Quality of Safety-Related and Real-Time Traffic Information Services

Practical Guidelines

EU EIP SA 4.1: Determining Quality of European ITS Services

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Preface

This document gives practical guidelines about how to determine the quality of SRTI (Safety Related Traffic Information) and RTTI (Real Time Traffic Information) messages from a data supplier such as a Traffic Information Centre (TIC) or a Traffic Management Centre (TMC). The data categories of SRTI and RTTI are listed in Annex 1: EC Directive and Delegated Regulations.

The document is prepared as part of the sub-activity 4.1 of the EU EIP project (cf. Annex 2: EU ITS Platform (EU EIP)).

TABLE OF CONTENTS

1. Introduction: Quality of traffic information

These Guidelines give a short practical description of what to do in order to measure and to document the quality of traffic information, generated by a data supplier. A data supplier in this context is often a Traffic Information Centre (TIC) or a Traffic Management Centre (TMC), in the following text called “traffic centre”.

The Guidelines aim to support the staff at traffic centres, when implementing quality assessment and quality management practices for their data provision.

The Guidelines will also help to report quality levels to the users of the traffic information as well as to the European Commission (EC), as required in the Delegated Regulations/Acts concerning SRTI (Safety Related Traffic Information) (Ref 1) and RTTI (Real Time Traffic Information) (Ref 2). (See also Annex 1: EC Directive and Delegated Regulations).

The Guidelines contain:

- definitions of relevant quality parameters,
- explanations of how to measure quality parameters, and
- specifications of quality requirements for each parameter.

The Guidelines are focused on event-oriented SRTI and RTTI (as e.g. accidents), as defined by the mentioned EC Delegated Regulations/Acts. Status-oriented SRTI/RTTI (as e.g. traffic flow) is not considered. Furthermore, these Guidelines focus on the quality of the data itself. Quality of the RTTI/SRTI service provision is not considered.

This document is based on other EIP documents, especially the Quality package for SRTI and RTTI services (Ref 3), (called “Quality package”). The Quality package contains further guidance on status-oriented SRTI and RTTI, as well as on quality of service provision. Furthermore, the Quality package describes 10 quality assessment methods and practices.

2. Why quality

Providing the right traffic information at the right time to drivers improves traffic flow and safety. In order to be useful, the traffic information must have a certain quality.

Consequently, data suppliers are required to:

- to know and to monitor the quality of data,
- to set goals for the quality,
- to report quality levels, and
- to analyse problems and eventually improve the data provision.

In order to be able to do this:

- it must be specified, where to measure quality,
- quality parameters must be defined,
- quality levels must be defined,
- it must be specified, how to measure quality, and
- quality requirements must be set.

These specifications, definitions and requirements (described in the following chapters) should be applicable for different types of traffic information and in different data supplier environments, thus allowing transparent and comparable quality assessment.

3. Where quality

These Guidelines consider the quality of traffic information within a specific part of the information process.

This information process can be illustrated by the Value Chain for SRTI (Safety Related Traffic Information) and RTTI (Real Time Traffic Information) services, as shown in Figure 1 below.

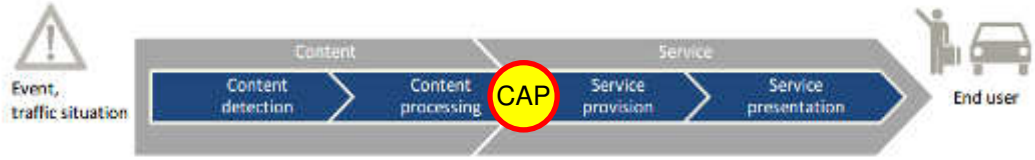


Figure 1: Value Chain of SRTI and RTTI services with CAP indicated

These Guidelines focus on the Content part of the Value Chain. The Content part, which is typically in the responsibility of a data supplier, covers processes between the detection of a real event or a traffic situation until the provision of related information in a Content Access Point (CAP). At a CAP, the traffic information is (typically) made available to many service providers via e.g. a data portal. This point can also be called a Single Point of Access (SPA).

On the other hand, aspects on the Service part of the Value Chain have been covered by the Traveller Information Services Association (TISA). TISA has published a Position paper on this (Ref 4), describing quality aspects as being important for the end users und to be met by service providers.

Further details about Value Chains can be seen in Annex 3: Value chains.

4. What is quality

What is quality of traffic information? As mentioned in chapter 2, traffic information with a good quality is the right traffic information at the right time.

Thus, the following items must be covered by the quality parameters:

- Time
- Right information.

For **time**, two quality parameters have been defined:

- Timeliness
- Latency.

These two parameters can be explained as follows (cf. Figure 2 below):

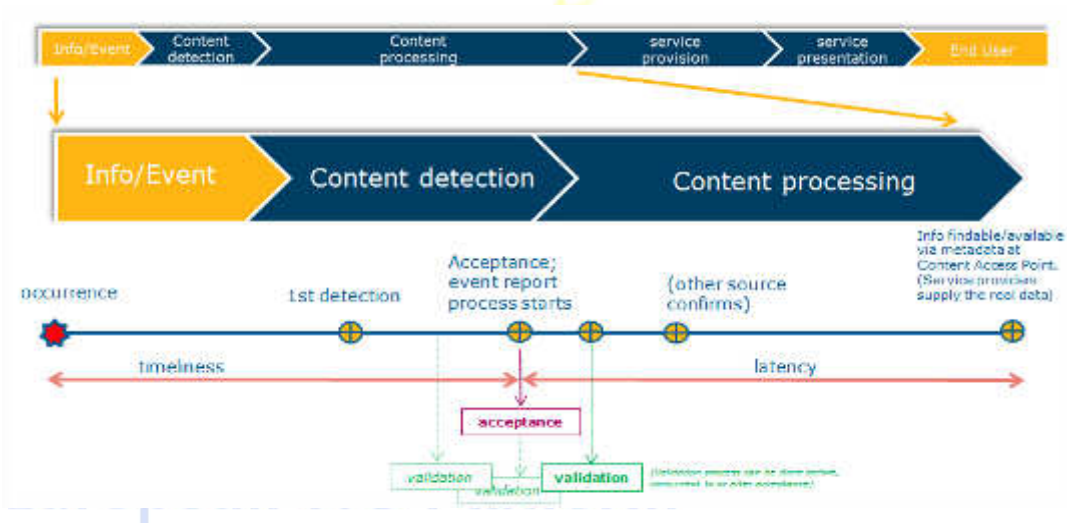


Figure 2: Value Chain with timeliness and latency indicated

Timeliness is the time span from the occurrence of an event until it is detected and accepted at the traffic centre. Latency is the time span from the acceptance until the information (message) about the event is available at the CAP/SPA. Validation can start/end either before or after the acceptance. Validation depends on an organization's quality policy, and it is not used in the definitions of the quality parameters.

For **right information**, three quality parameters have been defined:

- Location accuracy
- Classification correctness
- Event coverage.

Location accuracy tells how correct the reported location is, Classification correctness tells if the classification (the selected event) is correct, and Event coverage describes the percentage of the occurred events that have been reported.

The definitions (with a more precise language) of these five quality parameters are shown in Table 1 below. This is a copy from the Quality Package (Ref 3).

Table 1: Definitions of quality parameters

Quality parameter	**Definition**
Timeliness (start)	The time between the occurrence of an event and the acceptance of the event.
Timeliness (update)	The time between the end or (safety-) relevant change of condition and the acceptance of this change.
Latency (content side)	The time between the acceptance of the event or its end or (safety-) relevant change of condition and the moment the information is provided by the content access point.
Location accuracy	The relative precision of the referenced location for the published event with respect to the actual location of the actual event (NB: two possibilities, if appropriate - for an area or a road).
Classification correctness	100 % minus the percentage of the published events which are known to be not correct (concerning actual occurrence of this event type / class). *(NB: It is recommended to use time and place for matching events between data sets).*
Event coverage	Percentage of the actually occurring events which are known to be correctly detected and published by type / class, time and location (i.e. Detection Rate).

The definitions of important terms, as used in this document, are shown in table 2 below.

Table 2: Definition of important terms

Term	Definition
Content Access Point (CAP)	A Content Access Point is a place (e.g. data portal) where information is available for users. The point can also be called a Single Point of Access (SPA). The CAP is shown on figure 1.
National Access Point (NAP)	A National Access Point shall constitute a Single Point of Access (SPA) or CAP for users (national or international), or point to one or more CAPs/SPAs.
First detection	The first detection of an event is the first indication of the event at the traffic centre. The time of the first detection can be the same as the time of acceptance. If some validation or other considerations are needed before acceptance, first detection is before acceptance.
Acceptance	An event is considered accepted when it has been found trustworthy according to an organization's quality policy, so action will be taken to have the event report processed and published at the Content Access Point (CAP).
Validation	An event is considered validated, when it has been detected (manually or based on technical means) by a source different from the source originally detecting the event, as stipulated by an organisation's quality policy. Validation can start/end either before or after the acceptance. Validation is not used in the definitions of the quality parameters (table 1).

5. Quality levels

In order to be able to communicate the quality of the traffic information from a data provider in a simple way, three quality levels have been defined:

** Basic*

*** Enhanced*

**** Advanced*

At the two lower quality levels (* Basic and ** Enhanced), it is not required to have a continuous monitoring of the road network covered. A continuous monitoring would be needed in order to detect all events and to know the point in time an event has occurred (the ground truth). Consequently, the quality parameter Event coverage (requiring knowledge of ground truth) will not have to be measured and Timeliness will only have to be measured partly (the part not requiring knowledge of ground truth). At the highest quality level (*** Advanced) the ground truth must be known, and all five quality parameters must be measured. This is further explained in chapter 6.

The requirements for the quality parameters are given in chapter 7.

For the traffic information from a data provider to obtain a certain quality level, all required quality parameters must at least be at that level.

6. Measuring Quality

This chapter describes how to measure the quality parameters, defined in chapter 4 above.

6.1. Basic and enhanced levels

In order to fulfil the requirements for quality levels * *Basic* and ** *Enhanced*, the following quality parameters (cf. chapter 5) must be measured:

- Timeliness start (partly)
- Latency (content side)
- Location accuracy
- Classification correctness

6.1.1. Timeliness start (partly)

Timeliness and Latency are time spans/durations. They could be measured with a stop watch, but this is not practical in most cases. So the points in time of events and actions are noted manually or logged automatically, and the durations can be found.

The Timeliness (start) is the time between the occurrence of an event and the acceptance of the event.

At the * *Basic level* the Timeliness (start) is not measured.

At the ** *Enhanced level* only a small part of Timeliness (start) is measured. It is the time or the duration from the first detection of an event until acceptance.

The time of the first detection (the first indication of an event) can be the same as the time of acceptance. If some validation or other considerations are needed before acceptance, first detection is before acceptance.

At what time an event is accepted depends on the practice in the traffic centre. Events reported by some sources may be accepted as soon as they are received. Events reported by other sources may have to be validated first by calling e.g. the police before being accepted. The time of acceptance may be available as the time (which may be logged) of receipt of a message from a trustworthy source. Acceptance may also take place during a telephone conversation with a trustworthy source. In this case, the time of acceptance is not logged, and it will have to be estimated. If start and end of the telephone conversation are logged, the estimate might be the point in time in the middle of these two logged points in time. If the first logging of a time is the point in time when

the text covering the telephone conversation is logged, this point in time can be used with a small adjustment for the typical duration of ending a telephone conversation and typing it into the computer. This adjustment can be found as the average of a small number of simple measurements with a manual timer. This adjustment is then added to all the durations found from the logged points in time.

6.1.2. Latency (content side)

The Latency (content side) is the duration from the acceptance of the event or its end or (safety-) relevant change of condition and until the moment the information is provided by the content access point.

How to find the point in time of acceptance is explained above in section 6.1.1.

At what point in time the event is provided by the content access point can hopefully also be found from a log. If only the point in time when a message is sent out from an IT-system in the traffic centre (the time when the operator presses “send” or “enter”) is known, it will have to be estimated, how long the computer systems take from this “send” until the message is available at the content access point. This duration must be added to the duration between the logged points in time. Since this small additional duration is due to processing in the IT system(s), it may be fairly constant. Thus it will only have to be measured one or a few times a year and, when a new IT system is taken into operation.

At the * *Basic* and ** *Enhanced* levels, the Latency (content side) only has to be measured at the start and at the end of an event.

The description above explains how to measure the Latency at the start of an event. The Latency at the end of an event is measured similarly. The start of the latency period is when it is accepted, that an event has ended. This could be, when the police calls and tells that the road again is free. The duration is measured or estimated as explained above for the start time.

6.1.3. Location accuracy

The Location accuracy is the relative precision of the referenced location for the published event with respect to the actual location of the event (ground truth). The quality requirements are given separately for two location types: Areas and roads.

As seen from table 3, in chapter 7 the location on a road can be indicated as being between two intersections or exits on a road/motorway or as a point on the road. A point

on the road can be indicated by coordinates (from a GPS device) or by km and meters from the start of the road as written on the km-markers along the side of the road.

Most incidents (including accidents) only cover a short distance on the road, and they are located as a point. Road works may cover short or long distances. Consequently, a road work will often have to be located by its start point and by its end point or by its start point and by a length.

If the event covers an area (as e.g. a sudden storm), the location is given as a region, e.g. a municipality or a part of the country.

The Location accuracy is always found from the first message which was sent out (disregarding “preliminary messages” or “not confirmed messages”). The corresponding ground truth about this event would be the location reported by an independent, trustworthy source. The first source may be a driver and the trustworthy source can be the police having arrived at the location during the duration of the event.

If the first source is a trustworthy source and no other source reports the location, the Location accuracy is considered to be correct.

6.1.4. Classification correctness

The class/type of an event can be:

- Known to be correct

  E.g.: An independent, trustworthy source as the police has confirmed the event type.

- Known to be not correct

  E.g.: A misunderstanding has been found, and an incorrect event class/type is corrected.

- Not known

  No information from an independent, trustworthy source has been available, as if e.g. animals on the road are reported to a traffic centre, which quickly sends out a corresponding message, but nothing more is heard about the animals. It is then not known if there were animals on the road or not.

The Classification correctness is hundred percent minus the percentage of the published events which are known to be not correct (concerning actual occurrence of this event type/class). Knowledge of time and place of an event can be helpful to identify the event. Messages which cannot be identified as having a correct or an incorrect class/type shall be excluded when calculating Classification correctness. An event type, which is later changed, when more information becomes available, is considered as an error only, if it can have had a consequence for the user behaviour. Typically a change of event type

within the same event class is not considered an indication of an error in the event type, which was changed. See examples below.

The Classification correctness concerns the correct classification of an event. It is measured by comparing the classification of the event in the first message which was sent out (disregarding “preliminary messages” or “not confirmed messages”) and the classification reported by an independent, trustworthy source, if this is possible. The classification in the last message sent out will typically come from the police or from a rescue service at the site of the event, and it can be used as the correct classification. If the classification in the last message is not from an independent, trustworthy source, it may still be used to check, if the first message is known to be not correct.

If the classification has been more detailed in the last message compared to the first message, the classification is still correct. An example of this could be: Classification in first message: “Accident” and classification in last message: “Serious accident”. If the classification in the first message differs from the classification in the last message, it is checked, if there is a valid reason for this. The first classification could be “Animals on roadway” and the last one “Accident”. This could be, because there was an accident caused by the animals on the roadway and an end message (the road is again free) was sent out, when the accident had ended. In this case, the classification is still correct. However, if the event in the first message is different from the event in the last message, and there is no clear explanation why, the classification is known to be not correct.

6.2. Advanced level

In order to fulfil the requirements for the quality level *** *Advanced*, the following quality parameters (cf. chapter 5) must be measured:

- Timeliness (start)
- Timeliness (update)
- Latency (content side)
- Location accuracy
- Classification correctness
- Event coverage

6.2.1. Timeliness (start)

The Timeliness (start) is the duration from the occurrence of an event and until the acceptance of the event. In order to know the time of the occurrence, the ground truth must be known, e.g. from video monitoring or from some other automated measurement.

The time of acceptance is found as described above in section 6.1.1.

6.2.2. Timeliness (update)

The Timeliness (update) is the duration from the end or (safety) relevant change of condition and until the acceptance of this change. Again, the ground truth must be known in order to know the time of the end or the (safety) relevant change of the occurrence. The time of acceptance is found as described above in section 6.1.1.

6.2.3. Latency (content side)

The Latency is found as described above in section 6.1.2. Latency for the (safety) relevant changes of condition must also be found.

6.2.4. Location accuracy

The Location accuracy is found as described above in section 6.1.3.

6.2.5. Classification correctness

The Classification correctness is found as described above in section 6.1.4.

6.2.6. Event coverage

The Event coverage is the percentage of the actually occurring events which are known to be correctly detected and published by type/class, time and location (i.e. Detection Rate). In order to know all the occurring events, the ground truth must be known, e.g. from video monitoring or from some other automated measurement.

6.3. Procedures

Even though it has been attempted to make the definitions of the quality parameters very precise, different practices/procedures in Traffic Management Centres/Traffic Information Centres may still have some influence on the values of the quality parameters, and comparisons between different Centres may not be possible. Thus, it is important to describe the practices/procedures in use together with the measured results of the quality

parameters. This will allow Centres with comparable procedures to compare values of quality parameters.

7. Quality requirements

From the work in EIP+ and in EU EIP, the quality criteria shown in Table 3 have been suggested (cf. Ref 3).

Table 3: Initial Target Values for the Level of Quality

Parameter	*** Basic**	**** Enhanced**	***** Advanced**
Timeliness start (95%)	-	Acceptance after first detection < 10 min	Detection & acceptance < 5 min after event occurrence
Timeliness update/end (95%)	-	-	Detection & acceptance < 10 min after event change/end
Latency (content side) (95%)	< 10 min[1]	< 5 min[1]	< 3 min
Location accuracy (95%) - Area	Administrative region	Geographic area ; 10 km accuracy or Administrative region	Geographic area; 5 or 10 km accuracy
Location accuracy (95%) - Road	Link between intersections[2]	< 10 km or link between intersections[2]	< 5 km[2]
Classification correctness	> 85 %	> 90 %	> 90 %
Event coverage	-	-	> 80% of all occurring events

[1] For the first two levels (basic and enhanced), it is only necessary to measure latency at the beginning and at the end of an event.

[2] For an event with a length, like many road works, both the start point and the end point must fulfil the given criteria.

Explanations:

- Timeliness start (95%): The criteria must be fulfilled for at least 95 % of the measured values.

- Timeliness update/end (95%): The criteria must be fulfilled for at least 95 % of the measured values.
- Latency (content side) (95%): The criteria must be fulfilled for at least 95 % of the measured values.
- Each Latency and Timeliness must be calculated separately for the start, update and end of an event, meaning that e.g. at least 95 % of the measured values of Latency (content side, start) must fulfil the criteria.
- Location accuracy (95%) - Area: The criteria must be fulfilled for at least 95 % of the measured values.
- Location accuracy (95%) - Road: The criteria must be fulfilled for at least 95 % of the measured values.
- Classification correctness: More than the required percentage of the events must have a classification which is known to be correct. Messages which cannot be identified as having a correct or an incorrect class/type shall be excluded when calculating Classification correctness. (Cf. section 6.1.4).
- Event coverage: More than the required percentage of the actually occurring events must be known to be correctly detected and published by type/class, time and location.

For the traffic information to obtain a certain quality level, all quality parameters must at least be at that level.

8. Examples

As a first example, only a few accidents have been included just to indicate, how the quality parameters can be found. (More examples will be included later).

From the Traffic Management Centre at DRD, out of 35 events classified as accidents in the period 19 June 2017 0:00 till 20 June 17:30, 5 events have randomly been extracted. From the resumes of these events, the following data have been found:

2017-06-19

No	Event	Start info. received	First traffic message sent	End info. received	Cancel traffic message sent	Event un-changed	Location un-changed
1	Accident	07:13	07:15:26	-	07:45:45	Yes	Yes
2	Accident	23:14	23:21:31	01:32	01:32:15	Yes	Yes

2017-06-20

No	Event	Start info. received	First traffic message sent	End info. received	Cancel traffic message sent	Event un-changed	Location un-changed
3	Accident	08:24	08:26:44	08:55	08:57:02	Yes	Yes
4	Accident	07:33	07:37:56	08:42	08:43:31	Yes	Yes
5	Accident	14:26:11	14:27:43	16:22	16:23:43	Yes	Yes

Explanations of the table headings and of the procedures used to find the quality parameters are listed below:

"Event" is the type of the event as mentioned in the traffic messages.

"Start info. received" is (for the shown examples) the point in time of the start of the telephone call during which the Traffic Management Centre (TMC) is first informed about the accident.

"First traffic message sent" is the point in time, when the first traffic message is sent to the Content Access Point, when the operator presses "enter". The duration from this point in time until the message is available at the National Access point has not been

measured. From theoretical considerations, it is assumed to be less than 30 seconds, and it is not taken into the calculations. It will have to be measured at a later time.

“End info. received” is the point in time of the telephone call with the police or a person from the rescue service at the site of the previous accident informing the TMC that the road is again opened.

“Cancel traffic message sent” is the point in time, when the cancel traffic message (the road is cleared) is sent to the Content Access Point.

“Event unchanged” means that the event in the first message is the same as the event in the last (cancelling) message. The police or one or more persons from the rescue service have been at the site of the accident and confirmed that the event type reported in the last message was correct.

“Location unchanged” means that the location in the first message is the same as the location in the last (cancelling) message. The police or one or more persons from the rescue service have been at the site of the accident and confirmed that the location reported in the last message was correct.

The resulting values of the quality parameters are listed below:

- Latency (content side) start: 1 over 7 minutes. All under 10 minutes.
- Latency (content side) end: All under 3 minutes.
- Location accuracy: Link between intersections and all correct.
- Classification correctness: All correct.

In this example, all parameters except “Latency (content side) start” are sufficient for the quality level ** *Enhanced*. However, “Latency (content side) start” is only sufficient for the quality level * *Basic*, so the quality level for the traffic information is: * *Basic*.

Note: a sample of five accidents is too small in order to check if 95 percent of all latencies meet specific quality requirements. Thus, this example only gives some indication of the quality level. For a significant quality assessment, the sample size would have to be considerably increased.

9. References

Ref 1, Delegated Act SRTI:

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. Available on: http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32013R0886

Ref 2, Delegated Act RTTI:

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. Available on: http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32015R0962

Ref 3, Quality package:

Quality of Safety-Related and Real-Time Traffic Information Services - Quality package. Version 1.1 of 26 February 2018.

Ref 4, TISA Position on Quality of Traffic Information:

Traveller Information Services Association (TISA).Quality Working Group, October 2016. Available on: http://tisa.org/wp-content/uploads/QWG16001_TISA_Position_paper_Quality_Of_Traffic_Information_v12a_final.pdf

Annex 1: EC Directive and Delegated Regulations

Short descriptions of the ITS Directive and the relevant Delegated Regulations are given below.

ITS Directive 2010/40/EU

Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010, establishes a framework in support of the coordinated and coherent deployment and use of Intelligent Transport Systems (ITS) within the Union.

For the purpose of this Directive, there are some areas considered as priority for its development. Those priority areas are the following:

i. Optimal use of road, traffic and travel data.

ii. Continuity of traffic and freight management ITS services.

iii. ITS road safety and security applications.

iv. Linking the vehicle with the transport infrastructure.

Within previous priority areas, six priority actions for the development and use of specifications and standards have been defined:

a) The provision of EU-wide multimodal travel information services.

b) The provision of EU-wide real-time traffic information services.

c) Data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users.

d) The harmonised provision for an interoperable EU-wide eCall.

e) The provision of information services for safe and secure parking places for trucks and commercial vehicles.

f) The provision of reservation services for safe and secure parking places for trucks and commercial vehicles.

For each priority action, the Commission can develop delegated acts in order to adopt the specifications. For the moment Commission Delegated Acts for priority actions (a), (b), (c), (d) and (e) have been developed.

Commission Delegated Regulations

Delegated Regulations, related to these Practical Guidelines, are the following:

Priority action b. Commission Delegated Regulation (EU) No 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 - No 2015/962.

The data categories as listed in the Delegated Regulation are:

1. Static road data (e.g. road network geometry, traffic signs and speed limits);
2. Dynamic road status data (e.g. road closures, roadworks, accidents and incidents and dynamic speed limits;
3. Traffic data (e.g. traffic volume, location and length of traffic queues and travel times).

Priority action c. 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 - No 886/2013.

The data categories as listed in the Delegated Regulation are:

(a) Temporary slippery road;

(b) Animal, people, obstacles, debris on the road;

(c) Unprotected accident area;

(d) Short-term road works;

(e) Reduced visibility;

(f) Wrong-way driver;

(g) Unmanaged blockage of a road;

(h) Exceptional weather conditions.

Annex 2: EU ITS Platform (EU EIP)

Activities and sub-activities

The EU ITS Platform focuses the cooperation on five activities:

- Activity 1: EU ITS Platform Governance and Management
- Activity 2: Monitoring and Dissemination (including ITS Deployment Guidelines)
- Activity 3: Feasibility study East-West Corridor and first pilot implementation
- Activity 4: Harmonization Cluster
- Activity 5: Evaluation.

The scope of **Activity 4** is to define the specifications to be follow for Directive implementation and it is sub-divided into seven sub-activities, which can be developed simultaneously. Sub-activities of Activity 4 "Harmonization Cluster" are the following:

- ✓ Sub-activity 4.1: Determining Quality of European ITS Services
- ✓ Sub-activity 4.2: Facilitating automated driving
- ✓ Sub-activity 4.3: ITS Deployment Road Map Update
- ✓ Sub-activity 4.4: Cooperative ITS Services Deployment Support
- ✓ Sub-activity 4.5: Liaison and harmonization on interfaces for data exchange
- ✓ Sub-activity 4.6: Monitoring and harmonization of Single Point of Access
- ✓ Sub-activity 4.7: Provision of updates of ITS spatial road data.

These Practical Guidelines are developed under Sub-activity 4.1, which is briefly described below.

Scope and objectives of EU EIP sub-activity 4.1: Determining Quality of European ITS Services

The scope of sub-activity 4.1 is the development of quality requirements and quality assessment practices for all ITS Directive priority services involving the road authorities and operators in a major role, building up on results from EIP and EIP+, widening the scope to other priority services than for the following priority actions of EU EIP:

- Priority action b) The provision of EU-wide real-time traffic information services.
- Priority action c) Defining data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users.

To pursue the sub-activity scope definition, four tasks have been identified to be developed to achieve the objectives of the sub-activity. The sub-activity 4.1 tasks are the following:

- Task 1: Identify stakeholders, value chains, recommended work processes, quality assurance, and introduction paths for road operator relevant ITS Directive priority services.
- Task 2: Propose European minimum quality requirements and quality assessment practices for all ITS Directive's priority services involving road authorities/operators in a major role.
- Task 3: Validate and improve the quality criteria, requirements and assessment practices proposed.
- Task 4: Work towards specifying optimum quality for selected priority services.

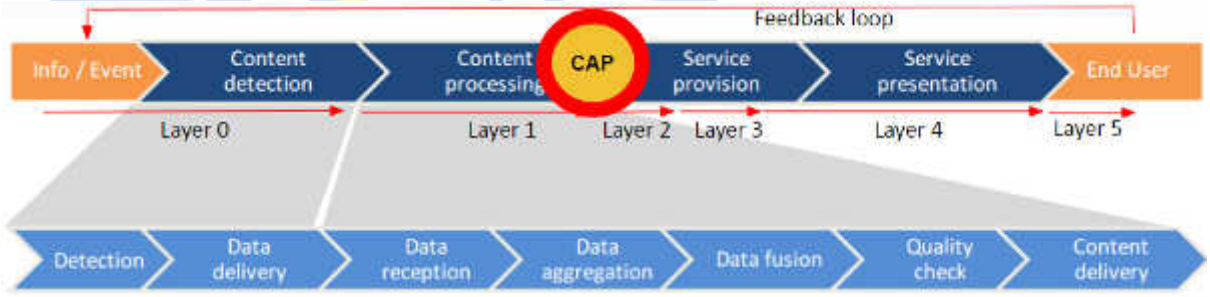
Annex 3: Value chains

TISA definition of value chain

TISA has defined the terms and definitions for the traffic and travel information value chain. The value chain in the most simplified form is shown in the following figure:

At the highest level, two elements can be identified: Content and service. Content is referred to the observation of an incident or the measurement of a traffic condition, while service is referred to the transfer of the information and its maintenance.

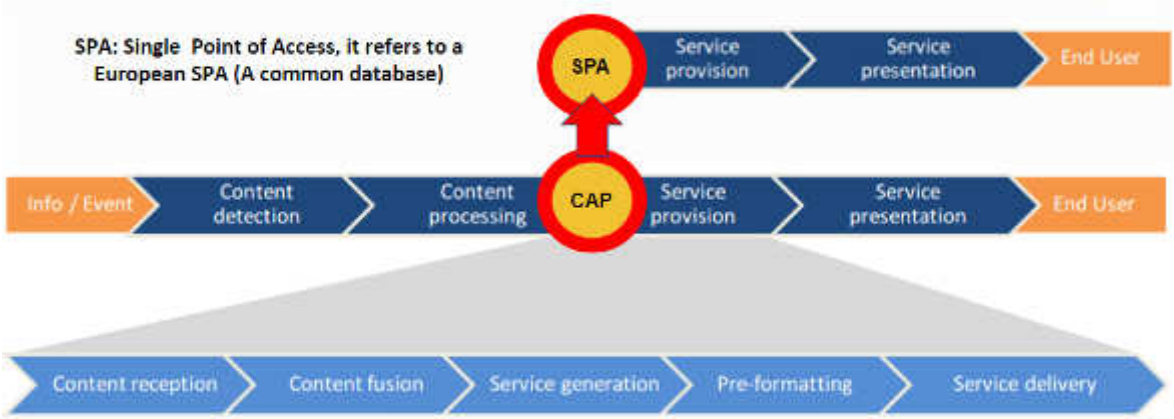
The Content segment expanded to show detailed functional sub-segments.



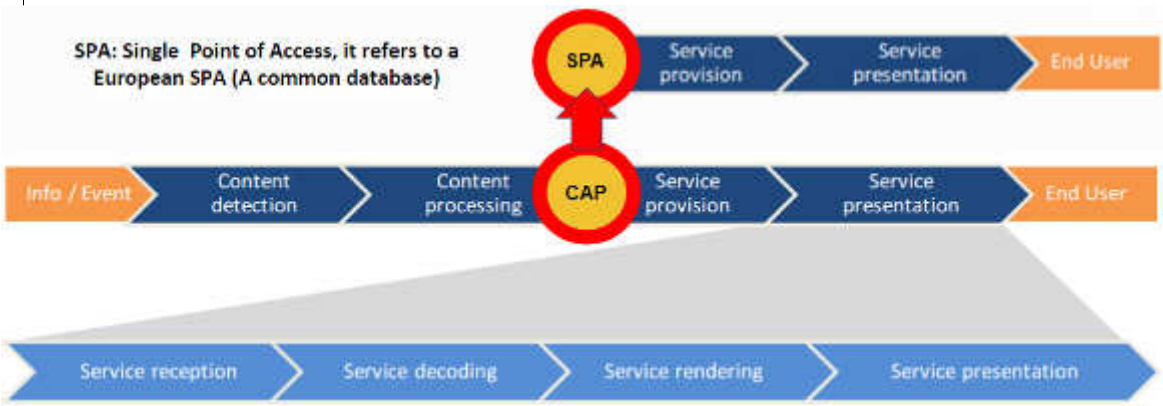
- DETECTION: The process of observing a measurement sample by means of technical equipment (detection could also involve human observation).
- DATA DELIVERY: The process of transferring the detected measurement sample from the measurement location to a central place.
- DATA RECEPTION: The process of collecting several measurement samples from the measurement locations at a central entity.
- DATA AGGREGATION: The process of gathering the received measurement samples in a repository.
- DATA FUSION: The process of combining raw data measurement samples from different means of detection into a representation of the traffic situation (traffic cameras, loop detectors, human observation...).

- QUALITY CHECK: The process of checking on measurement samples and the reconstructed traffic situation with the goal of removing erroneous samples.
- CONTENT DELIVERY: The process of transferring the content to a service provider, which will take care of the distribution of the content to the End Users.

The Service sub-segment expanded to show detailed functional sub-segments:



- CONTENT RECEPTION: The process of receiving content at the service provider (could be obtained from various content providers and through different communication channels).
- CONTENT FUSION: The process of combining the content from different content providers into a Service that can be consumed by the End User.
- SERVICE GENERATION: The process of improve the quality of the content such that it can be delivered to the End User (addition of meta information about the service area covered, type of content to be delivered...).
- PRE-FORMATTING: The process of "wrapping" the service in a way such that it can be transferred to the End User (data compression for reducing the required bandwidth for the transfer, packaging the content in smaller data containers…).
- SERVICE DELIVERY: The transportation of the service to the End User (radio, cellular phone, internet, apps...).



- SERVICE RECEPTION: The process of collecting the service at the End User device (FM or digital radio, mobile phones, personal computer...).
- SERVICE DECODING: The process of "unwrapping" the service from its packaging.
- SERVICE RENDERING: The process of preparing the content received as part of a service in a way that useful information can be presented to the End User (icon on a car navigation map, text message, audible announcement...).
- SERVICE PRESENTATION: The process of presenting the info or event to the End User, using whatever capabilities the End User device has to offer (graphical or alphanumeric display, loudspeaker...).