D. 3.3
TN-ITS Feedback Loop

TN-ITS GO
Map Update Exchange

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D. 3.3

The TN-ITS Feedback Loop

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Abstract
This document reports the positions of stakeholders, a common concept and the test implementations of a TN-ITS Feedback Loop Service. This service describes the interface and the information flowing back from Map Providers to Data Providers as a response to provided data.

Legal Disclaimer

Preface

TN-ITS GO is a Programme Support Action (PSA) for the implementation and facilitation of seamless spatial data exchange which are essential for the deployment of ITS applications. The duration of the action is spread over 48 months in order to give time to six new Member States to plan and implement carefully their ITS spatial data supply chain strategy right from the source (police decision, road maintenance,...) all the way to the open TN-ITS interface and into the map database of the end user.

The Action will capitalise on the pre-existing knowledge and expertise of the TN-ITS initiative which has already resulted in operational services in Sweden, Norway, Finland and Flanders. Other piloting efforts are ongoing in France, UK, and Ireland but not operationalised yet. Part of this Action invests in these past efforts in order to further consolidate the operational services covering increasing part of the TEN-T with the most relevant ITS attributes and increased quality. Also, the most advanced services will now work on the feedback loop from map makers to road operators which has not been tested so far.

The action is focussing on realising operational exchange of operational data on the TEN-T network and its interface to other road networks but the exchange mechanisms put in place by the Member States should be scalable and extensible to the whole network.

The work of TN-ITS GO supports the Commission Delegated Regulation (EU) 2015/962 on RTTI, in particular the part of the Regulation that is concerned with static road data, i.e. data (and changes thereof) that will generally be included in digital maps for ITS, for which TN-ITS closely cooperates with DG MOVE of the European Commission.

1. Introduction

Work package 3 of the TN-ITS GO project aims to implement extension of the TN-ITS services (depending on the level of advance of the MS):

- transfer implementations from current pilot to operational services (activity 3.1)
- add map data attributes, cover a wider area and/or increase data quality (activity 3.2)
- with the map makers, define and experiment the map data feedback loop (activity 3.3)

The TN-ITS service allows for road authorities to efficiently and effectively publish changes of road data to any data user in a standardised way across Europe. The adoption of a pan-European common data specification and a technical interface enables map providers to quickly consume these changes and update their map databases accordingly, considering that these changes are coming from a trusted source.

This deliverable is a result of activity 3.3 and describes the steps towards the implementation of a Feedback Loop: a service which allows the stream of information back from the Map Providers as Data Users, to the Road Authorities as Data Providers, as a response to provided data.

2. Background and Context

2.1 Introduction

2.2 The ROSATTE project

In 2009, the ROSATTE deliverable D3.1 “Specification on Data Exchange Methods” stated as a Functional Requirement that “A feedback channel from in-formation providers back to enacting authorities shall be provided” to make it sure that it must be possible to provide feedback information to the enacting authorities about the integration process of the provided update information.

The same report describes the “Package Feedback” and states that one fundamental purpose of the feedback loop is to provide a log file, from Map Providers back to the ROSATTE Data Service Operator, describing the outcome when handling the delivered road safety attributes. A possible purpose of the feedback loop is to give the ROSATTE Data Service Operator a possibility to take appropriate actions according to the information retrieved from the received receipt. This might be to correct obvious technical mistakes or to send it further on to the Data Store operators and the Enacting authorities. The incremental data that has been transferred from the ROSATTE Data Service Operator to the Map Provider will not be repeatedly transferred again (unless in a full supply). This means that the Map Provider has to keep track of all received data regardless of if it was possible to handle it or not when first delivered. The Feedback Package defines the classes needed to support the feedback loop.

2.3 Sharing private sector data in the European data economy

EC working document: “Guidance on sharing private sector data in the European data economy” (25.04.2018) link

Already in January 2017 with the Communication ‘Building a European Data Economy’, the Commission put forward a first description of potential issues of data access in particular with respect to machine-generated data and with respect to platform-to-business relations. It also mentioned the importance of access to private sector data for public interest purposes.

The new working document is based partly on a study performed by the consultant EVERIS. It provides basic principles for business-to-business (B2B) and business-to-government (B2G) data. Common principles are transparency, shared value creation, respect for each’s others commercial interests, ensure undisturbed competition and minimise data lock-in. For B2G in addition there is e.g. proportionality in the use of private sector data by justification of clear and demonstrable public interest.

3. Stakeholders perspective on the Feedback Loop Service

3.1 Introduction

Since the start of the ROSATTE project one decade ago, the concept of a Feedback Loop Service has been explored with moderate enthusiasm by the stakeholders. The ROSATTE management team captured the interest of the Data Providers in this particular aspect of the road data exchange interface, which was then also translated by the technical team in the early specifications. However, this Feedback Loop Service was not implemented by the Data/Service Providers during this period, nor was it after the projected terminated and several operational TN-ITS services were providing changes of road data since. Also, during the follow-up pilots: the Transportation Pilot (EULF/JRC) and the CEF EIP A4.7 pilots, the Map Provider did not set-up the envisaged (web) service but instead provided feedback on an ad-hoc basis, often via email. This feedback was basically provided right after a service was launched and some fine tuning – mostly with respect to the Location Referencing – was required to get to an optimum performance of the service. A general sentiment in the past was that even if the Map/Service Providers would have set-up the Feedback Loop service, no road authority would have connected to it as it would require investments including resources to collect and review the feedback. So for a long time a response to the provided data in the form of a report in an email and some follow up calls was consider ok by the stakeholders.

3.2 Data Providers

3.2.1 Introduction

An online survey was conducted in October 2018 to collect the high-level expectations of the Data Providers on the Feedback Loop. The results of this survey were then reviewed and were presented and discussed at a TN-ITS GO Workgroup 3 workshop in Brussels on the 5th of October. Representatives of HERE, TomTom, MOW, IGN, DTTAS, FTA, STA and ERTICO attended this workshop.

3.2.2 Online questionnaire

To catch the full range of expectations it was decided to open up the questionnaire to all of the TN-ITS GO partners instead of limiting it to the Activity 3.3 partners. In total 10 parties responded. Upon request of the partners, the responses are reflected in an anonymous way. In total, 10 questions were formulated, some were open questions, others could be answered via radio buttons or checkboxes. Basically, we probed to understand why the feedback is important, what information – and level of detail is expected, under which conditions, and how swift the information should be made available.

3.2.3 Expectation from Data Providers

The question asked was:

"What is the high-level expectation from Data Providers regarding the feedback? What is important? Could you please prioritize? "

There emerged consensus that the Feedback Loop should be implemented by Map/Service Providers (in decreasing order of importance expressed by the Data Providers):

- to improve the data quality of the TN-ITS service of the Data Provider. This is generally the highest priority expressed by the Data Provider. The support of public service obligations was mentioned.
- to improve the quality of the map at the side of the Map/Service provider. This was generally a second priority interest by the Data Provider
- to learn if the provided data could actually be processed by the Map/Service provider. Of concern here is if the provided data was technical compliant to the TN-ITS specification schema, if the road feature attribute value is within a plausible range (e.g. obvious error, say 300km/h speed restriction inside a build-up area instead of 30km/h) and also if the location reference describing the spatial context of the road update could be decoded successfully by the Map/Service provider. In order for the Data Provider to be able to take appropriate corrective actions, the specific issue(s) per specific road feature need to be made available.
- to know if provided data has actually led to an update of the map at the side of the Map/Service Provider,
- to know if the provided update was already correctly reflected by the Map/Service provider, e.g. via an alternative source (mobile mapping, extended floating car data, etc.)
- to obtain 'safety related feedback' from the Map/Service Provider information. Driving patterns were mentioned. The Map/Service providers could consider this particular response as proprietary and subject to commercial licenses. As this topic could also touch upon data privacy matters, it seems not appropriate to address this in the TN-ITS GO project, at least not in this first stage.

3.2.4 Feedback Data: Rejection/Confirmation

Following up on the first question, the next question was:

"What is more important for Data Providers: to be informed if provided input is rejected by Data Users, or to get a confirmation this input led to an update of the map at the Data Users side?"

Several Data Providers expressed that both types of feedback are equally important. In the event of a rejection, Data Providers indicated they would like to know why the update was categorized as such. This includes the situation where the provided update could be correctly processed - complying to the TN-ITS schema, an attribute value within range and the location accurately matched – but where the Map/Service Provider claim the update is not correct, hence rejected. This could reflect a situation where a Map/Service Provider has

access to very recent (live) & reliable sources indicating the real-world situation is indeed different than suggested. It was also mentioned there was interest in receiving the 'correct' information in case a provided update was rejected.

3.2.5 Mandatory or voluntary Feedback Service

The question in the survey was:

"On which basis should a feedback service be implemented by TN-ITS data users (map providers)?" Mandatory/Voluntary/Others?

Here, a smaller majority indicated the Feedback Service actually must be implemented and should be operational by the Map/Service providers. About 40% of those who responded argued it should be a voluntary service. The latest view of the data licenses under which the data is shared shows that for all operational TN-ITS services in 2018 an Open Data license was chosen, such as Creative Commons Zero or 3.0 with Attribution. This implies that there is no legal requirement to set up a feedback service but, in the 'BY' condition, the attribution of the source is required. This is typically covered by the Map/Service providers in the legal notices they publish online on a regular basis – typically quarterly.

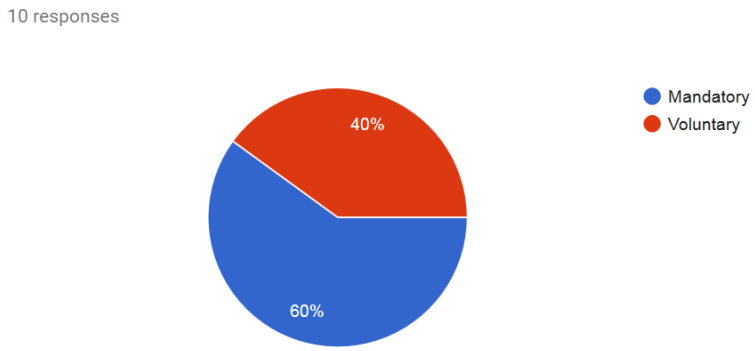

Figure 1 : Feedback Service: a voluntary or mandatory service

3.2.6 Level of detail of Feedback Data

The original ROSATTE specification already foresaw that a summary could be published by the Feedback Service. The question hence was:

"What 'Level of detail' should the feedback reflect?"

The small majority of the answers indicate that 'all' details need to be offered back to the Data Providers. This relates to individual road data updates, characterized by a dataset identifier and a road event identifier. This level of detail allows for following up on specific updates of road data changes. Several respondents also showed interest only in the

summarized information, presenting the statistics of the successful/failed-rejected provided changes of road data.

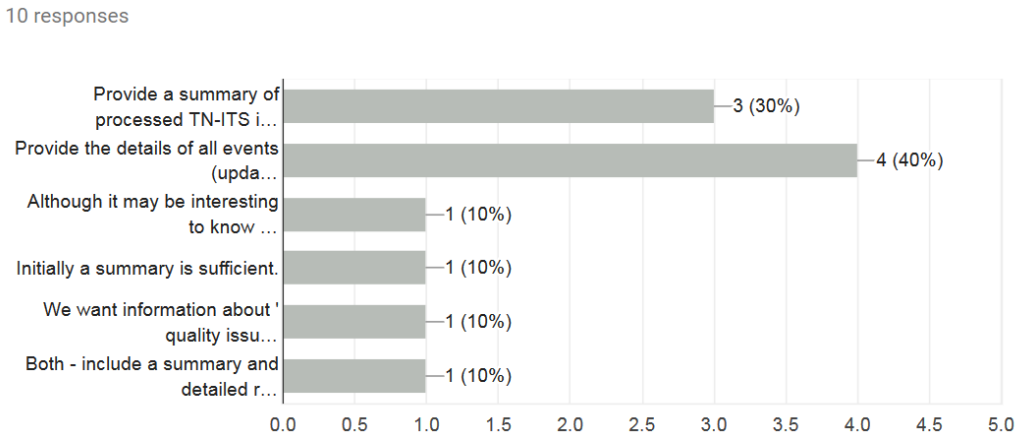

Figure 2 : The Feedback Service: summary and/or details?

3.2.7 More Feedback than originally defined in ROSATTE

The ROSATTE specifications already supported a number of codes for describing feedback data on the road event level, specifically in rejection situations. Therefore, the question asked was:

"Looking at the ROSATTE list (DecodeLocationError, DecodeLocation ErrorGeometry Mismatch, DecodeLocationErrorRoadDescriptor Mismatch, IllegalProperty Value, Schema VersionMismatch) are we missing key feedback?"

Whereas several Data Providers indicated this set of feedback rejection codes is sufficient and no key information is missed in the ROSATTE specifications, several others indicated it is too soon to say. In fact, based on experience gained by conducting the pilot it could be that some codes are found to be missing. It was also mentioned that during a first phase of a pilot, these codes could be important but after a break-in/tuning phase it is expected that the number 'fail-codes' occurrences will go down and that feedback on the success to the transaction if gaining importance. One Data Provider indicated this low-level feedback is OK but it does not support for higher level semantics to express data inconsistency or road safety issues on larger parts of the transport network. The latter might prove quite difficult to implement, though the added value may be substantial. It was also stated by several Data Providers that feedback on the content (attribute) provided is important too, so not just the rejection codes.

3.2.8 Required Feedback information

We already looked into the overall service, whether it should be a voluntary or mandatory implementation. Now the same question addresses the information. The question was:

"What feedback information should be mandatory, what optional? "

The input we received reflects consensus that all 'rejections/poor quality' should be mandatory pieces of information and Map/Service Providers must share this information with the Data Providers. To several, a successful map update performed by the Map/Service Provider should also be mandatory in sharing, several others however classify this as optional. One road authority emphasized that Feedback Data should all be mandatory for safety related information. Content error (attribute errors) are also stated as information the Map Provider must share feedback on. One authority indicated that is important to know if an update to certain location or a certain attribute repeatedly fails.

3.2.9 Access to the Feedback Loop Service

The Map/Service Providers would set up a Feedback Service to meet the request of the Data Provider to improve the quality of the data sharing service by offering a status on the provided data reflecting the success of the processing of this shared data. The question asked was:

"Who should get access to the feedback data?"

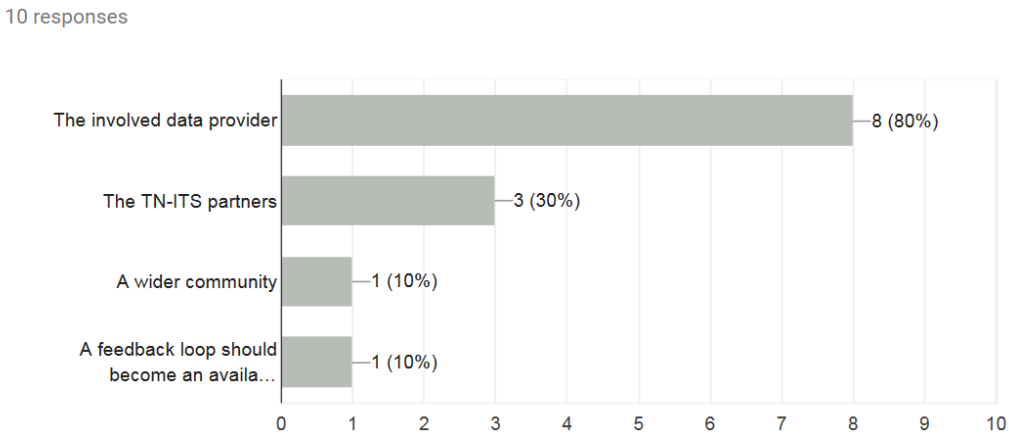

Figure 3 : Access to the Feedback Service

A large majority of the Data Providers indicated that the feedback data should only be shared with the authority that provided the original data. A substantially lower percentage believes the feedback should be shared among the TN-ITS partners. One party mentioned that it should be shared with a wider community, another supported that the feedback data should be shared as Open Data.

3.2.10 How to access a Feedback Loop Service

Where in the past – in the ROSATTE days - the Feedback Data was shared as texts in an email or in a report discussed over a call, the question now was:

"How to get access to feedback information?

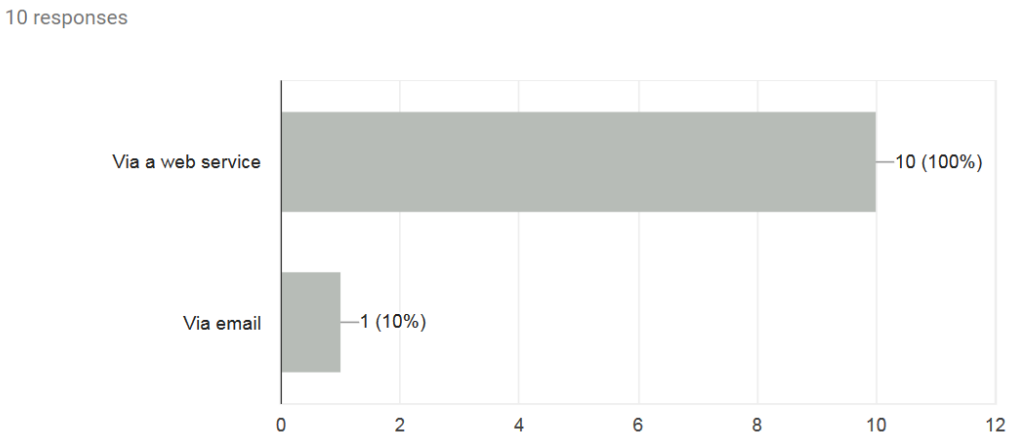

Figure 4 : Access to a Feedback Service

Clearly, the majority of the Data Providers favour a web service to access Feedback Data at the side of the Map/Service Provider. Only one authority also added email as an interface to share Feedback Data. The latter is probably linked to some – at least one – authorities which already have a community feedback chain in place that is email based. If the email message from the MAP/Service provider could be mapped into an available schema, the manual processing by the authority could be readily supported.

3.2.11 The dynamic aspect of the Feedback Loop

Immediately after the Map/Service Providers has downloaded the dataset containing the TN-ITS road data updates from a Map Provider, the processing can start and Feedback Data can be produced. When exactly this data can/should be shared depends upon the expectation of the Data Provider and upon the 'level of readiness' of the Map/Service Provider. For example, it could take several days to weeks before a provided road update is finally either accepted or rejected by the Map Provider, as occasionally alternative sources are needed to make a final decision.

The question was:

"How 'dynamic' should the feedback loop be?

A majority of four Data Providers indicated that a monthly fresh delivery of Feedback data is what they would require. One mentioned yearly updates, another one quarterly update. Two parties answered 'weekly'. Three Data Providers stated that they would like to see the individual transactions and their actual status on the side of the Map/Service providers with the Feedback Service as a rest webservice. One party mentioned that the Feedback Loop needs to be dynamic and adaptable depending on the nature of the problem and prioritization of the resulting outcome. This would require to be customizable based on user needs, volume of transaction, prioritization.

3.3 Map/Service Provider

3.3.1 Introduction

At least one face-to-face meeting and two telephone conferences were held in Q3 and Q4 of 2018 to discuss and consolidate the position of Map Providers with respect to the TN-ITS Feedback Loop (Service). As a principle, the map providers HERE and TomTom are supportive of defining and piloting a feedback loop mechanism to help the Data Providers to improve their TN-ITS services.

The general terms and conditions of such a Feedback Loop service have been defined and are represented on a high level in the next chapter. This serves as a basis for the technical specification of the interface for the exchange of feedback data.

As the position of the Map/Service provider impacts the technical design of the interface, this exercise had to be performed first. For example, the fact that access to Feedback Data will be available only to the respective Data Provider will require implementing authorisation/authentication framework or protocol.

The development and testing of the Feedback Loop Service will start in 2019: as a first phase, the map providers will provide feedback upon the information which is currently already available at the side of the Map Providers when doing the intake of the published TN-ITS data. In a second phase a restfull web service will be set up by the Map/Service Providers to allow (continuous) access to Feedback Data by Data Providers.

3.3.2 General terms of engagement

The Map/Service Providers reserve the right to draft and use their own Feedback Loop Service agreement. The details of such agreement can't be shared, but the general items will be common between the different Map/Service Providers. Elements of a TN-ITS Feedback Agreement would typically include but not limited to:

- A definitions section describing the parties in the data chain, their roles, and description of general terminology as:
    - "Confidential information"
    - "Feedback"
    - "Open Data"
    - "Personnel"
    - "Purpose"
    - "Suppliers"
- A section describing that Feedback Data can only be used for internal purposes by Data Provider
- A section reflecting a Non-Disclosure clause which allows for the publication of (results/assessment) of Feedback data if both the Map/Service and Data Provider agree. One important aspect is that access to the generated Feedback Data will be limited to the TN-ITS Data Provider on which input the data applies. Therefore, it will not be shared with other parties, nor will it be offered as Open Data.

- A section stating that the Data Provider has no IP rights on Feedback Data provided by Map Providers
- A section which indicates that Feedback Data may be shared by the Data Provider with their suppliers. Typically, if the Data Provider sources changes of road data from e.g. a municipality, before to publish them on a TN-ITS service, the Data Provider can share Feedback Data with their source
- A section covering Liability, stating that the Feedback Data is provided “as is”, without any warranty, expressed or implied, etc.
- As standard, the typical Feedback Loop Agreement will include a termination clause.

3.4 Technical considerations for a Feedback Loop Service

The TN-ITS Feedback Loop service:

- Will be based on CEN Technical Specifications TS 17268, made available since December 2018
- Access will require Authorisation and Authentication protocol or framework (e.g. OAuth)
- Is a rest web service with a read API available to the Data Provider to get access to:
    - the status of an individual RoadFeatureEvent per database. This will give:
        - time at when the status information was created
        - status information (accessed, in progress, rejected, accepted)
        - details of rejected
    - the statistics of rejected/accepted, time, and status (not started/in progress/finalized) per database

As the CEN TS17268 Technical Specifications were only released by the end of December 2018, the team could not continue – if necessary – on his specification. This review and potential extension will be done in Q1-Q2 2019, with the Activity 3.3 core team.

3.5 The European Commission

Position of the EC on data sharing, G2B, B2G etc.to be described in the final version.

4. Specification of the TN-ITS Feedback Loop

4.1 CEN TS 17278 on the Feedback Loop

To be described in the next release of this document.

4.2 Change request towards CEN TS 17278

5. To be described in the final release of this document.

5.1 Time plan

(Describe the time plan associated with the steps mentioned in paragraph 5.2)

6. Testing of the Feedback Loop

6.1 Introduction

(Describe the current status of the TN-ITS services.)

6.2 Implementations

At TomTom and HERE

6.3 Time plan

(Describe the time plan associated with the steps mentioned in paragraph 6.2)

7. Conclusions

(Preliminary)

This deliverable addresses the TN-ITS Feedback Loop, a harmonized data chain between Map/Service Providers and Data Providers, offering feedback on published TN-ITS information to the respective Data Provider, with the objective to improve the quality of the service of the Data Provider. After the introduction, a first chapter elaborates on the expectations of the Data Providers regarding the Feedback Loop. These are based on a survey send out to all the TN-ITS GO partners that (will) have TN-ITS services up-and-running. Whereas sometimes there are different opinions on the subject, a general picture emerged. A next chapter reflects the position of the Map/Service Providers, having considered the formulated expectations as well as the company's business position. An outline for a common Feedback Loop Agreement was defined. With the Technical Specifications TS 17278 released only on December 2018, which already has a basis of the Feedback Loop, the next chapters will elaborate on this specification, possible extensions (change request), as well as the testing of the interface. The evaluation of the Feedback Loop will be part of another Deliverable.

8. References