustainability are gaining importance, while current systems focus primarily on motorized traffic. Secondly, existing solutions frequently suffer from vendor lock-in and a lack of cross-compatibility. Finally, high infrastructure and software costs, along with expensive and ambiguous data licensing conditions can be an issue for smaller cities.

## Data

To tackle this, TMaaS brings together a number of data providers, urban authorities, stakeholders, research institutions and SME's to collaborate on the development of the TMaaS dashboard. A large amount of data from these various sources and stakeholders is retrieved, stored and augmented for visualization on the dashboard. The Ghent Open Data Platform provides information on bicycle services along with the location and real-time occupancy of car parks and bicycle parking facilities. TomTom, Waze and Be-Mobile provide travel times along specific routes and traffic incident information. Local public transport providers can provide real time data about bus or train delays. Several data sets that

provide the real-time availability and location of local car and bike sharing providers have also been integrated. Public highway authorities have provided live speed and vehicle count data from counting loops in and around Ghent. These data are made available for visualization and for re-use by interested external parties through a public API.

## Practical use

The data give traffic managers a greater awareness of the current traffic situation for a limited investment. It enables them to monitor specific road segments and to act quickly in the event of disturbances. Operators can also validate, edit and remove traffic events to ensure fast, reliable and useful communications to residents about mobility in areas of interest to them. These are geolocated points or road segments where traffic is disrupted due to car accidents, public transport disturbances, etc. This can help road-users decide whether they need to change their departure time or look for alternative means of transport.

## Polis

As the project is currently coming to an end, we would like to share some of the lessons learned and problems encountered, as well as demonstrate and share our final results and output. Therefore we would like to demo our dashboards through an interactive session, where participants will be able to experiment with our personalization tools and to create their own personalized dashboards.

## Innovative aspects

### Multi-modal pre-trip notifications

One solution provided by TMaaS is a pre-journey alert module that analyses daily user routes and sends out an alert in case of delays. Registered users enter their preferences including their daily route as well as the time and day of the week when they want to receive alerts. At the time of writing this abstract, the plan is to send alerts to platform users via email and sms. What makes this feature so innovative is the fact that it analyses all transport modes and provides alternative options. The first two cities to try out this service are Ghent as part of the Link.Gent mobility management dashboard (developed by TMaaS) and Antwerp (as part of Slim naar Antwerpen).

### Focus on innovation

The TMaaS project is an innovative partnership of different commercial entities offering similar products and services to similar customers. This requires a balanced legal framework that serves and protects all partners. Moreover, the output of the project - 24-hour access to a real-time traffic monitoring dashboard - results in integrated anonymous data from the project partners that provide an enriched, neutral traffic information flow that does not exist in any other project or commercial product.

## Results

TMaaS brings together more than 20 data sources from multiple providers for its traffic monitoring dashboard. In addition to the map interface in which these data sources are visualised via individual layers that can be switched on and off, TMaaS has developed a number of analytics widgets to enable speedy analysis. The modular system can be individually tailored in line with the personal preferences of the user, e.g. changing the layout of the map and widgets, etc. In addition to the dashboard, the TMaaS team developed professional traffic management add-ons including a traffic event management tool and a road segment analysing dashboard. Operator accounts can send out general alerts to display on

the dashboard as well to send out to registered users. The pre-journey alerts module allows cities to communicate directly with their residents by sms or email. This is the first step in convincing people to use more sustainable means of transport. The TMaaS framework is being tested in four different cities around the world, each with its own use cases and degrees of data availability. This proves that the concept is replicable and has the potential to be rolled out in line with the needs of individual cities.

## Lessons learned

We have learned that the process of integrating (open) data from multiple data providers is challenging. Each data source needs to be checked and adapted into a standardized format to ensure interesting visualisation within a mobility management dashboard. The quality of data is not always consistent and needs to be continually monitored after integration into the system.

Another complexity within our partnership is the modus operandi of each organisation. For example, software companies work in “sprints” and plan ahead accordingly, whereas local authorities allocate their personnel for the entire duration of a project. What’s more, different parties within the partnership bring different ambitions to the whole (the focus on residents versus traffic management, launching a commercial product versus enhancing the innovative aspects of certain challenges).

TMaaS values the importance of involving residents and stakeholder groups in the design process whilst defining expectations right from the start to avoid creating false hopes. Balancing the wishes and needs of these end users with the technical limitations of the project proved to be an iterative process. Transparency between partners and regular team meetings ensured open communications between all partner organisations and kept expectations aligned.