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## **The changing roles of Road Authorities and Service Providers in Traffic Management 2.0 deployment: A Guidelines Document**

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### **Abstract**

All around the world ITS developments are growing from deploying ‘collective’ means of traffic management (TM1.0) towards more individualised, functional and tailor-made traffic management (TM2.0). The members of the ERTICO TM2.0 innovation platform believe in cooperation among traffic stakeholders to grow towards TM2.0, however also acknowledge that this will require changes in the traditional role of the road authority or the service provider. By building on previous knowledge from the TM2.0 platform and lessons from multiple international ITS stakeholders deploying TM2.0, the taskforce on Guidelines for Stakeholders will provide recommendations that can serve as a start of a standard approach when getting involved in TM2.0 collaboration. This is done by structuring gained knowledge, setting out surveys among road authorities (getting) involved in TM2.0, and gathering their practical experience and recommendations for others.

### **Keywords:**

Traffic Management 2.0, Changing Roles, Deployment Guidelines

### **Introduction**

Over the past few years, increased connectivity, use of in-car services and improvements in traffic management ICT infrastructure have opened up a new range of possibilities in traffic management deployment. Throughout Europe ITS developments are showing a gradual shift from focusing on deploying ‘collective’ measures (traffic management 1.0) towards more individualised, more functional and tailor-made traffic management (traffic management 2.0). The members of the ERTICO TM2.0 innovation platform<sup>1</sup> believe in cooperation among European traffic stakeholders in order to work towards (1) better insights in the infrastructure status for road authorities, (2) more effective tools to influence this status where needed, and (3) improved services that service providers can offer to their users. The TM2.0 concept focuses on enabling vehicle interaction with traffic management plans and procedures, keeping in mind the heterogeneous character that traffic management operations

in Europe can have in terms of availability and quality. By discussing different aspects of TM2.0 deployment in Europe, the TM2.0 innovation platform members aim to pave the way for the TM2.0 concept to be implemented in various cities and regions around Europe, based on the win-win of its actors. The group of members consists of traffic management stakeholders such as Public authorities, Road Operators for cities and regions, OEMs, Traffic Information Service Providers, Road Infrastructure Providers, ITS research centres and road-network users associations.

In previous phases of the TM2.0 innovation platform, different taskforces have worked on several subjects related to TM2.0 deployment such as identifying barriers and enablers, exploring value propositions, contractual agreements & schemes, links to other traffic modes and the exchange of traffic management plans. This has, among other results, led to the identification of involved stakeholders and roles<sup>2</sup>, definition of traffic management plans exchange<sup>3</sup>, and description of multiple use-cases<sup>4</sup> in which TM2.0 deployment will provide a win-win for all stakeholders involved. In the meantime, several European TM organisations have deployed TM2.0 aspects. The combination of previous insights from TM2.0 platform taskforces and the experiences from concrete deployment allow for a conversion of this knowledge by focusing on how the traditional roles of road authorities and service providers are gradually changing in TM2.0 deployment, and if guidelines extracted from previous knowledge and projects can help stakeholders to collaborate effectively. The current taskforce on Guidelines for Stakeholders focused on this task: how can we use the lessons from previous taskforces and experiences from TM2.0 deployment projects be extended to provide traffic management stakeholders with guidelines on how to collaborate effectively in a TM2.0 ecosystem.

### **Changing roles of stakeholders**

The shift from TM1.0 to TM2.0 brings many opportunities in more effective traffic management. Apart from a technological transformation where individual technical columns are increasingly integrated with each other, TM2.0 deployment also has consequences for changing work processes, collaboration schemes and roles as organisations with different backgrounds, strategies and goals will have to find a common approach. Parts of these challenges are already considered in the 2005 ITS platform deployment guideline document<sup>5</sup> where corridor collaboration between different road authorities is described. This document however does not consider service providers yet, as this is a more recent development. For these new forms of collaboration, and the increased involvement in the activities of other stakeholders, it is essential to understand what each other's motives, intentions and strategies are, and how these can be aligned clearly. In order to address these challenges and learn from past experiences, this paper will first describe the general vision and mission of road authorities and service providers under TM2.0. Then, based on a TM2.0 collaborative elements structure, several TM2.0 stakeholders are interviewed on their experiences and implications for others.

### **Vision and Mission of stakeholders**

On the tactical level of traffic management (with strategic level being the policy development, and operational being the actual execution of individual identified traffic measurement measures), the situation in the network will be described and compared with the traffic policy to determine and analyze the bottlenecks, incidents and emergencies. For the services and measures to be triggered into action under TM 2.0, the vision and mission of the two main groups of road stakeholders have to be clarified: road authorities and service providers differ to a great extent in this respect given their different background, interests, operations and dependencies.

The vision on behalf of the road authorities is:

- Safe, efficient and sustainable management of road infrastructure
- Use available means for traffic management in the most (cost-)effective way
- Responsibility for road infrastructure

The vision on behalf of the service providers is:

- Fast, efficient and safe driving experience for its users
- Make routing and navigation a tool for reliable journey planning and better driving
- Competitive advantage

The mission on behalf of the road authorities is:

- Cooperation with service providers so that a better overview of road infrastructure is gained, and more effective and individualised measures are available
- Gain better insight in what is happening on the roads by collecting data
- Improve ways of taking measures to adapt road infrastructure use

The mission on behalf of the service providers is:

- Cooperation with the road authorities to contribute to their tasks on traffic management
- Acquire knowledge of the TMPs so that the user/driver has the best information and service

The differing interests and viewpoints of the two groups of stakeholders in traffic management, have to be aligned according to the TM 2.0 concept. For TM 2.0 to work, stakeholders will have to understand and respect each other's interests and effectively translate the traffic management strategy towards measures taken by both.

### **Traffic Management Collaboration phases**

In order to have the best alignment between different stakeholders when exchanging Traffic Management Plans information, stakeholders must commit to a longer term collaboration, encompassing both the TMP preparation, actuating the TMPs as well as the evaluation of TMPs effects. The whole functionality of a traffic management plan can be divided into three different phases which by their nature strongly differ:

- **TMP elaboration phase:** A common management task of various stakeholders/organizations involved, not only in combining Traffic Management Services and Traffic Information Services, but also with regards to networks operated by different authorities. Hence a thorough preparation of the service and documentation by means of intermediate deliverables is a must in order to create and agree upon a clear common understanding between all stakeholders involved.
- **TMP operation phase:** This is the phase where a traffic management plan is executed.
- **TMP evaluation phase:** Traffic conditions change rapidly. In particular, end users change their behavior when confronted with traffic management measures. Hence a thorough analysis of impact a measure has and – if necessary - revision of the service as this is offered, is also a must and should be undertaken recurrently. The evaluation results must be documented and, in-turn, provide input for improving the traffic management plan that was executed.

In all the above mentioned three phases, road authorities and service providers can strengthen each other's role and impact with regard to insights in traffic management situations and effects, the toolbox of measures that could be included in a TMP, and the short iterative evaluation possibilities.

### **Guidelines for the traffic management collaboration phases**

In the following initial guidelines/recommendation for the implementation of the traffic management collaboration phases are provided based on TM2.0 stakeholder workshops

#### **Collaboration of stakeholders in TMP elaboration phase**

General aspects:

- Establish common understanding goals/responsibilities (e.g. user vs network optimum)
- Establish common understanding of means/measures (e.g. detour recommendation via VMS, flow control via traffic lights, route recommendations (based on traffic information) via navigation service) to influence user behaviour, improve user acceptance
- Establish common understanding on existing means (e.g. speed data, demand data, volume data, cameras) to identify traffic state or incident information
- Identify means to derive user acceptance ratio

Location specific aspects

- Agree/discuss/understand local policies
- Identify local means to influence traffic (e.g. available infrastructure and alternative)
- Establish common understanding of goals and possibilities
- Define triggers and measures for TMPs
- Agree on protocols and distribution channels

**Collaboration of stakeholders in TMP operation phase**

General aspects:

- Identify and agree on proceedings for evaluation of active strategies/measures in real-time
- Agree and define on feedback loop

Location specific aspects:

- Identify and agree on available measures for actuating TMPs
- Identify and agree on local ‘special’ restrictions for TMPs deployment

**Collaboration of stakeholders in TMP evaluation phase**

General aspects:

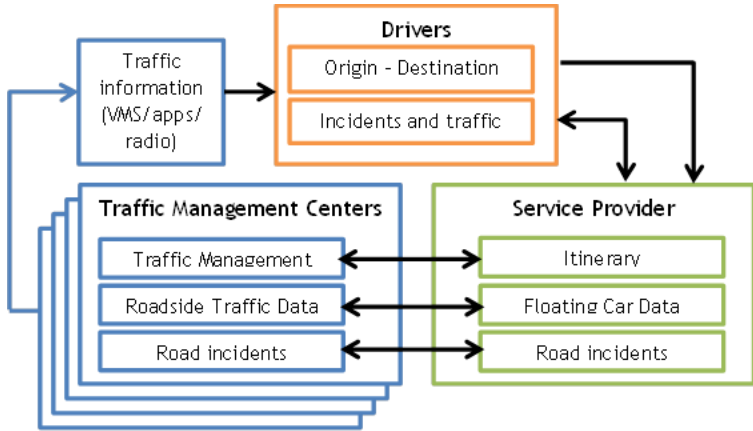
- Identify and agree on proceedings/methods for evaluation of active strategies/measures (continues before and after evaluation)
- Identify required (and available) data for evaluation

Location specific aspects:

- Avoid local direct feedback loops by measures from different stakeholders

**TM2.0 collaboration elements**

TM2.0 collaboration can, dependant on the level of involvement, take different forms and is strongly related to local existing TM operations, governance, available assets and local traffic situations. In order to structure the different aspects involved in such a collaboration scheme, figure 1 was produced. In this figure, the different levels of TM2.0, and different categories of roles find their place. The blue boxes represent the TM1.0 paradigm where TMCs have limited and relatively static ways of managing traffic and informing drivers (using VMS panels or radio-information). The green box represents service providers, that mostly already are in direct contact with their clients (Drivers, in the orange box). The mutual collaboration between TMCs and SPs represents the paradigm shift towards TM2.0.



**Figure 1 – Traffic management 2.0 collaborative elements**

## TM2.0 experience survey

Establishing a framework from above-mentioned insights can be done in different ways and with different scopes. In order to learn how these principles are (in some cases partly) implemented with actual stakeholders, a survey was constructed by the taskforce in which international Traffic Management stakeholders were asked to provide insights on their organisations' role and vision, possible involvement in TM2.0 collaboration, related motives and expectations, and recommendations for other organisations (getting) involved in such schemes. The taskforce retrieved six fully filled survey replies, and another six either partly filled, e-mail based or informal replies with relevant insights. The organisations are mentioned below:

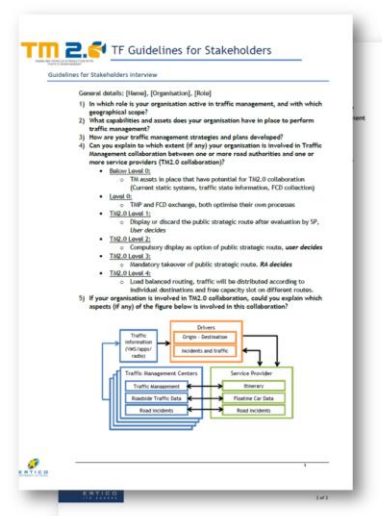


Figure 2: Stakeholder Survey

- Bavarian Road Administration, Germany
- City of Amsterdam, The Netherlands
- City of Timisoara, Romania
- Flemish Traffic Centre, Belgium
- Hamburg Traffic Management Centre, Germany
- City of Montreal, Canada
- City of Copenhagen, Denmark
- Transport Scotland, Scotland
- Several UK cities
- Powerfleet, Greece
- Road Authority of North Rhine Westphalen, Germany
- State of Salzburg, Austria



Figure 3: Geographical overview of Survey response

## Survey Results

The survey results show a wide range of insights, that will be described by elaboration on the levels and forms of TM2.0 collaboration in which respondents are (getting) involved, their motivations to do so and their expectations of the outcome, the perceived effects on their roles and responsibilities, and the recommendations from respondents for others.

## TM2.0 collaboration levels and forms

All organisations showed to be in the very first stages of TM2.0 schemes, or are ramping up to start such a collaboration. Most responses state that collaboration between multiple TMC's and regions is in operation for some time (Blue side of figure 1), and the first collaborations with SPs are starting out. This primarily takes the form of the road authority publishing traffic data via open data and protocols such as Datex-II, and buying FCD data from service providers to improve insights in current

infrastructure status. Active traffic management strategies are in all responses designed by the road authorities itself (sometimes in collaboration with police and other governmental bodies), but in no case SPs were involved in the early stages. Some comment that they publish their data for free, however that SPs make little use of it as they do not integrate with separate cities due to financial reasons. Also organisations are discouraged by the perceived system optimum vs user optimum problem. One respondent stated that they only recently started out with integrated traffic management in operation, and are therefore aiming to get acquainted with TM2.0 collaboration as soon as possible.

*“We see that future increased collaboration with private sector in-vehicle service providers is desirable and important, but we are still exploring exactly what form that should take”*

### **Motives and Expectations from TM2.0 collaboration**

The motives for getting involved in TM2.0 schemes, and the expectations of its outcomes vary across the respondents in roughly three categories: Efficient use of assets and resources, gaining better insights in the traffic state, and more effective means to influence traffic and/or inform drivers. Regarding costs, several respondents expect that collaboration with SPs might either reduce costs of the traffic management operation as a whole, or increase the capabilities of the operation with the same costs. Regarding better insights, respondents expect to receive more reliable real-time information on the traffic state, as well as information on the context of this state (e.g. the reason why a delay in the grid is occurring, and therefore more quick and effective response to the incident). The last category, expecting more effective traffic management, relates to the broader toolset that TM2.0 might provide to TMCs.

*“We enact the political and societal goals of our organisation/city. We expect that working together in TM2.0 collaboration will give us a better chance to reach those goals”*

### **Effect of TM2.0 collaboration on roles and responsibilities**

Given the early TM2.0 stages in which the respondents primarily find themselves, the majority of respondents state that current TM2.0 collaboration actions and processes are still in line with existing processes, tasks and responsibilities, and do not provide challenges yet. However almost all respondents add to that that these challenges are certainly expected in the near future when the collaboration increases. For example, one respondent states that the organisation will have to grow from a collective TM mindset to also keep in mind more individual TM, which demands rescheduling priorities in TM strategies. Also, one respondent states that a public-private partnership will always have to keep in mind the effects of the collaboration for parties that are not a part of the collaboration. It also demands looking for a win-win balance between TM policy goals and commercial viability.

*“We have to make a shift from a chain that is totally in our control towards reliance on other parties, and shift from a general uniform approach to an individual dedicated approach to the road-user.”*

### **Recommendations for parties (getting) involved in TM2.0**

From the survey results, the following recommendations were provided:

- Once small scale successful collaboration is established, try to jointly go through TM strategies and reevaluate with the possibilities that were not there before.
- Keep in mind the questions: How do we make sure a level playing field for market parties is reached? Which tasks within the TM process can SPs potentially deliver and are what are the benefits and drawbacks of these choices, now and in the future, when looking at the societal and political goals of a public body such as a city or road authority?
- Create pilots and evaluate, don't be afraid of mistakes, we learn from mistakes.
- What is good for one party might negatively affect another. Be aware of that in the collaboration, be open about goals of all parties, and make clear agreements.
- When determining benefits for road users, do not focus too much on either individual users or only on the population as a whole, but consider both individuals and population in strategies.
- Public entities will have to keep in mind the negative impacts on parties that are not a direct part of the collaboration. This is done by using open standards so that parties can join in later.
- Always keep in mind providing uniform information to the road user (discrepancy between road display and in-car display will diminish trust in the system and create legal issues)

*“Start with tangible solutions and get to work. Make something that creates a win-win-win situation for all involved and build upon that.”*

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