
**Transport Information and control
systems — Data interfaces between
centres for transport information and
control systems —**

Part 1:

Message definition requirements

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 *Systèmes de commande et d'information des transports — Interfaces
de données entre les centres pour systèmes de commande et
d'information des transports —*

ISO 14827-1:2005

Partie 1. Exigences relatives à la définition du message

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14827-1 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, Working group 9, with the collaboration of:

- European Road Transport Telematics Implementation Co-ordination Organisation (ERTICO);
- Comite Europeen de Normalisation (CEN);
- American Association of State Highway and Transportation Officials (AASHTO);
- Institute of Transportation Engineers (ITE); and
- National Electrical Manufacturers' Association (NEMA).

ISO 14827 consists of the following parts, under the general title *Transport information and control systems — Data interfaces between centres for transport information and control systems*:

- *Part 1: Message definition requirements*
- *Part 2: DATEX-ASN*

Introduction

In the 1980s and 1990s, transport networks became increasingly congested and computer technologies were deployed to more efficiently manage the limited transport network. As these systems were deployed, it became increasingly important to integrate nearby systems to properly provide the required services.

One of the first efforts to standardize the interface between transport control centres was a European Union effort led by the DATEX Task Force. In May 1993, this group was established as a horizontal activity to coordinate the diverging developments which were ongoing within the framework of the Advanced Transport Telematics (ATT) Programme. Within the ATT Programme, three different data exchange systems were developed, namely INTERCHANGE, EURO-TRIANGLE and STRADA. The group produced a set of basic tools to meet existing needs, including a common Data Dictionary, a common set of EDIFACT messages and a common Geographical Location Referencing system.

The initial solution provided a common interface which satisfied the basic requirements of existing systems and was named the Data Exchange Network (DATEX-Net) Specifications for Interoperability. During the initial efforts to deploy this standard, there was a growing sense that the message structure should be better organized and should be defined using Abstract Syntax Notation One (ASN.1) rather than EDIFACT.

ASN.1 presents a standard notation for the definition of data types and values. A data type is a class of information (for example, numeric, textual, still image or video information). A data value is an instance of such a class. ASN.1 defines several basic types and their corresponding values, and rules for combining them into more complex types and values. These types and values can then be encoded into a byte stream according to any of several standardized encoding rules.

Efforts to standardize communications between transport control centres were also underway in other parts of the world. In 1997, all of these efforts began to merge, with the United States developing the initial draft of the ASN.1 structures for the Data Exchange in Abstract Syntax Notation (DATEX-ASN). These structures, called data packets, were then placed within a procedural context and submitted to the ISO standardization process.

A portion of the submittal dealt with the specification of messages. As this portion of the document could apply to various protocols, it was placed in ISO 14827-1. The remainder of the original submittal formed the basis of the Application Layer protocol and was placed in ISO 14827-2. Thus, Part 2 defines only one way to implement the messages that are specified in the format defined by Part 1.

Due to the flexibility required by the rapidly developing Transport Information and Control Systems environment, the resulting International Standard uses a very generic structure. Thus, although initially intended to be an International Standard for TICS, it is flexible enough to be used for virtually any data exchange.

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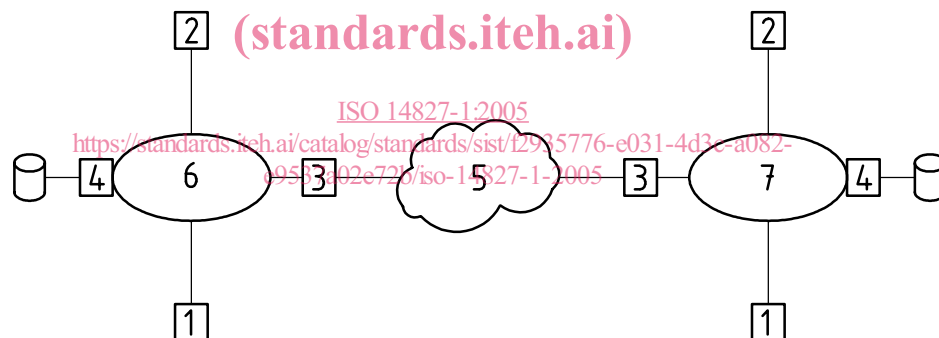
Transport Information and control systems — Data interfaces between centres for transport information and control systems —

Part 1: Message definition requirements

1 Scope

This part of ISO 14827 defines the format that should be used to document those end-application messages that are to be exchanged between and among central systems. The format is protocol-independent to the extent practical. For example, this one format can be used to define data exchanges that may apply to DATEX-ASN, CORBA, or other application protocols.

In general, each system can be viewed as consisting of the interfaces as shown in Figure 1:



Key

- 1 application interface
- 2 operator interface
- 3 communication interface
- 4 database interface
- 5 communications cloud
- 6 client system
- 7 server system

NOTE The communications cloud between the systems may be complex or simple.

Figure 1 — System interface

This part of ISO 14827 deals only with the communication interface and is at a very high level. Other parts define how end-application messages can be exchanged using various application layer protocols.

While this part of ISO 14827 has been designed to meet the unique requirements of a TICS environment, it has been designed in a generic fashion and thus could be used for other data exchanges as well.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 7498-4, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Part 4: Management framework*

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Specification of basic notation*

ISO/IEC 8824-2, *Information technology — Abstract Syntax Notation One (ASN.1) — Information object specification*

ISO/IEC 8825-1, *Information technology — ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*

ISO/IEC 8825-2, *Information Technology — ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*

ISO 9735, *Electronic data interchange for administration, commerce and transport (EDIFACT) — Application level syntax rules*

3 Terms and definitions

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For the purposes of this document, the following terms and definitions apply.

3.1 application layer

top layer of the OSI seven-layer model as defined in ISO/IEC 7498-4

NOTE This layer defines the structure and format of the data packet content along with the rules and procedures for exchanging data packets.

3.2 center

any computer or network that is required to meet a standardized communications interface over a fixed-point communications network, regardless of whether the “center” is the only system within the building or just one of many, or even if the “center” is located in the field

NOTE This part of ISO 14827 only deals with communications that are between “centers”.

3.3 client

computer or application which requests and accepts data from a server computer or application using some kind of protocol

3.4 command

data packet which is prepared by one system in order to control some function(s) of another system

NOTE Commands may be conveyed as a subscription (request) or publication (reply) depending on the design of the specific data exchange.

3.5 data packet

entity of data that can be sent between end-application systems in order to exchange information

NOTE A data packet relates to the Application Layer of the OSI stack and may be broken into several pieces by lower layer protocols.

3.6**end application message**

message

data structure that has been associated with a specific meaning and which, when properly sent in a data packet, an instance of the structure can convey information between systems

NOTE A data structure might, for example, be specified to include a list of speeds from detector stations. This one data structure could be used to specify the content of several messages (e.g. the list of current speeds being detected, the list of stored speeds that will trigger a congestion warning if current values fall below the indicated level, or a request for a list of locations where the current speed is less than the indicated speed). An instance of the message would then contain actual values.

3.7**message instance**

specific instance of an end application message

3.8**message specification**

documentation defining the meaning of a message, the result of applying this part of ISO 14827 to a specific message

3.9**profile**

International Standard that defines rules by only combining requirements of other International Standard

EXAMPLE An application profile is a profile that specifies the application, presentation, and session layers by referencing a group of other International Standards.

3.10**protocol**

set of formal rules describing how to transmit data, especially across a network

3.11**publication**

reply

data which have been prepared by a server, usually in response to a subscription

NOTE In some cases, a publication may be termed a “reply” or a “response”.

3.12**server**

computer or application which receives and responds to requests for data from client computers or applications using some kind of protocol

3.13**subscription**

request

data packet which is prepared by a client in order to request current or future publication(s)

NOTE In some cases, a subscription may be termed a “request”.

4 Symbols and abbreviated terms

ASN.1 Abstract Syntax Notation 1 (ISO/IEC 8824-1 and ISO/IEC 8824-2)

BER Basic Encoding Rules (ISO/IEC 8825-1)

CORBA Common Object Request Broker Architecture