
**Intelligent transport systems (ITS) — Data
exchange involving roadside modules
communication —**

Part 3:
**Application profile-data exchange
(AP-DATEX)**

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*Systemes intelligents de transport (SIT) — Échange de données
impliquant la communication par modules en bordure de route —*

Partie 3: Profil d'application-échange de données (AP-DATEX)

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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
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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 15784-3 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

ISO 15784 consists of the following parts, under the general title *Intelligent transport systems (ITS) — Data exchange involving roadside modules communication*:

- Part 1: *General principles and documentation framework of application profiles*
- Part 3: *Application profile-data exchange (AP-DATEX)*

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Introduction

The functional requirements for communication between a traffic management centre and roadside modules used for traffic management are varied because internationally there are many kinds of roadside modules for traffic management, such as signal controllers, dynamic message signs and vehicle detectors. In the development of standards for data exchanges between a traffic management centre and roadside modules used for traffic management, ISO/TC 204/WG9 agreed that the concept of a single standard for all countries and devices might not be appropriate, but a set of standards for different types of roadside module might be more appropriate.

As a result, ISO/TC 204/WG9 adopted the philosophy of producing profile documents to specify how data should be exchanged.

In the development of this part of ISO 15784, reference was made to the existing standards about profiles, specifically NTCIP 8003 which is the US standard for a profile framework, and ISO/IEC TR 10000, which is a series of Technical Reports under the general title *Information technology — Framework and taxonomy of International Standardized Profiles*.

The purpose of a profile is to specify the use of one or more base standards to provide a requested function. Because there are multiple functional requirements to data exchange between a centre and the roadside modules, ISO 15784 defines multi-part profiles.

This part of ISO 15784 defines only the application profile. End application data is defined in the data-registry. Each country should define lower layer profiles based on the internationally standardized protocols because each country has its own circumstance on communication infrastructure.

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Intelligent transport systems (ITS) — Data exchange involving roadside modules communication —

Part 3: Application profile-data exchange (AP-DATEX)

1 Scope

The purpose of this part of ISO 15784 is to define an application profile referring ISO 14827 and other base standards.

The application profile specified in this part of ISO 15784 is used to exchange data and messages in the following cases.

- a) Between a traffic management centre and roadside modules for traffic management.
- b) Between roadside modules used for traffic management.

The scope of this part of ISO 15784 does not include the communication between roadside modules and in-vehicle units, in-vehicle communication, in-cabinet communication or motion video transmission from a camera or recorded media.

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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 8825-1:2002, *Information technology — ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER) — Part 1*

ISO/IEC TR 10000-2:1998, *Information technology — Framework and taxonomy of International Standardized Profiles — Part 2: Principles and Taxonomy for OSI profiles*

ISO 14827-2:2005, *Transport information and control systems — Data interfaces between centres for transport information and control systems — Part 2: DATEX-ASN*

3 Terms and definitions

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

3.1

application layer

layer containing all functions needed for the distributed applications and not already provided by the presentation service

NOTE The application layer constitutes layer 7 of the OSI model.

3.2

base standard

approved international standard or a related authoritative standard

3.3

Basic Encoding Rules

BER

standardized determination of data encoding to conform to the requirements of ISO 8824, ASN.1

NOTE The Basic Encoding Rules are given in ISO 8825.

3.4

centre

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

3.5

client

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

3.6

compatibility

capability of two or more items or components of equipment or material to exist and/or function in the same system or environment without modification, adaptation or mutual interference

3.7

data

information before it is interpreted

3.8

datagram

a self-contained unit of data transmitted independently of other datagram

3.9

data link layer

layer that manages frames and performs error detection and correction

NOTE The data link layer constitutes layer 2 of the OSI model. It can also be used to co-ordinate distribution of physical connections.

3.10

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.

3.11

encoding rules

rules which specify the representation during transfer of the values of ASN.1 types

NOTE Encoding rules also enable the values to be recovered from the representation, given knowledge of the type.

3.12

end-application

process or program using the communications stack

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3.13**intelligent transport systems**

major national initiative to improve information, communication and control technologies in order to improve the efficiency of surface transport

3.14**internet protocol**

network protocol offering a connectionless mode network service in the internet suite of protocols

3.15**message**

set of data grouped together for transmission

3.16**network layer**

layer that provides functional and procedural means of transferring variable length data sequences from a source to a destination

NOTE The network layer constitutes layer 3 of the OSI model.

3.17**open systems interconnection****OSI**

reference model developed by ISO to enable different or similar systems to dialogue with one another

NOTE 1 This model constitutes a reference framework for describing data exchanges. Each layer performs a service at the request of the adjacent higher layer, and in turn, requests more basic services from the lower layers. It is described in 7 layers.

NOTE 2 Open systems interconnection (OSI) is an international effort to facilitate communications among computers of different manufacture and technology.

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3.18**physical layer**

layer that defines the physical data transmission medium

NOTE The physical layer constitutes layer 1 of the OSI model.

3.19**port**

logical channel in a communications system

NOTE UDP and TCP use port numbers to multiplex data packets from a variety of applications onto a single communications system.

3.20**port number**

identifier of an application-entity to a transport service in the internet suite of protocols

NOTE The concept of port numbers is often present in OSI literature; however, port numbers are not inter-network standardized, but exist as local network conventions only.

3.21**presentation layer**

layer that converts data using different syntax

NOTE The presentation layer constitutes layer 6 of the OSI model.

**3.22
profile**

standard that defines rules by only combining requirements of other standards

NOTE An application profile is a profile that specifies the application, presentation, and session layers by referencing a group of other standards.

**3.23
roadside modules**

terminal units controlled or monitored by a traffic management centre

NOTE Roadside modules are usually installed at the roadside arena.

**3.24
server**

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

**3.25
session layer**

layer that manages the dialogue between end-user application processes including restart, termination, and checkpointing

NOTE The session layer constitutes layer 5 of the OSI model.

**3.26
transport layer**

layer that provides transparent transfer of data between end users

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NOTE The transport layer constitutes layer 4 of the OSI model.

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**3.27
transport profile**

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set of services which are responsible for providing a virtually error-free, point to point connection so that host-A can send data packets to host-B and they will arrive uncorrupted

NOTE Connection-oriented transport profiles can also ensure that the data packets arrive in the correct order.

4 Abbreviated terms

AP	Application Profile
ASN.1	Abstract Syntax Notation One
ATM	Asynchronous Transfer Mode
DATEX-ASN	Data Exchange in ASN.1
FHWA	Federal Highway Administration
FDDI	Fiber Distributed Data Interface
FSK	Frequency Shift Keying
FTP	File Transfer Protocol
IEC	International Electro-technical Commission

ISO	International Organization for Standardization
OSI	Open Systems Interconnection
PICS	Profile Implementation Conformance Statement
PMPP	Point to Multi Point Protocol
PPP	Point-to-Point Protocol (RFC 1661)
SFMP	Simple Fixed Message Protocol
SLIP	Serial Line Internet Protocol
SNMP	Simple Network Management Protocol (RFC 1157)
SONET	Synchronous Optical Network
STMF	Simple Transportation Management Framework
STMP	Simple Transportation Management Protocol
TCP	Transmission Control Protocol (RFC 793)
TFTP	Trivial File Transfer Protocol
TMP	Transportation Management Protocols
TR	Technical Report
UDP	User Datagram Protocol (RFC 768)

5 General

5.1 Open systems interconnection (OSI) reference model

The OSI reference model defines seven layers, each performing a particular role in the transmission of data over a medium. Application profiles define the upper three layers.

The top layer of the OSI seven layer model, the application layer, handles issues like network transparency, resource allocation and problem partitioning. The application layer is concerned with the user's view of the network.

The second highest layer in the OSI seven layer model, also known as layer 6 or the presentation layer, performs functions such as text compression, code conversion, or format conversion to try to smooth out differences between hosts.

Layer 5, the session layer, handles security and creation of the session.

5.2 Scenario

AP-DATEX should be used when there are connections between a traffic management centre and roadside modules used for traffic management.

This part of ISO 15784 deals with the interface described in Figure 1.