

SLOVENSKI STANDARD

SIST EN 28073:1997

01-december-1997

Information technology - Telecommunications and information exchange between systems - Open Systems Interconnection - Protocol for providing the connection-mode transport service (ISO/IEC 8073:1992 and Technical Corrigendum 1:1993)

Information technology - Telecommunications and information exchange between systems - Open Systems Interconnection - Protocol for providing the connection-mode transport service (ISO/IEC 8073:1992 and Technical Corrigendum 1:1993)

iTeh STANDARD PREVIEW

Informationstechnik - Telekommunikation und Informationsaustausch zwischen Systemen - Kommunikation offener Systeme - Protokoll zur Erbringung des verbindungsorientierten Transportdienstes (ISO/IEC 8073:1992 und Technisches Corrigendum 1:1993)

[SIST EN 28073:1997](https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9e55-b8f79a2892de/sist-en-28073-1997)

<https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9e55-b8f79a2892de/sist-en-28073-1997>

Technologies de l'information - Télécommunications et échange d'informations entre systèmes ouverts (OSI) - Protocole pour fourniture du service de transport en mode connexion (ISO/IEC 8073:1992 et rectificatif technique 1:1993)

Ta slovenski standard je istoveten z: EN 28073:1993

ICS:

35.100.40 Transportni sloj Transport layer

SIST EN 28073:1997

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 28073:1997

<https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-b8f79a2892de/sist-en-28073-1997>

EUROPEAN STANDARD

EN 28073

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 1993

UDC 681.3:621.39

Descriptors: Data processing, telecommunications, information interchange, network interconnection, open systems interconnection, data transfer, communication procedure, control procedures, transport layer, protocols layer, protocols

English version

**Information technology - Telecommunications and
information exchange between systems - Open
Systems Interconnection - Protocol for providing
the connection-mode transport service (ISO/IEC
8073:1992 and Technical Corrigendum 1:1993)**

Technologies de l'information -
Télécommunications et échange d'informations
entre systèmes - Interconnexion de systèmes
ouverts (OSI) - Protocole pour fourniture du
service de transport en mode connexion (ISO/IEC
8073:1992 et rectificatif technique 1:1993)

Informationstechnik - Telekommunikation und
Informationsaustausch zwischen Systemen -
Kommunikation offener Systeme - Protokoll zur
Erbringung des verbindungsorientierten
Transportsdienstes (ISO/IEC 8073:1992 und
Technisches Corrigendum 1:1993)

SIST EN 28073:1997

<https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-10770c390714/cen-en-28073-1997>

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO
Urad RS za standardizacijo in meroslovje
LJUBLJANA

SIST.....EN.....28073.....

PREVZET PO METODI RAZGLASITVE

-12- 1997

This European Standard was approved by CEN on 1993-11-25. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

Foreword

The Technical Board decided to submit the international Standard and its technical Corrigendum:

"Information technology - Telecommunications and information exchange between systems - Open Systems Interconnection - Protocol for providing the connection-mode transport service (ISO/IEC 8073:1992 and Technical Corrigendum 1:1993)"

to the Unique Acceptance Procedure (UAP).

The result of the Unique Acceptance Procedure was positive.

For the time being, this document exists only in English.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 1994, and conflicting national standards shall be withdrawn at the latest by May 1994.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

<https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-b8c199999999>

The text of the International Standard ISO/IEC 8073:1992 and its technical corrigendum 1:1993 was approved by CEN as a European Standard without any modification.



INTERNATIONAL
STANDARDISO/IEC
8073Third edition
1992-12-15

**Information technology —
Telecommunications and information
exchange between systems — Open
Systems Interconnection — Protocol for
providing the connection-mode transport
service**

SIST EN 28073:1997

[https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-](https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-8b179a287ade/sist-en-28073-1997)

*Technologies de l'information — Télécommunications et échange
d'informations entre systèmes — Interconnexion de systèmes ouverts
(OSI) — Protocole pour fourniture du service de transport en mode
connexion*



Reference number
ISO/IEC 8073:1992(E)

ISO/IEC 8073 : 1992 (E)

Contents

	Page
Foreword	iii
Introduction	iv
1 Scope	1
2 Normative references	1
Section one: General	3
3 Definitions	3
4 Symbols and abbreviations	4
5 Overview of the Transport Protocol	5
Section two: Transport protocol specification	10
6 Elements of procedure	10
7 Protocol classes	30
8 Specification for class 0: Simple class	32
9 Specification for class 1: Basic error recovery class	32
10 Specification for class 2: Multiplexing class	33
11 Specification for class 3: Error recovery and multiplexing class	34
12 Specification for class 4: Error detection and recovery class	36
13 Structure and encoding of TPDUs	47
Section Three: Conformance	64
14 Conformance	64
Annex A State tables	66
Annex B Network connection management subprotocol	84
Annex C PICS Proforma	99
Annex D Checksum Algorithms	126
Annex E State tables for operation of class 4 over connection-mode and connectionless-mode network services	127

© ISO/IEC 1992

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

ISO/IEC Copyright Office • Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland



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 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 8073 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This third edition cancels and replaces the second edition (ISO/IEC 8073:1988) and includes technical revisions that have been published as: ISO 8073:1986/Add.1:1988, ISO/IEC 8073:1988/Add.2:1989, ISO/IEC 8073:1988/Am.3, ISO/IEC 8073:1988/Tech.Cor.1:1990, ISO/IEC 8073:1988/Tech.Cor.2:1990, ISO/IEC 8073:1988/Tech.Cor.3:1990, ISO/IEC 8073:1988/Tech.Cor.4:1991, ISO/IEC 8073:1988/Tech.Cor.5:1991 and ISO/IEC 8073:1988/Tech.Cor.6:1992. This edition also includes ISO/IEC 8073:1988/Dam.4 and various technical revisions that have been balloted together with the Draft International Standard of this edition.

Annex A, B and C form an integral part of this International Standard. Annexes D and E are for information only.

<https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-b8f79a2892de/sist-en-28073-1997>

Introduction

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

The Transport Protocol Standard is positioned with respect to other related International Standards by the layers defined in the Reference Model for Open Systems Interconnection (ISO 7498). It is most closely related to, and lies within the field of application of the Transport Service Standard (ISO 8072). It also uses and makes reference to the Network Service Standard (ISO/IEC 8348), whose provisions it assumes in order to accomplish the transport protocol's aims. The interrelationship of these International Standards is illustrated in Figure 1.

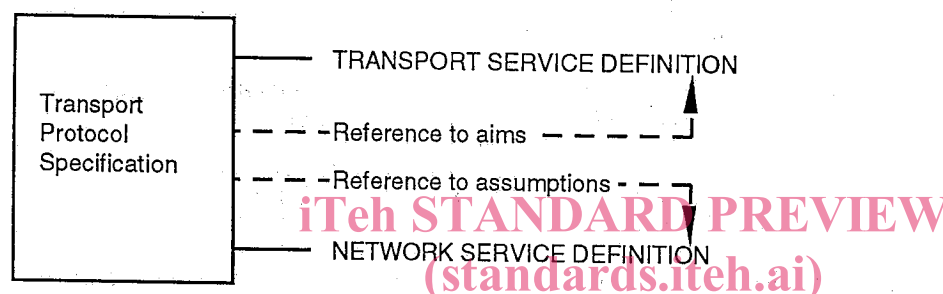


Figure 1 – Relationship between the Transport Protocol and adjacent services

<https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-b8f79a2892de/sist-en-28073-1997>

This International Standard specifies a common encoding and a number of classes of transport protocol procedures to be used with different network qualities of service.

It is intended that the Transport Protocol should be simple but general enough to cater for the total range of Network Service qualities possible, without restricting future extensions.

The protocol is structured to give rise to classes of protocol which are designed to minimize possible incompatibilities and implementation costs.

The classes are selectable with respect to the Transport and Network Services in providing the required quality of service for the interconnection of two session entities (each class provides a different set of functions for enhancement of service qualities).

This International Standard defines mechanisms that can be used to optimize network tariffs and enhance the following qualities of service:

- a) different throughput;
- b) different error rates;
- c) integrity of data requirements;
- d) reliability requirements.

It does not require an implementation to use all of these mechanisms, nor does it define methods for measuring achieved quality of service or criteria for deciding when to release transport connections following quality of service degradation.

The primary aim of this 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 i.e.:

- 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 International Standard will be designers and implementors of equipment this International Standard contains, in notes or in annexes, guidance on the implementation of the procedures defined herein.

It should be noted that, as the number of valid protocol sequences is very large, it is not possible with current technology to verify that an implementation will operate the protocol defined in this 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 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.

SIST EN 28073:1997
https://standards.iteh.ai/catalog/standards/sist/28073-1997/iso-8073-1992
This International Standard contains a section on conformance of equipment claiming to implement the procedures in this International Standard. 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 C. Attention is drawn to the fact that this International Standard does not contain any tests to demonstrate this conformance.

The variations and options available within this International Standard are essential as they enable a transport service to be provided for a wide variety of applications over a variety of network qualities. Thus, a minimally conforming implementation will not be suitable for use in all possible circumstances. It is important, therefore, to qualify all references to this International Standard with statements of the options provided or required or with statements of the intended purpose of provision or use.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 28073:1997

<https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-b8f79a2892de/sist-en-28073-1997>

Information technology — Telecommunications and information exchange between systems — Open Systems Interconnection — Protocol for providing the connection-mode transport service

1 Scope

This International Standard specifies

a) five classes of procedures when operating over the connection-mode network service:

- 1) class 0: simple class;
- 2) class 1: basic error recovery class;
- 3) class 2: multiplexing class;
- 4) class 3: error recovery and multiplexing class;
- 5) class 4: error detection and recovery class;

for the connection-mode transfer of data and control information from one transport entity to a peer transport entity;

b) one class (class 4) of procedure when operating over the connectionless-mode network service;

c) the means of negotiating the class of procedures to be used by the transport entities;

d) the structure and encoding of the transport protocol data units 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 transport protocol data units;
- 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 defined in the main text of this International Standard supplemented by state tables in annex A.

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

This International Standard specifies, in clause 14, 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 ISO/IEC 9646-2. It does not contain tests which can be used to demonstrate this conformance.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7498:1984, *Information processing systems — Open Systems Interconnection — Basic Reference Model*.

ISO 7498:1984/Add.1:1987, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Addendum 1: Connectionless-mode transmission*.

ISO 7498-3:1989, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Part 3: Naming and addressing*.

ISO 8072:1986, *Information processing systems — Open Systems Interconnection — Transport service definition*.

ISO/IEC 8348:1992, *Information processing systems — Data communications — Network service definition*.

ISO/IEC 8073 : 1992 (E)

© ISO/IEC

ISO/IEC 9646-1:1991, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts.*

ISO/IEC 9646-2:1991, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 2: Abstract test suite specification.*

ISO/IEC 11570:1992, *Information technology — Telecommunications and information exchange between systems — Open Systems Interconnection — Transport protocol identification mechanism.*

CCITT X.224, *Transport Protocol Specification for Open Systems Interconnection for CCITT Applications Version 1988.*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 28073:1997

<https://standards.iteh.ai/catalog/standards/sist/33688a12-9a0d-4f50-9ef5-b8f79a2892de/sist-en-28073-1997>

Section one: General

3 Definitions

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

3.1 This International Standard is based on the concepts developed in ISO 7498 and ISO 7498/Add.1 and ISO/IEC 7498-3 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) connectionless-mode transmission;
- g) nil selector value.

3.2 For the purposes of this 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 transport service user: An abstract representation of the totality of those entities within a single system that make use of the transport service.

3.2.3 network service provider: An abstract machine that models the totality of the entities providing the network service, as viewed by a transport entity.

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

3.2.5 initiator: A transport entity that initiates a CR TPDU.

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

NOTE – Initiator and responder are defined with respect to a single transport connection. A transport entity can be both an initiator and responder simultaneously.

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

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

3.2.9 preferred class: The protocol class that the initiator indicates in a CR TPDU as its first choice for use over the transport connection.

3.2.10 alternative class: A protocol class that the initiator indicates in a CR TPDU as an alternative choice for use over the transport connection.

3.2.11 proposed class: A preferred class or an alternative class.

3.2.12 selected class: The protocol class that the responder indicates in a CC TPDU that it has chosen for use over the transport connection.

3.2.13 proposed parameter: The value for a parameter that the initiator indicates in a CR TPDU that it wishes to use over the transport connection.

3.2.14 selected parameter: The value for a parameter that the responder indicates in a CC TPDU that it has chosen for use over the transport connection.

3.2.15 error indication: An N-RESET indication, or an N-DISCONNECT indication with a reason code indicating an error, that a transport entity receives from the NS-provider.

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

3.2.17 protocol error: A TPDU whose use does not comply with the procedures for the class.

3.2.18 sequence number:

- a) the number in the TPDU-NR field of a DT TPDU that indicates the order in which the DT TPDU was transmitted by a transport entity;
- b) the number in the YR-TU-NR field of an AK or RJ TPDU that indicates the sequence number of the next DT TPDU expected to be received by a transport entity.

3.2.19 transmit window: The set of consecutive sequence numbers which a transport entity has been authorized by its peer entity to send at a given time on a given transport connection.

3.2.20 lower window edge: The lowest sequence number in a transmit window.

3.2.21 upper window edge: The sequence number which is one greater than the highest sequence number in the transmit window.

3.2.22 upper window edge allocated to the peer entity: The value that a transport entity communicates to its peer entity to be interpreted as its new upper window edge.

3.2.23 closed window: A transmit window that contains no sequence number.

3.2.24 window information: Information contained in a TPDU relating to the upper and the lower window edges.

3.2.25 frozen reference: A reference that is not available for assignment to a connection because of the requirements of 6.18.

3.2.26 unassigned reference: A reference that is neither currently in use for identifying a transport connection nor which is in a frozen state.

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

3.2.28 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-mode network service.

3.2.29 retained TPDU: A TPDU that is subject to the retransmission procedure or retention and acknowledgement procedure and is available for possible retransmission.

3.3 This International Standard uses the following terms defined in ISO/IEC 8348:

- a) connection-mode network service
- b) connectionless-mode network service

3.4 This International Standard uses the following terms defined in ISO/IEC 9646-1:

- a) PICS proforma
- b) protocol implementation conformance statement (PICS)

4 Symbols and abbreviations

4.1 Data units

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

4.2 Types of Transport Protocol data units

CR TPDU	Connection request TPDU
CC TPDU	Connection confirm TPDU
DR TPDU	Disconnect request TPDU
DC TPDU	Disconnect confirm TPDU
DT TPDU	Data TPDU
ED TPDU	Expedited data TPDU
AK TPDU	Data acknowledge TPDU
EA TPDU	Expedited acknowledge TPDU
RJ TPDU	Reject TPDU
ER TPDU	Error TPDU

4.3 TPDU Fields

LI	Length indicator (field)
CDT	Credit (field)
TSAP-ID	Transport-service-access-point identifier (field)
DST-REF	Destination reference (field)
SRC-REF	Source reference (field)
EOT	End of TSDU mark
TPDU-NR	DT TPDU number (field)
ED-TPDU-NR	ED TPDU number (field)
YR-TU-NR	Sequence number response (field)
YR-EDTU-NR	ED TPDU number response (field)
ROA	Request of acknowledgement mark

4.4 Times and associated variables

T_1	Local retransmission time
N	The maximum number of transmissions
L	Time bound on reference and sequence number
I	Inactivity time
W	Window time
TTR	Time to try reassignment/resynchronization
TWR	Time to wait for reassignment/resynchronization
TS_1	Supervisory timer 1
TS_2	Supervisory timer 2
M_{LR}	NSDU lifetime local-to-remote
M_{RL}	NSDU lifetime remote-to-local
E_{LR}	Expected maximum transit delay local-to-remote
E_{RL}	Expected maximum transit delay remote-to-local
R	Persistence time
A_L	Local acknowledgement time
A_R	Remote acknowledgement time
I_L	Local inactivity time
I_R	Remote inactivity time

4.5 Miscellaneous

TS-user	Transport-service user
TSAP	Transport-service-access-point
NS-provider	Network service provider
NSAP	Network-service-access-point
QOS	Quality of service
CLNS	Connectionless-mode network service
CONS	Connection-mode network service

5 Overview of the Transport Protocol

NOTE – This overview is not exhaustive and has been provided for guidance.

5.1 Service provided by the Transport Layer

The protocol specified in this International Standard supports the Transport Service defined in ISO 8072.

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

5.2 Service Assumed from the Network Layer

The protocol specified in this International Standard assumes the use of the Network Service defined in ISO/IEC 8348.

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

NOTES

- 1 The parameters listed in Table 2a) are those in the current connection-mode network service (see ISO/IEC 8348).
- 2 The parameters listed in table 2b) are those in the current connectionless-mode network service (see ISO/IEC 8348).
- 3 The way the parameters are exchanged between the transport entity and the NS-provider is a local matter.

iTeh STANDARD PREVIEW

(standards.iteh.ai)

Table 1 – Transport service primitives

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