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DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

OPEN SYSTEMS INTERCONNECTION – PROTOCOL IDENTIFICATION

TRANSPORT PROTOCOL IDENTIFICATION MECHANISM

ITU-T Recommendation X.264

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis..

The World Telecommunication Standardization Conference (WTSC), which meets every four years, etablishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation X.264 was prepared by ITU-T Study Group 7 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 16th of November 1993.

NOTE

In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

CONTENTS

SUMMARY

This Recommendation defines the transport protocol identification mechanism. The use of a protocol identification procedure allows transport entities to be implemented which can support both the OSI transport and non-OSI protocols above the OSI network layer.

INTRODUCTION

This Recommendation is one of a set of Recommendations produced to facilitate the interconnection of open systems. The set of Recommendations covers the services and protocols required to achieve such interconnection.

The identification mechanism of transport protocols is positioned with respect to other related Recommendations by the layers defined in the Reference Model for Open Systems Interconnection (see Recommendation X.200). It allows identification of protocols (both OSI and non-OSI) used on a given network connection. The initiating transport entity of a network connection may indicate to the accepting transport entity, what transport protocol is to be used on that network connection.

TRANSPORT PROTOCOL IDENTIFICATION MECHANISM[1)]

(Geneva, 1993)

1 Scope of the Recommendation

The procedures specified in this Recommendation do not prevent communication between transport entities conforming to ITU-T Recommendation X.224 | ISO/IEC 8073 only and those conforming to ITU-T Recommendation X.224 | ISO/IEC 8073 as well as to this Recommendation.

The use of a protocol identification procedure allows transport entities to be implemented which can support both the OSI transport protocols and non-OSI protocols above the OSI network layer.

NOTE – The use of NSAP addresses as it is defined in CCITT Recommendation X.650 | ISO/IEC 7498-3 provides another possibility in distinguishing between OSI and non-OSI users of the network service. If however, the use of NSAPs incurs unacceptable penalties, for example where each NSAP is charged for by the network provider, then the transport protocol identification mechanism is available.

2 References

The following Recommendations and International Standards contain provisions which through reference in this text, constitute provisions of this Recommendation. 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 are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and 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

- CCITT Recommendation X.213 (1992) | ISO/IEC 8348:1992, *Information technology – Network service definition for Open Systems Interconnection*.
- ITU-T Recommendation X.214 (1993) | ISO/IEC 8072:1993, *Information technology – Transport service definition for Open Systems Interconnection*.
- ITU-T Recommendation X.234[2)] | ISO/IEC 8602 …[2)], *Information technology – Protocol for providing the OSI connectionless-mode transport service*.

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.200 (1988), *Reference model of Open Systems Interconnection for CCITT applications*.

  ISO 7498:1984, *Information processing systems – Open Systems Interconnection – Basic Reference Model*.
- ITU-T Recommendation X.224 (1993), *Protocol for providing the OSI connectionless-mode transport service*.

  ISO/IEC 8073:1992, *Information technology – Telecommunications and information exchange between systems – Open Systems Interconnection – Protocol for providing the connection mode transport service*.

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1) Recommendation X.264 and ISO/IEC 11570, Information technology – Telecommunications and information exchange between systems – Open Systems Interconnection – Transport protocol identification mechanism, were developed in close collaboration and are technically identical.

2) Presently at the stage of draft.

– CCITT Recommendation X.650 (1992), *Open Systems Interconnection (OSI) – Reference model for naming and addressing*.

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

– ITU-T Recommendation X.274[3)], *Transport layer security protocol for Open Systems Interconnection*.

  ISO/IEC 10736:1992, *Information technology – Telecommunications and information exchange between systems – Transport layer security protocol*.

2.3 Additional references

– ITU-T Recommendation X.25 (1993), *Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit*.

– CCITT Recommendation X.244 (1988), *Procedure for the exchange of protocol identification during virtual call establishment on packet switched public data networks*.

3 Definitions

The following terms are used by this Recommendation and are defined by CCITT Recommendation X.200 | ISO 7498:

– Open Systems Interconnection (OSI);

– network connection;

– transport entity.

4 Abbreviations

4.1 Transport protocol data unit

UN TPDU Use of network connection TPDU

4.2 TPDU fields

LI Length indicator (field)

SHARE Sharing option (field)

PRT-ID Protocol identifier (field)

5 Use of the network service

Transport protocol identification makes use of the network service defined in CCITT Recommendation X.213 | ISO/IEC 8348. It uses the NS-user data parameter of the N-CONNECT request and indication primitive only.

6 Protocol functions

6.1 Default identification

When using default identification, no NS-user data parameter shall be placed in the N-CONNECT request primitive. ITU-T Recommendation X.224 | ISO/IEC 8073 is then identified.

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3) Presently at the stage of draft.

6.2 Explicit identification

When using explicit identification, an UN TPDU shall be placed in the NS-user data parameter of the N-CONNECT request primitive. This UN TPDU may be followed by other PDUs, which are recognizable by the identified protocol, in the NS-user data parameter of the N-CONNECT request primitive.

The sending transport entity shall

a) set the PRT-ID field of the UN TPDU to the value assigned in 7.3 to the protocol used;

b) set the SHARE field of the UN TPDU to the value 0000 0000 (no sharing);

c) not use the variable part of the UN TPDU.

NOTE – This Recommendation does not include procedures for sharing a network connection between different protocols. The following strategies could be used in the future:

a) sequential reuse of a network connection by several protocols (i.e. consecutive sharing);

b) concurrent use of a network connection by several protocols (i.e. concurrent sharing).

Inclusion of these strategies will use other values of the SHARE field and may make use of the variable part of the UN TPDU.

6.3 Protocol operation

The receiving transport entity shall operate the protocol, identified either by default or explicitly, if it is claimed that this protocol is supported. Otherwise the network connection shall be refused.

7 Structure and encoding of the UN TPDU

The length of the UN TPDU shall not exceed 32 octets.

NOTE – This is a restriction imposed on future enhancements to this TPDU by constraints within the Network Layer. This restriction on the length of the parameter is due to the desire not to conflict with the protocol identifier field carried by X.25 CALL REQUEST/INCOMING CALL packets. This is a single octet located at the same position as the length indicator of the UN TPDU when the latter is carried in an X.25 CALL REQUEST/INCOMING CALL packet. ITU-T has already chosen values for this parameter and thus it is important not to use those values (see CCITT Recommendation X.244).

7.1 Structure

1	2	3	4	5 to p
LI	UN 0000 0001	PRT-ID	SHARE	Variable part

7.2 Length indicator (LI) field

The field is contained in the first octet of the TPDUs. The length is indicated by a binary number, with a maximum value of 254 (1111 1110). The length indicated shall be the header length in octets including parameters, but excluding the length indicator field and user data, if any. The value 255 (1111 1111) is reserved for possible extensions.

If the length indicated exceeds or is equal to the size of the NS-user data which is present, this is a protocol error.

7.3 Fixed part

The fixed part shall be as follows:

a) UN: UN TPDU code 0000 0001;

b) PRT-ID: protocol identifier.

Values:

0000 0000	Reserved
0000 0001	CCITT Recommendation X.224 | ISO/IEC 8073
0000 0010	ITU-T Recommendation X.234 | ISO/IEC 8602
0000 0011	ITU-T Recommendation X.274 | ISO/IEC 10736 in conjunction with CCITT Recommendation X.224 | ISO/IEC 8073
0000 0100	ITU-T Recommendation X.274 | ISO/IEC 10736 in conjunction with CCITT Recommendation X.234 | ISO/IEC 8602
0000 0101 through 0111 1111	Reserved for other OSI protocols
1000 0000 through 1111 1111	Reserved for private use.

NOTE – The code "0000 0010" is also currently being used to identify telematic terminals within the ITU.

c) SHARE: sharing strategy

Values:

0000 0000	No sharing

7.4 Variable part

The variable part consists of one optional parameter. This parameter is only present when SHARE is different from 0000 0000.

1	2	3 to p
PRT-ID LIST 1101 1111	LENGTH 1 to 26	Values
TYPE = PRT-ID LIST (1101 1111), LENGTH = number of PRT-IDs, Value = list of PRT-IDs, one per octet.		

8 Conformance

A system claiming to conform to this Recommendation shall comply with the requirements of 6.1 and 6.2.

8.1 When initiating a network connection a transport entity shall either

a) not use the NS-user data parameter of N-CONNECT request primitive and operate using the protocol of ITU-T Recommendation X.224 | ISO/IEC 8073 on this network connection; or

b) include a UN TPDU in the NS-user data parameter of the N-CONNECT request primitive and operate using the transport protocol specified in the PRT-ID parameter of the UN TPDU.

8.2 When processing an N-CONNECT indication, a transport entity shall:

a) regard ITU-T Recommendation X.224 | ISO/IEC 8073 as being identified if no UN TPDU is present; or

b) accept the PRT-ID field of the UN TPDU if the UN TPDU is present,

and operate the identified protocol if it is claimed that this protocol is supported, otherwise reject the network connection.

Annex A[4)]

Protocol Implementation Conformance Statement (PICS) Proforma

(This annex forms an integral part of this Recommendation)

A.1 General

A.1.1 Symbols used

Status symbols:

M Mandatory

O Optional to implement. If implemented the feature may or may not be used

Support symbols:

Yes Supported

No Not supported

N/A Not applicable

A.1.2 Instructions for completing the PICS proforma

The main part of the PICS proforma is a fixed-format questionnaire divided into a number of clauses. Answers to the questionnaire are to be provided in the rightmost column either by simply marking an answer to indicate a restricted choice (such as Yes or No) or by entering a value of a range of values or entering what action is taken.

A.2 Supported TPDU

Index	TPDU	Reference (subclause)	Status	Support
ST1	UN supported on transmission	6.2	P1:O NOT P1:M	Yes No
ST2	UN transmitted, when identifying ITU-T Rec. X.224 | ISO/IEC 8073	6.2, 6.1	ST1:O	Yes No N/A
ST3	UN supported on receipt	6.3	M	Yes
P1: The only transport protocol claimed to be supported is ITU-T Rec. X.224 | ISO/IEC 8073.				

4) Copyright release for PICS proforma.

Users of this Recommendation may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose and may further publish the completed PICS.

A.3 Supported parameters of issued TPDU

Index	Supported parameters	Reference (subclause)	Allowed values	Supported values
IU1	Protocol identifier	7.3 b)	ITU-T Rec. X.224 | ISO/IEC 8073; ITU-T Rec. X.234 | ISO/IEC 8602; ITU-T Rec. X.274 | ISO/IEC 10736 in conjunction with ITU-T Rec. X.224 | ISO/IEC 8073; ITU-T Rec. X.274 | ISO/IEC 10736 in conjunction with ITU-T Rec. X.234 | ISO/IEC 8602; Private: 1000 0000, ..., 1111 1111	
IU2	Sharing strategy	7.3 c)	No sharing	

A.4 Supported parameters for received UN TPDU

Index	Supported parameters	Reference (subclause)	Allowed values	Supported values
RU1	Protocol identifier	7.3 b)	ITU-T Rec. X.224 | ISO/IEC 8073; ITU-T Rec. X.234 | ISO/IEC 8602; ITU-T Rec. X.274 | ISO/IEC 10736 in conjunction with ITU-T Rec. X.224 | ISO/IEC 8073; ITU-T Rec. X.274 | ISO/IEC 10736 in conjunction with ITU-T Rec. X.234 | ISO/IEC 8602; Private: 1000 0000, ..., 1111 1111	
RU2	Sharing strategy	7.3 c)	No sharing	

A.5 Actions on protocol identification

Index	Event	Reference (subclause)	Status	Support
PI1	Absence of a UN TPDU in an N-CONNECT indication is regarded as identifying ITU-T Rec. X.224 | ISO/IEC 8073	6.1	M	Yes
PI2	Operate the identified protocol	6.1, 6.3	P2:M	Yes
PI3	Refuse the network connection	6.3	NOT P2:M	Yes
P2: It is claimed to support the identified protocol.				