

Road transport and traffic telematics — DATEX specifications for data exchange between traffic and travel information centres (version 1.2a)

ICS 35.240.60

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National foreword

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According to the replies received by the end of the review period, the responsible BSI committee will decide whether to support the conversion into a European Standard, to extend the life of the prestandard or to withdraw it. Comments should be sent in writing to the Secretary of BSI Technical Committee EPL/278, Road Transport Informatics, at 389 Chiswick High Road, London W4 4AL, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

Summary of pages

This document comprises a front cover, an inside front cover, the ENV title page, pages 2 to 231 and a back cover.

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English version

**Road transport and traffic telematics - DATEX specifications for
data exchange between traffic and travel information centres
(version 1.2a)**

Télématique de la circulation et du transport routier -
Spécifications DATEX pour l'échange des données entre
les centres d'information routière (version 1.2a)

Telematik für den Strassenverkehr und -Transport - DATEX
Spezifikation für den Datenaustausch zwischen Verkehrs-
und Reiseinformationszentralen (Version 1.2a)

This European Prestandard (ENV) was approved by CEN on 5 May 2000 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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1. Foreword [informative]

This European Prestandard has been prepared by Technical Committee CEN/TC 278 "Road transport and traffic telematics", the secretariat of which is held by NNI.

This draft, produced from the DATEX-Net specifications is intended to serve the general needs and in particular the data exchange applications as specified by DATEX.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

2. Introduction [informative]

Information system applications are increasingly interconnected. A predominant trend towards standardisation has been a major theme throughout DRIVE and its successors, which is found in national projects as well.

In December 1996, DATEX has prepared both versions 3.0 of the dictionary and the first version, numbered 1.1, of the Specifications for Interoperability. This package has been put forward to the CEN TC 278 WG8 which in turn sent it in 1997 to stage 32 for informal vote.

The resulting comments have been processed by the last DATEX effort, funded by the EC, which has produced this Data Exchange Specifications for Interoperability version 1.2a proposed as a draft prENV to WG8 as well as version 3.1a of the Traffic and Travel Data Dictionary.

These Data Exchange Specifications for Interoperability aim to be used as a companion book of the DATEX-Net Data Dictionary also proposed for standardisation in data/information exchange.

For this reason this ENV contains common normative elements and specific informative parts.

3. Scope [normative]

This standard defines the methodology, functions and message structures for the exchange of data between traffic and travel information centres managed by different road operators.

The normative and informative clauses of the draft have been identified but due to the complexity of the document and cross-referencing the normative and information clauses have not been separated.

4. Normative References

This European Prestandard incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and publications are listed below. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

PrENV ISO 14819-3

Traffic and traveller Information (TTI) - TTI Messages
via traffic message coding - Part 3: Location

Referencing for ALERT C (under preparation, current document CEN/TC 278/N783, October 1997)

ENV 13106

DATEX Data Dictionary, version 3.1a

EN ISO 3166-1

Codes for the representation of names of countries and their subdivisions - Part 1: Country codes

ISO 4217

Codes for the representation of currencies and funds

The reference documents are still evolving and have various status. The following versions of this document will be updated to include the modifications of the above reference documents.

PrENV ISO 14819-3 indicates how the ALERT C RDS-TMC location referencing system should be used. This is of major importance to DATEX-Net. The draft European Prestandard will shortly be submitted to a Formal Vote. Keeping updated with these developments is important.

ENV 13106 is including the CEN/TC 278/WG 8 requirements as in the draft prENV/278/8/1/8 issued in October 1998.

CORD Deliverable D0004/Part 6 (see 16) provides methodology guidelines which were used when preparing the conceptual data models of the specifications. It may be used for an easier understanding of the specifications.

5. General architecture

5.1 Overview [informative]

DATEX-Net will allow different systems to exchange traffic data between different regions and countries. The peculiarity of DATEX-Net is that each system adopting this solution will be free to implement its own functionalities that may be different from region to region according to the local user requirements.

The DATEX-Net system comprises a certain number of Client and Supplier sub-systems. Each sub-system is composed of the following interfaces:

1. Application Interface;
2. Operator Interface;
3. Communication Interface;
4. Database Interface.

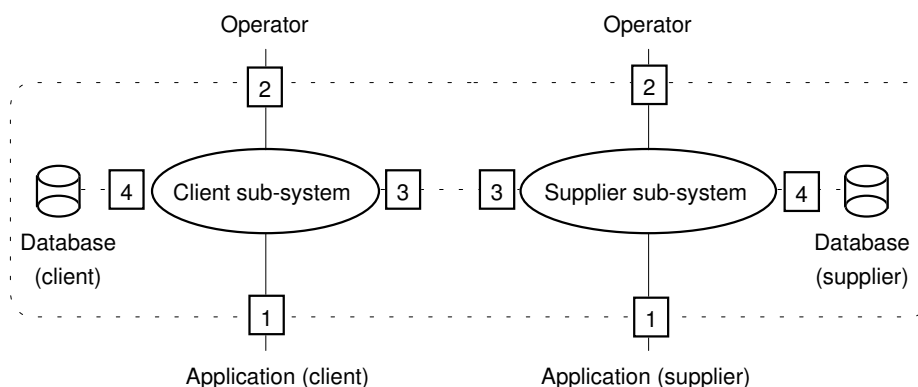


Figure 2 - Schematic of general system architecture

This document deals only with communication interface number 3. DATEX-Net specifies the data exchange across this interface, where the actual data are specified in the Data Dictionary version 3.1a.

DATEX-Net enables the communication between two or more traffic centres implementing a data exchange system, as depicted in figure 3. In order to achieve interoperability between centres, it is required to agree upon several options and choices which must be fixed in an Interchange Agreement. Clause 8.2 contains a checklist of items to be considered in such an agreement.

In the framework of the communication architecture proposed by DATEX, a traffic centre implementing the data exchange system “A”, which includes DATEX-Net, will be able to be interoperable with any different DATEX-Net compatible system (like “B” and “N”); and at the same time it can exchange information with other traffic centres adopting the same protocol as “A”.

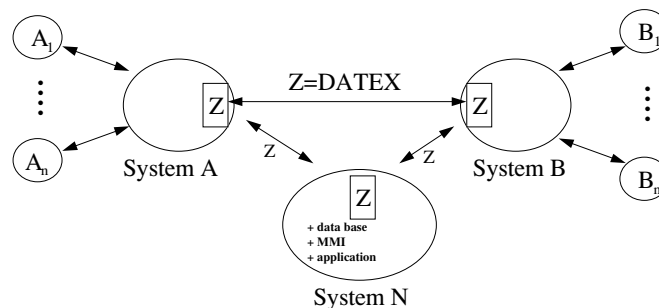


Figure 3 - General communication architecture

5.2 Levels of Operation [normative]

Each system including these specifications has to make its own choices and then has to follow the document according to what has been chosen. The DATEX Task Force has defined three system operating Levels. Implementors can decide at which Level they want to operate, being sure that following the rules explained in this document their choice of Level will be compatible with the others.

The identified Levels are:

Level 1: delivery;

Level 2: request / delivery;

Level 3: order on catalogue / delivery.

There are interoperability solution given between Levels. They are specified in each of the Level descriptions (10, 11 and 12).

6. Situation data

6.1 Definitions [normative]

Traffic/Travel situation: a set of traffic/travel circumstances with a common cause (or causes) which apply to a common set of locations. Traffic/travel situations comprise event and status reports. A situation shall be composed of situation elements.

Situation Element: a traffic/travel circumstance related to one data object, one phrase, and one location.

In each DATEX-Net message, only one situation element is sent.

Each situation element is uniquely identified by the combination of message sender identification, situation reference and element reference. The situation reference is a unique reference to each sender. The element reference is a unique reference within each situation.

For specific definitions refer to ENV 13106 (see 4).

6.2 Situation data [normative]

One data model has been built with the following rules:

SITUATION: One situation shall have one or several situation elements.

SITUATION ELEMENT: One situation element shall have:

- one **DATA_OBJECT**,
- one **PHRASE**,
- one location:
 - If the situation is not related to a diversion, the situation element shall have one **ELT_PRIM_LOC** (element primary location) and may have one **ELT_SEC_LOC** (element secondary location),
 - If the situation is related to a diversion, the situation element shall have one **ELT_DEC_PT** (element decision point).

One situation element shall have one or several **ELT_ATTRIBUTES** (element attributes).

ELT_ATTRIBUTES (element attribute): The element attribute refers to a list of predefined attributes.

For entities, attributes and domains details, see ENV 13106 (see 4).

Note 1:	This data model has been built to solve interoperability problems (between EUROTRIANGLE, INTERCHANGE, STRADA).
Note 2:	This data model has led to the definition of the “DATEX-Net Situation Message”, which is detailed in 6.4: “Situation Element message”.
Note 3:	In this data model situation elements are updated as the situation evolves in time.
Note 4:	The updating results in a new version of the situation element which may either contain active information or be not active any more.
Note 5:	At a given time a situation is described by collecting information from the last version of all active situation elements related to the situation.

The following diagram represents the DATEX Situation Conceptual Data Model. It has been used the Entity-Relationship method. The Entity-Relationship approach is described in Annex A of document CORD Deliverable D004/Part 6 (see 4).

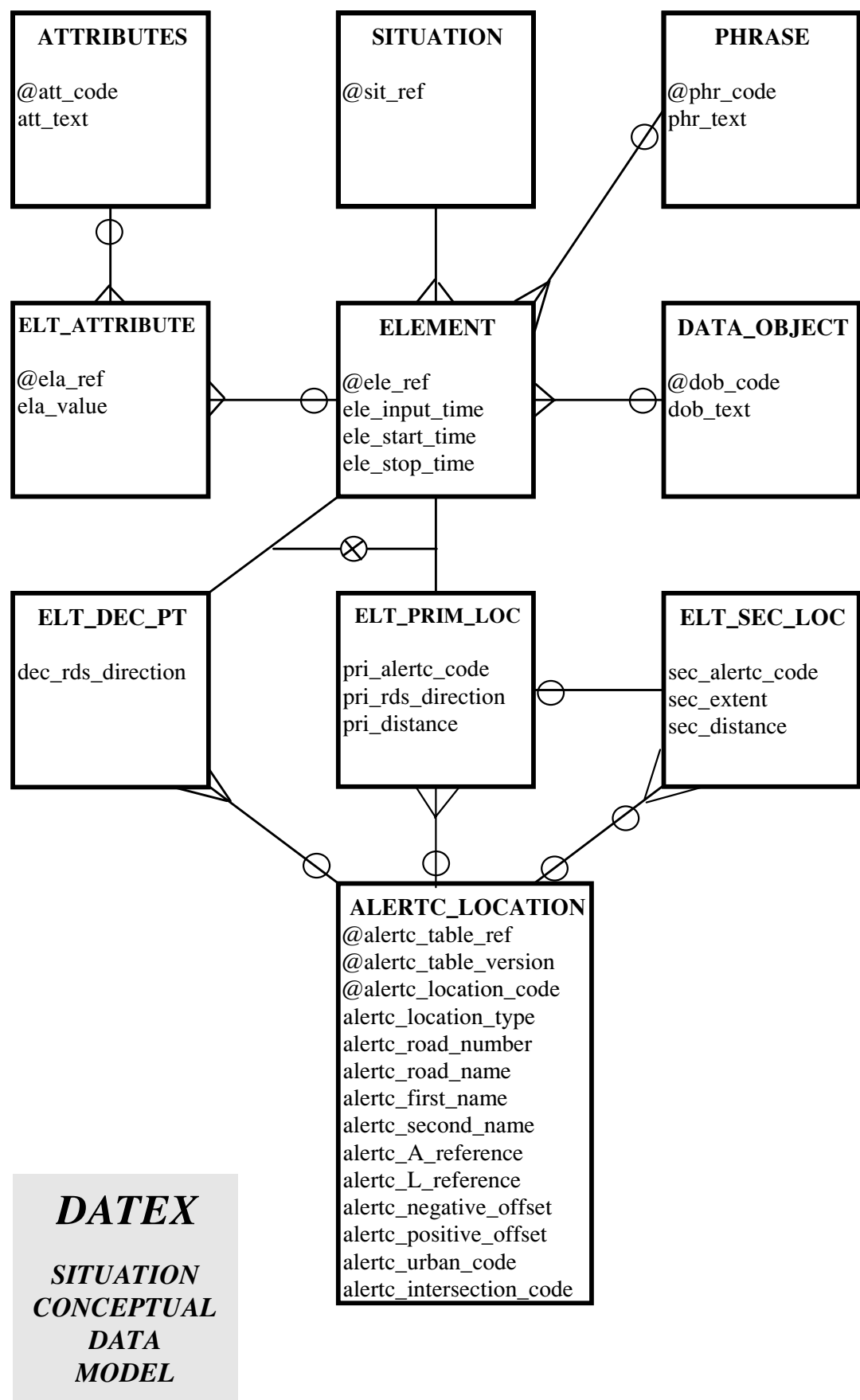


Figure 4 - Situation conceptual data model

6.3 Location referencing methods [normative]

Different ALERT C location referencing methods shall be used. These methods are described in prENV ISO 14819-3 (see 4).

6.3.1 Pre-defined primary location + extent

This method refers to method 1.2.1 of prENV ISO 14819-3 (see 4). This method uses a predefined primary location which shall be one ALERT C location code (LCO). Optionally an extent (LEX) may be used to indicate the extent of the event and show the secondary location.

This is coded as DATEX-Net method 1.

In this method, ALERT C direction shall be used to indicate the direction(s) affected. ALERT C direction shall be positive if the extent is negative and, conversly, negative if the extent is positive unless both directions are affected or the direction is unknown.

Further details of usage of the UN EDIFACT Location Segment (LOC) are given in 13.3.

6.3.2 Pre-defined primary and secondary locations

This method refers to method 1.2.2 of prENV ISO 14819-3 (see 4). This method uses a predefined primary location and a predefined secondary location which shall each be one ALERT C location code (LCO).

This is coded as DATEX-Net method 2.

In this method, ALERT C direction shall be used to indicate the direction(s) affected.

Further details of usage of the UN EDIFACT Location Segment (LOC) are given in 13.3.

6.3.3 Primary and secondary locations using pre-defined locations + extent + distances

This method refers to method 1.2.5 of prENV ISO 14819-3 (see 4). This method uses a predefined primary location which shall be one ALERT C location code (LCO). Optionally an extent (LEX) may be used to indicate the extent of the event and show the secondary location. Additionally and optionally offset distances from the primary and the inferred secondary predefined locations may be used to indicate to a higher degree of accuracy the position of the primary and secondary position of the event. The offsets distance from the primary and the inferred secondary predefined locations shall only indicate distances toward the inferred secondary and primary predefined locations respectively.

If no extent is given, such as in the case of a point location, the ALERT C direction shall indicate the direction in which to apply an offset distance from the predefined primary location. If no extent is given no offset from the secondary location shall be given.

This is coded as DATEX-Net method 3.

In this method, ALERT C direction shall be used to indicate the direction(s) affected. ALERT C direction shall be positive if the extent is negative and, conversly, negative if the extent is positive unless both directions are affected or the direction is unknown.

Further details of usage of the UN EDIFACT Location Segment (LOC) are given in 13.3.

6.3.4 Primary and secondary locations using pre-defined locations + distances

This method refers to method 1.2.6 of prENV ISO 14819-3 (see 4). The method uses a predefined primary location and a predefined secondary location which shall each be one ALERT C location code (LCO). Optionally offset distances from the primary and secondary predefined locations may be used to indicate to a higher degree of accuracy the position of the

primary and secondary position of the event. The offsets distance from the primary and secondary predefined locations shall only indicate distances toward the secondary and primary predefined locations respectively.

This is coded as DATEX-Net method 4.

In this method, ALERT C direction shall be used to indicate the direction(s) affected.

Further details of usage of the UN EDIFACT Location Segment (LOC) are given in 13.3.

6.3.5 Application of location referencing methods to the Element Location

ELEMENT PRIMARY LOCATION (ELT_PRIM_LOC): shall be defined with an ALERT C location code.

One distance may be added to indicate a distance offset from the ALERT C location, depending on the referencing method which is used (DATEX-Net method 3 and DATEX-Net method 4).

ELEMENT SECONDARY LOCATION (ELT_SEC_LOC): may be defined with an extent related to the primary location (DATEX-Net method 1 and DATEX-Net method 3) or one ALERT C location code (DATEX-Net method 2 and DATEX-Net method 4).

One distance may be added, depending on the referencing method which is used.

ELEMENT DECISION POINT (ELT_DEC_PT): shall be defined with an ALERT C location code.

6.4 Situation Element message [informative]

6.4.1 Message Content and Structure

Within the structure of the situation information message individual data shall have two different status. The status of data are:

Mandatory (M)	These data shall be used in the message.
Conditional (C)	These data should be used in the message dependent on certain conditions. The relevant conditions for required occurrence of the data may be given as part of the definition. If no conditions are specified then the data may be used subject to agreement between the Supplier and Client, or at the option of the Supplier.

The list below indicates the key data to be carried by the situation information message. Data types are indicated as mandatory or conditional. Additionally these data have been categorised as system/message management (M), meta-data (MD) or traffic/travel data (D) (see ENV 13106).

MANAGEMENT INFORMATION

Mandatory:

- Code list version number (CLV) M
- Situation reference (SNM) M
- Element reference (ERF) M
- Message sending time (MST) M
- Message sender (MSE) M

Conditional:

- Urgency (URG) M
- Message priority (MPR) M
- TMC message reference (TMN) M
- Subscription (SUT) M
- Request time (REQ) M
- Expiry time (EXP) M
- Out of range (OOR) M
- Filter end (FIL) M
- Order number (ORN) M
- Specification version (SVE) M
- Data dictionary version (DDV) M
- Message chain (MCH) M
- Delivery mode (DMD) M
- Message reference (MRF) M
- Element version number (VNM) M

Message Content - Part 1: General Information

METADATA:

Conditional:

- Element version time (VET) MD
- Area of interest (ARI) MD
- Broadcast (BRO) MD
- Cancel (CAN) MD

• Confidentiality (CFI)	MD
• Nature (NAT)	MD
• Quality index (QIN)	MD
• Reference time (RTI)	MD
• Source type qualifier (value of SOT)	MD
• Source identification (SID)	MD
• Source name (SNA)	MD
• Link with other traffic/travel situation (LNK)	MD
• Rerouting agreement request reference (RAR)	MD
• Accuracy (ACU)	MD
• Probability (PRB)	MD
• Measurement length (MLE)	MD

TRAFFIC/TRAVEL DATA:

Mandatory:

• Data object (value of DOB)	D
• Phrase (value of PHR)	D
• Start time (STA)	D
• Input time (INP)	D
• Location usage (values of LOT - Element location (LOC) - the element location for situation information - OR - element rerouting decision point (RDP) - the element rerouting decision point in the diversionary route agreement process)	D
• ALERT C location table reference (LTR)	D
• Location referencing method (LRM)	D
• ALERT C direction (RDI)	D
• ALERT C location table version number (LTV)	D

Conditional:

• Confirmation time (CNT)	D
• Stop time (STO)	D
• Time until (UTM)	D
• Entering delay (DEN)	D
• Leaving delay (DLE)	D
• Delay time value (DLT)	D
• Duration value (DUV)	D

- Travel time numerical value (TTV) D
- Coded delay time (DLC) D
- Coded duration (DUR) D
- Time of day (TOD) D
- Time until (UTM) D
- Day of week (DOW) D
- Day until (DUN) D

- Diversion advice (DAD) D
- Mobility (MBY) D
- Motoring conditions (MOT) D
- Probability, coded D
- Severity (SEV) D
- Action plan identifier (API) D
- Forecast (FOR) D
- End (END) D

- Element supplementary advice (SAD) D
- Cause (PHC) D
- Location usage (values of LOT - element rerouting destination location (RDL), element rerouting locations (RDD), element distribution location (DIL), element presentation location (PAL), location of source of problem (LSP)) D
- ALERT C location code (primary) (LCO) D
- ALERT C location name D
- ALERT C location code (secondary) (LCO) D
- ALERT C direction, named (LDN) D

- Extended location type code (ELT) D
- Lane (LNP) D
- Distance from primary location (DPL) D
- Distance from secondary location (DSL) D
- Wind direction bearing (WDB) D
- Wind direction compass (WDD) D
- Vehicle classification (CLA) D
- Vehicle class (VCL) D

• Direction bearing (DIR)	D
• Compass point direction (DRC)	D
• Link time (LTT)	D
• Nationality (NAL)	D
• Next departure time (NTI)	D
• Service number (SEN)	D
• Individual vehicle ID (VID)	D
• Above stated altitude (ALG)	D
• Advisory speed limit (SPA)	D
• Air temperature (ATE)	D
• AM frequency (AMH)	D
• Atmospheric pressure at sea level (APR)	D
• Average speed numerical value (AVV)	D
• Average wind speed (WDS)	D
• Below stated altitude (BSA)	D
• Capacity remaining (CYR)	D
• Car park occupancy (POC)	D
• Carbon monoxide concentration (CMC)	D
• Channel number (NCH)	D
• Concentration numerical value (CTV)	D
• Depth (DPH)	D
• Direction bearing (DIR)	D
• FM frequency (FMH)	D
• Gross vehicle weight (GVW)	D
• Journey number (JRN)	D
• Length affected (LEN)	D
• Mandatory speed limit (SPM)	D
• Maximum permitted axle weight (MAW)	D
• Maximum temperature (MTE)	D
• Maximum wind speed (MWS)	D
• Methane concentration (CH4)	D
• Minimum car occupancy (OCP)	D
• Minimum temperature (MIT)	D
• Non methane hydrocarbon concentration (NMC)	D

• Number of accidents (NAC)	D
• Number of bridges (NBR)	D
• Number of broken down vehicles (NBV)	D
• Number of burst pipes (NBP)	D
• Number of buses (NBU)	D
• Number of caravans (CAV)	D
• Number of convoys (NCY)	D
• Number of deaths (DEA)	D
• Number of drivers (NRD)	D
• Number of fallen trees (NFT)	D
• Number of heavy lorries (NHL)	D
• Number of heavy vehicles (NHV)	D
• Number of incidents (NIC)	D
• Number of injured (INJ)	D
• Number of lanes (NLN)	D
• Number of loads (NLD)	D
• Number of objects (NOJ)	D
• Number of obstructions (NOB)	D
• Number of queues (NLQ)	D
• Number of ramp controls (NRC)	D
• Number of service lanes (NSL)	D
• Number of sewers (NSW)	D
• Number of shed loads (NSH)	D
• Number of trailers (TAI)	D
• Number of vacant parking spaces (NPS)	D
• Number of vehicles (NVE)	D
• Number of vehicles on fire (NVF)	D
• Number of waiting vehicles (NWV)	D
• Occupancy numerical value (OCV)	D
• Original number of lanes (ONL)	D
• Ozone concentration (O3C)	D
• PCU flow numerical value (FLV)	D
• Precipitation intensity (PIN)	D
• Precipitation or deposition depth (PDD)	D
• Primary particulate concentration (PPP)	D

• Queue length (QUE)	D
• Relative humidity (HUM)	D
• Ratio of a vehicle class in a traffic flow (VCF)	D
• Road surface temperature (RTE)	D
• Sections of resurfacing work (SRR)	D
• Sequential ramp number (SEQ)	D
• Sets of blasting work (SBL)	D
• Sets of construction work (SCR)	D
• Sets of maintenance work (SMW)	D
• Sets of road marking work (SRM)	D
• Sets of roadworks (SRW)	D
• Sets of slow moving maintenance vehicles (SMM)	D
• Sets of temporary traffic lights (NTL)	D
• Sets of traffic lights (STL)	D
• Speed reduction (SPV)	D
• Speed reduction ratio (SPR)	D
• Test message number (TES)	D
• Total hydrocarbons concentration (THC)	D
• Travel time increase (TTI)	D
• Vehicle flow numerical value (VFV)	D
• Vehicle height (HEI)	D
• Vehicle length (VLN)	D
• Vehicle speed (IVS)	D
• Vehicle weight (WEI)	D
• Vehicle width (WID)	D
• Visibility (VIS)	D
• Volume of dangerous goods (VDG)	D
• Weight of dangerous goods (WDG)	D
• Nitrogen dioxide concentration (N2C)	D
• Nitrogen monoxide concentration (NOC)	D
• Sulphur dioxide concentration (S2C)	D
• Sun radiation net (SRN)	D
• Sun total radiation (STR)	D
• Wind direction bearing (WDB)	D
• Wind measurement height (WMH)	D

- Message display (DIS) D
- Comment (text) (SUR) D
- Chemical name (AAD) D

Message Content - Part 2: Conditional: Tariff associated with a duration of parking

Mandatory:

- Cost for the duration indicated (COS) - either D
- Rate per hour (RPH) - or D
- Rate per day (RPD) - or D
- Parking duration (PAD) D

Message Content - Part 3: Conditional: Situations involving hazardous materials:

Mandatory:

- Type of load (value of LOA) D

Conditional:

- Dangerous goods regulations (DRE) D
- Hazard code identification (HCI) D
- Hazard substance/item/page no. (HSI) D
- Hazard code version number (HZV) D
- UNDG number (UNN) D
- Dangerous goods flashpoint (DGF) D
- TREM card number (TRN) D

6.5 Physical Format [informative]

The EDIFACT message TRAVIN is used (see 13.4).

7. Traffic Data

7.1 Definitions [normative]

Traffic data are produced by physical traffic equipment.

Each physical traffic equipment can deliver measurement values concerning:

- different data objects: average speed, flows, occupancies, ... ,
- different vehicle classes (All vehicles, Light Vehicles, Heavy Vehicles, ...),
- different measurement units (Example: vehicle/hour or vehicle/day),
- different measurement periods (Example: 1 minute or 6 minutes),
- different roads (at cross-roads),
- different directions on one road,
- different lanes (or all lanes) in one direction.

This means that each measurement value is associated with:

- one data object,
- one vehicle class,
- one measurement unit,
- one measurement period,
- one road, one direction, one lane (or all lanes).

We define the notion of “measurement point” which shall have one unique reference (measurement point reference) and corresponds to:

- one data object,
- one vehicle class,
- one measurement unit,
- one measurement period,
- one road, one direction, one lane (or all lanes).

This notion of “measurement point” is the basis of the DATEX traffic data transfers.

Note 1: The measurement point may have one ALERT C location (ALERT C location table number, ALERT C location table version number, ALERT C location type, ALERT C location code, ALERT C direction, ALERT C offset point distance).

Note 2: The measurement point may have a name (measurement name) given by the Supplier.

Note 3: The side of the road concerned by the measurement point may be described in a text field (measurement side).

7.2 Exchange description [informative]

The message for traffic data shall be as short as possible, as it may be sent, by the Supplier, every 5 or 6 minutes for several hundred values.

The following solution has been chosen:

- a. The measurement points are defined, by the Supplier, in a Measurement point table.
- b. The Supplier sends the Measurement point table to the Client (on-line or off-line) when the Client asks for it.
- c. In each Traffic Data message, for each traffic data the Supplier only sends the measurement point reference and the data object corresponding value.
- d. The Client can find the physical characteristics of each measurement point (data object, vehicle class, measurement unit, measurement period, road, direction, lane(s)) in the Measurement point table that he has previously received from the Supplier.

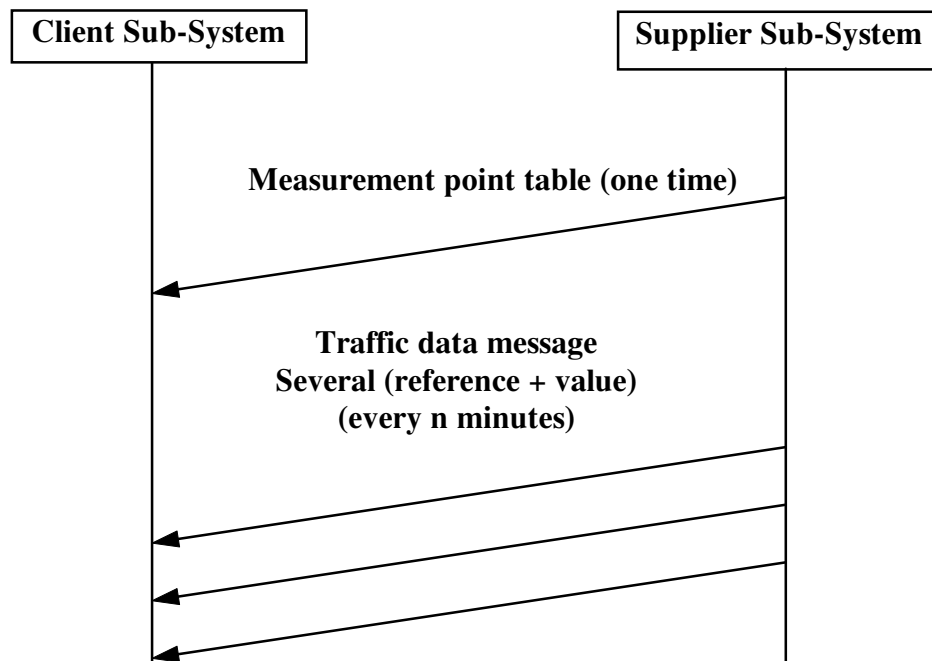


Figure 5 - Schematic of message exchanges related to Measurement point table

7.3 Measurement point table [normative]

Table 1 contains the measurement point definitions.

Field name	Format
Measurement point reference	M
Data Object	M
ALERT C location table number	C
ALERT C location table version number	C
ALERT C location code	C
ALERT C direction	C
ALERT C point distance	C
Measurement point name	C
Measurement side	C
Measurement lane	M
Measurement vehicle class	M
Measurement period	M
Measurement unit	M
Measurement equipment reference	C

Table 1 - Measurement point definitions

The management of this table is described in 8.5 “Supplier and Client: Handle measurement point table”.

7.4 Traffic Data message [informative]

In each message we find:

- one measurement time (start time),
- for each measurement point:
 - one reference,
 - one value.

Field name	Format
Start time	M
Measurement point	C 99999
Reference	M
Value	M

Table 2 - Indicative content of Traffic Data Message

7.5 Physical format [informative]

The EDIFACT message TRAILS is used (see 13.5).

7.6 Traffic data model [informative]

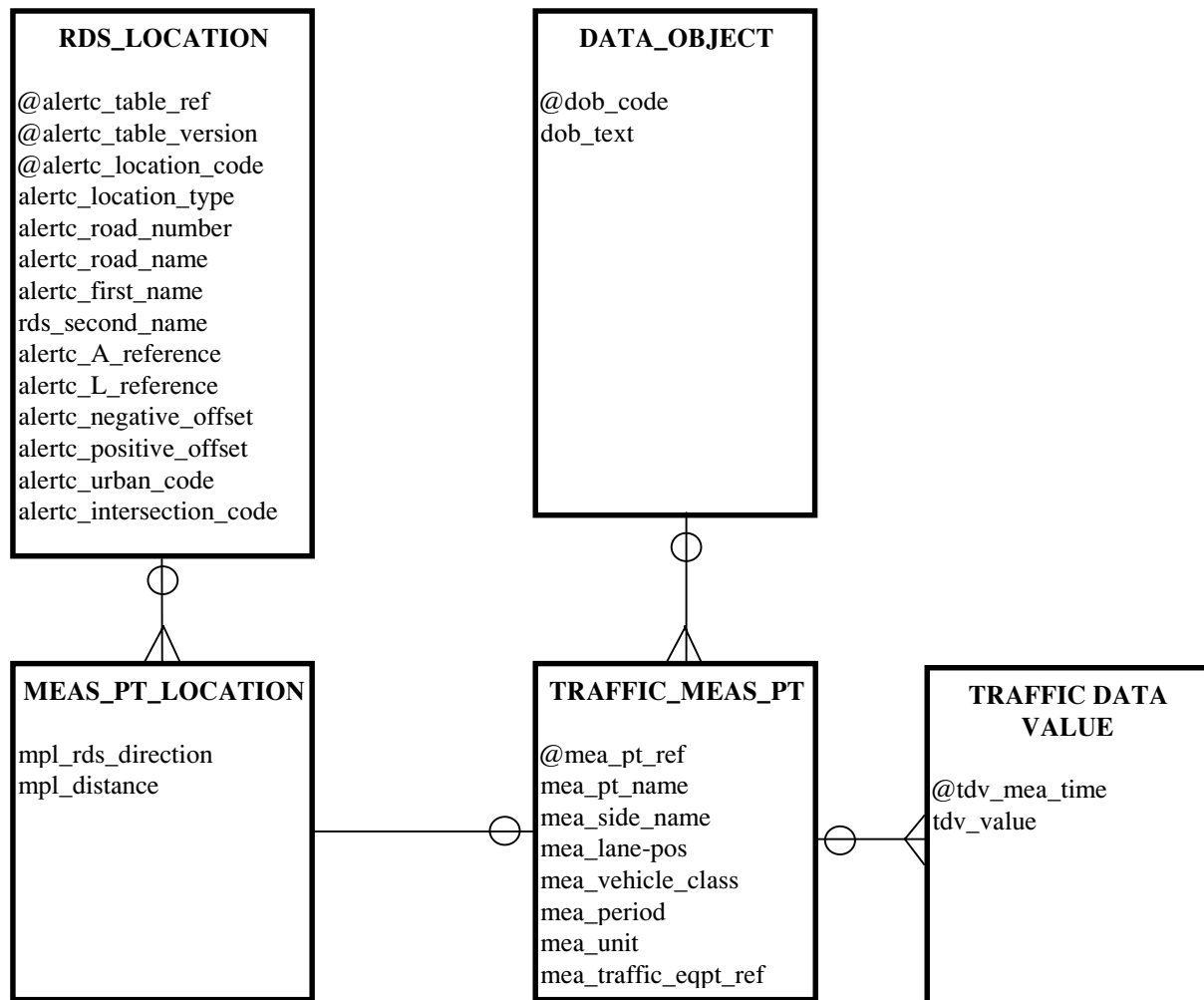


Figure 6 - Traffic data model

EXPLANATION

TRAFFIC MEASUREMENT POINT:

- The TRAFFIC_MEASUREMENT_POINT refers to one DATA_OBJECT.
- The TRAFFIC_MEASUREMENT_POINT may be localised with one MEASUREMENT_POINT_LOCATION.
- The value of the TRAFFIC_MEASUREMENT_POINT may be stored in a MASSIVE_STORAGE table.

MEASUREMENT POINT LOCATION: One MEASUREMENT_POINT_LOCATION refers to one RDS_LOCATION code, a point location given by which shall be an ALERT C location point and may have an offset distance.

MASSIVE_STORAGE: This table contains the measurement point values for the different start times.

For entities, attributes and domains details, see Conceptual data models (see 14).

8. Common functions

8.1 Introduction [informative]

The functions detailed in this clause are common to the different operating Levels (1, 2 and 3) described later on in the document.

Before exchanging data, traffic centres shall agree on some specific issues that are described in the Interchange Agreement and shall adopt the same code lists for data objects, phrases, attributes and location referencing.

The common functions to be handled at each Level are:

- Handle location table;
- Handle measurement point table for traffic data;
- Creating and updating situation information;
- Filtering process;
- Send data;
- Receive data;
- Diversion process;
- Handle status message.

8.2 Supplier and Client: Interchange agreement [informative]

The interchange agreement is a document that describes bilateral agreements between Supplier and Client needed for the exchange of DATEX-Net information. The interchange agreement should deal with all the information that is needed for the data exchange to take place. In the current clause you will find a checklist of items that could be considered in the agreement. The list also shows DATEX-Net suggested values for specific items.

The description assumes that the information exchange follows the basic principles of DATEX. Specifically it is assumed that two parties are involved: a Supplier providing messages and a Client receiving messages.

General:

1. Time period throughout which the overall agreement is valid

The agreement shall state the time period in which the agreement is valid. It should define the date of commencement and the date of ending.

2. Rules for terminating the agreement before the expiry time of the agreement

The agreement should specify the conditions under which the contract can be terminated before its expiry date.

3. Company/authority names, contact addresses, telephone, fax and E-mail details

The two parties shall clearly defined the company and/or the authority's names address and the practical contacting persons with all related communication data such as telephone and fax numbers and email addresses.

Access:

DATEX-Net assumes access through user name/password. The user names are required to be unique across the network and shall consist of 5 alphanumeric characters. A user name is

composed of a 2 letter country code according to EN ISO 3166-1, followed by three characters that identify the user.

4. IP address of the Client

The agreement should mention the Internet Protocol address of the client that is going to be used for setting up the communication between the parties.

5. IP address of the Supplier

The agreement can mention the Internet Protocol address of the supplier that is going to be used for setting up the communication between the parties.

6. Supplier user name

The agreement should mention the user name that will be adopted by the supplier. This will be the SupplierId used throughout this paper.

7. Client user name

The agreement can mention the user name that will be adopted by the supplier. This will be the ClientId used throughout this paper.

8. Password for Supplier to connect to Client

If the parties decide to use a password, this should be specified here. If other means of access control are used these should be specified here.

9. Password for Client to connect to Supplier

If the parties decide to use a password, this should be specified here. If other means of access control are used they should be specified here.

File transfer:

10. Choice of public network for File Transfer Protocol and configuration

All technical information needed for the file transfer between the parties should be described here (Example: X25, ISDN, special line ... and router parameters, ASCII transfer mode...)

11. Name of directory at the Client site where the transmitted messages from the Supplier Server are placed

The directory name is PATH_CLI and is given by the Client during the interchange agreement, because it depends on the Client's hardware and software.

12. Name of files containing supplier messages

Files are named USERNAMEXXX.MSG, where USERNAME is the SupplierId, and XXX represents a sequence guaranteeing unique names in the time period needed by the Client to process the message. XXX could be numbers starting from 000 incrementing to 999 and then repeating from 000 again.

13. Name of directory at the Supplier site where the Client can place requests or orders

The directory name is PATH_SUP and is given by the Supplier during the interchange agreement, because it depends on the Supplier's hardware and software. For one system which contains both one Client sub-system and one Supplier sub-system, PATH_SUP shall be different from PATH_CLI.

If the requests or orders are done using FAX or HTML forms, the fax number or URL address should be given.

14. Name of files containing client messages

Files are named USERNAMEXXX.REQ, where USERNAME is the ClientId of the Client, and XXX represents a sequence guaranteeing unique names in the time period needed by the Supplier to process the request. XXX could be numbers starting from 000 increasing to 999 and then repeating from 000 again.

This is not applicable if the requests or orders are done using FAX or HTML forms.

EDIFACT:

15. Character repertoire

The interchange agreement shall mention the character repertoire to be used. The character sets ISO 8859-1: Latin 1 characters (UNOC) is recommended.

For information, the code table for Latin alphabet N°1 is given in Table 3.

	0X	1X	2X	3X	4X	5X	6X	7X	8X	9X	AX	BX	CX	DX	EX	FX	
X0			SP	0	@	P	`	p			NBSP	8	¿	—	‡	?	X0
X1			!	1	A	Q	a	q			°	±	¡	—	·	Ò	X1
X2			“	2	B	R	b	r			¢	=	¬	“	,	Ú	X2
X3			#	3	C	S	c	s			£	=	v	“	„	Û	X3
X4			\$	4	D	T	d	t			§	¥	f	‘	%	Ü	X4
X5			%	5	E	U	e	u			•	µ	~	’	Â	ý	X5
X6			&	6	F	V	f	v			¶		?	÷	Ê	^	X6
X7			'	7	G	W	g	w			ß	?	“	?	Á	~	X7
X8			(	8	H	X	h	x			®	?	“	ÿ	Ë	-	X8
X9			)	9	I	Y	i	y			©	ğ	...	ÿ	È	ÿ	X9
XA			*	:	J	Z	j	z			™	?		/	Í	я	XA
XB			+	;	K	[	k	{			’	ª	À	¤	Î	°	XB
XC			,	<	L	\	l				SHY	º	Ã	<	Ï	¸	XC
XD			-	=	M	]	m	}			?	?	Ö	>	Ì	S	XD
XE			.	>	N	^	n	~			Æ	æ	Œ	?	Ó	I	XE
XF			/	?	O	_	o				Ø	ø	œ	?	Ô	Ÿ	XF
	0X	1X	2X	3X	4X	5X	6X	7X	8X	9X	AX	BX	CX	DX	EX	FX	

Table 3 - UNOC Character Set

16. Information separators

The default service characters are Table 4: The use of the UNA service segment is optional if the default characters are used.

Graphic Representation	Name	Functionality
'	Apostrophe	segment terminator
+	Plus sign	data element separator
:	Colon	component data element separator
?	Question mark	release character

Table 4 - Separator Characters

17. Structure - Functional group

The functional group as specified in EDIFACT is not used in DATEX.

18. Date/Time formats

Default formats for date/time are provided in the Data Dictionary ENV 13106. If default formats are not used, the formats to be used shall be specified here. In all cases, it is recommended that the format should be indicated where possible.

19. Default language for free text

The default language for free text should be specified here.

20. Decimal mark

The representation of the decimal mark should be given here.

Management of background information:

21. Specification of the Attribute list, phrase code list and data object list (see 8.3)

This clause deals with the code lists that have to be shared in order that the exchanged data can be decoded properly at the receiving site. The DATEX codes lists are included in the DATEX dictionary. Due to its wide-scope, the DATEX Data Dictionary may be too extensive for some users and not enough for others. Therefore, some users may wish to:

- add entities and attributes not listed in this dictionary;
- use attributes not recommended in a given object description;
- use only a part of the proposed entities.

22. Specification of location tables used (see 8.4)

A site dependent location table also has to be identified. This list is provided by the Supplier.

Message management and functions:

23. Level of operation and all related options

- Specify the operation level and how to exchange filters/orders
Level 1: HTML/SGML or fax form;
Level 2: EDIFACT TRAREQ message or HTML/SGML or fax form;
Level 3: EDIFACT TRACAT message or HTML/SGML or fax form.
- Specify which are the data exchange supported (situation data or/and traffic data);
- Specify if diversion process is used;
- Specify how to manage situation data (updating method, end ...);
- Specify how to exchange location table (offline or EDIFACT TRALOC message, see 8.4);
- Specify if handle status messages is used (see 8.11).

24. Actions to be taken when errors occur during message transmission/reception.

Rights and obligations:

25. Description of the quality of the data provided by Supplier.

26. Description of actions by Supplier in connection with the Supplier Server being down:

- actions when Supplier Server is down for planned maintenance,
 - actions when Supplier Server is down due to system crash,
 - actions when Supplier server starts up.
27. Description of actions by Client in connection with the Client system being down:
- actions when Client system is down for planned maintenance,
 - actions when Client system is down due to system crash,
 - actions when Client system starts up.
28. Description of payment mechanism for the service, if any.
29. Statement on liability in case of transmission of incorrect information.
30. Rules for the further dissemination by the Client of information received using DATEX.

8.2.1 Main choices available

This clause provides an overview of the main choices that are available to the system developer when implementing a DATEX-Net compatible information exchange system. A range of interoperable choices exist due to the evolution of these standards from a number of pilot systems which incorporate different philosophies and focuses on user requirements. It should be stressed that these solutions are interoperable and the selection of particular choices should not inhibit further and future interoperability.

The main areas of choice available to the system developer are as follows:

1. The types of data to be exchanged

The DATEX-Net specifications enable the exchange of traffic/travel situation and status information and traffic data. The system developer has to choose which data will be supported and exchanged. It is possible to implement a subset of data suited to the user requirements as long as the mandatory data is exchanged.

2. The operating level of the system

There are three levels of operation defined in the DATEX-Net specification. These operating levels broadly range from simple one-way information distribution links to complex messaging environments with a system administrator function.

3. The updating strategy adopted within message management

As the unified DATEX-Net approach has been developed from a number of earlier pilot project based information exchange systems, two methods for updating information have been accommodated. These can be considered to be the necessary approaches if communications between Supplier and Client are performed either in real-time or on a batch-mode periodic basis.

8.3 Supplier and Client: Establish code lists

The situation conceptual data model shows that:

- one situation element shall be related to
 - one data object in a pre-defined data object list,
 - one phrase in pre-defined phrase list,
 - one location in a pre-defined location code list.
- an element attribute shall refer to
 - one of the attributes of the pre-defined list.

These pre-defined lists shall be common to all DATEX-Net network users, in order that Clients and Suppliers could understand in the same way requests and distributions of data. Users do not necessarily have to implement the complete list.

8.3.1 Data objects, phrases, attributes, supplementary information

The different codes to be used in the DATEX-Net context are described in ENV 13106.

The process concerning the translations of the definitions of the standards codes is on going under the responsibility of the different Member States.

8.3.2 Location code

In this version of the DATEX-Net Specification, the ALERT C location referencing system will be used. The ALERT C location referencing system is described in prENV ISO 14819-3 (see 4).

The definition of an off-line format is under progress in CEN TC278 WG7.3; this format should be used by national authorities responsible to produce the national databases.

An EDIFACT on-line message TRALOC can be used to exchange these tables between Suppliers and Clients (see the common function 8.4: Handle location table).

A Supplier may need several location tables from different regions or countries, they can be merged in the same Supplier table, indeed each location code is unique since it is composed of the ALERT C location table reference, the ALERT C location table version number and the code in the ALERT C location table itself (see the situation data model in 6).

8.4 Supplier and Client: Handle location table

8.4.1 General description

For locating situations, a Supplier uses his ALERT C location table.

This Supplier ALERT C location table can be composed of different elementary ALERT C location tables (each with its ALERT C location table reference, the ALERT C location table version number and the code in the ALERT C location table itself).

For each elementary ALERT C location table, the list of locations should conform fully to the location referencing rules prENV ISO 14819-3 (see 4).

When a Client wants to receive information from a Supplier, he needs the Supplier ALERT C location table to “understand” the ALERT C location codes.

The exchange of this Supplier ALERT C location table is made in three steps:

1. the Client has to REQUEST FOR LOCATION TABLE;
2. the Supplier has to SEND LOCATION TABLE;
3. the Client has to RECEIVE LOCATION TABLE.

These steps can be made off-line or on-line.

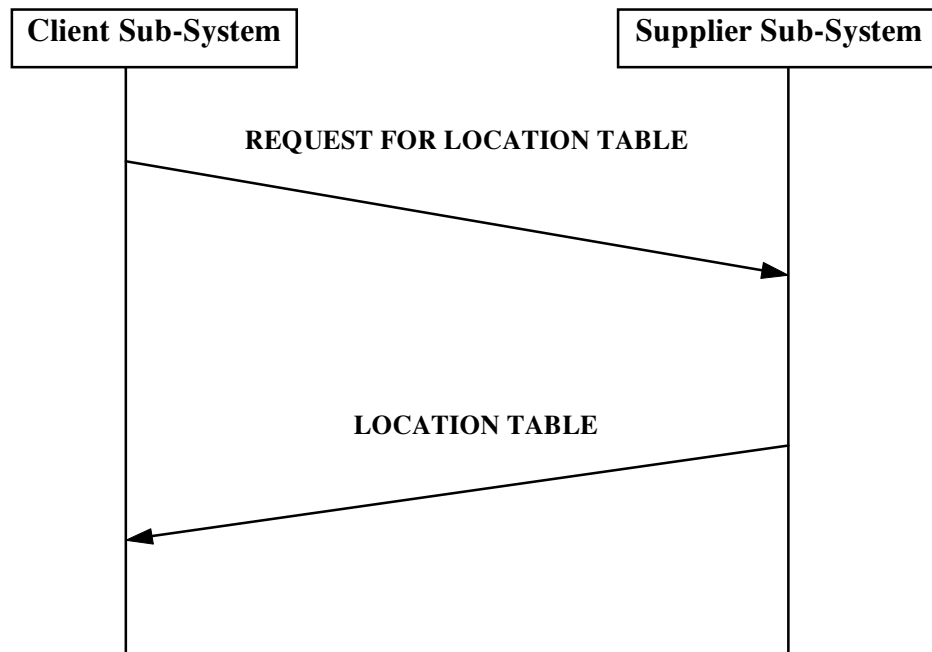


Figure 7 - Schematic of handle location table

8.4.2 Physical format [informative]

When the exchange of the location table is made off-line, the physical format, which is under progress in CEN TC278 WG7.3, is recommended. At present, the physical format is the result of an agreement between the Supplier and the Client.

When the exchange of the location table is made on-line, the physical format corresponds to the EDIFACT message TRALOC for the LOCATION TABLE.

For the REQUEST, using EDIFACT, the message TRAREQ is used (see 13.8).

8.4.3 Exchange description

8.4.3.1 Client: Request for location table

The operator of the Client sub-system uses this function to ask for an initial version or update of the Location Table, relating to a Supplier.

External Interface [normative]

Input

Request containing:

- SupplierId.

Output

Message **REQUEST FOR LOCATION TABLE** to Supplier (For the physical format, see the previous clause).

Process Description [informative]

Send the **REQUEST FOR LOCATION TABLE** message to the selected Supplier.

8.4.3.2 *Supplier: Send location table*

This function processes the **REQUEST FOR LOCATION TABLE** message from Clients. It returns to each Client a message containing the list of locations stored in the Supplier's database.

External Interface [normative]

Input

Message **REQUEST FOR LOCATION TABLE** from Client.

Output

Message **LOCATION TABLE** to Client.

Process Description [informative]

Compose the **LOCATION TABLE** message from the location data stored in the Supplier's sub-system (list of all the locations).

Send the message to the Client.

8.4.3.3 *Client: Receive location table*

This function is used to create or update the Client's Location Table for one Supplier. Location data integrity is kept between the Supplier (sender) and the Client (receiver) once the update is done.

Warning: when updating, Client information may be linked to the previous table. Implementation choices shall be taken to achieve global information integrity.

External Interface [normative]

Input

Message **LOCATION TABLE** from Supplier.

Output

New location table in the Client database for this Supplier.

Process Description [informative]

Replace the previous Location Table with the one described in the **LOCATION TABLE** message.

Location data related to other Suppliers are maintained.

8.5 *Supplier and Client: Handle measurement point table*

8.5.1 General description

Each traffic data corresponds to one measurement point (see 7: Traffic data). At the Supplier level, the measurement point is described in the measurement point table.

When a Client wants to receive information from a Supplier, he needs the Supplier measurement point table to "understand" the measurement point references.

The exchange of this Supplier measurement point table is made in three steps:

1. the Client has to REQUEST FOR MEASUREMENT POINT TABLE,
2. the Supplier has to SEND MEASUREMENT POINT TABLE,
3. the Client has to RECEIVE MEASUREMENT POINT TABLE.

These steps can be made off-line or on-line.

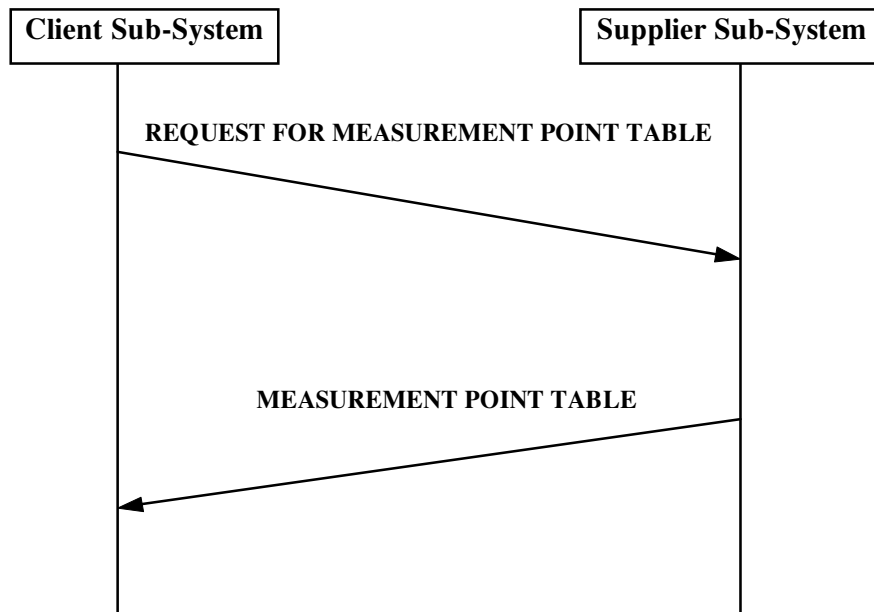


Figure 8 - Schematic of handle measurement point table

8.5.2 Physical format

When the exchange of the measurement point table is made off-line, the physical format is the result of an agreement between the Supplier and the Client.

At Level 3, the measurement point table is included in the catalogue and the exchange is made on-line (see 12).

When the exchange of the measurement point table is made on-line, the physical format corresponds to the EDIFACT message TRACAT.

For the request using EDIFACT, the message TRAREQ is used (see 13.8).

8.5.3 Exchange description

8.5.3.1 Client: Request for measurement point table

The operator of the Client sub-system uses this function to create or update the measurement point table relating to the selected Supplier.

External Interface [normative][normative]

Input

Request from Application or Operator Interface, containing:

- SupplierId.

Output

Message **REQUEST FOR MEASUREMENT POINT TABLE** to Supplier.

Process Description [informative]

Compose and send the **REQUEST FOR MEASUREMENT POINT TABLE** message to the selected Supplier.

8.5.3.2 Supplier: Send measurement point table

This function process the Request for measurement point table message from Clients. It returns to each Client a message containing the measurement point table stored in the Supplier's database.

External Interface [normative]

Input

Message **REQUEST FOR MEASUREMENT POINT TABLE** from Client.

Output

Message **MEASUREMENT POINT TABLE** to Client.

Table 5 indicates the fields contained in this message.

Field name	Format
Measurement Point	M 9999
Measurement point reference	M
Data Object	M
ALERT C location table number	C
ALERT C location table version number	C
ALERT C location code	C
ALERT C direction	C
ALERT C point distance	C
Measurement point name	C
Measurement side	C
Measurement lane	M
Measurement vehicle class	M
Measurement period	M
Measurement unit	M
Measurement equipment reference	C

Table 5 - Indicative content of Measurement point table message

Process Description [informative]

Compose the **MEASUREMENT POINT TABLE** message from data stored in the Supplier's database.

Send the message to the Client.

8.5.3.3 *Client: Receive measurement point table*

This function is used to create or update the Client's measurement point table related to a Supplier. Data integrity is kept between the Supplier (sender) and the Client (receiver) once the update is done.

External Interface [normative]

Input

Message **MEASUREMENT POINT TABLE** from Supplier.

Output

If necessary, information to Operator Interface, containing:

- SupplierId,
- Request for measurement point table status,
- List of the references and the descriptions of the measurement point table.

Process Description [informative]

Data, contained in the received message, are dumped into the Client's database, replacing the previous values.

Warning: once the update is effective, some records may refer to non-existent references. Warning messages shall appear on the Client's Operator Interface to inform the operator, and ask for action: modification or deletion of the inoperative records.

The measurement point tables related to other Suppliers are kept in place.

If necessary, inform the Operator Interface about the status of the previous request (Request for measurement point table).

8.6 *Situation and element information management*

8.6.1 Introduction [normative]

Situations and their elements are created, updated and terminated by a number of methods described below. Three possibilities exist to change an active situation element into a non-active one.

- A situation element should be ended using an "End".
- A Situation element can be cancelled using "Cancel". In this case, part or all of the information previously sent for this Element was wrong.

A Situation element can be invalidated by use of an expiry time. If this time is reached on the Client's side, it is assumed that the information is no longer valid, i.e. the situation element is implicitly ended.

The delivery of a situation element to a specific client can be stopped and indicated to him by three methods:

1. the use of an "Out of range",
2. the use of a "Filter end",
3. the use of a "Delivery break".

The use of an “Out of Range” indicates to the client that the information is no longer delivered to him because the element has passed out of the filter range (Example: the queue length is now below the threshold specified by the client).

“Filter End” indicates to the Client that the information is no longer delivered to him because the end of the time frame specified in the filter is reached.

“Delivery break” indicates that the data delivery is stopped by some reason independent from the element existence and filter specification.

Using any of these attributes means that the delivery has stopped, while the situation element may still be active on the ground.

This clause describes processes that may have to be taken during the management of situations and messages exchanged. Each of the message management processes is described below.

- Create Situation and first situation element;
- Update Situation;
 - Create a further Situation element;
 - Update an existing Situation element;
 - Cancel Situation element Information;
 - Out of filter specification.
- End Situation element.
- End Situation.

The information describing a traffic/travel situation is likely to be altered throughout the duration of the situation. Renewal of the situation information to the Client is provided by means of an update to the situation elements.

Create Situation and first situation element

The situation creation is done automatically by sending an situation element, for the first time, for this situation.

Fields to be filled:

- Situation Reference (SNM): generate a new situation reference.
- Element Reference (ERF): generate a unique element reference within the situation.

When a situation element begins, it shall have a start time (STA), data object (DOB), phrase (PHR) and location (see 6.2).

Update Situation

On updating the state of an existing situation alterations may be made by means of creating an additional new situation element or by updating the information within an existing situation element. Three special cases of situation element updating are covered here where the situation element changes from an active to a non-active condition due to cancellation or invalidation.

Create a further Situation element

Fields to be filled:

- Situation Reference (SNM): use the existing situation reference.

- Element Reference (ERF): generate a unique element reference within the situation.

When a situation element begins, it shall have a start time (STA), data object (DOB), phrase (PHR) and location (see 6.2).

Update an existing Situation element

Fields to be filled:

- Situation Reference (SNM): use the existing situation reference.
- Element Reference (ERF): the reference of the situation element concerned.

The Data Object cannot be changed when updating the situation element information. The inclusion of new Data Object requires the generation of new situation elements.

Special case - Cancel Situation element Information

All the information previously sent for the situation element are not valid anymore.

If the Supplier has new valid information this should be sent in the same message.

Fields to be filled:

- Cancel (CAN): filled.

If new information is inserted into the message, the element is to be considered as valid and former information is replaced by the new one; if no new information is provided, the client must consider this element existence as an error and close it in his database.

Special case - Out of Filter Specification

Due to a change within the attributes of a situation element or a change in the filter requirements or for some other reason in relation to information filtering, the information contained within a situation element is considered to be out of the filter specification. This is explained in greater detail in 8.7.2.

Three cases exist as explained in 8.7.2.

Fields to be filled:

- Out of Range (OOR): filled or
- Filter End (FIL): filled or
- Delivery Break (DBK): filled.

End Situation element

Fields to be filled:

- Situation Reference (SNM): use the existing situation reference.
- Element Reference (ERF): the reference of the situation element concerned.

A situation element is considered to have ended when an “End” has been used. This method is recommended.

An Expiry Time may be used to invalidate a situation element - following the application of an expiry time (EXP) to situation element information, if this situation element information has not been superseded (updated) and the expiry time has been passed, the situation element is considered to have expired (the information will be considered to sufficiently aged to contain errors). This is a method of terminating or de-activating a situation element by default.

8.6.2 End Situation [normative]

A situation is ended when all of its situation elements are not active. A situation element is not active when it has been ended (see End Situation Element above), expired (see End Situation Element above), or is out of Filter Specification (see Special case - Out of Filter Specification above).

8.6.3 Updating Methods [normative]

Two methods to update information can be used by the Supplier, as described below. Both of the updating methods can support the situation version number, if it is used. This is not mandatory. In both cases, when an information update is made the situation version number would be incremented by one. This is for interoperability with existing Interchange applications.

Single Situation element Updating

In this option, Supplier sends only those situation elements that contain new or updated information. Each new or updated situation element will be transmitted once the information has been altered by the Supplier. It is assumed, by the Client, that all the other information contained in other situation elements relating to the situation are unchanged.

The Client will gain a full description of the current status of a situation by searching the Client database for the latest versions of situation elements relating to that situation.

Single situation element updating is the recommended method.

All Situation element Updating

In this option, a full description of the situation is sent with each update. The Supplier sends all situation elements related to a situation when sending an update, including those situation elements of the situation that have ended. This procedure ensures that when receiving an update the Client will identify correctly the current status of all situation elements relating to a situation. This may result in the Client receiving multiple updates indicating that a situation element has ended.

The Client will gain a full description of the current status of a situation either by receiving an update of the situation or by searching the Client database for the latest versions of elements relating to that situation.

8.6.4 Example [informative]

This example illustrates the two methods of information updating provided above - Single situation element updating and All situation element updating. The information displayed for each situation element is an extract of the full element information.

Step 1

An accident (ACI) is reported to the Supplier at 10:00 am. Additionally the Supplier is told that there is stationary traffic (LS1).

Both Single Situation element Updating and All Situation element Updating will react in the same manner when a situation is first reported. Both methods will create two elements of the situation (situation reference, say, 110). These situation elements will contain the phrase codes ACI and LS1 respectively, which provide a partial description of the situation. This information will be sent to the Client by means of two messages, each describing one situation element.

Both updating methods will send the same simplified messages:

1ab. Situation 110; element 1; ACL.

2ab. Situation 110; element 2; LS1.

The table below shows a representation of what may be held in a Client's database, with each of the updating methods. With each step of the example a new line is added. The version of situation elements shown in this table are only for clarity and are not exchanged as part of the message. The version number shown may be generated by the Client's database, but are not mandatory.

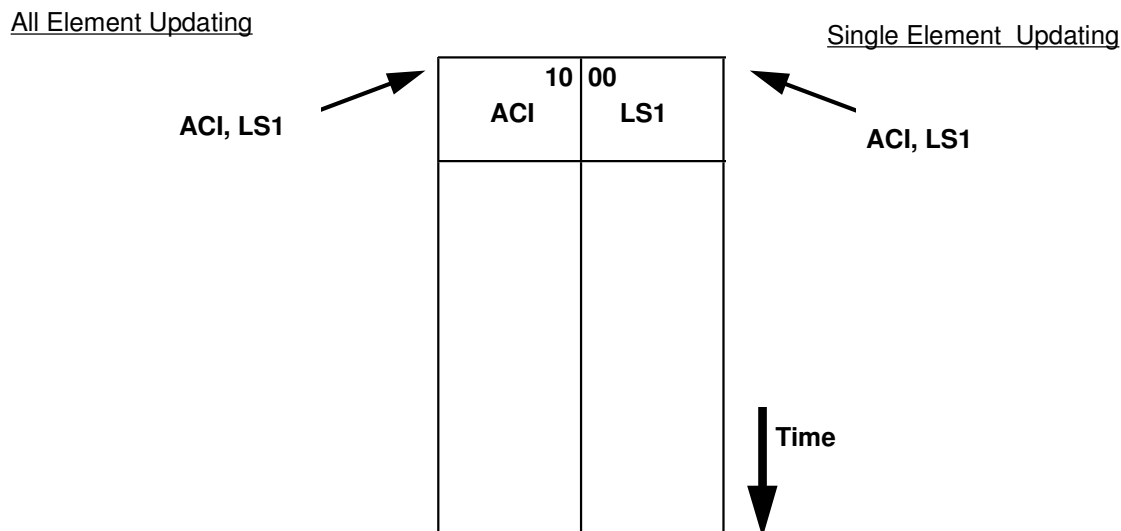


Figure 9 - Schematic of example, step 1

Input Time	Situation overview		Single Element Updating		All Element Updating	
	Element 1	Element 2	Element 1	Element 2	Element 1	Element 2
10:00	ACI (Version 1)	LS1 (Version 1)	ACI (Version 1)	LS1 (Version 1)	ACI (Version 1)	LS1 (Version 1)

Table 6 - Different updating views of Step 1

Step 2

At 10:30 am the Supplier is informed that the accident has been cleared but that the stationary traffic remains.

Using the Single Situation element Updating method only the situation element containing new information will be updated and exchanged between Supplier and Client. Element 1 will be ended by use of “End”. As only one situation element has been updated only one message will be exchanged. Element 2 will remain unchanged.

The simplified messages to be exchanged:

3a. Situation 110; element 1; ACI End.

Using the All Situation elements Updating method the information within element 1 is modified. Then both situation elements are sent to the Client again. In this case, the information relating to element 2 will be identical to that originally sent.

The simplified messages to be exchanged:

3b. Situation 110; element 1; ACI End.

4b. Situation 110; element 2; LS1.

All Element Updating

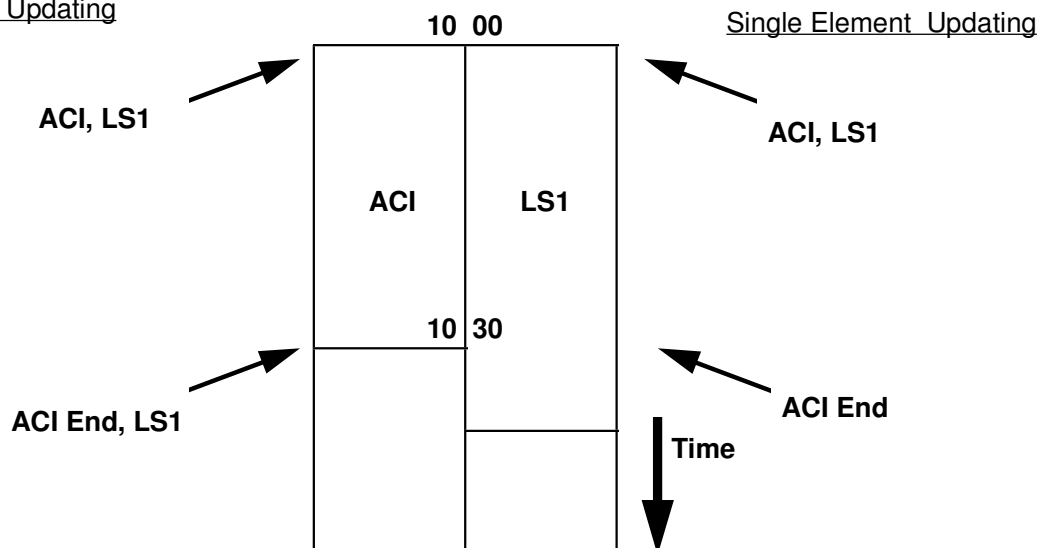


Figure 10 - Schematic of example, step 2

Input Time	Situation overview		Single Element Updating		All Element Updating	
	Element 1	Element 2	Element 1	Element 2	Element 1	Element 2
10:00	ACI (Version 1)	LS1 (Version 1)	ACI (Version 1)	LS1 (Version 1)	ACI (Version 1)	LS1 (Version 1)
10:30	ACI End (Version 2)	LS1 (Version 1)	ACI End (Version 2)	-	ACI End (Version 2)	LS1 (Version 1)

Table 7 - Different updating views of Step 2

Step 3

At 10:45 am the traffic has started to move again. Its description has changed from stationary traffic (LS1) to slow traffic (LS3).

Using the Single Situation element Updating method, only the situation element containing new information will be updated and exchanged between Supplier and Client. The phrase code contained in Element 2 will be changed from LS1 to LS3. As only one situation element has been updated only one message will be exchanged. Element 1 information is unchanged and Element 1 has been ended.

The simplified messages to be exchanged:

3a. Situation 110; element 2; LS3.

Once created a situation element shall have one and one only data object throughout all of its versions.

Using the All Situation elements Updating method the information within Element 2 is modified. Then both situation elements are sent to the Client again. In this case, the information relating to element 1 will be identical to that last sent (Element 1 has ended).

The simplified messages to be exchanged:

- 5b. Situation 110; element 1; ACI End.
- 6b. Situation 110; element 2; LS3.

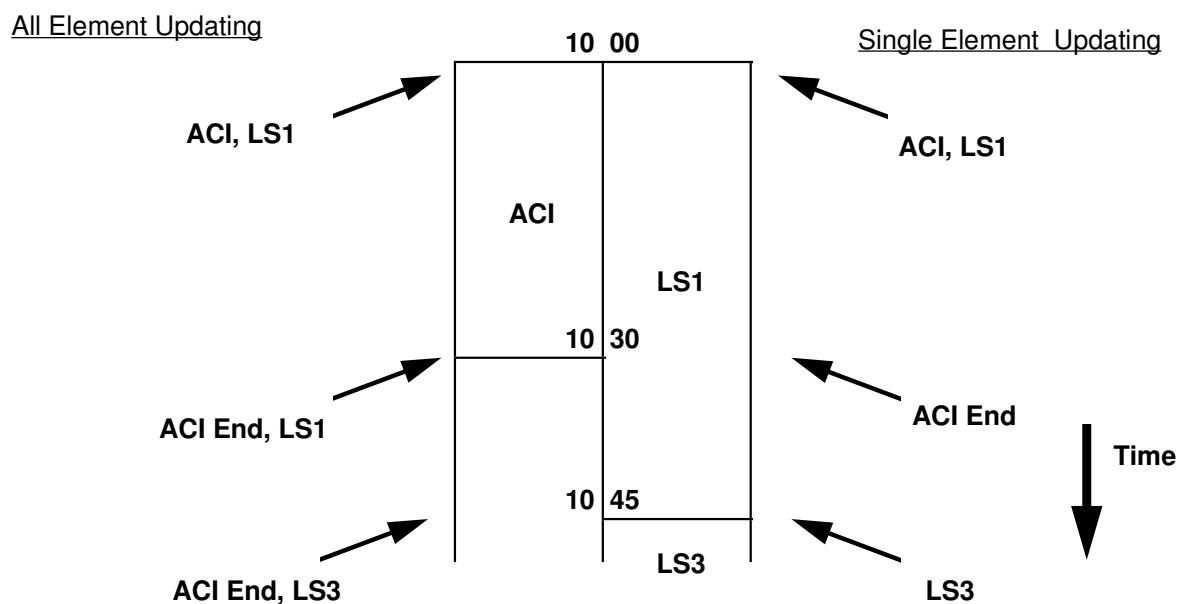


Figure 11 - Schematic of example, step 3

Input Time	Situation overview		Single Element Updating		All Element Updating	
	Element 1	Element 2	Element 1	Element 2	Element 1	Element 2
10:00	ACI (Version 1)	LS1 (Version 1)	ACI (Version 1)	LS1 (Version 1)	ACI (Version 1)	LS1 (Version 1)
10:30	ACI End (Version 2)	LS1 (Version 1)	ACI End (Version 2)	-	ACI End (Version 2)	LS1 (Version 1)
10:45	ACI End (Version 2)	LS3 (Version 2)	-	LS3 (Version 2)	ACI End (Version 2)	LS3 (Version 2)

Table 8 - Different updating views of Step 3

From this example, it is clear that the major advantage of the Single Situation element Updating method is that it reduces the communications burden by sending only the altered information. However, the advantage of All Situation element Updating method arises from the knowledge that the current status of the situation is fully described in the latest update.

8.7 Filtering general specification

8.7.1 Introduction [normative]

Information has to be transmitted from Supplier to Client. The information can be filtered in order:

- that the Client gets adequate information;
- to reduce communications costs.

This can be done using Client filter and/or Supplier filter which can be Client and/or Supplier driven.

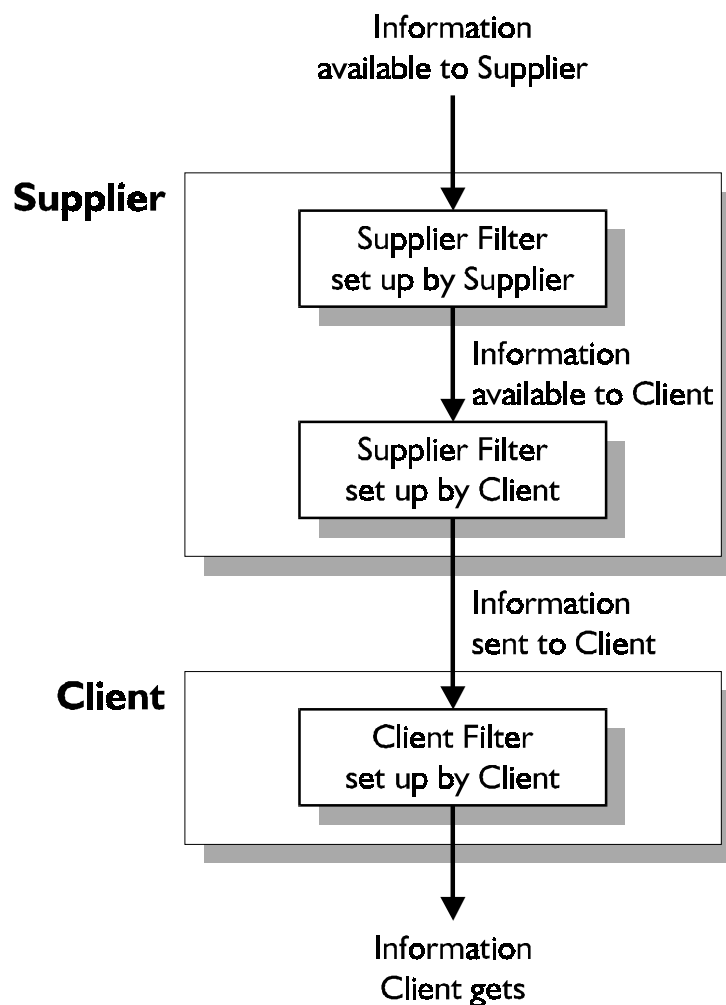


Figure 12 - Example using three kind of filters

The only case where Client and Supplier interact is when there is a Supplier Filter set up by Client. The way the Filter setup process is done defines the Levels:

Level 1: Filter exchange (if any) is done off-line. It means that a Supplier operator has to validate and install the filter. The Client requests information from the Supplier off-line and the Supplier provides what he is able to or he chooses to (See Figure 13 Levels 1 and 2).

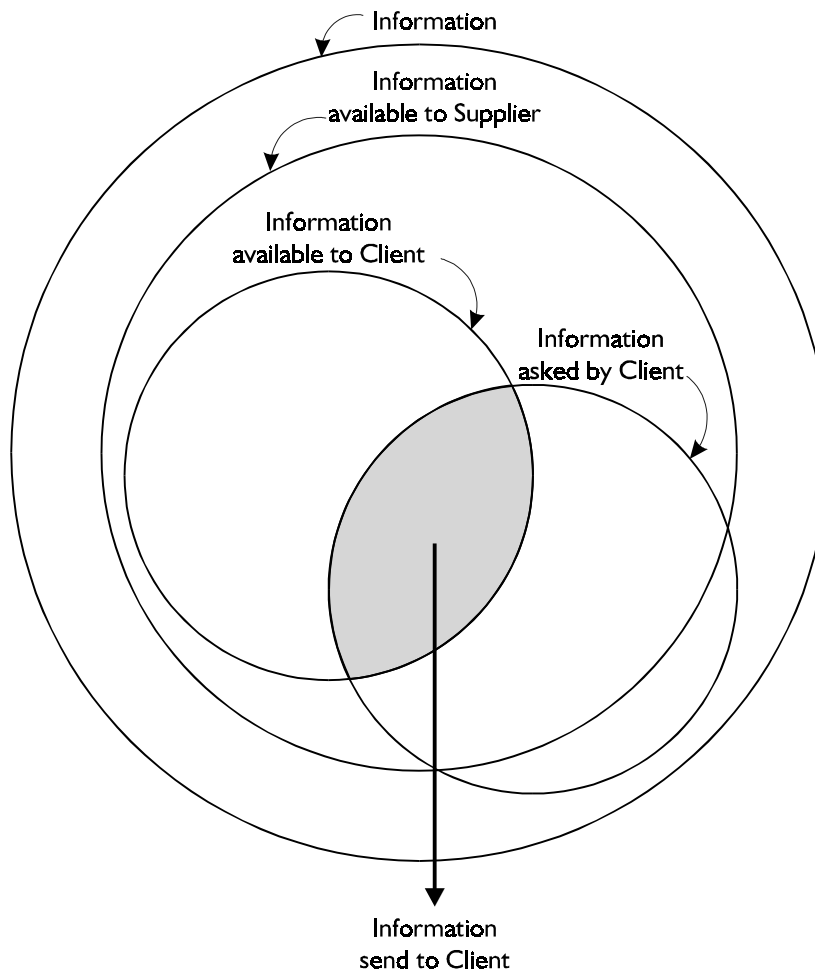


Figure 13 - Levels 1 and 2

Level 2: The Filter exchange is done on-line using request. It allows the automation of the exchange process and the application of the filter. The Client requests information from the Supplier following precise rules and the Supplier provides what he is able to or what he chooses to (see Figure 13).

Level 3: The filter exchange is done on-line via catalogue by using an order. The Client orders some items of a Supplier catalogue and the Supplier provides what the Client ordered (see Figure 14).

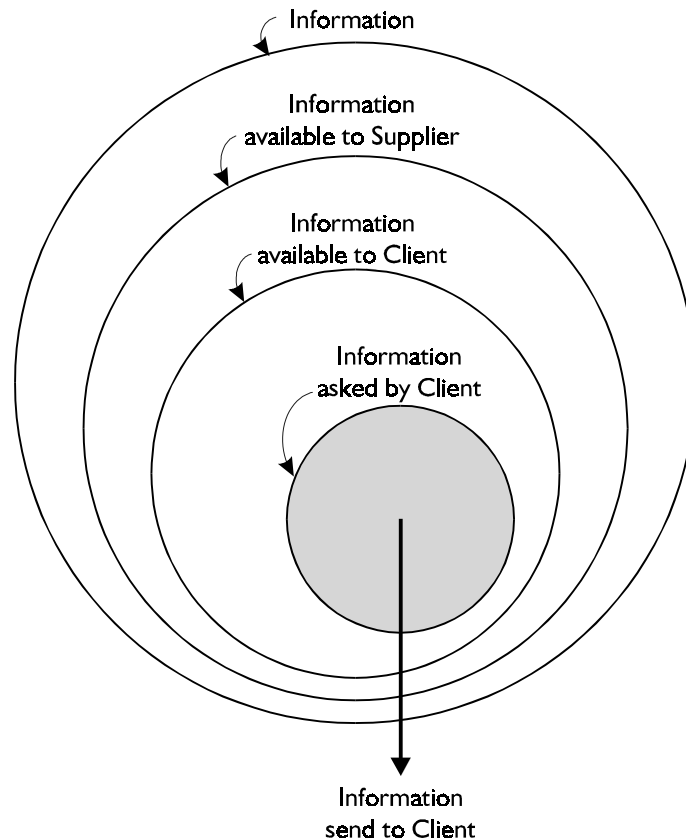


Figure 14 - Level 3

The detail of each Level is given in 10, 11 and 12.

Interoperability between Levels:

To be interoperable at this stage the Level 1 has been chosen.

There is a possibility to gather all those options in a common solution, such as HTML pages on Internet, but this will be studied more closely at a later stage.

Every centre can choose how far it will implement the filter process but is invited to follow the same rules in order to be interoperable. You will find description of those rules in this clause.

8.7.2 “Out of Range”, “Filter End” and “Delivery Break” Indicators [normative]

These filter status indicators requires some explanation. The information and/or the filters can evolve over time and it is very important for the Client to know the validity of the information received.

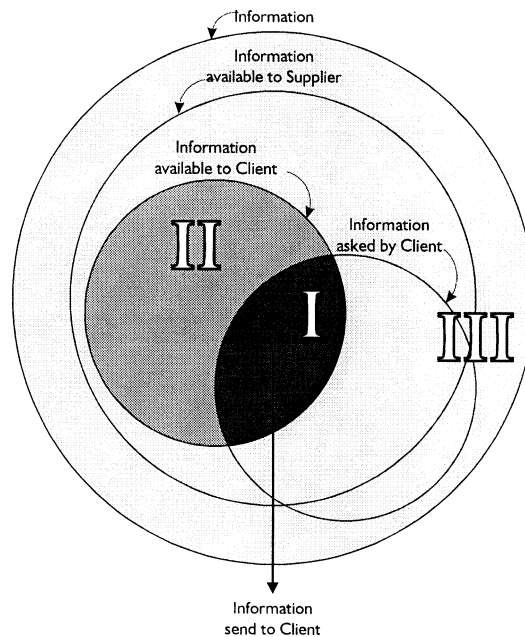


Figure 15 - Zones I, II, III

Example:

- An event on the road occurs and the information A about this event is input into the Supplier system. This information exists in the sets on Figure 15. As long as this information is in Zones II or III, it is not sent and the Client knows nothing of the event.
- After some time (because of information content and/or a change to the set) the information A exists in Zone I. This information is then sent to the Client.
- After some further time (because of information content and/or a change to the set) the information A exists outside Zone I. There are two possibilities:
 1. The information A exists in Zone II, meaning that the information is out of the filter range (“out of range”).
 2. The information A exists in Zone III, meaning that the information is no longer available for this Client.

When such an event occurs, with information A in Zone II (possibility 1), the Supplier shall send an “Out of Range” related to this information to the Client.

Alternatively the filter established for the Client may pass its valid period of operation, no further information would be sent, so the Supplier shall send a “Filter End” in relation to this information.

If for a reason the information cannot be supplied by the Supplier or is longer available to the Client (possibility 2), the Supplier shall send a “Delivery Break” related to this information.

The Client has to manage “Out of Range”, “Filter End” and “Delivery Break” because it is possible that an “End” or “Cancel” will not be received at a later time for this situation element.

8.7.3 Historical, Active and Future information [informative]

Definitions:

Future information are not already known by the system at the Present System Time.

Past information exist in the system by present system time. This includes both Active and Non-Active information.

Active information at Present System Time are defined as last version of information known by the system at that time excluding versions which have been invalidated. Invalidation occurs by the specific use of “End”, “Out of Range”, “Filter End”, “Delivery Break”, or an expired Expiry Time.

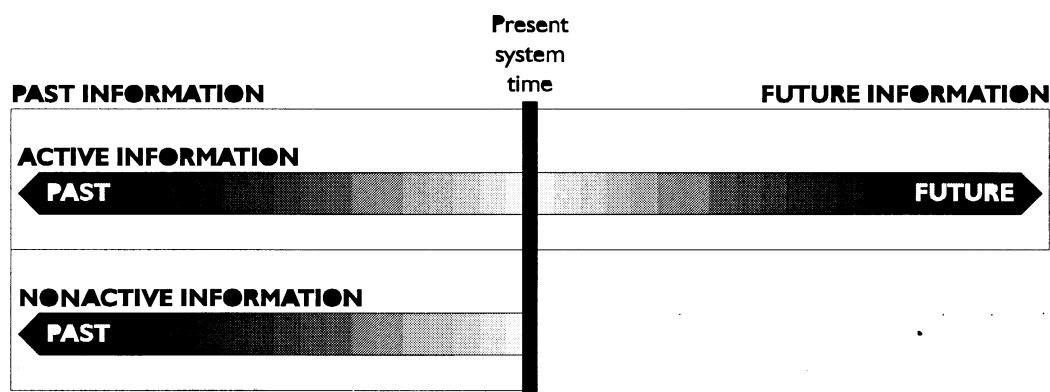


Figure 16 - Future, Past and Active information

Historical information at a time are defined as the last version of information known by the system at that time excluding versions which are not Active at that time.

Notes:

If a TIC operator needs information on-line, he will be interested in Active and Future information only. If he needs Non Active information for special applications, he can store information received for later usage. In this case, the filter deals only with Active and Future information. Generally, non Active information is needed when a filter comes into operation or for a special purpose like recovering from a system crash.

If a statistician needs Historical information, he can ask the Supplier directly. However Historical information can be linked to the backup procedure of each centre and therefore difficult to specify. Some Suppliers will not be able to supply Historical information on-line.

In conclusion, each Supplier shall supply Active and Future information for on-line operations. The Supplier can supply Historical information on-line or off-line.