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Information technology — Telecommunications and information exchange between systems — Protocol combinations to provide and support the OSI Network Service —

Part 1: General principles

*Technologies de l'information — Télécommunications et échange d'informations
entre systèmes — Combinaisons de protocoles pour fournir et supporter le service
réseau OSI —*

Partie 1: Principes généraux



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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 8880-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 8880-1 consists of the following parts, under the general title *Information technology — Telecommunications and information exchange between systems — Protocol combinations to provide and support the OSI Network Service*:

- *Part 1: General principles*
- *Part 2: Provision and support of the connection-mode Network Service*
- *Part 3: Provision and support of the connectionless-mode Network Service*

Annex A is for information only.

Introduction

ISO/IEC 8880 provides the framework for understanding the set of International Standards that deal with the provision and support of the OSI Network Service.

In some layers of the OSI Reference Model Architecture, it is possible to refer to a single layer protocol standard specification as the place in which all information necessary to understand how to provide the layer service can be found. This is not possible in the Network Layer since the number of different subnetwork technologies and interconnection strategies that must be accommodated is too large to permit the specification of a single OSI Network Layer Protocol. It is therefore the intention of ISO/IEC 8880 to serve as a single point of reference for information concerning the ways in which Network Layer protocols can be used to provide the OSI Network Service in various environments.

ISO 8348^{[1] [2]} and its Addendum 1 define the OSI Connection-mode Network Service and OSI Connectionless-mode Network Service, respectively. ISO 8348/Add.2^[3] covers network layer addressing. ISO 8648 outlines the architectural framework for the definition of Network Layer protocols and for describing the relationship of the various real world components which can participate in the provision of the Network Service. ISO/IEC 8880 describes the application of the Network Layer architecture in ISO 8648 and the International Standard Network Layer protocols to the provision of the Network Service in real instances of use.

This part of ISO/IEC 8880 specifies: how the provision and support of the Network Service is described; criteria for the inclusion of protocol combinations; and statements of conformance principles which govern the specific conformance requirements specified in the other parts.

The other parts of ISO/IEC 8880 describe the applicability of particular International Standard Network Layer protocols to the provision and support of either the Connection-mode or the Connectionless-mode Network Service. They specify the sets of individual standards which describe procedures and arrangements for the use of specific Network Layer protocols in end systems attached to specific subnetwork types.

Figure 1 illustrates the relationship between the parts of ISO/IEC 8880. It also shows the other International Standards that describe or define the Network Layer.

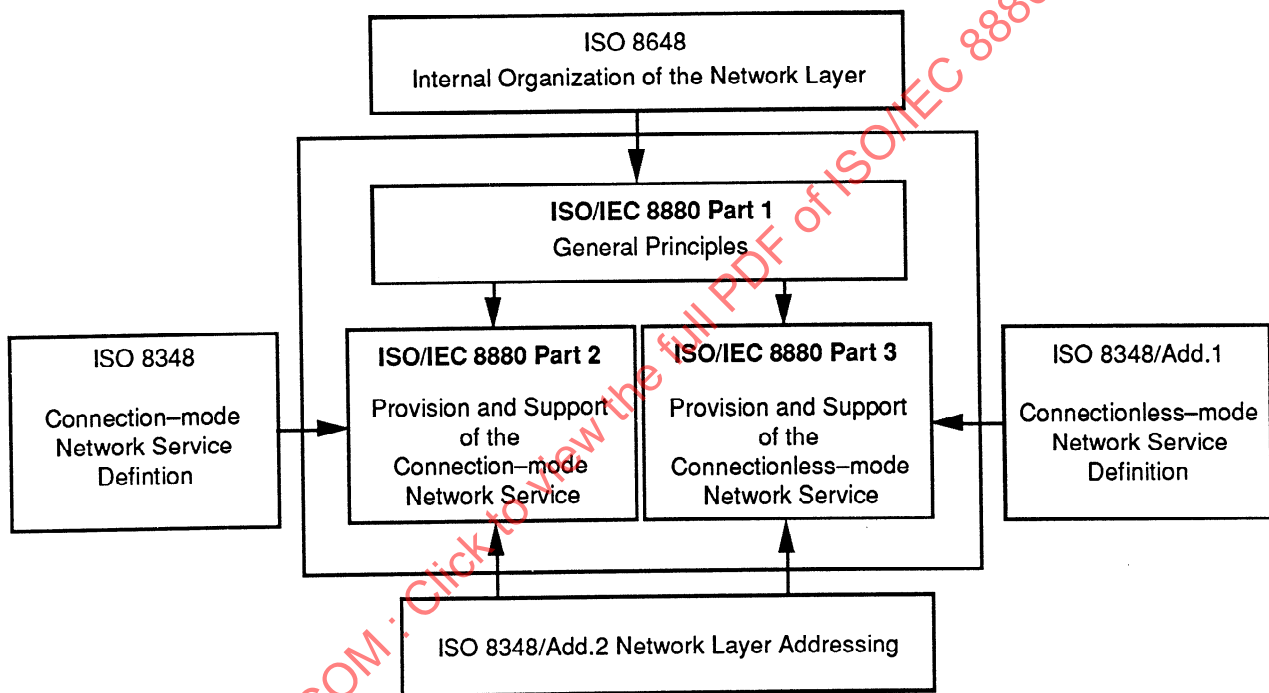


Figure 1 – Organization of ISO/IEC 8880

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Information technology — Telecommunications and information exchange between systems — Protocol combinations to provide and support the OSI Network Service —

Part 1: General principles

1 Scope

This part of ISO/IEC 8880 specifies the protocol combinations to be used to support the OSI Network Service defined in ISO 8348 and its Addendum 1. The field of application of this part of ISO/IEC 8880 is that of the environments defined in the other parts of ISO/IEC 8880. The field of application may be extended by the incorporation of a new environment as specified herein. This part of ISO/IEC 8880

- a) provides a general introduction;
- b) refers to those International Standards which define the architectural principles governing the provision of the Network Service;
- c) defines terms which may be used in specifying the environments in which protocol combinations operate;
- d) specifies principles and a framework for describing the support of the OSI Network Service;
- e) defines the conformance principles to be followed in the other parts of ISO/IEC 8880 which specify the requirements for equipment claiming conformance to ISO/IEC 8880;
- f) considers the rationale for the inclusion of protocol combinations in the other parts of ISO/IEC 8880 and the subsequent addition of protocol combinations to those parts; and
- g) specifies the format and content of the other parts ISO/IEC 8880 and subsequent additions to those parts.

Where an environment does not support the OSI Network Service of the appropriate mode, it lies outside the field of application of ISO/IEC 8880.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 8880. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 8880 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.1:1987, *Information processing systems — Open Systems Interconnection — Basic reference model — Addendum 1: Connectionless-mode transmission*.

ISO 8648:1988, *Information processing systems — Open Systems Interconnection — Internal organization of the Network layer*.

ISO/IEC 8880-2 : 1990, *Information technology — Telecommunications and information exchange between systems — Protocol combinations to provide and support the OSI Network Service — Part 2: Provision and support of the connection-mode Network Service*.

ISO/IEC 8880-3 : 1990, *Information technology — Telecommunications and information exchange between systems — Protocol combinations to provide and support the OSI Network Service — Part 3: Provision and support of the connectionless-mode Network Service*.

3 Definitions

3.1 Reference model definitions

This part of ISO/IEC 8880 makes use of the following terms defined in ISO 7498 and ISO 7498/Add.1:

- a) OSI Network Layer;
- b) OSI Network Service;
- c) Service;
- d) Protocol;
- e) Connection-mode;
- f) Connectionless-mode;
- g) Intermediate System;
- h) End-system.

3.2 Network layer architecture definitions

This part of ISO/IEC 8880 makes use of the following term defined in ISO 8648:

- a) Subnetwork.

4 Abbreviations

The following abbreviations are used in this part of ISO/IEC 8880:

- a) CONS Connection-mode Network Service;
- b) CLNS Connectionless-mode Network Service;
- c) OSI Open Systems Interconnection.

5 Principles and framework for describing the support of the OSI Network Service

This International Standard describes the provision and support of the Network Service in a unified fashion, identifying the protocol combinations to be used, and their applicability in various environments.

This description of the support of the Network Service

- a) recognizes that differences in the environments in which the Network Service is to be supported could require the use of different protocol combinations;
- b) focuses on the use of a small set of protocol combinations; and
- c) emphasizes the need to consider arrangements for interworking in the specification of how the Network Service is to be supported.

6 Protocol combinations and conformance principles

The other parts of ISO/IEC 8880 identify a number of environments and specify the protocol combinations that are applicable to each of those environments. For each environment ISO/IEC 8880 specifies the protocol combinations that may be used.

The requirements for equipment claiming conformance to ISO/IEC 8880 are such that two systems both claiming conformance in the same environment for the same mode of Network Service are capable of interworking. Therefore there is, for each environment identified in the other parts ISO/IEC 8880, one and only one protocol combination identified as required for conformance to ISO/IEC 8880 for the support of the mode of Network Service considered by that part. This does not preclude the use of the other protocol combinations specified in ISO/IEC 8880; rather it ensures that a common basis for communication exists where systems claim to support the OSI Network Service in a particular environment.

The choice of provision of Connection-mode or Connectionless-mode Network Service is provided in accordance with 6.2 of ISO 7498/Add. 1 entitled "Combinations of Connection-mode and Connectionless-mode service".

7 Format and contents of parts 2 and 3

7.1 Overall structure

Parts 2 and 3 of ISO/IEC 8880 describe the provision and support of the Network Service in specific environments. Part 2 describes provision of the CONS; part 3 describes provision of the CLNS. They have a similar structure, as described below.

7.2 Section 1 of ISO/IEC 8880 parts 2 and 3

Section one, entitled "General", contains:

- a) an identification of the environments for which support and provision of the Network Service is specified (sub-clause 1.5). For each environment, one or more references are made to subsequent sections which define the protocol combinations applicable to that environment;
- b) an identification of the protocols used to provide the Network Service, and for each protocol one or more references to subsequent sections which define the way in which the protocol is used (sub-clause 1.6); and
- c) a conformance statement for End Systems in each environment (sub-clause 1.7).

7.3 Sections on protocol combinations

Section two and subsequent sections of part 2 and 3 define protocol combinations. Each section contains

- a) a specification of the applicability of the protocol combination; and
- b) references to the International Standards that specify the protocols to be used.

7.4 Expansion ISO/IEC 8880

As further protocol combinations or environments are found to be applicable they may be added to ISO/IEC 8880 by adding the following to part 2 or part 3 (as appropriate):

- a) a new section defining a protocol combination and its applicability;
- b) identification of the new protocol combination or environment in clauses 5 and 6;
- c) specification of the conformance protocol combination for a new environment in clause 7.

8 Criteria for expansion of ISO/IEC 8880

8.1 Criteria for inclusion of protocol combinations

The protocol combinations for each environment are selected to satisfy a number of competing goals. The criteria used are as follows:

- a) The protocol combination should facilitate interworking between End Systems.
- b) Whenever possible, OSI protocols that are already present in an environment and which provide the necessary functionality and services, should be used.
- c) The complexity of an end-system should be minimized; for example, by minimizing the number of protocol combinations that end-systems must support in a given environment.
- d) The complexity of the functions required to support interworking between environments should be minimized.

- e) A conforming protocol combination should apply to a broad range of end-systems; for example, by ensuring that the conformance protocol combination provides appropriate functionality and Quality of Service characteristics.

8.2 Criteria for Inclusion of environments

Each environment in ISO/IEC 8880 corresponds to specific network technology used to form a subnetwork. New environments are added as needed to describe subnetworks based on specific network technologies not yet described in ISO/IEC 8880. Adding environments that are based on minor variations of network technologies that are already covered by existing environments is strongly discouraged as environments should be distinct, insofar as it is possible.

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