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**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)**

*Systèmes de traitement de l'information — Téléinformatique — Protocole de routage d'un
système d'extrémité à un système intermédiaire à utiliser conjointement avec le protocole
fournissant le service de réseau en mode sans connexion (ISO 8473)*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 9542 was prepared by Technical Committee ISO/TC 97, *Information processing systems*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Annex A forms an integral part of this International Standard. Annexes B and C are for information only.

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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)

0 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.

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 International Standard permits End Systems and Intermediate Systems to exchange configuration and routing information to facilitate the operation of the routing and relaying functions of the Network Layer.

The aspects of Network Layer routing that are concerned with communication between End Systems and Intermediate Systems on the same subnetwork are to a great extent separable from the aspects that are concerned with communication among the Intermediate Systems that connect multiple subnetworks. This protocol addresses only the former aspects. It will be significantly enhanced by the cooperative operation of an additional protocol that provides for the exchange of routing information among Intermediate Systems, but is useful whether or not such an additional protocol is available.

This International Standard is designed to operate in close conjunction with ISO 8473 and its addenda.

This International Standard provides solutions for the following practical problems.

- a) How do End Systems discover the existence and reachability of Intermediate Systems that can route NPDUs to destinations on subnetworks other than the one(s) to which the End System is directly connected?
 - b) How do End Systems discover the existence and reachability of other End Systems on the same subnetwork (when direct examination of the destination NSAP address does not provide information about the destination subnetwork address)?
 - c) How do Intermediate Systems discover the existence and reachability of End Systems on each of the subnetworks to which they are directly connected?
 - d) How do End Systems decide which Intermediate System to use to forward NPDUs to a particular destination when more than one Intermediate System is accessible?
- The protocol assumes that:
- a) routing to a specified subnetwork point of attachment address (SNPA) on the same subnetwork is carried out satisfactorily by the subnetwork itself, but
 - b) the subnetwork is not, however, capable of routing on a global basis using the NSAP address alone to achieve communication with a requested destination.¹⁾
- In addition, certain protocol functions assume that:
- c) the subnetwork supports broadcast, multicast, or other forms of multi-destination addressing for n -way transmission.

¹⁾Consequently, it is not possible to use Application Layer communication to carry out the functions of this International Standard.

The protocol is connectionless, and is designed to:

- minimize the amount of a priori state information needed by End Systems before they can begin to communicate with other End Systems;
- minimize the amount of memory needed to store routing information in end systems; and
- minimize the computational complexity of End System routing algorithms.

1 Scope and Field of Application

This International Standard specifies a protocol which is used by Network Layer entities operating ISO 8473 in End Systems and Intermediate Systems (referred to herein as ES and IS respectively) to maintain routing information. The Protocol herein described relies upon the provision of a connectionless-mode underlying service.¹⁾

This International Standard specifies:

- a) procedures for the transmission of configuration and routing information between Network entities residing in End Systems and Network entities residing in Intermediate Systems;
- b) the encoding of the protocol data units used for the transmission of the configuration and routing 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:

- a) the interactions between End System and Intermediate System Network entities through the exchange of protocol data units; and
- b) the interactions between a Network entity and an underlying service provider through the exchange of subnetwork service primitives.

This International Standard does *not* specify any protocol elements or algorithms for facilitating routing and relaying among Intermediate Systems. Such functions are intentionally beyond the scope of this International Standard.

2 References

ISO 7498, *Information processing systems — Open systems interconnection — Basic reference model*.

ISO 7498/Add.1, *Information processing systems — Open systems interconnection — Basic reference model. ADDENDUM 1: Connectionless-mode transmission*.

ISO 7498/Add.4, *Information processing systems — Open systems interconnection — Basic reference model. ADDENDUM 4: OSI Management Framework*.

ISO 8208, *Information processing systems — Data communications — X.25 Packet Level Protocol for Data Terminal Equipment*.

ISO 8348, *Information processing systems — Data communications — Network Service Definition*.

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

ISO 8348/Add.2, *Information processing systems — Data communications — Network Service Definition. ADDENDUM 2: Network Layer Addressing*.

ISO 8473, *Information processing systems — Data communications — Protocol for providing the connectionless-mode Network Service*.

ISO 8648, *Information processing systems — Open Systems Interconnection — Internal organization of the Network layer*.

ISO 8802, *Information processing systems — Data communications — Local Area Networks*.

CCITT X.25, *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, 1985*.

¹⁾ See Clause 8 of ISO 8473 for the mechanisms necessary to realize this service on subnetworks based on ISO 8208 and ISO 8802.