

**Implementation of
ISO/IEC 9596-1:1991**

**Information
technology —
Open Systems
Interconnection —
Common management
information protocol —**

Part 1: Specification

UDC 681.3:621.39

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Information Systems Technology Standards Policy Committee (IST/-) to Technical Committee IST/21, upon which the following bodies were represented:

- Association for Payment Clearing Services
- British Computer Society
- British Gas plc
- British Telecommunications plc
- Computing Services Association
- Department of Trade and Industry (Alvey — Advanced Network Systems Architecture)
- Department of Trade and Industry (National Physical Laboratory)
- EEA (the Association of Electronics, Telecommunications and Business Equipment Industries)
- HM Treasury (Central Computer and Telecommunications Agency)
- Institute of Chartered Secretaries and Administrators
- Institution of Electrical Engineers
- Inter-universities Computing Committee
- Joint Network Team
- Ministry of Defence
- National Health Service
- United Kingdom Atomic Energy Authority
- University of London Computer Centre

This British Standard, having been prepared under the direction of the Information Systems Technology Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 30 August 1991

© BSI 01-2000

The following BSI references relate to the work on this standard:
Committee reference IST/21
Draft for comment 90/64854 DC

ISBN 0 580 19956 8

Amendments issued since publication

Amd. No.	Date	Comments
7305	September 1992	
7477	December 1992	
7535	December 1992	
7805	August 1993	
8335	January 1995	Indicated by a sideline in the margin

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	iii
Text of ISO/IEC 9596-1	1

National foreword

This British Standard reproduces verbatim ISO/IEC 9596-1:1991 Technical Corrigenda 1, 2, 3, 4 and 5 and implements it as the UK national standard. It supersedes BS ISO/IEC 9596:1990 which is withdrawn.

This British Standard is published under the direction of the Information Systems Technology Standards Policy Committee 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 BSI Sales Department, BSI, Linford Wood, Milton Keynes, MK14 6LE.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO/IEC title page, pages ii to iv, pages 1 to 30 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

INTERNATIONAL STANDARD

ISO/IEC
9596-1

Second edition
1991-06-01

Information technology — Open Systems Interconnection — Common management information protocol —

Part 1: Specification

*Technologies de l'information — Interconnexion des systèmes
ouverts — Protocole commun d'information de gestion —*

Partie 1: Spécification



Reference number
ISO/IEC 9596-1:1991(E)



Documents

Document Sharing Hub

Contents

	Page
Foreword	iii
1 Scope	1
2 Normative references	1
3 Definitions	2
3.1 Basic Reference Model definitions	2
3.2 Management Framework definitions	2
3.3 Remote Operations definitions	2
3.4 CMIS definitions	2
3.5 ACSE definitions	2
3.6 Presentation definitions	2
4 Symbols and abbreviations	3
5 Overview	3
5.1 Service provided	3
5.2 Underlying services	3
5.3 Management information definitions	4
5.4 Protocol version	4
6 Elements of procedure	4
6.1 Association establishment	4
6.2 Remote operations	4
6.3 Event reporting procedure	5
6.4 Get procedure	6
6.5 Set procedure	7
6.6 Action procedure	8
6.7 Create procedure	8
6.8 Delete procedure	9
6.9 Association orderly release	9
6.10 Association abrupt release	10
7 Abstract syntax	10
7.1 Conventions	10
7.2 Correspondence between CMISE primitives and CMIP operations	10
7.3 ACSE user data	11
7.4 CMIP data units	11
7.5 Definition of abstract syntax for CMIP	18
8 Conformance	19
8.1 Static requirements	19
8.2 Dynamic requirements	19
Annex A (normative) Association rules for CMISE	20
Annex B (informative) Expanded ASN.1 syntax	22
Annex C (informative) Examples of CMISE ROSE APDUs	29
Annex D (informative) Revisions of CMIP	30
Table 1 — Common Management Information Services	3
Table 2 — Correspondence between CMIS and ROSE parameters	5
Table 3 — Mapping RO-Reject-User.Invoke-problem to CMISE error codes	5
Table 4 — Correspondence between CMISE primitives and CMIP operations	10

Descriptors: Data processing, information interchange, network interconnection, open systems interconnection, communication procedure, control procedures, application layer, management protocols, specifications.

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 9596-1 was prepared by the Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This second edition cancels and replaces the first edition (ISO/IEC 9596:1990), which has been technically revised.

ISO/IEC 9596 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Common management information protocol*:

- *Part 1: Specification;*
- *Part 2: Protocol implementation conformance statement (PICS) proforma.*

Annex A forms an integral part of this part of ISO/IEC 9596. Annex B, Annex C and Annex D are for information only.

1 Scope

This part of ISO/IEC 9596 specifies a protocol which is used by application layer entities to exchange management information.

This part of ISO/IEC 9596 specifies

- procedures for the transmission of management information between application entities;
- the abstract syntax of the Common Management Information Protocol and the associated encoding rules to be applied;
- procedures for the correct interpretation of protocol control information;
- the conformance requirements to be met by implementation of this part of ISO/IEC 9596.

This part of ISO/IEC 9596 does not specify

- the structure or meaning of the management information that is transmitted by means of CMIP;
- the manner in which management is accomplished as a result of CMIP exchanges;
- the interactions which result in the use of CMIP.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 9596. 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 9596 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.

2.1 Identical CCITT Recommendations | International Standards

CCITT Recommendation X.712 (1992) | ISO/IEC 9596-2:1992, *Information technology — Open Systems Interconnection — Common management information protocol: Protocol implementation conformance statement (PICS) proforma*.

2.2 Additional references

ISO 7498:1984, *Information processing systems — Open Systems Interconnection — Basic Reference Model*.

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

ISO 8326:1987, *Information processing systems — Open Systems Interconnection — Basic connection oriented session service definition*.

ISO 8649:1987, *Information processing systems — Open Systems Interconnection — Service definition for the Association Control Service Element*.

ISO 8650:1987, *Information processing systems — Open Systems Interconnection — Protocol specification for the Association Control Service Element*.

ISO 8822:1987, *Information processing systems — Open Systems Interconnection — Connection oriented presentation service definition*.

ISO 8823:1987, *Information processing systems — Open Systems Interconnection — Connection oriented presentation protocol specification*.

ISO/IEC 8824:1990, *Information technology — Open Systems Interconnection — Specification of Abstract Syntax Notation One (ASN.1)*.

ISO/IEC 8825:1990, *Information technology — Open Systems Interconnection — Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)*.

ISO/IEC 9072-1:1989, *Information processing systems — Text Communication — Remote Operations — Part 1: Model, Notation and Service Definition*.

ISO/IEC 9072-2:1989, *Information processing systems — Text Communication — Remote Operations — Part 2: Protocol Specification*.

ISO/IEC 9595:1991, *Information technology — Open Systems Interconnection — Common Management Information Service Definition*.

3 Definitions

For the purposes of this part of ISO/IEC 9596, the following definitions apply.

3.1 Basic Reference Model definitions

This part of ISO/IEC 9596 makes use of the following terms defined in ISO 7498.

- a) application-service-element;
- b) application-process;
- c) real open system;
- d) systems-management.

3.2 Management Framework definitions

This part of ISO/IEC 9596 makes use of the following terms defined in ISO/IEC 7498-4.

- a) managed object;
- b) management information;
- c) management information base;
- d) systems management application-entity.

3.3 Remote Operations definitions

This part of ISO/IEC 9596 makes use of the following terms defined in ISO/IEC 9072-1.

- a) association-initiator;
- b) association-responder;
- c) linked-operations;
- d) Remote Operations;
- e) Remote Operation Service Element;
- f) invoker;
- g) performer;
- h) Association Class;
- i) Operation Class.

3.4 CMIS definitions

This part of ISO/IEC 9596 makes use of the following terms defined in ISO/IEC 9595.

- a) attribute;
- b) common management information service element;
- c) common management information services;
- d) CMISE-service-provider;
- e) CMISE-service-user;
- f) invoking CMISE-service-user;
- g) performing CMISE-service-user.

3.5 ACSE definitions

This part of ISO/IEC 9596 makes use of the following terms defined in ISO 8649.

- a) application context;
- b) application-association;
- c) association.

3.6 Presentation definitions

This part of ISO/IEC 9596 makes use of the following terms defined in ISO 8822.

- a) abstract syntax;
- b) transfer syntax.

4 Symbols and abbreviations

ACSE	Association Control Service Element
APDU	Application Protocol Data Unit
ASE	Application Service Element
ASN.1	Abstract Syntax Notation One
CMIP	Common Management Information Protocol
CMIPM	Common Management Information Protocol Machine
CMIS	Common Management Information Service
CMISE	Common Management Information Service Element
DCS	defined context set
PCI	protocol control information
PDU	protocol data unit
PICS	protocol implementation conformance statement
RO	remote operations
ROSE	Remote Operations Service Element
SMAE	systems management application-entity

5 Overview

The Common Management Information Protocol (CMIP) specifies protocol elements that may be used to provide the operation and notification services described in ISO/IEC 9595, which defines the Common Management Information Services (CMIS).

5.1 Service provided

The protocol specified in this part of ISO/IEC 9596 supports the services defined in ISO/IEC 9595. These services are summarized in Table 1.

Table 1 — Common Management Information Services

Service	Type
M-CANCEL-GET	confirmed
M-EVENT-REPORT	confirmed/non-confirmed
M-GET	confirmed
M-SET	confirmed/non-confirmed
M-ACTION	confirmed/non-confirmed
M-CREATE	confirmed
M-DELETE	confirmed

5.2 Underlying services

This part of ISO/IEC 9596 uses the RO-INVOKE, RO-RESULT, RO-ERROR and RO-REJECT-U services of the Remote Operations Service Element (ROSE) defined in ISO/IEC 9072-1. ROSE assumes the use of the presentation service defined in ISO 8822. The confirmed operations of CMIP are Operation Class 2 (asynchronous) or Operation Class 1 (synchronous) as required by the application. The choice of Operation Class is a local matter. The unconfirmed operations of CMIP are Operation Class 5 (asynchronous, outcome not reported). CMIP uses Association Class 3.

If the extended service functional unit is successfully negotiated, ROSEapdus may be mapped on to presentation services other than the P-DATA service.

NOTE For example, it may be necessary to modify the presentation defined context set (DCS) when the CMIP operation is sent to the peer CMISE-service-user. In this case, the ROSE APDU which carries the CMIP operation will be mapped onto the P-ALTER-CONTEXT service which is also used to perform the changes to the DCS.

Details of which other presentation services are required and how they are used, are described in the description of the application context in use on the association.

5.2.1 *Service assumed from the ACSE*

This part of ISO/IEC 9596 assumes the use of the A-ASSOCIATE, A-RELEASE, A-ABORT, and A-P-ABORT services of the Association Control Service Element.

5.2.2 *Service assumed from the presentation layer*

ISO/IEC 9072-2 assumes the use of the P-DATA service of the presentation layer for the transfer of the RO-INVOKE, RO-RESULT, RO-ERROR and RO-REJECT PDUs.

5.3 Management information definitions

This part of ISO/IEC 9596 defines the abstract syntax of the Common Management Information Protocol. The definitions of management information to be carried by the protocol are not specified in this International Standard.

5.4 Protocol version

This International Standard defines version 2 of CMIP. Version 2 replaces version 1. This International Standard does not define any interworking between version 2 and version 1.

6 Elements of procedure

This clause provides definition for the procedural elements of the CMIP. The procedures define the transfer of CMIP PDUs whose structure, coding and relationship with the CMIS service primitives is specified in clause 7.

The Common Management Information Protocol Machine (CMIPM) accepts CMIS request and response service primitives, and issues CMIP PDUs initiating specific elements of procedure as specified in this clause.

A CMIPM shall accept any well-formed CMIP PDU, and pass it to the performing CMISE-service-user for processing, by means of CMIS indication and confirmation service primitives. If the received PDU is not well formed or does not contain a supported notification or operation, a PDU is returned indicating that the received PDU has been rejected.

The procedures indicate only how to interpret the various fields in the CMIP PDU, not what an invoking CMISE-service-user should do with the information it requests nor how a performing CMISE-service-user should process the invocation.

6.1 Association establishment

The establishment of an association involves two CMISE-service-users, one that is the association-initiator and one that is the association-responder.

A CMISE-service-user may initiate an association establishment by using the A-ASSOCIATE service of ISO 8649.

The application context specifies, among other things, the rules required for the coordination of initialisation information corresponding to different ASEs. The association rules for CMISE are specified in Annex A.

6.2 Remote operations

6.2.1 *RO elements of procedure*

The CMIP elements of procedure rely on the following underlying Remote Operations elements of procedure

- a) invocation;
- b) return-result;
- c) return-error;
- d) user-reject;
- e) provider-reject.

These elements of procedure are described fully in ISO/IEC 9072-2.

Table 2 specifies the correspondence between CMIS and ROSE parameters.