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Australian Standard®

Information processing systems—

Open Systems Interconnection—Internal organization of the network layer

This Australian Standard was prepared by Committee IS/1, Information Processing Systems. It was approved on behalf of the Council of Standards Australia on 2 November 1988 and published on 13 February 1989.

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PREFACE

This Standard was prepared by the Standards Australia Committee on Information Processing Systems. It is identical with and has been reproduced from International Standard ISO 8648—1988.

This Standard provides an architectural model of the OSI Network Layer as a framework for OSI Network Layer standardization, allowing incorporation of existing networks within the OSI architecture.

This framework encourages the design of real subnetworks that fully support the OSI Network Service whilst accommodating the participation, in the OSI environment, of other subnetworks that do not fully support the OSI Network Service.

This Standard is intended for use both in the design and application of Network Layer protocols, operating between network-entities either in end systems providing the OSI Network Service, or in intermediate systems providing the routeing and relay functions.

The organization defined herein does not address Network Layer management; in particular it is not concerned with the relationships among Network Layer entities which may be required for Network Layer management purposes. In addition, this Standard does not specify the operational requirements for relay functions in intermediate systems, nor address how specific combinations of permitted functions might be practically and efficiently utilized.

The Standard is one of a series of Open Systems Interconnection (OSI) Standards which are currently under development. Since OSI Standards are developmental, there may be some minor difficulties encountered in their implementation. For this reason, Standards Australia will be providing a limited interpretation service to coordinate and disseminate information concerning difficulties which are identified in using this Standard.

For the purpose of this Australian Standard, the text of the ISO Standard given herein should be modified as follows:

(a) *Terminology.* The words 'Australian Standard' should replace the words 'International Standard' wherever they appear.

(b) *References.* The references to International Standards should be replaced by references to Australian Standards as follows:

Reference to International Standard	*Australian Standard*
ISO 7498 Information processing systems—Open Systems Interconnection—Basic Reference Model	AS 2777 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	AS 2777 Supp.1 Information processing systems—Open Systems Interconnection—Basic reference model Supplement 1: Connectionless-mode transmission
ISO 8208 Information processing systems—Data communications—X.25 Packet Level Protocol for Data Terminal Equipment	AS 3621 Information processing systems—Data communications—X.25 packet level protocol for data terminal equipment.
ISO 8348 Information processing systems—Data communications—Network service definition	AS 2994 Information processing systems—Data communications—Network service definition (ISO 8348 & ISO 8348 Add.1)
ISO 8348/Add.1 Information processing systems—Data communications—Network service definition—Addendum 1: Connectionless-mode transmission	AS 2994 Information processing systems—Data communications—Network service definition (ISO 8348 & ISO 8348 Add.1)

Reference to International Standard	*Australian Standard*
ISO/TR 8509 Information processing systems—Open Systems Interconnection—Service conventions	AS 3620 Information processing systems—Open Systems Interconnection—Service conventions.
NOTE: See also CCITT Recommendation X.210 Open Systems Interconnection (OSI)—Layer service definition conventions	—
ISO 8802—Part 2: Information processing systems—Data communications—Local area networks—Logical link control	—
—Part 3: Carrier sense multiple access with collision detection (CSMA/CD) Access method and physical layer specifications	—
—Part 4: Token-passing bus access method and physical layer specifications	—
—Part 5: Token ring access method and physical layer specifications	—
—Part 7: Slotted ring access method and physical layer specifications	—
CCITT Recommendation X.21, General purpose interface between data terminal equipment and data circuit-terminating equipment for synchronous operation on public data networks	—
CCITT Recommendation X.25, Interface between data terminal equipment and data circuit-terminating equipment for terminals operating in the packet mode on public data networks	—

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0 Introduction

This International Standard defines an architectural organization of the Network Layer of the OSI Reference Model. It is concerned with the functional organization of Network Layer entities in open systems, and with the ways in which this organization can be mapped to "real world" components (e.g. "real" networks, switches, transmission media, etc.). This International Standard relates those "real world" objects which must be dealt with to a set of abstract elements. There may be a variety of mappings between an abstract element and the physical equipment used to realize it. The description of such mappings requires a clear distinction between architectural terms and real world terms.

The architectural organization defined in this International Standard identifies and categorizes the way in which functions can be performed within the Network Layer by Network Layer protocols. In so doing, it provides a uniform framework for describing how different Network Layer protocols, operating either individually or cooperatively, can be used to provide the OSI Network Service. By focusing attention on the common functional elements of Network Layer protocols, this framework is intended to

a) simplify the use of Network Layer protocols to provide the Network Service in different situations;

b) limit the uncoordinated proliferation of Network Layer protocols with overlapping functions; and

c) clarify the requirements for, and guide the development of, future Network Layer protocol standards.

This detailed internal structure is necessary in the case of the Network Layer for two reasons:

1. The Network Layer provides its users with a uniform Network Service, regardless of potentially wide variations in underlying "real-world" network services, technologies, and administrative organization. It is important to understand how the underlying components are organized and interact within the Network Layer, and how they can be efficiently and effectively used.

2. ISO 7498 specifies that the Network Layer performs routeing and relaying functions and may contain entities residing in intermediate systems as well as in end systems. It is necessary to describe events that take place within the Network Layer in both types of entities; i.e. in end systems (within which the Network Service is provided to NS users) and in intermediate systems (within which network-entities providing these relaying and routeing functions do not provide the Network Service to NS users).

1 Scope and field of application

This International Standard provides an architectural model of the OSI Network Layer as a framework tor OSI Network Layer standardization, allowing incorporation of existing networks within the OSI architecture.

This framework encourages the design of real subnetworks that fully support the OSI Network Service whilst accommodating the participation, in the OSI environment, of other subnetworks that do not fully support the OSI Network Service.

This International Standard is intended for use both in the design and application of Network Layer protocols, operating between network-entities either in end systems providing the OSI Network Service, or in intermediate systems providing the routeing and relay functions.

It shall be used to

a) provide a common set of concepts and terminology for use in Network Layer standards (such standards shall reference this International Standard);

b) analyse Network Layer functionalty and classify Network Layer protocols;

c) specify how "real networks" should be used in supporting or providing the OSI Network Service, in particular, in circumstances where multiple "real networks" are to be interconnected and used.

The organization defined herein does not address Network Layer management; in particular it is not concerned with the relationships among Network Layer entities which may be required for Network Layer management purposes. In addition, this International Standard does not specify the operational requirements for relay functions in intermediate systems, nor address how specific combinations of permitted functions might be practically and efficiently utilized.