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

Part 2:  
**DATEX-ASN**

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

*Partie 2: DATEX-ASN*



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**Contents**

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>2</b>
<b>3 Terms and definitions</b> .....	<b>3</b>
<b>4 Symbols and abbreviated terms</b> .....	<b>5</b>
<b>5 Implementation considerations</b> .....	<b>6</b>
<b>6 Data exchange procedures</b> .....	<b>6</b>
<b>6.1 General data packet procedures</b> .....	<b>7</b>
<b>6.2 General file procedures</b> .....	<b>7</b>
<b>6.3 Sessions</b> .....	<b>8</b>
<b>6.4 Requesting information</b> .....	<b>11</b>
<b>6.5 Publication of information</b> .....	<b>12</b>
<b>Annex A (normative) Data packet structures</b> .....	<b>16</b>
<b>Annex B (normative) Data dictionary</b> .....	<b>23</b>
<b>Annex C (normative) Value domains</b> .....	<b>45</b>
<b>Annex D (normative) DATEX-ASN over internet protocols</b> .....	<b>55</b>
<b>Annex E (normative) Protocol requirements list</b> .....	<b>56</b>
<b>Annex F (informative) Implementation guidance</b> .....	<b>61</b>
<b>Annex G (informative) Advantages of DATEX-ASN</b> .....	<b>62</b>

## 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 14827-2 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*, Working Group 9, with the collaboration of:

- European Road Transport Telematics Implementation Coordination Organization (ERTICO);
- Comité Européen de Normalisation (CEN);
- American Association of State Highway and Transportation Officials (AASHTO);
- Institute of Transportation Engineers (ITE);
- 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 more 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: 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 International 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 (e.g. 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 standardised 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 — *Message definition requirements*. The remainder of the original submittal formed the basis of the application layer protocol and was placed in this part of ISO 14827. Thus, this part defines only one way to implement the messages that are specified in the format defined by ISO 14827-1. This resulting International Standard supports existing and foreseen data exchange needs using modern design concepts.

Due to the flexibility required by the rapidly developing transport information and control systems (TICS) environment, this part of ISO 14827 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.

ISO 14827-1 explains how to define end-application messages that are to be exchanged between centres for TICS. This definition has been designed to be relatively generic to the selected protocol (e.g. DATEX-ASN, CORBA, etc.) This part of ISO 14827 provides the specification of the Data Exchange protocol in ASN.1 (DATEX-ASN) used to exchange data between central systems. DATEX-ASN was the first protocol standardized because:

- the development of DATEX-Net could be leveraged, and
- there was sufficient market interest to perform the required technical work.

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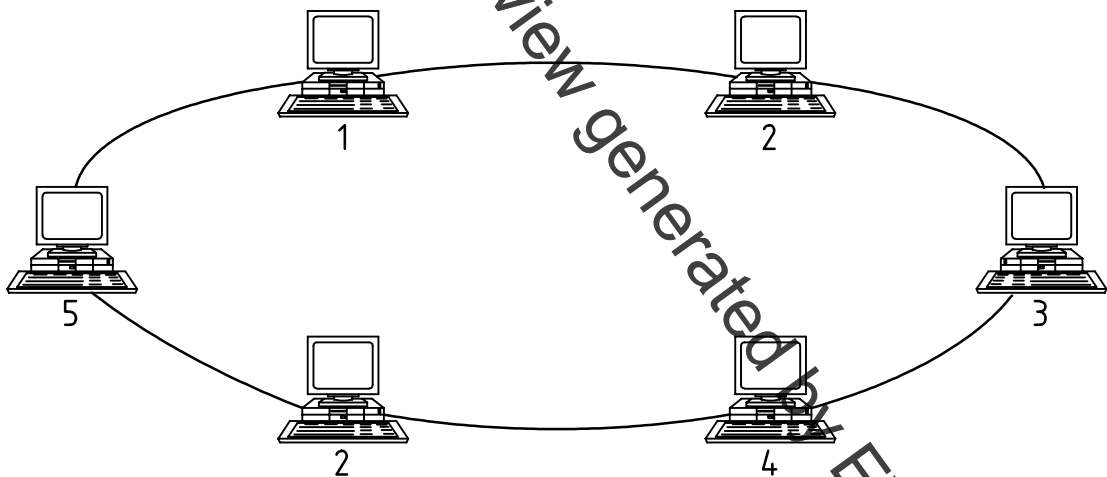
# Transport information and control systems — Data interfaces between centres for transport information and control systems —

## Part 2: DATEX-ASN

### 1 Scope

DATEX-ASN allows different systems to exchange relevant data. This is contained in end-application messages. Each end-application message is defined as either a “subscription” or a “publication” according to the format as specified in ISO 14827-1. DATEX-ASN defines how these end-application messages are packaged to form a complete data packet and also defines the rules and procedures for exchanging these data packets. Systems using DATEX-ASN are free to implement additional end-application functionalities according to the user requirements.

A DATEX-ASN network comprises a certain number of systems, an example of which is provided in Figure 1.

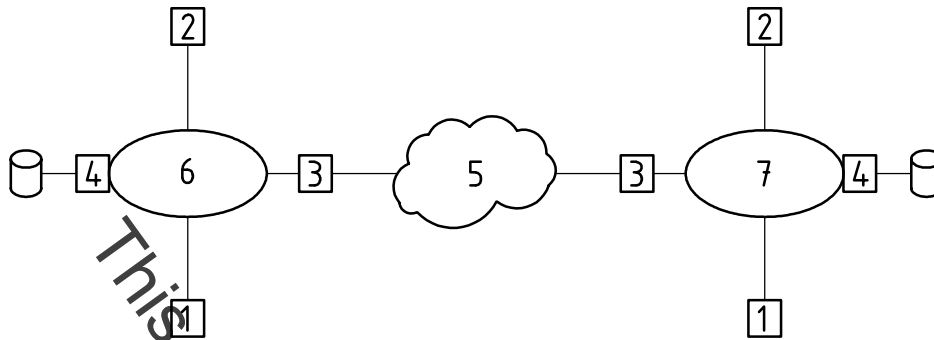


#### Key

- 1 weather system
- 2 traffic management system
- 3 transit management system
- 4 emergency management system
- 5 information service provider

Figure 1 — An example of a DATEX-ASN network

Each system can be viewed as consisting of the interfaces, as shown in Figure 2:



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

Figure 2 — System interfaces

This part of ISO 14827 deals only with the communications interface. It has been designed to meet the unique requirements of TICS; however, it has been designed in a generic fashion and thus could be used for other data exchanges as well.

Systems implementing this part of 14827 sometimes operate simultaneously as a client and server, using multiple sessions. The communications cloud between the two systems may be complex or simple.

## 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 4217, *Codes for the representation of currencies and funds*

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

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

ISO 14827-1, *Transport information and control systems — Data interfaces between centres for transport information and control systems — Part 1: Message definition requirements*