INTERNATIONAL STANDARD

ISO/IEC 9548-1

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Information technology — Open Systems Interconnection — Connectionless Session protocol: Protocol specification

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Protocole de session en mode sans connexion: Spécification du protocole

Reference number
ISO/IEC 9548-1:1996(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 9548-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.235.

ISO/IEC 9548 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Connectionless Session protocol*:

— *Part 1: Protocol specification*

— *Part 2: Protocol Implementation Conformance Statement (PICS) proforma*

Annex A forms an integral part of this part of ISO/IEC 9548.

Introduction

The connectionless session protocol specification is one of a set of Recommendations | International Standards produced to facilitate the interconnection of computer systems. The set of standards covers the services and protocols required to achieve such interconnection.

The connectionless session protocol specification is positioned with respect to other related standards by the layers defined in the Reference Model for Open Systems Interconnection (see ITU-T Rec. X.200 | ISO/IEC 7498-1). In particular, it is a protocol of the Session Layer. It is most closely related to the Session Service Definition (see ITU-T Rec. X.215 | ISO/IEC 8326) and the Transport Service Definition (see ITU-T Rec. X.214 | ISO/IEC 8072). The interrelationship of these standards is depicted in Figure.

The structure of this Recommendation | International Standard is similar to the structure of the connection mode Session Protocol Specification (see ITU-T Rec. X.225 | ISO/IEC 8327-1) in order to facilitate cross reference between the two standards.

Figure Intro.1 – Relationship between the connectionless session protocol and adjacent services

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ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – CONNECTIONLESS SESSION PROTOCOL: PROTOCOL SPECIFICATION

SECTION 1 – GENERAL

1 Scope

This Recommendation | International Standard specifies:

a) procedures for the connectionless transmission of data and protocol control information from one session entity to a peer session entity;

b) the encoding of the session protocol data units used for the transmission of data and control information;

c) procedures for the correct interpretation of session protocol control information; and

d) the functional requirements for implementations claiming conformance to this Recommendation | International Standard.

The procedures are defined in terms of:

e) the interactions among peer session entities through the exchange of session protocol data units;

f) the interactions between a session entity and a session service user through the exchange of session service primitives; and

g) the interactions between a session entity and a transport provider through the exchange of transport service primitives.

This Recommendation | International Standard specifies a connectionless session protocol. A connection-oriented session protocol is specified in ITU-T Rec. X.225 | ISO/IEC 8327-1.

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 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 Standards listed below. Members of ISO and IEC 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.214 (1993) | ISO/IEC 8072:1994, *Information technology – Open Systems Interconnection – Transport service definition.*

- ITU-T Recommendation X.215 (1994) | ISO/IEC 8326:...[1], *Information technology – Open Systems Interconnection – Session service definition.*
- ITU-T Recommendation X.225 (1994) | ISO/IEC 8327-1:...[1], *Information technology – Open Systems Interconnection – Connection-oriented Session Protocol: Protocol specification.*

3 Definitions

3.1 Reference model definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.200 | ISO/IEC 7498-1:

a) Transport Layer;
b) Session Layer;
c) session service access point;
d) session service access point address;
e) session entity;
f) protocol;
g) service.

3.2 Additional definitions

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

3.2.1 calling session address: Identifies the session service user that acts as the source of data during a particular instance of session connectionless mode transmission.

3.2.2 called session address: Identifies the session service user that acts as the sink of data during a particular instance of session connectionless mode transmission.

4 Abbreviations

4.1 Data Units

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

SPDU	Session Protocol Data Unit
SDU	Service Data Unit
TSDU	Transport Service Data Unit

4.2 Session protocol data units

UD SPDU	Unit Data SPDU

4.3 SPDU fields

SI	SPDU Identifier
LI	Length Indicator
PI	Parameter Indicator
PV	Parameter Value

[1] To be published.

4.4 Parameters

- calling session selector;
- called session selector.

4.5 Miscellaneous

SPM	Session Protocol Machine
SS	Session Service
SS-user	Session Service User
SSAP	Session Service Access Point
TSAP	Transport Service Access Point

5 Overview of the connectionless session protocol

5.1 Service provided by the session layer

The service provided by the protocol described in this Recommendation | International Standard is a connectionless session service. The connectionless session service is described in ITU-T Rec. X.215 | ISO/IEC 8326. The session service primitives provided are summarized in Table 1.

Table 1 – Connectionless session service primitives

Primitive	Parameters
S-UNIT-DATA request	Calling session address Called session address Quality of Service SS-User-Data
S-UNIT-DATA indication	Calling session address Called session address SS-User-Data

5.2 Service assumed from the transport layer

The session protocol described in this Recommendation | International Standard can operate only over the connectionless transport service defined in ITU-T Rec. X.214 | ISO/IEC 8072. When operating over that service, the service primitives summarized in Table 2 are used.

Table 2 – Connectionless transport service primitives

Primitive	Parameters
T-UNIT-DATA request	Source address Destination address Quality of Service TS-User-Data
T-UNIT-DATA indication	Source address Destination address TS-User-Data
NOTE – Only those parameters pertinent to this session protocol are included in the above tables.	

5.3 Functions of the session layer

The functions of the session layer are:

a) to map session addresses onto transport addresses;

b) to select transport Quality of Service parameters needed;

c) to transfer session selectors; and

d) to transfer an SSDU.

5.4 Model of the session layer

A session protocol entity is comprised of one or more session protocol machines (SPMs). A SPM may be connection oriented or connectionless. The connectionless session protocol machine communicates with the SS-user through one or more SSAPs by means of the connectionless session service primitives (defined in ITU-T Rec. X.215 | ISO/IEC 8326). These session service primitives cause or result from the exchange of SPDUs between peer session entities engaged in connectionless mode transmission. These protocol exchanges are effected by making use of the services of the transport layer, as defined in the transport service definition.

The model of session connectionless mode transmission is presented in 6.2 of the session service definition covering connectionless mode transmission. The model of the session layer is illustrated in Figure 1.

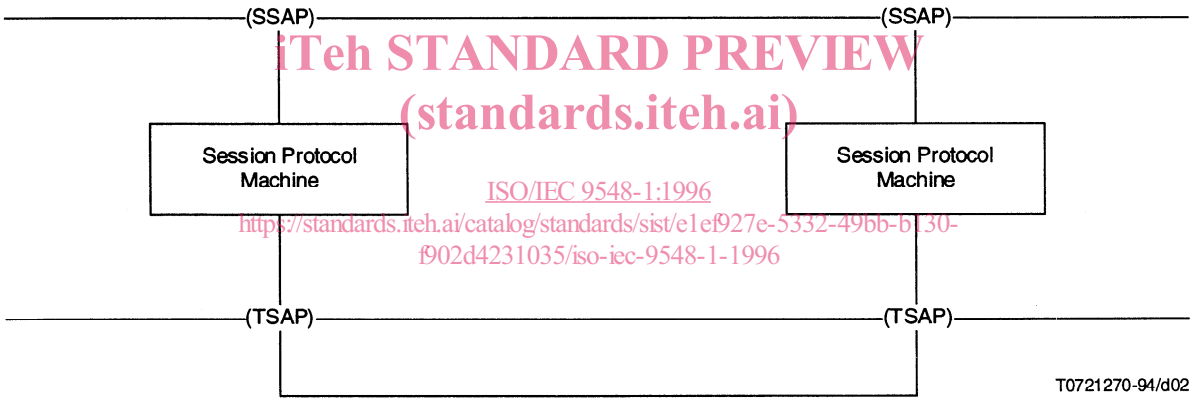

Figure 1 – Model of the connectionless session layer

SECTION 2 – CONNECTIONLESS SESSION PROTOCOL SPECIFICATION

6 Protocol mechanisms

The protocol mechanisms described below are those used for the connectionless session protocol.

6.1 Session protocol data unit (SPDU) transfer

6.1.1 Purpose

To convey session protocol data units in user data fields of transport service primitives.

6.1.2 Transport service primitives

The procedure uses the following transport service primitives:

T-UNIT-DATA request
T-UNIT-DATA indication

6.1.3 SPDUs used

The SPDUs defined for the connectionless protocol are listed below:

SPDU Name	Abbreviation
UNITDATA	UD

6.2 Connectionless mode transfer

6.2.1 Purpose

To transfer one SSDU from one SS-user to another SS-user without session connection establishment or release.

6.2.2 Transport service primitives

T-UNIT-DATA request
T-UNIT-DATA indication

6.2.3 SPDUs and fields used

UD SPDU
- version number
- calling session selector
- called session selector
- user data

6.2.4 Sending a UD SPDU

The called and calling session address parameters of the S-UNIT-DATA request service primitive are used to determine the source address, calling session selector, destination address, and called session selector.

If the length of the SPDU exceeds the maximum TSDU size supported by the transport service, then the S-UNIT-DATA request is discarded and a local report may be made to the SS-user indicating the inability of the session layer to provide the service requested.

A UD SPDU is constructed with a calling session selector, a called session selector, and user data supplied by the SS-user in the S-UNITDATA request. It also contains a protocol version number provided by the SPM.

A T-UNIT-DATA request service primitive is issued with the source and destination addresses determined above, the Quality of Service requested and a TS-user-data parameter containing the UD SPDU.

6.2.5 Receiving a UD SPDU

The UD SPDU arrives in the TS-user-data field of a T-UNIT-DATA indication.

A valid incoming UD SPDU results in an S-UNIT-DATA indication, provided that the version number parameter in the incoming UD SPDU indicates at least one protocol version which is supported by the receiving SPM. Parameters corresponding to the highest common protocol version are supplied in the S-UNIT-DATA indication.

The source address from the T-UNIT-DATA indication and the calling session selector from the UD SPDU will be used to determine the calling session address parameter for the S-UNIT-DATA indication. The destination address from the T-UNIT-DATA indication and the called session selector from the UD SPDU will be used to determine the called session address parameter for the S-UNIT-DATA indication.

The user information field of the UD SPDU will be mapped to the user data parameter of the S-UNIT-DATA indication.

If the data cannot be immediately delivered to a SS-user due to non-existent recipient, recipient not ready to receive, or too large data field size, that unit data is discarded without any notification.

7 Encoding of the unit data (UD) SPDU

7.1 TSDU structure

Each UD SPDU is contained within a single TSDU and consists of octets that are numbered sequentially starting from 1.

Each octet within an SPDU consists of eight bits numbered 8 to 1 where 1 is the low ordered bit.

The sequence of octets within an SPDU and the sequence of data within an octet are defined for each SPDU in 7.3, with the additional convention that where the text refers to bits within a two octet field and the bits are numbered 16 to 1, then 1 is the low order bit and the octet containing bits 16 to 9 precedes the octet containing bits 8 to 1 in the SPDU.

Within each TSDU:

a) the ordering of the octets is maintained to the same order as in the SPDU;

b) the ordering of bits within each TSDU is maintained in the same order as in the SPDU (i.e. the low order bit is mapped onto the low order bit and the high order bit is mapped onto the high order bit).

NOTES

1 The TSDU structure is illustrated in Figure 2. The integrity of this structure is maintained over a transport service. This Recommendation | International Standard does not define the way in which the TSDU is transmitted.

2 When the structure of an SPDU is illustrated in this Recommendation | International Standard, the following convention is used:

a) octets are shown with the lowest numbered octet to the left, higher numbered octets being shown further to the right;

b) within an octet, bits are shown with bit 8 to the left and bit 1 to the right.

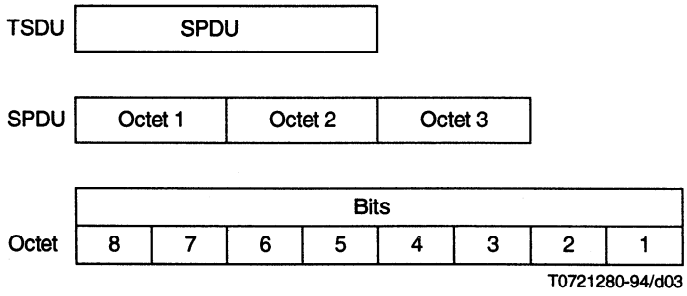

Figure 2 – Illustration of definition of TSDU structure

7.2 SPDU structure

This subclause specifies the general structure of SPDUs in terms of their constituent fields. This structure is illustrated in Figure 3.

Codings and structural requirements specific to particular SPDUs are specified in 7.3.

Examples of valid SPDU structure are illustrated in Figure 4.

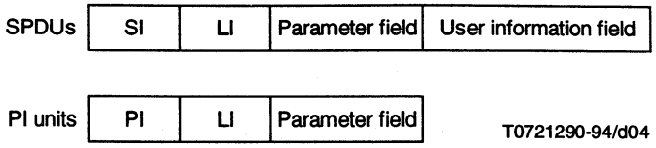

Figure 3 – Illustration of structure of SPDUs and PI units

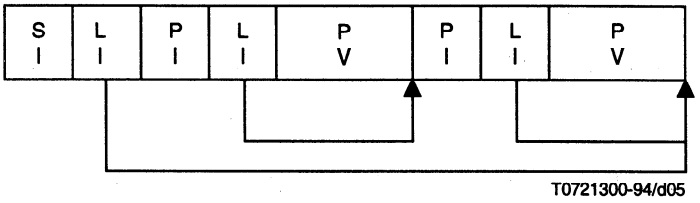

Figure 4 – Examples of SPDU structure

7.2.1 SPDUs

SPDUs shall contain, in the following order:

a) the SI field that identifies the type of SPDU;

b) the LI field that indicates the length of the associated parameter field defined in c);

c) the parameter field which, if present, consists of the PI units (see 7.2.2) defined for the SPDU;

d) the user information field, if defined for the SPDU and if present.

7.2.2 PI units

PI Units shall contain, in the following order:

a) the PI field that identifies the parameter;

b) the LI field that indicates the length of the associated parameter field defined in 7.2.3;

c) the parameter field which, if present, consists of the parameter value.

7.2.3 Length indicator field

The value of the LI field is expressed as a binary number representing the length, in octets, of the associated field (see Note). A value of zero indicates that the associated parameter field is absent.

LI fields indicating lengths within the range 0-254 shall comprise one octet.

LI fields indicating lengths within the range 255-65 555 shall comprise three octets. The first octet shall be coded 1111 1111 and the second and third octets shall contain the length of the associated parameter field with the high order bits in the first of these two octets.

NOTE – The LI field does not include either itself or any subsequent user information.