

**Implementation of
ISO/IEC 13712-2 : 1995**

**Information technology —
Remote Operations: OSI
realizations —
Remote Operations Service
Element (ROSE) service
definition**

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National foreword

This British Standard reproduces verbatim ISO/IEC 13712-2 : 1995 and implements it as the UK national standard.

It constitutes a revision of BS ISO/IEC 9072-1 : 1989 but that standard together with BS ISO/IEC 9072-2 : 1989 will not be withdrawn and will remain effective for the applications and reasons given in the introduction to ISO/IEC 13712-2 : 1995.

This British Standard is published under the direction of the Information Systems Technology Assembly whose Technical Committee IST/21 has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

NOTE. International and European Standards, as well as overseas standards, are available from Customer Services, BSI, 389 Chiswick High Road, London W4 4AL.

Textual error. When adopting the text of the international standard, the textual error given below was discovered. It has been marked in the text and has been reported to ISO in a proposal to amend the text of the international standard.

Delete paragraph 4 of the foreword.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

**Information technology — Remote
Operations: OSI realizations — Remote
Operations Service Element (ROSE) service
definition**

*Technologies de l'information — Opérations à distance: Réalisations
OSI — Définition du service pour l'élément de service des opérations à
distance (ROSE)*



Reference number
ISO/IEC 13712-2:1995(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 13712-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open Systems Interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.881.

*It cancels and replaces ISO/IEC 9072-2:1989, of which it constitutes a technical revision.

ISO/IEC 13712 consists of the following parts, under the general title *Information technology — Remote operations*:

- *Part 1: Concepts, model and notation*
- *Part 2: OSI realizations — Remote Operations Service Element (ROSE) service definition*
- *Part 3: OSI realizations — Remote Operations Service Element (ROSE) protocol specification*

Annex A forms an integral part of this part of ISO/IEC 13712. Annexes B and C are for information only.

*See national foreword for details of textual error.

Introduction

Remote operations (ROS) is a paradigm for interactive communication between objects. As such it can be used in the design and specification of distributed applications. The basic interaction involved is the invocation of an operation by one object (the invoker), its performance by another (the performer), possibly followed by a report of the outcome of the operation being returned to the invoker.

The concepts of ROS, as specified in ITU-T Rec. X.880 | ISO/IEC 13712-1, are abstract and may be realized in many ways. For example, objects whose interactions employ ROS concepts may be separated by a software interface or by an OSI network.

This Recommendation | International Standard provides the framework for the realization of an operation package and association contract as an OSI application context. Such an application context is specified primarily in terms of a collection of application service elements (ASE). From a ROS perspective, these ASEs fall into three broad categories:

- a) operation-specific ASEs, which embody knowledge of the definitions of the operations in the association contract;
- b) the Remote Operations ASE (ROSE) which drives the general-purpose protocol required to invoke and report returns of arbitrary operations;
- c) information transfer ASEs concerned with the establishment and release of associations where necessary, and the communication of the ROSE protocol control information (PCI). In the OSI realization, such ASEs are the Association Control Service Element (ACSE), the Reliable Transfer Service Element (RTSE) used together with the services of the Presentation layer.

This Recommendation | International Standard focuses on the derivation of ROSE-based application context specifications, the service provided by ROSE, and the way that ROSE is used. This Recommendation | International Standard is a revision of CCITT Rec. X.219 | ISO/IEC 9072-1. The existing usage of ROSE in connection with ACSE, RTSE and the Presentation layer as defined in CCITT Rec. X.219 | ISO/IEC 9072-1 remains valid after this revision. This revision makes no change to the ROSE PCI.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – REMOTE OPERATIONS: OSI REALIZATIONS – REMOTE OPERATIONS SERVICE ELEMENT (ROSE) SERVICE DEFINITION

1 Scope

This Recommendation | International Standard provides the framework for the realization as an OSI application context of the abstracts concepts of operation package and association contract defined in ITU-T Rec. X.880 | ISO/IEC 13712-1. Such an application context is described in terms of a collection of application service elements, in particular the Remote Operations Application Service Element (ROSE), which drives the general purpose protocol for invoking and reporting the returns of arbitrary operations.

The terms, definitions, and mechanisms defined in ITU-T Rec. X.880 | ISO/IEC 13712-1 apply here and are specialized for an OSI realization as specified in this Recommendation | International Standard. This Recommendation | International Standard focuses on the services provided by ROSE, and the way ROSE is used. The ROSE services are provided by the use of the ROSE protocol (specified in a companion Recommendation | International Standard, ITU-T Rec. X.882 | ISO/IEC 13712-3), in conjunction with the Association Control Service Element (ACSE) services (ITU-T Rec. X.217 | ISO 8649) and the ACSE protocol (ITU-T Rec. X.227 | ISO 8650), and, optionally, the Reliable Transfer Service Element (RTSE) services (ITU-T Rec. X.218 | ISO/IEC 9066-1) and the RTSE protocol (ITU-T Rec. X.228 | ISO/IEC 9066-2), and the Presentation service (ITU-T Rec. X.216 | ISO/IEC 8822).

No requirement is made for conformance to this Recommendation | International Standard.

2 Normative references

The following ITU-T Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Specification. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Specification are encouraged to investigate the possibility of applying the most recent editions of the Recommendations and Standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunications Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology — Open Systems Interconnection — Basic Reference Model: The Basic Model*.
- ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology — Open Systems Interconnection — Basic Reference Model — Conventions for the definitions of OSI services*.
- ITU-T Recommendation X.215 (1994) | ISO 8326:—¹⁾, *Information processing systems — Open Systems Interconnection — Basic connection oriented session service definition*.
- ITU-T Recommendation X.216 (1994) | ISO/IEC 8822:1994, *Information technology — Open Systems Interconnection — Presentation service definition*.
- ITU-T Recommendation X.217 (1995) | ISO 8649:—²⁾, *Information processing systems — Open Systems Interconnection — Service definition for the Association Control Service Element*.
- ITU-T Recommendation X.227 (1995) | ISO 8650:—³⁾, *Information processing systems — Open Systems Interconnection — Protocol specification for the Association Control Service Element*.
- ITU-T Recommendation X.680 (1994) | ISO/IEC 8824-1:1995, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*.

1) To be published. (Revision of ISO 8326:1987)

2) To be published. (Revision of ISO 8649:1988)

3) To be published. (Revision of ISO 8650:1988)

- ITU-T Recommendation X.681 (1994) | ISO/IEC 8824-2:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- ITU-T Recommendation X.682 (1994) | ISO/IEC 8824-3:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- ITU-T Recommendation X.683 (1994) | ISO/IEC 8824-4:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications.*
- ITU-T Recommendation X.880 (1994) | ISO/IEC 13712-1:1995, *Information technology – Remote Operations: Concepts, model and notation.*
- ITU-T Recommendation X.882 (1994) | ISO/IEC 13712-3:1995, *Information technology – Remote Operations: OSI realizations – Remote Operations Service Element (ROSE) protocol specification.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- ITU-T Recommendation X.218 (1993), *Reliable Transfer: Model and service definition.*
ISO/IEC 9066-1:1989, *Information processing systems – Text communication – Reliable Transfer – Part 1: Model and service definition.*
- ITU-T Recommendation X.228 (1993), *Reliable Transfer – Protocol specification.*
ISO/IEC 9066-2:1989, *Information processing systems — Text communication — Reliable Transfer — Part 2: Protocol specification.*
- CCITT Recommendation X.219 (1988), *Remote Operations: Model, notation and service definition.*
ISO/IEC 9072-1:1989, *Information processing systems – Text communication – Remote Operations – Part 1: Model, notation and service definition.*
- CCITT Recommendation X.229 (1988), *Remote Operations: Protocol specification.*
ISO/IEC 9072-2:1989, *Information processing systems – Text communication – Remote Operations – Part 2: Protocol specification.*

3 Definitions

3.1 Reference Model definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.200 | ISO/IEC 7498-1:

- a) abstract syntax;
- b) Application Layer;
- c) application-process;
- d) application-entity;
- e) application-service-element;
- f) application-protocol-data-unit;
- g) application-protocol-control-information;
- h) Presentation Layer;
- i) presentation-service.

3.2 Service conventions definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.210 | ISO/IEC 10731:

- a) service-provider;
- b) service-user;
- c) confirmed service;

- d) non-confirmed service;
- e) provider-initiated service;
- f) service-primitive; primitive;
- g) request (primitive);
- h) indication (primitive);
- i) response (primitive); and
- j) confirm (primitive).

3.3 Presentation service definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.216 | ISO/IEC 8822:

- a) abstract syntax name;
- b) transfer syntax name;
- c) presentation context.

3.4 Association control definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.217 | ISO 8649:

- a) application-association; association;
- b) application context;
- c) Association Control Service Element.

3.5 Reliable Transfer definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Recommendation X.218 | ISO/IEC 9066:

- Reliable Transfer Service Element.

3.6 ROSE definitions

For the purpose of this Recommendation | International Standard the following definitions apply:

3.6.1 association-initiating-application-entity; association-initiator: The application-entity that initiates the application-association.

3.6.2 association-responding-application-entity; association-responder: The application-entity that responds to the initiation of an application-association by another AE.

3.6.3 invoking-application-entity; invoker: The application-entity that invokes the Remote Operation.

3.6.4 performing-application-entity; performer: The application-entity that performs a Remote Operation invoked by the other application-entity.

3.6.5 requestor: The part of an application-entity that issues a request primitive for a particular ROSE service.

3.6.6 acceptor: The part of an application-entity that receives the indication primitive for a particular ROSE service.

3.6.7 linked operation: See 3.3.8 of ITU-T Rec. X.880 | ISO/IEC 13712-1.

3.6.8 parent-operation: An operation during whose execution the performer may invoke linked-operations.

3.6.9 child-operation: An operation that is invoked by the performer of a parent-operation in response to the latter operation's invocation.

3.6.10 ACSE-user: That portion of an application entity which performs the mapping of the bind operation and unbind operation onto ACSE.

3.6.11 Remote Operation Service Element: The application-service-element defined in this Recommendation | International Standard.

3.6.12 ROSE-provider: The provider of the Remote Operations Service Element services.

3.6.13 ROSE-user: That portion of an application entity which interacts with ROSE for the purpose of communicating with the remotely-located peer user.

3.6.14 RTSE-user: That portion of an application entity which performs the mapping of the bind operation and unbind operation onto RTSE.

4 Abbreviations

AE	Application entity
ACSE	Association Control Service Element
ASE	Application service element
ASN.1	Abstract Syntax Notation One
APDU	Application protocol data unit
RO (or ROS)	Remote Operations
ROSE	Remote Operations Service Element
RT (or RTS)	Reliable Transfer
RTSE	Reliable Transfer Service Element

5 Conventions

This Recommendation | International Standard defines services for the ROSE following the descriptive conventions defined in ITU-T Rec. X.210 | ISO/IEC 10731. In clause 8, the definition of each ROSE service includes a table that lists the parameters of its primitives. For a given primitive, the presence of each parameter is described by one of the following values:

Blank	Not applicable
M	Mandatory
U	User option
C	Conditional
O	Presence is a ROSE service-provider option

In addition, the notation (=) indicates that a parameter value is semantically equal to the value to its left in the table.

This specification employs ASN.1, as specified in ITU-T Rec. X.681 | ISO/IEC 8824-2, to define the **APPLICATION-CONTEXT** information object class. This also provides the notation with which designers of ROS applications can specify particular instances of the class.

6 OSI Realization model for ROS

A general model for the realization of ROS by communication means is shown in Figure 1 (reproduced from Figure 3 of ITU-T Rec. X.880 | ISO/IEC 13712-1).