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Information technology — Telecommunications and information exchange between systems — Intermediate system to Intermediate system intra-domain routeing information exchange protocol for use in conjunction with the protocol for providing the connectionless-mode Network Service (ISO 8473)

Technologies de l'information — Communication de données et échange d'informations entre systèmes — Protocole intra-domaine de routage d'un système intermédiaire à un système intermédiaire à utiliser conjointement avec le protocole fournissant le service de réseau en mode sans connexion (ISO 8473)

Reference number
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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 10589 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

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

Introduction

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

The protocol defined in this International Standard is positioned with respect to other related standards by the layers defined in ISO 7498 and by the structure defined in ISO 8648. In particular, it is a protocol of the Network Layer. This protocol permits Intermediate Systems within a routeing domain to exchange configuration and routeing information to facilitate the operation of the routeing and relaying functions of the Network Layer.

The protocol is designed to operate in close conjunction with ISO 9542 and ISO 8473. ISO 9542 is used to establish connectivity and reachability between End Systems and Intermediate systems on individual subnetworks. Data is carried using the protocol specified in ISO 8473. The related algorithms for route calculation and maintenance are also described.

The intra-domain IS–IS routeing protocol is intended to support large routeing domains consisting of combinations of many types of subnetworks. This includes point-to-point links, multipoint links, X.25 subnetworks, and broadcast subnetworks such as ISO 8802 LANs.

In order to support large routeing domains, provision is made for Intra-domain routeing to be organised hierarchically. A large domain may be administratively divided into *areas*. Each system resides in exactly one area. Routeing within an area is referred to as *Level 1 routeing*. Routeing between areas is referred to as *Level 2 routeing*. Level 2 Intermediate systems keep track of the paths to destination areas. Level 1 Intermediate systems keep track of the routeing within their own area. For an NPDU destined to another area, a Level 1 Intermediate system sends the NPDU to the nearest level 2 IS in its own area, regardless of what the destination area is. Then the NPDU travels via level 2 routeing to the destination area, where it again travels via level 1 routeing to the destination End system.

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1 Scope

This International Standard specifies a protocol which is used by Network Layer entities operating the protocol specified in ISO 8473 in Intermediate Systems to maintain routeing information for the purpose of routeing within a single routeing domain. The protocol specified in this International Standard relies upon the provision of a connectionless-mode underlying service.[1)]

This International Standard specifies:

a) procedures for the transmission of configuration and routeing information between network entities residing in Intermediate Systems within a single routeing domain;

b) the encoding of the protocol data units used for the transmission of the configuration and routeing information;

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

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

The procedures are defined in terms of

e) the interactions between Intermediate system Network entities through the exchange of protocol data units;

f) the interactions between a Network entity and an underlying service provider through the exchange of subnetwork service primitives; and

g) the constraints on route determination which must be observed by each Intermediate system when each has a routeing information base which is consistent with the others.

2 Normative references

The following International 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 International 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 International 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/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 7498-4:1989, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Part 4: Management framework.*

ISO/IEC 8208:1990, *Information technology — Data communications — X.25 packet Layer Protocol for Data Terminal Equipment.*

ISO 8348:1987, *Information processing systems — Data communications — Network service definition.*

ISO 8348/Add.1:1987, *Information processing systems — Data communications — Network Service Definition — Addendum 1: Connectionless-mode transmission.*

ISO 8348/Add.2:1988, *Information processing systems — Data communications — Network Service Definition — Addendum 2: Network layer addressing.*

ISO 8473:1988, *Information processing systems — Data communications — Protocol for providing the connectionless-mode network service.*

ISO/IEC 8473/Add.3:1989, *Information processing systems — Data Communications — Protocol for providing the connectionless-mode network service — Addendum 3: Provision of the underlying service assumed by ISO 8473 over subnetworks which provide the OSI data link service.*

ISO 8648:1990, *Information processing systems — Open Systems Interconnection — Internal organisation of the Network Layer.*

1) See ISO 8473 and its addendum 3 for the mechanisms necessary to realise this service on subnetworks based on ISO/IEC 8208, ISO 8802, and the OSI Data Link Service.

ISO/IEC 8802-1:[1)], *Information technology — Telecommunications and information exchange between systems — Local area networks — Part 1: General Introduction.*

ISO 8802-2:1989, *Information processing systems – Local area networks – Part 2: Logical link control.*

ISO/IEC 8802-3:1990, *Information processing systems — Local area networks — Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.*

ISO/IEC 8802-5:[1)], *Information technology — Local area networks — Part 5: Token ring access method and physical layer specifications.*

ISO/IEC 8802-6:[1)], *Information technology — Local area networks — Part 6: Distributed Queue Dual Bus (DQDB) access method and physical layer specifications.*

ISO/IEC 9314:1989, *Information processing systems — Fiber Distributed Data Interface (FDDI).*

ISO 9542:1988, *Information processing systems – Telecommunications and information exchange between systems — End system to Intermediate system Routeing exchange protocol for use in conjunction with the protocol for providing the connectionless -mode network service (ISO 8473).*

ISO/IEC TR 9575:1990, *Information technology — Telecommunications and information exchange between systems — OSI Routeing Framework.*

ISO/IEC TR 9577:1990, *Information technology — Telecommunications and information exchange between systems — Protocol identification in the network layer.*

ISO/IEC 10039:1991, *Information technology — Open Systems Interconnection — Local area networks — Medium Access Control (MAC) service definition.*

ISO/IEC 10165-1:[1)], *Information technology — Open Systems Interconnection — Structure of Management Information - Part 1: Management Information Model.*

ISO/IEC 10165-4:[1)], *Information technology — Open Systems Interconnection — Structure of management information — Part 4: Guidelines for the definition of managed objects.*

ISO/IEC 10733:[1)], *Information technology — Telecommunications and information exchange between systems — Elements of management information relating to OSI Network Layer standards.*

1) To be published

3 Definitions

3.1 Reference model definitions

This International Standard makes use of the following terms defined in ISO 7498:

a) Network Layer
b) Network Service access point
c) Network Service access point address
d) Network entity
e) Routeing
f) Network protocol
g) Network relay
h) Network protocol data unit

3.2 Network layer architecture definitions

This International Standard makes use of the following terms defined in ISO 8648:

a) Subnetwork
b) End system
c) Intermediate system
d) Subnetwork service
e) Subnetwork Access Protocol
f) Subnetwork Dependent Convergence Protocol
g) Subnetwork Independent Convergence Protocol

3.3 Network layer addressing definitions

This International Standard makes use of the following terms defined in ISO 8348/Add.2:

a) Subnetwork address
b) Subnetwork point of attachment
c) Network Entity Title

3.4 Local area network definitions

This International Standard makes use of the following terms defined in ISO 8802:

a) Multi-destination address
b) Media access control
c) Broadcast medium

3.5 Routeing framework definitions

This International Standard makes use of the following terms defined in ISO/IEC TR 9575:

a) Administrative Domain
b) Routeing Domain
c) Hop
d) Black hole