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**Information technology —
Telecommunications and information
exchange between systems — Protocol for
exchange of inter-domain routing
information among intermediate systems
to support forwarding of ISO 8473 PDUs**

*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Protocole pour échange d'information
inter-domaine de routage parmi les systèmes intermédiaires supportant la
transmission de PDUs de l'ISO 8473*



Reference number
ISO/IEC 10747:1994(E)

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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 10747 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*.

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

Introduction

This Protocol is one of a set of International Standards which facilitate the interconnection of open systems. They cover the services and protocols required to achieve such interconnection.

This Protocol is positioned with respect to other related standards by the layered structure defined in ISO 7498, and by the Network layer organization defined in ISO 8648. It is located at the top of the Network layer and relies on the services of ISO 8473. This protocol permits a routing domain to exchange information with other routing domains to facilitate the operation of the routing and relaying functions of the Network Layer. It applies to the following categories of routing, which are described in ISO/IEC TR 9575, making no distinction between them:

- Intra-Administrative Domain routing between routing domains
- Inter-Administrative Domain routing between routing domains.

Within the hierarchical relations between routing protocols, as described in ISO/IEC TR 9575, this protocol is situated above the intra-domain routing protocols. That is, this Inter-domain IS-IS protocol:

- maintains information about the interconnections between routing domains, but does not require detailed information about their internal structures
- calculates path segments on a hop-by-hop basis

This protocol calculates path segments which consist of *Boundary Intermediate systems* and the links that interconnect them. An NPDU destined for an End system in another routing domain will be routed via Intra-domain routing to a Boundary Intermediate system (BIS) in the source routing domain. Then,

the BIS, using the methods of this inter-domain routing protocol, will calculate a path to a Boundary Intermediate system in an adjacent routing domain lying on a path to the destination. After arriving at the next routing domain, the NPDU may also travel within that domain on its way towards a BIS located in the next domain along its path. This process will continue on a hop-by-hop basis until the NPDU arrives at a BIS in the routing domain which contains the destination End system. The Boundary IS in this routing domain will hand the incoming NPDU over to the domain's intra-domain routing protocol, which will construct a path to the destination End system.

This inter-domain IS-IS routing protocol places requirements on the type of information that a routing domain must provide and on the methods by which this information will be distributed to other routing domains. These requirements are intended to be minimal, addressing only the interactions between Boundary ISs; all other internal operations of each routing domain are outside the scope of this protocol. That is, this Inter-domain routing protocol does not mandate that a routing domain run a particular intra-domain routing protocol: for example, it would be a local choice as to whether a domain implements a standard intra-domain protocol (such as ISO/IEC 10589) or a private protocol.

The methods of this protocol differ from those generally adopted for an intra-domain routing protocol because they emphasize the interdependencies between efficient route calculation and the preservation of legal, contractual, and administrative concerns. This protocol calculates routes which will be efficient, loop-free, and in compliance with the domain's local routing policies. IDRP may be used when routing domains do not fully trust each other; it imposes no upper limit on the number of routing domains that can participate in this protocol; and it provides isolation between its operations and the internal operations of each routing domain.

Information technology - Telecommunications and information exchange between systems - Protocol for exchange of inter-domain routing information among intermediate systems to support forwarding of ISO 8473 PDUs

1 Scope

This International Standard specifies a protocol to be used by Boundary Intermediate systems (defined in 3.6) to acquire and maintain information for the purpose of routing NPDUs between different routing domains. Figure 1 illustrates the field of application of this International Standard.

This International Standard specifies:

- the procedures for the exchange of inter-domain reachability and path information between BISs
- the procedures for maintaining inter-domain routing information bases within a BIS
- the encoding of protocol data units used to distribute inter-domain routing information between BISs
- the functional requirements for implementations that claim conformance to this International Standard

The procedures are defined in terms of:

- interactions between Boundary Intermediate systems through the exchange of protocol data units
- interactions between this protocol and the underlying Network Service through the exchange of service primitives
- constraints on policy feasibility and enforcement which must be observed by each Boundary Intermediate system in a routing domain

The boundaries of Administrative Domains are realized as artifacts of the placement of policy constraints and the aggregation of network layer reachability information; they are not manifested explicitly in the protocol. The protocol described in this International Standard operates at the level of individual routing domains. The establishment of administrative domains is outside the scope of this International Standard.

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/Add. 1:1984, *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/IEC 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/IEC 8348:1993, *Information technology - Network Service Definition*.

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

ISO 8648: 1988, *Information processing systems - Telecommunications and information exchange between systems - Internal organization of the Network Layer*.

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

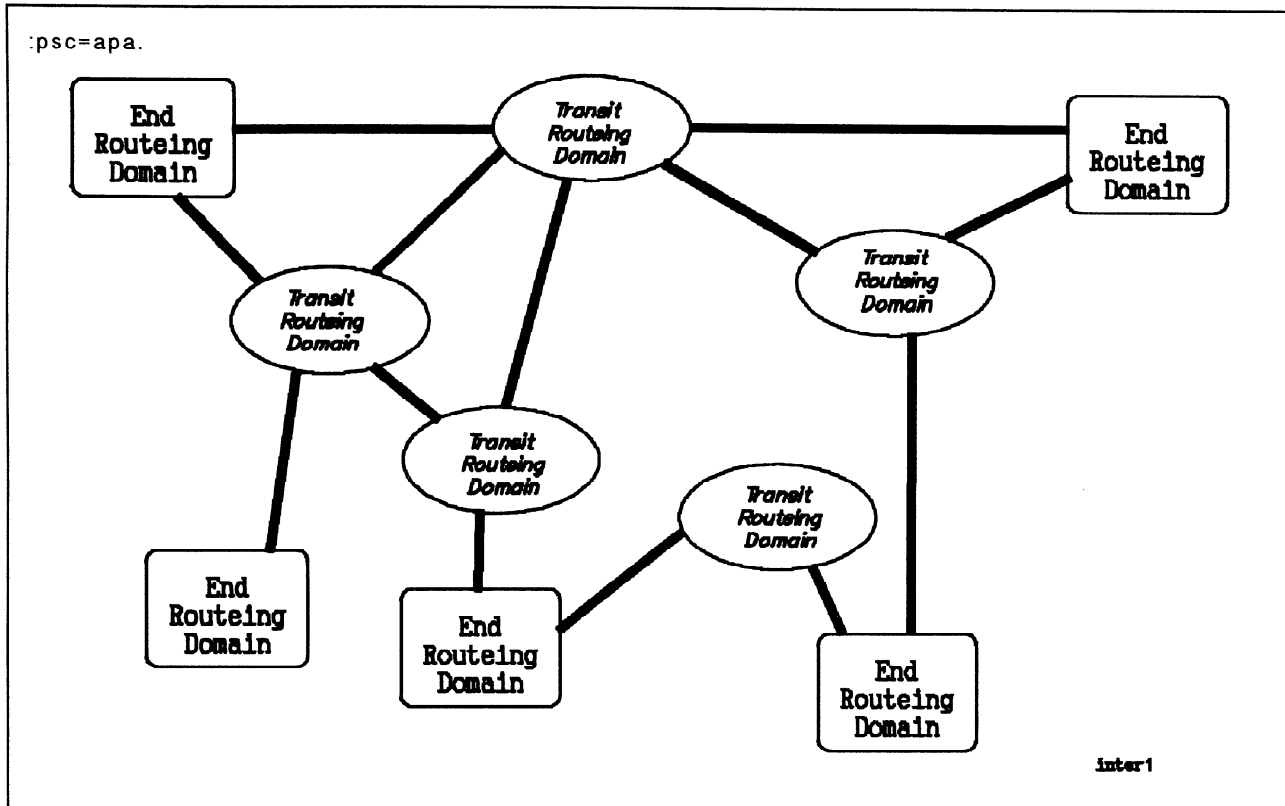


Figure 1 – Field of Application: The Inter-domain Routing Protocol operates between routing domains; intra-domain routing is not within its scope.

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

ISO/IEC TR 9577:1993, *Information technology - Telecommunications and information exchange between systems - Protocol identification in the Network Layer.*

ISO/IEC 10030:1990, *Information technology - Telecommunications and information exchange between systems - End System Routing Information Exchange Protocol for use in conjunction with ISO 8878.*

ISO/IEC 10589:1992, *Information technology - Telecommunications and information exchange between systems - Intermediate system to intermediate system intra-domain routing routine information exchange protocol for use in conjunction with the protocol for providing the connectionless-mode Network Service (ISO 8473).*

ISO/IEC 10165-4:1992, *Information technology - Open Systems Interconnection - Structure of management information: Guidelines for the definition of managed objects.*

ISO/IEC 10165-2:1992, *Information technology - Open Systems Interconnection - Structure of management information: Definition of management information.*