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National Access Points and Municipalities – Best Practices from the German National Access Point MDM

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Abstract

Municipalities are a key traffic data provider to National Access Points (NAP). However their participation is not mandated by the EU Delegated Regulations. This paper discusses the benefits of bringing data from municipalities into the NAP, reasons why municipalities benefit from contributing to the NAP and some challenges that municipalities face concerning traffic data and data provision. Observations are based on experiences of the German *Mobilitäts Daten Marktplatz*, which acts as the NAP in Germany.

Keywords:

National Access Point, MDM, mobility data, municipalities, user group

Introduction

Under the EU ITS Directive [9], four Delegated Regulations [6-8] have been elaborated in order to speed up the development of information services for road users and other ITS services. As these services are based on digital data, Member States have to establish National Access Points (NAP) for traffic data to make these data available and exchangeable in an interoperable way. Germany has set up the platform *Mobilitäts Daten Marktplatz* (MDM) as a NAP. The Federal Highway Research Institute (*Bundesanstalt für Straßenwesen, BASt*) is responsible for the operations and management of the MDM.

In order to foster acceptance of a NAP and to ensure its success, one of the most important challenges is to acquire active NAP partners, consisting of data providers as well as data users. In Germany, during the first years after the Delegated Regulations came into force, only few organisations actually delivered data to the NAP even though the Delegated Regulations mandate some data types to be

delivered to the NAP. Actively informing stakeholders of their duties via various channels is necessary to achieve a good coverage of data in the NAP via data providers.
The most important tier of data providers are public authorities on all administrative levels, from state ministries to small municipalities. A second tier are private organisations. This paper focuses on large and medium sized municipalities and their motivation to provide data to a NAP as well as ways of collaboration.

Using the example of Germany and the MDM, this paper will discuss the following key questions:

- How can municipalities be motivated to provide data to a NAP?
- What are the benefits of this data provision?
- What are the most important challenges for municipalities in the context of a NAP?
- How can collaboration between municipalities and the platform provider as well as other data providers and data users successfully be established?

Benefits for municipalities and regions

As most for the Delegated Regulations are mandatory for the Trans European Transport Network (TEN-T) 1 there is no obligation to provide data for municipalities, regions and agglomerations. But also in these areas there is a demand for Traffic and Road Information and other ITS applications as a lot of the traffic problems (congestion, pollution, road closure) are occurring outside the TEN-T.

Traffic problems and challenges in municipalities

Many of today's traffic challenges occur in municipalities, outside of the TEN-T. Heavy traffic during rush hours in combination with many uninformed drivers often leads to stressful, inefficient, unsafe and uneconomic situations. When we look at metropolitan areas in peak times, drivers have a very hard time to reach their destination. The sheer amount of traffic, heavy congestion and additional parking search traffic lead to emission problems in urban areas.
In addition to congested roads, roadwork related disruptions, closures and deviations as well as events are some of the complex challenges municipalities and metropolitan areas are confronted with. In order to manage and mitigate the effects, optimisation via traffic management measures or user services is called for. Key for traffic optimisations and road user information is transportation related data availability.

[1] Only Delegated Regulation 2017/1926 requires entire networks to be covered

Availability of traffic information from public authorities

In many municipalities data is already made available to the public: traffic level-of-service information, road work data, road closures for events and more. Some municipalities also publish preferred route networks for trucks, alternative routing for special events, parking space availability, speed limits and more.

Regarding communication channels, some municipalities are already publishing traffic information coming from their Traffic Information Centres on their websites or on own apps. These data publications are useful, yet the data cannot be (re-)used by third parties for ITS applications. This leads to a situation where only a limited group of travellers can be reached, as the municipalities' information is only available on isolated platforms. Travellers who are not aware of the platforms (e.g. visitors from outside) are likely to miss out on that kind of information. Even worse, the individual municipalities' solutions vary to a high extent, using different channels and content, and sometimes overlapping and contradicting to other information sources. On the other hand, other available digital channels such as RDS-TMC are not suitable to cover the complexity of the municipalities' networks.

Data distribution and standardisation through publication

The deficiencies explained above relate to missing common interfaces and standardised data flows, so that this information does not reach the end user of Intelligent Transportation Services.

The National Access Points can act as a facilitator to distribute the information to a broader audience of service providers which then can distribute this information to the end user.

The most important conditions for data to be used in ITS are:

- Easy accessibility
- Consolidation to one access point

  (A consolidated access point connects to many different data sources, covering a large area and many providers, and causing less effort than connecting to and managing many different services.)
- Standardized interfaces and transmission protocols

  (The fewer individual interfaces and data formats need to be implemented the better for any end user technology.)
- Clear data licenses

  (Uncertainty on data usage rights are show-stopping issues when setting up new services and solutions.)

The National Access Points are improving these conditions for the available data and are a suitable data access points for all related traffic and road information provided by road authorities on all levels.

Direct influence on ITS services

If the information on traffic and road infrastructure is provided over these access points, municipalities can have a stronger influence on ITS Services and provide the information to more citizens. Not only information on road works and road closures can and should be made available, but also active traffic management measures such as alternative routing strategies. Using available standards and interfaces, this information can be easily transmitted over the NAPs, which leads to more influence on the traffic flow. With the increasing trend of individual information via personal devices (apps, navigation devices, in-vehicle devices), instead of collective information via signs etc., it is important to provide centralised platforms that distribute relevant information via all information channels.

Important topics for municipalities

For municipalities, there are a variety of important topics regarding the publication of data via a NAP. In Germany, the most important issues are related to the nature of the data, georeferencing, format, data quality, legal terms of use for data publications as well as the value chain and motivation for data exchange. This section highlights the topics discussed by German municipalities with other MDM stakeholders. For some of the topics, discussion papers have been finished or are in progress and are likely to be published on the MDM website soon.

Static road data

The National Road Traffic Action Plan for ITS by the German Ministry of Transport (BMVI) aims to define the "Approach to the coordinated development of existing and accelerated deployment of new ITS to increase road safety, improve transport efficiency and reduce the negative impact of transport on the environment". [3] The prerequisite for the viability, effectiveness and success of ITS applications is the availability of high-quality data. [2]

In addition to "past-related data and real-time road traffic data" [9] - also referred to as traffic data - above all "data on road infrastructure features including fixed traffic signs or their regulated security features" [9] - referred to as road data - are essential for ITS. In particular, this also concerns traffic restrictions such as maximum height, maximum width, maximum axle load or access restrictions for trucks or dangerous goods, as well as restricted driving manoeuvres and one-way streets, etc. whose non-observance leads to dangerous situations or impairments. In this respect, this information is of high importance for the objectives of road safety, improving transport efficiency and reducing the

negative impact of transport on the environment. Another use case is driving restrictions to specific vehicle types, which do not meet specific emission standards, in low emission zones.

The relevant road data should be generated by any party who installs and maintains the corresponding physical infrastructure. For example, a road maintenance company could digitally communicate the positions and characteristics of a new traffic sign, after it has been physically installed. This way, changes in the road infrastructure could be communicated just-in-time. In this context, the research project FE03.0500 / 2012 / IRB of the Federal Highway Research Institute "Development of a method for optimized accessibility of map-related road data for ITS" [1] has to be considered.
As a prerequisite, comprehensive, up-to-date and high-quality data are desired, transmitted in a standardised procedure via a single interface. However, this also requires the digitalisation of administrative processes, resulting in machine-readable data that is up-to-date and consistent.

The Mobility Data Marketplace (MDM) already acts as a central data exchange platform for traffic-related data based on the DATEX II data exchange standard. [9]

Thus, an extension of the MDM to road data appears to be extremely useful as it would provide a central national access point both for road and traffic data. This recommendation is also given in the research project of the Federal Highway Research Institute (BASt) mentioned above.

It is especially important that any responsible authorities of the municipalities (for planning, construction and maintenance of infrastructure) as well as of the federal states are supported with access to the Mobility Data Marketplace.

Inside the MDM User Group the following recommendations regarding static road data were considered:

- Extension of the Mobility Data Marketplace to provide infrastructure data, in particular traffic signs
- Transmission of position and scope of the respective measure
- Promotion and support of the road authorities of the municipalities as well as the federal states to establish access to the Mobility Data Marketplace

Location referencing

The location reference of traffic data usually requires a digital road network. In Germany, like in many other countries, a national road database with all types of roads and road classes does not exist. In fact, there is a variety of heterogeneous digital road networks. While every state in Germany has its own road database, usually consisting of state roads only, larger municipalities maintain their own

networks, often more than one. A positive counterexample to be mentioned is Austria, where there is a database named *GraphenIntegrationsPlattform* [10], maintained by the Ministry of Transport, the nine states as well as the municipalities, mainly the larger ones, and used for many ITS applications.

For German municipalities, referencing methods are required which do not depend on a particular network. Independent referencing methods and their pros and cons are consequently an important topic of discussion for German municipalities. The most relevant network independent referencing methods are OpenLR, AGORA-C, TPEG2-GLR and TPEG-Loc (1997). All methods have their strengths and weaknesses and their choice is depending on the use case and the data. For municipalities, an automatic service for location referencing, preferably with different methods, directly available on the MDM platform, is seen as a useful service.

Data formats

As DATEX II is a default data format for the MDM, following the obligations from the Delegated Regulations, any generated traffic and road data should be either provided in DATEX II or be converted from another format into DATEX II. There might be compatibility challenges for municipalities which already have proprietary systems. Thus, guidance and support to municipalities on data modelling in DATEX II and possibly in conversion techniques is required.
There is another challenge for data types which are not the original domain of the MDM and DATEX II, such as spatial data and multi-modal traffic information. In these domains, other well-established data formats exist. Besides dealing with multiple data formats, the question may be raised if the current MDM set-up can actually serve the variety of data types, which are relevant for traffic in municipalities. Here, some rethinking of the MDM concept (technically and organisationally) is eventually required.

Real-time data

The MDM broker system is able to handle data in a frequency up to 1 minute. This is sufficient for present ITS applications, such as traffic status information, assuming the data provider is also able to act in the same frequency. However, for advanced future applications including the current state of signal timing, for example, this may not be enough. Further future demands for data exchange are derived from the high-resolution and high-frequency data domain of Automated Driving. In this context, further discussions and decisions have to be made on the way how to provide high-granular data, including communication technologies, platforms and data security and data protection issues.

Licence Agreements and Open Data

The MDM allows data providers and data users to establish individual agreements on licensing and even on charging for the subscribed data. Some model agreements from the Open Data domain are frequently used. It has to be clarified if the MDM should provide some specific "model contracts" for potential new data providers from municipalities, so these new providers have some confidence that their data is not misused.
Discussions with MDM users have revealed that the use of existing standard contracts (such as GeoNutzV [11] or Datenlizenz Deutschland [12]) as well as the option to agree to the terms of a licence by only clicking on a check-box are seen as useful.

The MDM and the municipalities

There are different ways how municipalities and other stakeholders can be in touch with existing MDM users and the MDM operators. On one side, there are official communication channels offered by the NAP provider, such as support hotlines, online forums and social media channels, but also events like workshops, presentations, et cetera. On the other side, users can engage in their own initiatives.

In Germany, the BASt provides a range of support and information channels for users. The municipalities, together with other users, have started their own initiative by founding the MDM User Group. The following section describes these two ways of collaboration and why both of them are relevant.

MDM organisation

In Germany, the MDM is organised with different roles, from software development and platform operation to customer and public relations. The following figure shows the current organisational set-up of the MDM.

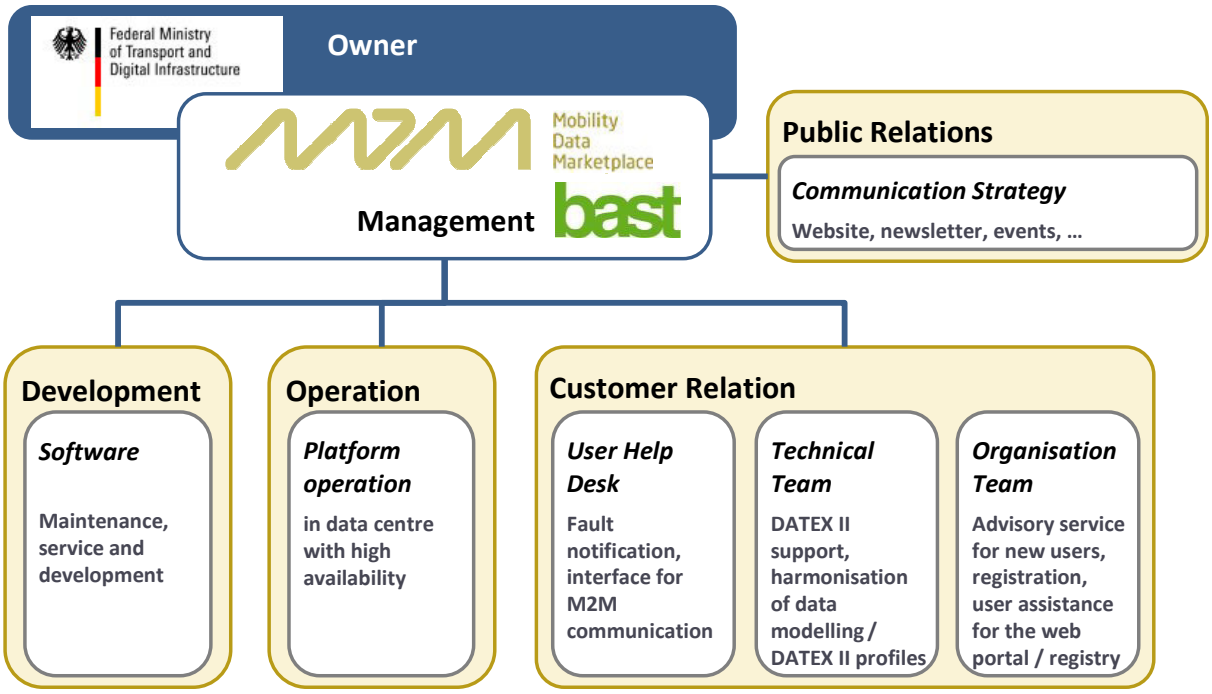

Figure 1 – Organisational set-up of the MDM

The user Help Desk can be contacted in case of technical problems or errors of the platform or interfaces.

If a municipality struggles with getting started with the MDM, the Orga-Team will provide support.

MDM XING group

Beside the above mentioned channels, there is also a XING group. XING is, similar to e.g. Linkedin, a European career-oriented social networking site for professionals. In the XING group, members can exchange information, e.g. about events, new developments, technologies, regulations, et cetera.

Currently, the MDM XING group has 387 members, many of them representatives of municipalities.

MDM User Group

In October 2014, MDM some users established the MDM User Group as an informal discussion group. The initial aim of the group was an exchange of experience between its members and to discuss potentials of the future development of the MDM platform.

Today, the MDM User Group is an association with the aims of making the MDM more popular and enhancing its further development in cooperation with the BASt. Aspects of all stakeholders,

municipalities as well as science and private sector, are considered. Therefore, the group consist of representatives of all these sectors.

To achieve the goals, different activities are carried out, such as regularly meetings, common participation in events, elaboration of papers and support of new and existing users through the exchange of knowledge and experience.

After three years and 11 meetings, the MDM User Group has identified about a dozen key topics and has elaborated about half of them in discussion papers. Besides, members of the MDM User Group took part in several events and presentations and have even organised a special forum with their Austrian counterparts during a conference in Salzburg.

The key of success for such an initiative is that the participants have a high intrinsic motivation, which is usually connected to a personal benefit. For example, this can be more knowledge, more influence or a better standing. Then, it helps if the participants are roughly on an equal level in terms of educational background, technical knowledge and position.

Conclusion

The EU ITS-Directive and the Delegated Regulations are an important step towards providing road and traffic data to increase safety and reduce congestion. The National Access Points are playing a crucial role as they will be the platform for ITS-related data, e.g. for Safety Related Traffic Information, on a Member State level.
As these Regulations are mainly mandatory for the TEN-T Road Network, municipalities are not obliged to expose their data on NAPs. On the other hand, many traffic challenges are taking place in urban areas.

A lot of traffic information is already made accessible by municipalities. However, this is mostly done in a fragmented way via own portals and apps, impeding the reuse of these data for other ITS-Applications.
In this context, NAPs can play the role of a centralised platform to make this data available for a wider use.
Interest groups like the MDM User Group in Germany can help municipalities to understand the value of providing the data on NAPs and give them a voice regarding the different topics discussed above.

This best practice from Germany is showing how municipalities can be stronger involved in the discussion around National Access Points.

References

1. BASt (2016): Entwicklung eines Verfahrens Entwicklung eines Verfahrens zur optimierten Zugänglichkeit von kartenrelevanten Straßendaten für IVS (www.okstra.de)
2. BASt (2015): Kurzdarstellung BASt-Forschungsprojekt FE03.0500/2012/IRB
3. BMVI(2017): http://www.bmvi.de/DE/Themen/Mobilitaet/Strasse/Intelligente-Verkehrssysteme/intelligente-verkehrssysteme.html
4. DATEX II: http://www.datex2.eu
5. European Commission (2013). Commission Delegated Regulation (EU) No 885/2013 of 15 May 2013 supplementing ITS Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles. http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013R0885
6. European Commission (2013). Commission Delegated Regulation (EU) No 886/2013 of 15 May 2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users. http://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=CELEX:32013R0886
7. European Commission (2013). Commission Delegated Regulation (EU) 2015/962 of 18 December 2014 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services. http://eurlex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015R0962
8. European Commission (2013). Commission Delegated Regulation (EU) 2017/1926 of 31 May 2017 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide multimodal travel information services. http://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=CELEX:32017R1926
9. European Commission (2013). Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport. http://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=CELEX:32010L0040
10. Fiby, H. et al. (2016): GIP.at – Intermodaler Verkehrsgraph Österreich, Standardbeschreibung 2.1, http://open.gip.gv.at/ogd/gip_standardbeschreibung.pdf, 08.06.2016
11. BMJV (2013): GeoNutzV – Verordnung zur Festlegung der Nutzungsbestimmungen für die Bereitstellung von Geodaten des Bundes (BGBl. I S. 547), 19.03.2013
12. Senatskanzlei, Geschäfts- und Koordinierungsstelle GovData (2018): Datenlizenz Deutschland – Namensnennung – Version 2.0, https://www.govdata.de/dl-de/by-2-0, 19.01.2018