INTERNATIONAL STANDARD

ISO/IEC 14699

First edition
1997-06-15

Information technology — Open Systems Interconnection — Transport Fast Byte Protocol

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Protocole de byte rapide de transport

Reference number
ISO/IEC 14699:1997(E)

Contents

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 14699 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.634.

Annex A forms an integral part of this International Standard. Annex B is for information only.

Introduction

This Recommendation | International Standard is one of a set of Recommendations | International Standards produced to facilitate the interconnection of information processing systems. This set of Recommendations | International Standards covers the services and protocols required to achieve such interconnection.

The Transport Fast Byte Protocol Recommendation | International Standard is positioned with respect to other related Recommendations | International Standards by the layers defined in the Reference Model for Open Systems Interconnection (see ITU-T Rec. X.200 | ISO/IEC 7498-1). It is most closely related to, and lies within the field of application of, the Transport Service definition (see ITU-T Rec. X.214 | ISO/IEC 8072). It also uses and makes reference to the Network Service definition (see ITU-T Rec. X.213 | ISO/IEC 8348), whose provisions it assumes in order to accomplish Transport Fast Byte's aims. The interrelationship of these Recommendations | International Standards is illustrated in Figure Intro. 1.

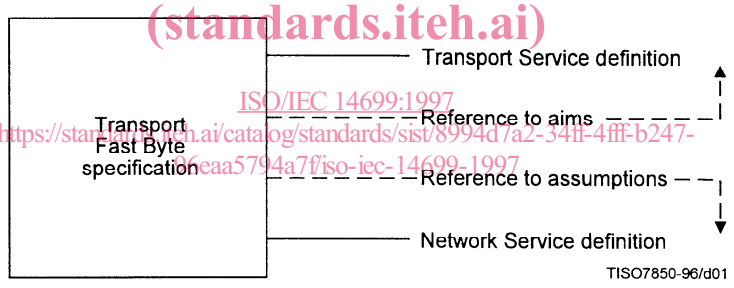

Figure Intro. 1 – Relationship between the Transport Fast Byte Protocol and adjacent services

This Recommendation | International Standard specifies a common encoding and protocol procedures. It is intended that the Transport Fast Byte Protocol should be simple and cater for a specific range of Network Service qualities possible.

The protocol is structured to give rise to two modes of operation which are designed to minimize possible incompatibilities and implementation costs. The modes are selectable with respect to the Transport and Network services in providing the required Quality of Service for the interconnection of two session entities (one mode ignores network signalled errors, the other mode does not). This Recommendation | International Standard does not define mechanisms that can be used to optimize network tariffs or enhance the quality of Network Service.

The primary aim of this Recommendation | International Standard is to provide a set of rules for communication expressed in terms of the procedures to be carried out by peer entities at the time of communication. These rules for communication are intended to provide a sound basis for development in order to serve a variety of purposes:

a) as a guide for implementors and designers;

b) for use in the testing and procurement of equipment;

c) as part of an agreement for the admittance of systems into the open systems environment;

d) as a refinement of the understanding of OSI.

As it is expected that the initial users of this Recommendation | International Standard will be designers and implementors of equipment, this Recommendation | International Standard contains, in notes or in annexes, guidance on the implementation of the procedures defined herein.

This Recommendation | International Standard contains a clause on conformance of equipment claiming to implement the procedures in this Recommendation | International Standard (see clause 8). To evaluate conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a given OSI protocol. Such a statement is called a Protocol Implementation Conformance Statement (PICS). A PICS proforma is provided in Annex A. Attention is drawn to the fact that this Recommendation | International Standard does not contain any tests to demonstrate this conformance.

It should be noted that it may not be possible with current technology to verify that an implementation will operate the protocol defined in this Recommendation | International Standard correctly under all circumstances. It is possible by means of testing to establish confidence that an implementation correctly operates the protocol in a representative sample of circumstances. It is, however, intended that this Recommendation | International Standard can be used in circumstances where two implementations fail to communicate in order to determine whether one or both have failed to operate the protocol correctly.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – TRANSPORT FAST BYTE PROTOCOL

1 Scope

This Recommendation | International Standard specifies:

a) Two modes of procedures when operating over the connection oriented network service:

   1) mode 0: acts on network signalled errors;

   2) mode 4: ignores network signalled errors,

   for the connection oriented transfer of data and control information from one transport entity to a peer transport entity.

b) The means of selecting the mode of procedures to be used by the transport entities.

c) The structure and encoding of the TPDUs used for the transfer of data and control information.

The procedures are defined in terms of:

a) the interactions between peer transport entities through the exchange of TPDUs;

b) the interactions between a transport entity and the transport service user in the same system through the exchange of transport service primitives;

c) the interactions between a transport entity and the network service provider through the exchange of network service primitives.

These procedures are applicable to instances of communication between systems which support the Transport Layer of the OSI Reference Model and wish to interconnect in the open systems environment using the Transport Fast Byte Protocol.

This Recommendation | International Standard specifies, in clause 8, conformance requirements for systems implementing these procedures and provides the PICS proforma in compliance with the relevant requirements, and in accordance with the relevant guidance, given in ITU-T Rec. X.296 and ISO/IEC 9646-7. It does not contain tests which can be used to demonstrate this conformance.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and International Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and International Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model.*
- ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: Conventions for the definition of OSI services.*
- ITU-T Recommendation X.213 (1995) | ISO/IEC 8348:1996, *Information technology – Open Systems Interconnection – Network service definition.*

- ITU-T Recommendation X.214 (1995) | ISO/IEC 8072:1996, *Information technology – Open Systems Interconnection – Transport service definition.*
- ITU-T Recommendation X.224 (1995) | ISO/IEC 8073:1997, *Information technology – Open Systems Interconnection – Protocol for providing the OSI connection-mode transport service.*
- ITU-T Recommendation X.263 (1995) | ISO/IEC TR 9577:1996, *Information technology – Protocol identification in the Network layer.*

2.2 Paired Recommendations | International Standards equivalent in technical contents

- ITU-T Recommendation X.290 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – General Concepts.*

  ISO/IEC 9646-1:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts.*
- ITU-T Recommendation X.296 (1995), *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Implementation conformance statements.*

  ISO/IEC 9646-7:1995, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements.*

3 Definitions

NOTE – The definitions contained in this clause make use of abbreviations defined in clause 4.

3.1 This Recommendation | International Standard is based on the concepts developed in ITU-T Rec. X.200 | ISO/IEC 7498-1 and makes use of the following terms defined in it:

a) concatenation and separation;
b) segmenting and reassembling;
c) multiplexing and demultiplexing;
d) splitting and recombining;
e) flow control;
f) nil selector value;
g) connection-mode network service;
h) connection-mode transport service.

3.2 For the purposes of this Recommendation | International Standard, the following definitions apply:

3.2.1 equipment: Hardware or software or a combination of both; it need not be physically distinct within a computer system.

3.2.2 local matter: A decision made by a system concerning its behaviour in the Transport Layer that is not subject to the requirements of this protocol.

3.2.3 initiator: A transport entity that acts on a T-CONNECT request from the TS-user.

3.2.4 responder: A transport entity with whom an initiator wishes to establish a transport connection.

3.2.5 sending transport entity: A transport entity that sends a given TPDU.

3.2.6 receiving transport entity: A transport entity that receives a given TPDU.

3.2.7 error indication: An N-RESET indication that a transport entity receives from the NS-provider.

3.2.8 invalid TPDU: A TPDU that does not comply with the requirements of this Recommendation | International Standard for structure and encoding.

3.2.9 protocol error: A TPDU whose use does not comply with the procedures for the mode.

3.2.10 transparent (data): TS-user data that is transferred intact between transport entities and which is unavailable for use by the transport entities.

3.2.11 owner (of a network connection): The transport entity that issued the N-CONNECT request leading to the creation of that network connection. Only applicable when operating over the connection-oriented network service.

3.2.12 calling: A classification associated with the initiator (e.g. a calling T-SEL is the T-SEL of the initiator; a data transfer direction of calling-to-called is the direction of transfer which originates at the initiator and terminates at the responder).

3.2.13 called: A classification associated with the responder (e.g. a called T-SEL is the T-SEL of the responder; a data transfer direction of called-to-calling is the direction of transfer which originates at the responder and terminates at the initiator).

3.3 This Recommendation | International Standard uses the following terms defined in ITU-T Rec. X.290 and ISO/IEC 9646-1:

a) PICS proforma;

b) Protocol Implementation Conformance Statement (PICS).

3.4 This Recommendation | International Standard uses the following terms defined in ITU-T Rec. X.210 | ISO/IEC 10731:

a) transport service user;

b) network service provider.

4 Symbols and abbreviations

For the purposes of this Recommendation | International Standard, the following abbreviations apply:

4.1 Data units

TPDU	Transport-protocol-data-unit
TSDU	Transport-service-data-unit
NSDU	Network-service-data-unit

4.2 TPDU types

FB-TPDU	Fast Byte TPDU

4.3 TPDU fields

EOT	End of TSDU
Null-PCI	Null PCI data transfer parameter
TPCI	Transport Layer Protocol Control Information

4.4 Miscellaneous

TS-user	Transport-service user
TS-provider	Transport-service provider
TSAP	Transport-service-access-point
T-SEL	Transport Selector
NS-provider	Network service provider
NSAP	Network-service-access-point
QOS	Quality of Service
CONS	Connection-mode Network Service

5 Overview of the Transport Fast Byte Protocol

The Transport Fast Byte Protocol eliminates the round trip delay associated with the establishment and release of a transport connection, and requires very low PCI overhead. The Transport Fast Byte Protocol is intended for use in situations in which enhancements to the network QOS are not required, and efficiency of operation (e.g. reduction of round trip delays on establishment and release) is of primary concern. The protocol ensures an interoperable method for accomplishing this, by standardizing a "mapping" between the transport and network services.

Unlike traditional protocols, the Fast Byte protocol does not define different PDU types (e.g. connect, release, reset, etc.). The Fast Byte protocol defines a single PDU, and the semantics of this PDU are dependent on the service primitive in which the PDU is received.

5.1 Service provided by the Transport Layer

The Transport Fast Byte Protocol supports the OSI connection-mode transport service defined in ITU-T Rec. X.214 | ISO/IEC 8072 with the following restrictions:

1) the length of TSAP IDs are fixed at 2 octets;

2) no enhancement of the network service QOS is provided, so that the transport service QOS approximates to the corresponding network service QOS.

This protocol is intended to complement, as opposed to replace, the existing protocol which supports the connection-mode transport service (see ITU-T Rec. X.224 | ISO/IEC 8073).

Information is transferred to and from the TS-user in the transport service primitives listed in Table 1.

Table 1 – Transport service primitives

Primitives		Parameters	Notes
T-CONNECT	request indication	Called address Calling address Expedited data option Quality of Service TS-user data	1 1 2 3
T-CONNECT	response confirm	Responding address Expedited data option Quality of Service TS-user-data	1 2 3
T-DATA	request indication	TS-user-data	
T-EXPEDITED DATA	request indication	TS-user-data	
T-DISCONNECT	request	TS-user-data	3
T-DISCONNECT	indication	Disconnect reason TS-user-data	 3

NOTES

1 The length of a T-SEL is fixed at 2-octets, and a value of NIL is assigned a default encoding.

2 QOS parameter values, and QOS negotiation capabilities, are limited by those available from the underlying network service provider. The Fast Byte protocol does not support enhancement of the QOS offered by the underlying service. Where the underlying service supports a range of QOS-parameter values, the Fast Byte protocol may use the corresponding negotiation facilities of the underlying service. A similar level of QOS service may be requested from the network service or, in the presence of local knowledge, a lower level may be requested. The actual level of QOS achieved may be lower than, similar to, or even higher than that requested.

3 Maximum length = maximum length of the user-data parameter of the underlying service minus the TPCI length.

5.2 Service assumed from the Network layer

The Transport Fast Byte Protocol assumes the use of the OSI connection-mode network service (CONS) defined in ITU-T Rec. X.213 | ISO/IEC 8348.

When operating over CONS, information is transferred to and from the NS-provider in the network service primitives listed in Table 2.

NOTES

1 The parameters listed in Table 2 are those in the network service.

2 The way the parameters are exchanged between the transport entity and the NS-provider is a local matter.

Table 2 – Connection-Oriented Network service primitives

Primitives		X/Z	Parameters	W/X/Y/Z
N-CONNECT	request	X	Called Address	X
	indication	X	Calling Address	X
			Receipt confirmation selection	Z
			Expedited data selection	W
			QOS parameter set	Y
			NS-user-data	X
N-CONNECT	response	X	Responding Address	X
	confirm	X	Receipt confirmation selection	Z
			Expedited data selection	W
			QOS parameter set	Y
			NS-user-data	X
N-DATA	request	X	NS-user-data	X
	indication	X	Confirmation request	Z
N-DATA ACKNOWLEDGE	request	Z		
	indication	Z		
N-EXPEDITED DATA	request	W	NS-user-data	W
	indication	W		
N-RESET	request	Z	Reason	Z
N-RESET	indication	X	Originator	Z
			Reason	Z
N-RESET	response	X		
	confirm	Z		
N-DISCONNECT	request	X	Reason	X
			NS-user-data	X
			Responding address	X
N-DISCONNECT	indication	X	Originator	X
			Reason	X
			NS-user-data	X
			Responding address	X

W	The Transport Fast Byte Protocol assumes that this facility is provided in some networks and a mechanism is provided to optionally use this facility.
X	The Transport Fast Byte Protocol assumes that this facility is provided in all networks.
Y	The Transport Fast Byte Protocol assumes that this facility is provided in all networks. The QOS-parameter values supported by the network limit the corresponding values provided to the TS-user, since there are no mechanisms in the Transport Fast Byte Protocol for enhancing the network-provided QOS.
Z	Not used by the Transport Fast Byte Protocol.