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Information technology — Telecommunications and information exchange between systems — OSI Routeing Framework

*Technologies de l'information — Communication de données et échange
d'information entre systèmes — Cadre général de routage OSI*



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a system for worldwide standardization as a whole. 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.

The main task of a technical committee is to prepare International Standards but in exceptional circumstances, the publication of a Technical Report of one of the following types may be proposed:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/IEC/TR 9575, which is a Technical Report of type 3, was prepared by ISO/IEC JTC1, *Information technology*.

Introduction

In the OSI environment (OSIE), the possibility exists for any End System (ES) to communicate with any other ES. The physical path (or paths) over which this communication takes place may

- include multiple Intermediate Systems (IS);
- include multiple subnetwork types; and
- traverse multiple, independent organisations.

Furthermore, one instance of communications may follow a different path from another instance of communications.

Within the Network Layer, the *Internal Organisation of the Network Layer* (ISO 8648) identifies two functions, **Routeing** and **Relaying**, as being central to the ability for End Systems to communicate through an arbitrary concatenation of subnetworks and Intermediate Systems.

Part of the overall function of routeing and relaying is to allow ESs and ISs to find an appropriate path between two or more ESs for a given instance of communications.

Relaying is concerned primarily with the actual transformation and manipulation of Network Protocol Data Units (NPDUs) as they transit Intermediate Systems. Routeing, on the other hand, is primarily concerned with the maintenance and selection of paths through multiple subnetworks and Intermediate Systems which allow NPDUs to flow smoothly between End Systems.

There are four important aspects to routeing, i.e.:

- a) the information required by ESs and ISs (5.1.1),
- b) the techniques used by ESs and ISs to collect that information (5.1.2),
- c) the techniques used by ESs and ISs to distribute that information (5.1.3), and
- d) the functions executed by ESs and ISs on that information to determine the paths over which NPDUs flow between pairs of NSAPs (5.1.4).

This Technical Report discusses these aspects of routeing, and describes how various protocols may be employed to effect the OSI routeing functions. It does not discuss relaying, except where relaying functions are closely allied with routeing functions.

Information technology — Telecommunications and information exchange between systems — OSI Routeing Framework

1 Scope

This Technical Report provides a framework in which OSI protocols for routeing may be developed and to expedite the progression of routeing protocols through the standardisation process.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this Technical Report. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Technical Report 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/Add.3:1989, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Addendum 3: Naming, including Addressing*.

ISO 7498/Add.4:1989, *Information processing systems — Open Systems Interconnection — Basic Reference Model — Addendum 4: Management Framework*.

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 8648:1988, *Information processing systems — Open Systems Interconnection — Internal organisation of the Network Layer*.

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)*.

3 Definitions

3.1 Reference Model definitions

This Technical Report 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
- i) System management
- j) Layer management

3.2 Network Layer architecture definitions

This Technical Report makes use of the following terms defined in ISO 8648:

- a) Subnetwork
- b) End system
- c) Intermediate system
- d) Subnetwork service