INTERNATIONAL STANDARD ISO/IEC 10164-1:1993/Amd.1:1996
TECHNICAL CORRIGENDUM 1

Published 1996-12-15

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION
INTERNATIONAL ELECTROTECHNICAL COMMISSION • МЕЖДУНАРОДНАЯ ЭЛЕКТРОТЕХНИЧЕСКАЯ КОМИССИЯ • COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

Information technology — Open Systems Interconnection — Systems Management: Object Management Function

AMENDMENT 1: Implementation conformance statement proformas

TECHNICAL CORRIGENDUM 1

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Gestion-systèmes: Fonction de gestion d'objets

AMENDEMENT 1: Proformes ICS

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to International Standard ISO/IEC 10164-1:1993/Amd.1:1996 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology,* Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing.*

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ICS 35.100.70 **Ref. No. ISO/IEC 10164-1:1993/Amd.1:1996/Cor.1:1996(E)**

Descriptors: data processing, information interchange, network interconnection, open systems interconnection, application layer, management, systems management.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – SYSTEMS MANAGEMENT: OBJECT MANAGEMENT FUNCTION

AMENDMENT 1
Implementation conformance statement proformas

TECHNICAL CORRIGENDUM 1

1) Annex A

In Table A.6 – "PICS Support Summary", *first row referencing* "CCITT Rec. X.730 | ISO/IEC 10164-1 Annex E, SM Application Context" *change the status from* "m" *to* "o" *and add the following note for the corresponding row of this table:*

"NOTE – The supplier of implementation shall indicate the application contexts supported."

2) Subclause A.1.3

Add the following sentence after the line "– Not applicable or out of scope" *and immediately before* "NOTES":

"The value of 'm' in the Status column for the receiving of parameters, of tables of type MCS in Annex A and the PICS in Annex E indicates that there is a minimum requirement for the implementation to be able to receive the parameter. The Additional information column shall be used to state whether the implementation provides support for more than the minimum requirement."

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INTERNATIONAL STANDARD

ISO/IEC 10164-1

First edition
1993-06-15

AMENDMENT 1
1996-05-15

Information technology — Open Systems Interconnection — Systems Management: Object Management Function

AMENDMENT 1: Implementation conformance statement proformas

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Gestion-systèmes: Fonction de gestion d'objets

AMENDEMENT 1: Proformes ICS

Reference number
ISO/IEC 10164-1:1993/Amd.1.1996(E)

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Foreword

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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.

Amendment 1 to International Standard ISO/IEC 10164-1 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 Rec. X.730/Amd.1.

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Introduction

This amendment includes tables, which document the mandatory and optional management information specific to the Object Management Function. This amendment will be used by Profile specifiers, for example those developing International Standardized Profiles (ISPs), to specify and explicit subset of capability, which will afford interoperability between implementatations. The tables also include a column for equipment vendors to state the capability of their products in terms of the Profiles or base specification. The table structures comply with the Guidelines for Implementation Conformance Statement Proformas specified in ITU-T Rec. X.724 | ISO/IEC 10165-6.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – SYSTEMS MANAGEMENT: OBJECT MANAGEMENT FUNCTION

AMENDMENT 1
(to Rec. X.730 | ISO/IEC 10164-1)

Implementation conformance statement proformas

1) *Add the following footnote to the first list item in 2.1:*

"[1] As amended by ITU-T Rec. X.701/Cor.2 | ISO/IEC 10040/Cor.2"

2) *Add the following reference to 2.1:*

"– ITU-T Recommendation X.724 (1993) | ISO/IEC 10165-6:1994, *Information technology – Open Systems Interconnection – Structure of management information: Requirements and guidelines for implementation conformance statement proformas associated with OSI management.*"

3) *Add the following references to 2.2:*

– CCITT Recommendation X.291 (1992), *OSI conformance testing methodology and framework for protocol Recommendations for CCITT applications – Abstract test suite specification.*

ISO/IEC 9646-2:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 2: Abstract Test Suite specification.*

– ITU-T Recommendation X.296[2], *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Implementation conformance statements.*

ISO/IEC 9646-7:1995, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements.*"

And then add the following footnote:

[2] Presently at the stage of draft.

4) *Apply the following changes to 3.4:*

Add the following items to the list

"Management Information Conformance Statement (MICS)"

"Managed Object Conformance Statement (MOCS)"

"MICS proforma"

"MOCS proforma".

Delete item c) and d), re-label the list and re-arrange the list in alphabetic order.

5) *Apply the following change to 3.7:*

Replace "system conformance statement" *with the following*:

"a) PICS proforma;

b) protocol implementation conformance statement;

c) system conformance statement."

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6) *Insert the following new subclause:*

"3.8 Implementation conformance statement proforma definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.724 | ISO/IEC 10165-6:

a) Managed Relationship Conformance Statement (MRCS);

b) Management Conformance Summary (MCS);

c) MCS proforma;

d) MRCS proforma."

7) *Add the following abbreviations to clause 4:*

"ICS Implementation Conformance Statement

MCS Management Conformance Summary

MICS Management Information Conformance Statement

MIDS Management Information Definition Statement

MOCS Managed Object Conformance Statement

MRCS Managed Relationship Conformance Statement

PICS Protocol Implementation Conformance Statement"

8) *Replace clause 13 by the following:*

"13 Conformance

Implementations claiming to conform to this Recommendation | International Standard shall comply with the conformance requirements as defined in the following subclauses.

13.1 Static conformance

The implementation shall conform to the requirements of this Recommendation | International Standard in the manager role, the agent role, or both roles. A claim of conformance to at least one role shall be made in Table A.1.

If a claim of conformance is made for support in the manager role, the implementation shall support at least one of the notifications or at least one of the management operations specified in this Recommendation | International Standard. The conformance requirements in the manager role for those management operations and notifications, are identified in Table A.3 and further tables referenced by Annex A.

If a claim of conformance is made for support in the agent role, the implementation shall support at least one of the notifications specified in this Recommendation | International Standard. The conformance requirements in the agent role are identified in Table A.4 and further tables referenced by Annex A.

The implementation shall support the transfer syntax derived from the encoding rules specified in CCITT Rec. X.209 | ISO/IEC 8825 named {joint-iso-ccitt asn1(1) basicEncoding(1)} for the abstract data types referenced by the definitions for which support is claimed.

NOTE – Prior to the publication of this amendment, this Recommendation | International Standard identified general and dependent conformance classes. A claim of conformance similar to general conformance class can be made by stating support in the manager role, the agent role, or both roles, for object events functional unit in Table A.2. A claim of conformance similar to dependent conformance class can be made by stating support for at least one of the items in Tables A.3 or A.4.

13.2 Dynamic conformance

Implementations claiming to conform to this Recommendation | International Standard shall support the elements of procedure and definitions of semantics corresponding to the definitions for which support is claimed.

13.3 Management implementation conformance statement requirements

Any MCS proforma, MICS proforma, MOCS proforma, and PICS proforma which conforms to this Recommendation | International Standard shall be technically identical to the proformas specified in Annexes A, B, C, E preserving table numbering and the index numbers of items, and differing only in pagination and page headers.

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The supplier of an implementation which is claimed to conform to this Recommendation | International Standard shall complete a copy of the Management Conformance Summary (MCS) provided in Annex A as part of the conformance requirements together with any other ICS proformas referenced as applicable from that MCS. An ICS which conforms to this Recommendation | International Standard shall:

- describe an implementation which conforms to this Recommendation | International Standard;
- have been completed in accordance with the instructions for completion given in ITU-T Rec. X.724 | ISO/IEC 10165-6;
- include the information necessary to uniquely identify both the supplier and the implementation.

Claims of conformance to the management information defined in this Recommendation | International Standard in managed object classes defined elsewhere shall include the requirements of the MIDS proforma, as specified in Annexe D, in the MOCS for the managed object class."

9) *Apply the following change to 11.1.1.2.1:*

In the last sentence replace "11.1.2.2" *by* "11.1.1.2.2"

10) *Apply the following change to 11.1.8.2.1:*

In the last sentence replace "11.1.6.2.2" by "11.1.8.2.2"

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11) *Add the following annexes:*

Annex A

MCS proforma[3)]

(This annex forms an integral part of this Recommendation I International Standard)

A.1 Introduction

A.1.1 Purpose and structure

The Management Conformance Summary (MCS) is a statement by a supplier that identifies an implementation and provides information on whether the implementation claims conformance to any of the listed set of documents that specify conformance requirements to OSI management.

The MCS proforma is a document, in the form of a questionnaire that when completed by the supplier of an implementation becomes the MCS.

A.1.2 Instructions for completing the MCS proforma to produce an MCS

The supplier of the implementation shall enter an explicit statement in each of the boxes provided. Specific instruction is provided in the text which precedes each table.

A.1.3 Symbols, abbreviations and terms

For all annexes of this Recommendation I International Standard, the following common notations, defined in CCITT Rec. X.291 I ISO/IEC 9646-2 and ITU-T Rec. X.296 I ISO/IEC 9646-7 are used for the Status column:

- m Mandatory;
- o Optional;
- c Conditional;
- x Prohibited;
- – Not applicable or out of scope.

NOTES

1 'c', 'm', and 'o' are prefixed by a 'c:' when nested under a conditional or optional item of the same table;

2 'o' may be suffixed by '.N' (where N is a unique number) for selectable options among a set of status values. Support of at least one of the choices (from the items with the same values of N) is required.

For all annexes of this Recommendation I International Standard, the following common notations, defined in CCITT Rec. X.291 I ISO/IEC 9646-2 and ITU-T Rec. X.296 I ISO/IEC 9646-7 are used for the Support column:

- Y Implemented;
- N Not implemented;
- – No answer required;
- Ig The item is ignored (i.e. processed syntactically but not semantically).

A.1.4 Table format

Some of the tables in this Recommendation I International Standard have been split because the information is too wide to fit on the page. Where this occurs, the index number of the first block of columns are the index numbers of the corresponding rows of the remaining blocks of columns. A complete table reconstructed from the constituent parts should have the following layout:

Index	First block of columns	Second block of columns	Etc.

3) Users of this Recommendation I International Standard may freely reproduce the MCS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed MCS. Instructions for completing the MCS proforma are specified in ITU-T Rec.X.724 I ISO/IEC 10165-6.

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In this Recommendation | International Standard the constituent parts of the table appear consecutively, starting with the first block of columns.

When a table with sub-rows is too wide to fit on a page, the continuation tables(s) have been constructed with index numbers identical to the index numbers in the corresponding rows of the first table, and with sub-index numbers corresponding to the sub-rows within each indexed row. For example, if Table X.1 has 2 rows and the continuation of Table X.1 has 2 sub-rows for each row, the tables are presented as follows:

Table X.1 – Title

					Support		
Index	A	B	C	D	E	F	G
1	a	b	–				
2	a	b	–				

Table X.1 (*continued*) – Title

Index	Sub-index	H	I	J	K	L
1	1.1	h	i	j		
	1.2	h	i	j		
2	2.1	h	i	j		
	2.1	h	i	j		

A complete table reconstructed from the constituent parts should have the following layout:

					Support								
Index	A	B	C	D	E	F	G	Sub-index	H	I	J	K	L
1	a	b	–					1.1	h	i	j		
								1.2	h	i	j		
2	a	b	–					2.1	h	i	j		
								2.2	h	i	j		

References made to cells within tables shall be interpreted as references within reconstructed tabled. In the example, above, the reference X.1/1d corresponds to the blank cell in the column G for row with Index 1, and X.1/1.2b corresponds to the blank cell in column L for row with Sub-index 1.2

A.2 Identification of the implementation

A.2.1 Date of statement

The supplier of the implementation shall enter the date of this statement in the box below. Use the format DD-MM-YYYY.

Date of statement

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A.2.2 Identification of the implementation

The supplier of the implementation shall enter information necessary to uniquely identify the implementation and the system(s) in which it may reside, in the box below.

A.2.3 Contact

The supplier of the implementation shall provide information on whom to contact if there are any queries concerning the content of the MCS or any referenced implementation conformance statement, in the box below.

A.3 Identification of the Recommendations | International Standards in which the management information is defined

The supplier of the implementation shall enter the title, reference number and date of the publication of the Recommendations | International Standards which specify the management information to which conformance is claimed, in the box below.

Recommendations	International Standards to which conformance is claimed

A.3.1 Technical corrigenda implemented

The supplier of the implementation shall enter the reference numbers of implemented technical corrigenda which modify the identified Recommendations | International Standards, in the box below.

A.3.2 Amendments implemented

The supplier of the implementation shall state the titles and reference numbers of implemented amendments to the identified Recommendation | International Standard, in the box below.

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A.4 Management conformance summary

The supplier of implementation shall state the capabilities and features supported and provide a summary of conformance claims to Recommendations | International Standards using the tables in this annex.

The supplier of the implementation shall specify the roles that are supported, in Table A.1.

Table A.1 – Roles

Index	Roles supported	Status	Support	Additional information
1	Manager role support	o.1		
2	Agent role support	o.1		

The supplier of the implementation shall specify support for the systems management functional units in Table A.2.

Table A.2 – Systems management functional unit

Index	Capability	Manager		Agent		Additional information
		Status	Support	Status	Support	
1	objectEvents functional unit	c1		c2		
2	allEvents functional unit	c1		c2		
3	control functional unit	c1		c2		
4	monitor functional unit	c1		c2		

c1: if A.1/1a then o else –.

c2: if A.1/2a then o else –.

The supplier of the implementation shall specify support for management information in the manager role, in Table A.3.

Table A.3 – Manager role minimum conformance requirement

Index	Item	Status	Support	Additional information
1	Object creation notification	c3		
2	Object deletion notification	c3		
3	Attribute value change notification	c3		
4	Operations on managed objects	c4		

c3: if A.2/1a or A.2/2a then m else (if A.1/1a then o.2 else –).

c4: if A.2/3a or A.2/4a then m else (if A.2/1a or A.2/2a then o else (if A.1/1a then o.2 else –)).

NOTE - Manager role minimum conformance requires support for at least one of the items identified by this Table. Conditions c3 and c4 express both of these requirements.

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The supplier of the implementation shall specify support for management information in the agent role, in Table A.4.

Table A.4 – Agent role minimum conformance requirement

Index	Item	Status	Support	Table reference	Additional information
1	Object creation notification	c5			
2	Object deletion notification	c5			
3	Attribute value change notification	c5			
4	Object creation record managed object class	c6			
5	Object deletion record managed object class	c7			
6	Attribute value change record managed object class	c8			

c5: if A.2/1b or A.2/2b then m else (if A.1/2a then o.3 else –).

c6: if A.4/1a and A.5/1a then m else –.

c7: if A.4/2a and A.5/1a then m else –.

c8: if A.4/3a and A.5/1a then m else –.

NOTE – The Table reference column in this table is the notification or managed object class table reference of the MOCS supplied by the supplier of the managed object which claims to import the notification from this Recommendation | International Standard.

Table A.5 – Logging of event records

Index		Status	Support	Additional information
1	Does the implementation support logging of event records in agent role?	c9		

c9: if A.1/2a then o else –.

NOTE – Conformance to this Recommendation | International Standard does not require conformance to CCITT Rec. X.735 | ISO/IEC 10164-6.

The supplier of the implementation shall provide information on claims of conformance to any of the Recommendation | International Standards summarized Tables A.6 to A.9. For each Recommendation | International Standard that the supplier of the implementation claims conformance to, the corresponding conformance statement(s) shall be completed, or referenced by, the MCS. The supplier of the implementation shall complete the Support, Table numbers and Additional information columns.

In Tables A.6 to A.9, the Status column is used to indicate whether the supplier of the implementation is required to complete the referenced tables or referenced items. Conformance requirements are as specified in the referenced tables or referenced items and are not changed by the value of the MCS Status column. Similarly, the Support column is used by the supplier of the implementation to indicate completion of the referenced tables or referenced items.

NOTE – Conformance to the MAPDUs defined in this Recommendation | International Standard can be claimed by completing the corresponding tables in the MICS and MOCS annexes of the referenced Recommendations | International Standards.

Table A.6 – PICS support summary

Index	Identification of the document that includes the PICS proforma	Table numbers of PICS proforma	Description	Constraints and values	Status	Support	Table numbers of PICS	Additional information
1	CCITT Rec. X.730 | ISO/IEC, 10164-1	Annex E all tables	SM application context	OBJECT IDENTIFIER	m			

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Table A.7 – MOCS support summary

Index	Identification of the document that includes the MOCS proforma	Table numbers of MOCS proforma	Description	Constraints and values	Status	Support	Table numbers of MOCS	Additional information
1	CCITT Rec. X.730 | ISO/IEC 10164-1	Annex C all tables	objectCreation Record	–	c10			
2	CCITT Rec. X.730 | ISO/IEC 10164-1	Annex C all tables	objectDeletion Records	–	c11			
3	CCITT Rec. X.730 | ISO/IEC 10164-1	Annex C all tables	attributeValue Change Records	–	c12			
c10: if A.4/4a then m else –. c11: if A.4/5a then m else –. c12: if A.4/6a then m else –.								

Table A.8 – MRCS support summary

Index	Identification of the document that includes the MRCS proforma	Table numbers of PICS proforma	Description	Constraints and values	Status	Support	Table numbers of MRCS	Additional information
1	CCITT Rec. X.735 | ISO/IEC 10164-6	Item D.1/1	logRecord-log name binding	–	c13			
c13: if A.5/1a then o else –.								

Table A.9 – MICS support summary

Index	Identification of the document that includes the MICS proforma	Table numbers of MICS proforma	Description	Constraints and values	Status	Support	Table numbers of MICS	Additional information
1	CCITT Rec. X.730 | ISO/IEC 10164-1	Table B.1	notifications	–	c14			
2	CCITT Rec. X.730 | ISO/IEC 10164-1	Tables B.2 and B.3	management operations	–	c15			
c14: if A.3/1a or A.3/2a or A.3/3a then m else –. c15: if A.3/4a then m else –.								

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Annex B

MICS proforma[4)]

(This annex forms an integral part of this Recommendation | International Standard)

B.1 Introduction

The purpose of this MICS proforma is to provide a mechanism for a supplier of an implementation which claims conformance, in the manager role, to management information specified in this Recommendation | International Standard, to provide conformance information in a standard form.

B.2 Instructions for completing the MICS proforma to produce a MICS

The MICS proforma contained in this annex is comprised of information in tabular form, in accordance with ITU-T Rec. X.724 | ISO/IEC 10165-6. In addition to the general guidance given in ITU-T Rec. X.724 | ISO/IEC 10165-6, the Additional information column shall be used to identify the object classes for which the management operations are supported. The supplier of the implementation shall state which items are supported in tables below and if necessary, provide additional information.

B.3 Symbols, abbreviations and terms

The following abbreviations are used throughout the MICS proforma:

dmi-att joint-iso-ccitt ms(9) smi(3) part2(2) attribute(7)

dmi-not joint-iso-ccitt ms(9) smi(3) part2(2) notification(10)

The notations used for the Status and Support columns are specified in A.1.3.

B.4 Statement of conformance to the management information

B.4.1 Notifications

The specifier of a manager role implementation that claims to support the notifications specified in this Recommendation | International Standard shall import a copy of Table B.1 and complete it.

Table B.1 – Notification support

					Support		
Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Confirmed	Non-confirmed	Additional information
1	objectCreation	{dmi-not 6}	–	c1			
2	objectDeletion	{dmi-not 7}	–	c2			
3	attributeValueChange	{dmi-not 1}	–	c3			
c1: if A.3/1a then m else –. c2: if A.3/2a then m else –. c3: if A.3/3a then m else –.							

(continued)

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Table B.1 (*concluded*) – Notification support

Index	Sub-index	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	sourceIndicator	{dmi-att 26}	0 to 3	m		
	1.2	attributeList	{dmi-att 9}	–	m		
	1.3	notificationIdentifier	{dmi-att 16}	–	m		
	1.4	correlatedNotifications	{dmi-att 12}	–	m		
	1.4.1	correlatedNotifications	–	–	m		
	1.4.2	sourceObjectInst	–	–	m		
	1.4.2.1	distinguishedName	–	–	m		
	1.4.2.2	nonSpecificForm	–	–	m		
	1.4.2.3	localDistinguishedName	–	–	m		
	1.5	additionalText	{dmi-att 7}	–	m		
	1.6	additionalInformation	{dmi-att 6}	–	m		
2	2.1	sourceIndicator	{dmi-att 26}	0 to 3	m		
	2.2	attributeList	{dmi-att 9}	–	m		
	2.3	notificationIdentifier	{dmi-att 16}	–	m		
	2.4	correlatedNotifications	{dmi-att 12}	–	m		
	2.4.1	correlatedNotification	–	–	m		
	2.4.2	sourceObjectInst	–	–	m		
	2.4.2.1	distinguishedName	–	–	m		
	2.4.2.2	nonSpecificForm	–	–	m		
	2.4.2.3	localDistinguishedName	–	–	m		
	2.5	additionalText	{dmi-att 7}	–	m		
	2.6	additionalInformation	{dmi-att 6}	–	m		
3	3.1	sourceIndicator	{dmi-att 26}	0 to 3	m		
	3.2	attribute identifier list	{dmi-att 8}	–	m		
	3.3	attributeValueChange definition	{dmi-att 10}	–	m		
	3.3.1	attributeId	–	–	m		
	3.3.2	oldAttributeValue	–	–	m		
	3.3.3	newAttributeValue	–	–	m		
	3.4	notificationIdentifier	{dmi-att 16}	INTEGER	m		
	3.5	correlatedNotifications	{dmi-att 12}	–	m		
	3.4.1	correlatedNotification	–	–	m		
	3.4.2	sourceObjectInst	–	–	m		
	3.4.2.1	distinguishedName	–	–	m		
	3.4.2.2	nonSpecificForm	–	–	m		
	3.4.2.3	localDistinguishedName	–	–	m		
	3.6	additionalText	{dmi-att 7}	–	m		
	3.7	additionalInformation	{dmi-att 6}	–	m		

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B.4.2 Attributes

The specifier of a manager role implementation that claims to support the management operations on attributes specified in this Recommendation | International Standard shall import a copy of Table B.2 and complete it.

Table B.2 – Attribute support

				Set by Create		Get		Replace	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support	Status	Support
1	objectClass	{dmi-att 65}		–		o.4		–	
2	nameBinding	{dmi-att 63}		–		o.4		–	
3	packages	{dmi-att 66}		–		o.4		–	
4	allomorphs	{dmi-att 50}		–		o.4		–	
5	logRecordId	{dmi-att 3}		–		o.4		–	
6	loggingTime	{dmi-att 59}		–		o.4		–	
7	managedObjectClass	{dmi-att 60}		–		o.4		–	
8	managedObjectInstance	{dmi-att 61}		–		o.4		–	
9	eventType	{dmi-att 14}		–		o.4		–	
10	eventTime	{dmi-att 13}		–		o.4		–	
11	notificationIdentifier	{dmi-att 16}		–		o.4		–	
12	correlatedNotifications	{dmi-att 12}		–		o.4		–	
13	additionalText	{dmi-att 7}		–		o.4		–	
14	additionalInformation	{dmi-att 6}		–		o.4		–	
15	attributeValueChange Definition	{dmi-att 10}		–		o.4		–	
16	sourceIndicator	{dmi-att 26}		–		o.4		–	
17	attributeIdentifierList	{dmi-att 8}		–		o.4		–	
18	attributeList	{dmi-att 9}		–		o.4		–	

(continued)

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Table B.2 (*concluded*) – Attribute support

	Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Additional information
1	–		–		–		
2	–		–		–		
3	–		–		–		
4	–		–		–		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		–		
9	–		–		–		
10	–		–		–		
11	–		–		–		
12	–		–		–		
13	–		–		–		
14	–		–		–		
15	–		–		–		
16	–		–		–		
17	–		–		–		
18	–		–		–		

B.4.3 Create and delete management operations

The specifier of a manager role implementation that claims to support the create or delete management operations on managed objects specified in this Recommendation | International Standard shall import a copy of Table B.3 and complete it.

Table B.3 – Create and delete support

Index	Operation	Constraints and values	Status	Support	Additional information
1	Create support	–	x		
1.1	Create with reference object	–	–		
2	Delete support	objectcreationRecord, objectDeletionRecord, attributeValueChangeRecord managed objects	o.4		

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Annex C

MOCS proforma[5)]

(This annex forms an integral part of this Recommendation I International Standard)

C.1 Introduction

The purpose of this MOCS proforma is to provide a mechanism for a supplier of an implementation which claims to conform to a managed object class, to provide conformance information in a standard form.

C.2 Instructions for completing the MOCS proforma to produce a MOCS

The MOCS proforma contained in this annex is comprised of information in tabular form, in accordance with ITU-T Rec. X.724 I ISO/IEC 10165-6. The supplier of the implementation shall state which items are supported in tables below and if necessary provide additional information.

C.3 Symbols, abbreviations and terms

The following abbreviations are used throughout the proformas:

dmi-att	joint-iso-ccitt ms(9) smi(3) part2(2) attribute(7)
dmi-moc	joint-iso-ccitt ms(9) smi(3) part2(2) managedObjectClass(3)
dmi-not	joint-iso-ccitt ms(9) smi(3) part2(2) notification(10)
dmi-pkg	joint-iso-ccitt ms(9) smi(3) part2(2) package(4)

The notations used in the Status and Support columns are specified in A.1.3.

The following requirement is commonly used throughout this MOCS proforma:

c1:	if C.3/3a or C.3/6a or C.3/7a or C.3/8a or C.3/9a or C.3/ 10a or C.3/12a or C.3/13a then m else –.
c2:	if C.1/1b then – else m.
c10:	if C.7/3a or C.7/6a or C.7/7a or C.7/8a or C.7/9a or C.7/ 10a or C.7/12a or C.7/13a then m else –.
c11:	if C.5/1b then – else m .
c19:	if C.11/3a or C.11/6a or C.11/7a or C.11/8a or C.11/9a or C.11/ 10a or C.11/12a or C.11/13a then m else –.
c20:	if C.9/1b then – else m.

C.4 Object creation record managed object class

C.4.1 Statement of conformance to the managed object class

See Table C.1.

Table C.1 – Managed object class support

Index	Managed object class template label	Value of object identifier for class	Support of all mandatory features? (Y/N)	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
1	objectCreationRecord	{dmi-moc 8}		

5) Users of this Recommendation I International Standard may freely reproduce the MOCS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed MOCS. Instructions for completing the MOCS proforma are specified in ITU-T Rec. X.724 I ISO/IEC 10165-6.

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If the answer to the actual class question in the managed object class support table is "N", the supplier of the implementation shall supply the actual class support details, in Table C.2.

Table C.2 – Actual class support

Index	Actual managed object class template label	Value of object identifier for managed object class	Additional information
1			

C.4.2 Packages

See Table C.3.

Table C.3 – Object creation record packages

Index	Package template lable	Value of object identifier for package	Constraints and values	Status	Support	Additional information
1	topPackage	–	–	m		
2	packagesPackage	{dmi-pkg 16}	–	c1		
3	allomorphicPackage	{dmi-pkg 17}	–	c2		
4	logRecordPackage	–	–	m		
5	eventLogRecordPackage	–	–	m		
6	eventTimePackage	{dmi-pkg 11}	–	o		
7	notificationIdentifierPackage	{dmi-pkg 24}	–	o		
8	correlatedNotificationPackage	{dmi-pkg 23}	–	o		
9	additionalTextPackage	{dmi-pkg 19}	–	o		
10	additionalInformationPackage	{dmi-pkg 18}	–	o		
11	objectCreationRecordPackage[6)]	–	–	m		
12	sourceIndicatorPackage	{dmi-pkg 28}	–	o		
13	attributeListPackage	{dmi-pkg 21}	–	o		

6) This package has no attributes.

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C.4.3 Attributes

See Table C.4.

Table C.4 – Object creation attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Set by Create		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	objectClass	{dmi-att 65}	–	x		m		x	
2	nameBinding	{dmi-att 63}	–	x		m		x	
3	packages	{dmi-att 66}	–	x		c1		x	
4	allomorphs	{dmi-att 50}	–	x		c2		x	
5	logRecordId	{dmi-att 3}	–	x		m		x	
6	loggingTime	{dmi-att 59}	–	x		m		x	
7	managedObjectClass	{dmi-att 60}	–	x		m		x	
8	managedObjectInstance	{dmi-att 61}	–	x		m		x	
9	eventType	{dmi-att 14}	–	x		m		x	
10	eventTime	{dmi-att 13}	–	x		c3		x	
11	notificationIdentifier	{dmi-att 16}	–	x		c4		x	
12	correlatedNotifications	{dmi-att 12}	–	x		c5		x	
13	additionalText	{dmi-att 7}	–	x		c6		x	
14	additionalInformation	{dmi-att 6}	–	x		c7		x	
15	sourceIndicator	{dmi-att 26}	–	x		c8		x	
16	attributeList	{dmi-att 9}	–	x		c9		x	

c3: if C.3/6a then m else –.
c4: if C.3/7a then m else –.
c5: if C.3/8a then m else –.
c6: if C.3/9a then m else –.
c7: if C.3/10a then m else –.
c8: if C.3/12a then m else –.
c9: if C.3/13a then m else –.

Table C.4 (*concluded*) – Object creation attribute support

Index	Add		Remove		Set to default		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		–		
4	x		x		–		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		–		
9	–		–		–		
10	–		–		–		
11	–		–		–		
12	x		x		–		
13	–		–		–		
14	x		x		–		
15	–		–		–		
16	x		x		–		

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C.5 Object deletion record managed object class

C.5.1 Statement of conformance to the managed object class

See Table C.5.

Table C.5 – Managed object class support

Index	Managed object class template label	Value of object identifier for class	Support of all mandatory features? (Y/N)	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
1	objectDeletionRecord	{dmi-moc 9}		

If the answer to the actual class question in the managed object class support table is "N", the supplier of the implementation shall supply the actual class support details, in Table C.6.

Table C.6 – Actual class support

Index	Actual managed object class template label	Value of object identifier for managed object class	Additional information
1			

C.5.2 Object deletion record packages

See Table C.7.

Table C.7 – Object deletion record packages

Index	Package name	Value of object identifier for package	Constraints and values	Status	Support	Additional information
1	topPackage	–	–	m		
2	packagesPackage	{dmi-pkg 16}	–	c10		
3	allomorphicPackage	{dmi-pkg 17}	–	c11		
4	logRecordPackage	–	–	m		
5	eventLogRecordPackage	–	–	m		
6	eventTimePackage	{dmi-pkg 11}	–	o		
7	notificationIdentifierPackage	{dmi-pkg 24}	–	o		
8	correlatedNotificationPackage	{dmi-pkg 23}	–	o		
9	additionalTextPackage	{dmi-pkg 19}	–	o		
10	additionalInformationPackage	{dmi-pkg 18}	–	o		
11	objectDeletionRecordPackage[7)]	–	–	m		
12	sourceIndicatorPackage	{dmi-pkg 28}	–	o		
13	attributeListPackage	{dmi-pkg 21}	–	o		

7) This package has no attributes.

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C.5.3 Attributes

See Table C.8.

Table C.8 – Object deletion record attribute support

				Set by Create		Get		Replace	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support	Status	Support
1	objectClass	{dmi-att 65}	–	x		m		x	
2	name Bnding	{dmi-att 63}	–	x		m		x	
3	packages	{dmi-att 66}	–	x		c10		x	
4	allomorphs	{dmi-att 50}	–	x		c11		x	
5	logRecordId	{dmi-att 3}	–	x		m		x	
6	loggingTime	{dmi-att 59}	–	x		m		x	
7	managedObjectClass	{dmi-att 60}	–	x		m		x	
8	managedObjectInstance	{dmi-att 61}	–	x		m		x	
9	eventType	{dmi-att 14}	–	x		m		x	
10	eventTime	{dmi-att 13}	–	x		c12		x	
11	notificationIdentifier	{dmi-att 16}	–	x		c13		x	
12	correlatedNotifications	{dmi-att 12}	–	x		c14		x	
13	additionalText	{dmi-att 7}	–	x		c15		x	
14	additionalInformation	{dmi-att 6}	–	x		c16		x	
15	sourceIndicator	{dmi-att 26}	–	x		c17		x	
16	attributeList	{dmi-att 9}	–	x		c18		x	

c12: if C.7/6a then m else–.
c13: if C.7/7a then m else –.
c14: if C.7/8a then m else –.
c15: if C.7/9a then m else –.
c16: if C.7/10a then m else –.
c17: if C.7/12a then m else –.
c18: if C.7/13a then m else–.

(continued)

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Table C.8 (*concluded*) – Object deletion record attribute support

	Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Additional information
1	–		–		–		
2	–		–		–		
3	x		x		–		
4	x		x		–		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		–		
9	–		–		–		
10	–		–		–		
11	–		–		–		
12	x		x		–		
13	–		–		–		
14	x		x		–		
15	–		–		–		
16	x		x		–		

C.6 Attribute value change record managed object class

C.6.1 Statement of conformance to the managed object class

See Table C.9.

Table C.9 – Managed object class support

Index	Managed object class template label	Value of object identifier for class	Support of all mandatory features? (Y/N)	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
1	attributeValueChangeRecord	{dmi-moc 2}		

If the answer to the actual class question in the managed object class support table is "N", the supplier of the implementation shall supply the actual class support details, in Table C.10.

Table C.10 – Actual class support

Index	Actual managed object class template label	Value of object identifier for managed object class	Additional information
1			

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C.6.2 Attribute value change record packages

See Table C.11.

Table C.11 – Attribute value change record packages

Index	Package name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–	–	m		
2	packagesPackage	{dmi-pkg 16}	–	c19		
3	allomorphicPackage	{dmi-pkg 17}	–	c20		
4	logRecordPackage	–	–	m		
5	eventLogRecordPackage	–	–	m		
6	eventTimePackage	{dmi-pkg 11}	–	o		
7	notificationIdentifierPackage	{dmi-pkg 24}	–	o		
8	correlatedNotificationPackage	{dmi-pkg 23}	–	o		
9	additionalTextPackage	{dmi-pkg 19}	–	o		
10	additionalInformationPackage	{dmi-pkg 18}	–	o		
11	attributeValueChangeRecordPackage	–	–	m		
12	sourceIndicatorPackage	{dmi-pkg 28}	–	o		
13	attributeIdentifierListPackage	{dmi-pkg 20}	–	o		

C.6.3 Attributes

See Table C.12.

Table C.12 – Attribute value change record attribute support

				Set by Create		Get		Replace	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support	Status	Support
1	objectClass	{dmi-att 65}	–	x		m		x	
2	nameBinding	{dmi-att 63}	–	x		m		x	
3	packages	{dmi-att 66}	–	x		c19		x	
4	allomorphs	{dmi-att 50}	–	x		c20		x	
5	logRecordId	{dmi-att 3}	–	x		m		x	
6	loggingTime	{dmi-att 59}	–	x		m		x	
7	managedObjectClass	{dmi-att 60}	–	x		m		x	
8	managedObjectInstance	{dmi-att 61}	–	x		m		x	
9	eventType	{dmi-att 14}	–	x		m		x	
10	eventTime	{dmi-att 13}	–	x		c21		x	
11	notificationIdentifier	{dmi-att 16}	–	x		c22		x	
12	correlatedNotifications	{dmi-att 12}	–	x		c23		x	
13	additionalText	{dmi-att 7}	–	x		c24		x	
14	additionalInformation	{dmi-att 6}	–	x		c25		x	
15	attributeValueChange Definition	{dmi-att 10}	–	x		m		x	
16	sourceIndicator	{dmi-att 26}	–	x		c26		x	
17	attributeIdentifierList	{dmi-att 8}	–	x		c27		x	

c21: iIf C.11/6a then m else –.
c22: if C.11/7a then m else –.
c23: if C.11/8a then m else –.
c24: if C.11/9a then m else –.
c25: if C.11/10a then m else –.
c26: if C.11/12a then m else –.
c27: if C.11/13a then m else –.

(continued)

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Table C.12 (*concluded*) – Attribute value change record attribute support

	Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Additional information
1	–		–		–		
2	–		–		–		
3	x		x		–		
4	x		x		–		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		–		
9	–		–		–		
10	–		–		–		
11	–		–		–		
12	x		x		–		
13	–		–		–		
14	x		x		–		
15	x		x		–		
16	–		–		–		
17	x		x		–		

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Annex D

MIDS (notification) proforma[8)]

(This annex forms an integral part of this Recommendation I International Standard)

D.1 Symbols, abbreviations and terms

The following abbreviations are used throughout the proformas:

dmi-att joint-iso-ccitt ms(9) smi(3) part2(2) attribute(7)

dmi-not joint-iso-ccitt ms(9) smi(3) part2(2) notification(10)

The notations used in the Status and Support columns are specified in A.1.3.

D.2 Notifications

The specifier of a managed object class that claims to support the notifications specified by CCITT Rec. X.730 I ISO/IEC 10164-1 shall import a copy of Table D.1 and complete it according to the instructions specified in ITU-T Rec. X.724 I ISO/IEC 10165-6.

Table D.1 – Notification support

					Support		
Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Confirmed	Non-confirmed	Additional information
1	objectCreation	{dmi-not 6}	–				
2	objectDeletion	{dmi-not 7}	–				
3	attributeValueChange	{dmi-not 1}	–				

(continued)

8) Users of this Recommendation I International Standard may freely reproduce the MIDS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed MIDS. Instructions for completing the MIDS proforma are specified in ITU-T Rec. X.724 I ISO/IEC 10165-6.

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Table D.1 (*concluded*) – Notification support

Index	Sub-index	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	sourceIndicator	{dmi-att 26}	0 to 3	o		
	1.2	attributeList	{dmi-att 9}	–	o		
	1.3	notificationIdentifier	{dmi-att 16}	INTEGER	c1		
	1.4	correlatedNotifications	{dmi-att 12}	–	o		
	1.4.1	correlatedNotifications	–	–	c:m		
	1.4.2	sourceObjectInst	–	–	c:o		
	1.4.2.1	distinguishedName	–	–	c:o.5		
	1.4.2.2	nonSpecificForm	–	–	c:o.5		
	1.4.2.3	localDistinguishedName	–	–	c:o.5		
	1.5	additionalText	{dmi-att 7}	–	o		
	1.6	additionalInformation	{dmi-att 6}	–	o		
2	2.1	sourceIndicator	{dmi-att 26}	0 to 3	o		
	2.2	attributeList	{dmi-att 9}	–	o		
	2.3	notificationIdentifier	{dmi-att 16}	INTEGER	c2		
	2.4	correlatedNotifications	{dmi-att 12}	–	o		
	2.4.1	correlatedNotification	–	–	c:m		
	2.4.2	sourceObjectInst	–	–	c:o		
	2.4.2.1	distinguishedName	–	–	c:o.6		
	2.4.2.2	nonSpecificForm	–	–	c:o.6		
	2.4.2.3	localDistinguishedName	–	–	c:o.6		
	2.5	additionalText	{dmi-att 7}	–	o		
	2.6	additionalInformation	{dmi-att 6}	–	o		
3	3.1	sourceIndicator	{dmi-att 26}	0 to 3	o		
	3.2	attribute identifier list	{dmi-att 8}	–	o		
	3.3	attributeValueChange definition	{dmi-att 10}	–	m		
	3.3.1	attributeId	–	–	m		
	3.3.2	oldAttributeValue	–	–	o		
	3.3.3	newAttributeValue	–	–	m		
	3.4	notificationIdentifier	{dmi-att 16}	INTEGER	c3		
	3.5	correlatedNotifications	{dmi-att 12}	–	o		
	3.4.1	correlatedNotification	–	–	c:m		
	3.4.2	sourceObjectInst	–	–	c:o		
	3.4.2.1	distinguishedName	–	–	c:o.7		
	3.4.2.2	nonSpecificForm	–	–	c:o.7		
	3.4.2.3	localDistinguishedName	–	–	c:o.7		
	3.6	additionalText	{dmi-att 7}	–	o		
	3.7	additionalInformation	{dmi-att 6}	–	o		i

c1: if D.1/1.4a then m else o.

c2: if D.1/2.4a then m else o.

c2: if D.1/3.5a then m else o.

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Annex E

Systems Management Application Context PICS proforma[9)]

(This annex forms an integral part of this Recommendation | International Standard)

E.1 Symbols, abbreviations and terms

The PICS proforma contained in this annex is comprised of information in a tabular form in accordance with the guidelines presented in CCITT Rec. X.291 | ISO/IEC 9646-2.

The notations used in the Status and Support columns are specified in A.1.3.

The following requirement is commonly used throughout this MOCS proforma:

c1: if E.2/1a then m else o.

E.2 Application context

The systems management application context is defined in Annex A of CCITT Rec. X.701 | ISO/IEC 10040. A conforming implementation shall be able to request and/or accept the systems management application context.

The PICS tables corresponding to the systems management application context are specified in this annex and shall be referenced by any PICS of any standard that supports the systems management application context.

Table E.1 – Systems management application context

Index	Application context identifier	Sending		Receiving	
		Status	Support	Status	Support
1	systems management application context {joint-iso-ccitt ms(9) smo(0) application-context(0) systems-management(2)}	o.8		o.8	

E.3 Functional unit negotiation mechanism

The negotiation of functional unit is optional. If functional unit negotiation is supported the supplier shall use Table E.2 to indicate support. The rules for negotiating functional units are described in CCITT Rec. X.701 | ISO/IEC 10040.

The parameters are carried by an EXTERNAL in the "user information" field of AARQ and AARE APDUs.

Table E.2 – SMFU negotiation support

Index	Negotiation capability	Status	Support	Additional information
1	Does the implementation support the negotiation of the systems management functional unit?	o		

If support for SMFU negotiation is claimed, then the supplier of the implementation shall state whether or not each parameter of SMASEUserData is supported in Tables E.3 to E.6.

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Table E.3 – SMASEUserData parameters carried by AARQ APDU-Sending

Index	Parameter name	Status	Support	Additional information
1	SMASEUserData	c1		
1.1	smfuPackages	c:o		
1.1.1	functionalUnitPackageId	c:m		
1.1.2	managerRoleFunctionalUnit	c:o.9		
1.1.3	agentRoleFunctionalUnit	c:o.9		
1.2	reason	–		
1.3	systemsManagementUserInformation[10)]	c:o		

Table E.4 – SMASEUserData parameters carried by AARE APDU-Sending

Index	Parameter name	Status	Support	Additional information
1	SMASEUserData	c1		
1.1	smfuPackages	c:o		
1.1.1	functionalUnitPackageId	c:m		
1.1.2	managerRoleFunctionalUnit	c:o.10		
1.1.3	agentRoleFunctionalUnit	c:o.10		
1.2	reason	c:o		
1.3	systemsManagementUserInformation[10)]	c:o		

Table E.5 – SMASEUserData parameters carried by AARQ APDU-Receiving

Index	Parameter name	Status	Support	Additional information
1	SMASEUserData	m		
1.1	smfuPackages	m		
1.1.1	functionalUnitPackageId	m		
1.1.2	managerRoleFunctionalUnit	m		
1.1.3	agentRoleFunctionalUnit	m		
1.2	reason	–		
1.3	systemsManagementUserInformation[10)]	m		

Table E.6 – SMASEUserData parameters carried by AARE APDU-Receiving

Index	Parameter name	Status	Support	Additional information
1	SMASEUserData	m		
1.1	smfuPackages	m		
1.1.1	functionalUnitPackageId	m		
1.1.2	managerRoleFunctionalUnit	m		
1.1.3	agentRoleFunctionalUnit	m		
1.2	reason	m		
1.3	systemsManagementUserInformation[10)]	m		

[10)] This parameter is provided solely for the convenience of the implementation needing to distinguish between different implementation environments, it shall not be subject to conformance testing.

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ICS 35.100.70

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INTERNATIONAL STANDARD

ISO/IEC 10164-1

First edition
1993-06-15

Information technology — Open Systems Interconnection — Systems Management: Object Management Function

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Gestion-systèmes: Fonction de gestion d'objets

Reference number
ISO/IEC 10164-1:1993(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 10164-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in collaboration with the CCITT. The identical text is published as CCITT Recommendation X.730.

ISO/IEC 10164 consists of the following parts, under the general title *Information technology – Open Systems Interconnection – Systems Management*:

- *Part 1 : Object Management Function*
- *Part 2 : State Management Function*
- *Part 3 : Attributes for representing relationships*
- *Part 4 : Alarm reporting function*
- *Part 5 : Event report management function*
- *Part 6: Log control function*
- *Part 7: Security alarm reporting function*
- *Part 8: Security audit trail function*
- *Part 9: Objects and attributes for access control*
- *Part 10: Accounting meter function*
- *Part 11: Workload monitoring function*
- *Part 12: Test management function*
- *Part 13: Summarization function*
- *Part 14: Confidence and diagnostic test categories*

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Introduction

ISO/IEC 10164 is a multipart Standard developed according to ISO 7498 and ISO/IEC 7498-4. ISO/IEC 10164 is related to the following International Standards:

ISO/IEC 9595:1990, *Information technology – Open Systems Interconnection – Common management information service definition*;

ISO/IEC 9596:1990, *Information technology – Open Systems Interconnection – Common management information protocol*;

ISO/IEC 10040:1992, *Information technology – Open Systems Interconnection – Systems management overview*;

ISO/IEC 10165:1992, *Information technology – Open Systems Interconnection – Structure of management information.*

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INTERNATIONAL STANDARD

CCITT RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – SYSTEMS MANAGEMENT: OBJECT MANAGEMENT FUNCTION

1 Scope

This Recommendation | International Standard defines a systems management function which may be used by an application process in a centralized or decentralized management environment to interact for the purposes of systems management, as defined by CCITT Rec. X.700 | ISO/IEC 7498-4. This Recommendation | International Standard defines the object management function that consists of services, functional units, and generic definitions. It is positioned in the application layer of CCITT Rec. X.200 | ISO 7498 and is defined according to the model provided by ISO/IEC 9545. The role of systems management functions are described by CCITT Rec. X.701 | ISO/IEC 10040.

This Recommendation | International Standard

- establishes user requirements for the object management function;
- establishes a model that relates the services and generic definitions provided by this function to user requirements;
- defines the services provided by the function;
- defines generic notification types and parameters documented in accordance with CCITT Rec. X.722 | ISO/IEC 10165-4;
- specifies the protocol that is necessary in order to provide the services;
- defines the relationship between these services and management operations and notifications;
- specifies compliance requirements placed on other Standards that make use of these generic definitions;
- defines relationships with other systems management functions;
- specifies conformance requirements.

This Recommendation | International Standard does not

- define the nature of any implementation intended to provide the object management function;
- specify the manner in which management is accomplished by the user of the object management function;
- define the nature of any interactions which result in the use of the object management function;
- specify the services necessary for the establishment, normal and abnormal release of a management association;
- preclude the definition of further notification types;
- define managed objects.

2 Normative references

The following CCITT Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. 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 Recommendation | International Standard 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 CCITT Secretariat maintains a list of the currently valid CCITT Recommendations.

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2.1 Identical Recommendations | International Standards

- CCITT Recommendation X.701 (1992) | ISO/IEC 10040:1992, *Information technology – Open Systems Interconnection – Systems managemet overview.*
- CCITT Recommendation X.720 (1992) | ISO/IEC 10165-1:1993, *Information technology – Open Systems Interconnection – Structure of management information: Management information model.*
- CCITT Recommendation X.721 (1992) | ISO/IEC 10165-2:1992, *Information technology – Open Systems Interconnection - Structure of management information: Definition of management information.*
- CCITT Recommendation X.722 (1992) | ISO/IEC 10165-4:1992, *Information technology – Open Systems Interconnection – Structure of management information: Guidelines for the definition of managed objects.*
- CCITT Recommendation X.733 (1992) | ISO/IEC 10164-4:1992, *Information technology – Open Systems Interconnection – Systems Management: Alarm reporting function.*
- CCITT Recommendation X.734 (1992) | ISO/IEC 10164-5:1993, *Information technology – Open Systems Interconnection – Systems Management: Event report management function.*
- CCITT Recommendation X.735 (1992) | ISO/IEC 10164-6:1993, *Information technology – Open Systems Interconnection – Systems Management: Log control function.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.200 (1988), *Reference Model of Open Systems Interconnection for CCITT Applications.*

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

- CCITT Recommendation X.209 (1988), *Specification of basic encoding rules for 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).

- CCITT Recommendation X.210 (1988), *Open Systems Interconnection. Layer Service Definition Conventions.*

  ISO/TR 8509:1987, Information processing systems – Open Systems Interconnection – Service conventions.

- CCITT Recommendation X.290 (1992), *OSI conformance testing methodology and framework for protocol Recommendations for CCITT applications – General concepts.*

  ISO/IEC 9646-1:1991, Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts.

- CCITT Recommendation X.700 (1992), *Management Framework Definition for Open Systems Interconnection (OSI) for CCITT Applications.*

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

- CCITT Recommendation X.710 (1991), *Common Management Information Service Definition for CCITT applications.*

  ISO/IEC 9595:1991, Information technology – Open Systems Interconnection – Common management information service definition.

2.3 Additional references

- ISO/IEC 9545:1989, *Information technology – Open Systems Interconnection – Application layer structure.*

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3 Definitions

For the purposes of this Recommendation | International Standard, the following definitions apply.

3.1 Basic reference model definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.200 | ISO 7498:

a) open system;

b) systems management;

c) layer management.

d) OSI environment;

3.2 Management framework definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.700 | ISO/IEC 7498-4:

managed object

3.3 CMIS definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.710 | ISO/IEC 9595:

attribute

3.4 Systems management overview definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.701 | ISO/IEC 10040:

a) agent;

b) agent role;

c) dependent conformance;

d) general conformance;

e) generic definitions;

f) managed object class;

g) manager;

h) manager role;

i) notification;

j) systems management functional unit;

k) systems management function;

l) systems management application protocol;

m) (systems management) operation.

3.5 Management information model definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.720 | ISO/IEC 10165-1:

managed object boundary

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3.6 Service conventions definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.210 | ISO/TR 8509:

a) confirm (primitive);

b) confirmed-service;

c) indication (primitive);

d) non-confirmed-service;

e) request (primitive);

f) response (primitive);

g) service-user;

h) service-provider.

3.7 OSI conformance testing definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.290 | ISO/IEC 9646-1:

system conformance statement

4 Abbreviations

ASN.1	Abstract Syntax Notation One
CMIS	Common Management Information service
Conf	Confirmation
Ind	Indication
MAPDU	Management application protocol data unit
OSI	Open systems interconnection
Req	Request
Rsp	Response
SMAPM	Systems management application protocol machine
SMI	Structure of management information

5 Conventions

This Recommendation | International Standard defines services for the object management function following the descriptive conventions defined in CCITT Rec. X.210 | ISO/TR 8509. In clause 9, the definition of each service includes a table that lists the service parameters. For a given service primitive, the presence of each parameter is described by one of the following values.

M the parameter is mandatory;

(=) the value of the parameter is equal to the value of the parameter in the column to the left;

U the use of the parameter is a Service-user option;

– the parameter is not present in the interaction described by the primitive concerned;

C the parameter is conditional;

P the parameter is subject to the constraints imposed by CCITT Rec. X.710 | ISO/IEC 9595.

NOTE – The parameters that are marked "P" in service tables of this Recommendation | International Standard are mapped directly onto the corresponding parameters of the CMIS service primitive, without changing the semantics or syntax of the parameters. The remaining parameters are used to construct an MAPDU.

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6 Requirements

The MIS-User needs the ability to

- create and delete managed objects;
- examine and modify the value of attributes of managed objects;
- be made aware of changes in the configuration of managed objects.

7 Model

7.1 Introduction

Each resource that is subject to systems management is represented by a managed object. These are described in CCITT Rec. X.720 | ISO/IEC 10165-1.

Managed objects can be created and deleted, and values of attributes of managed objects can be changed, in one or more of three distinct ways

- through configuration processes in the local system environment that are outside the scope of OSI;
- through the (N)-layer operation and/or the layer management of an open system, as described in those (N)-layer standards;
- through the OSI systems management services.

Object management describes services for

- the reporting of creation and deletion of managed objects;
- the reporting of changes to attribute values of managed objects.

Object management describes pass-through services for

- the creation and deletion of managed objects;
- performing actions upon managed objects;
- attribute changing;
- attribute reading;
- event reporting.

7.2 Pass-through services

Where different parts of systems management functions define operations or notifications, then they do so independently of their mapping onto an underlying communications service. This enables this Recommendation | International Standard to be used across a range of underlying communications services by other systems management functions or managed objects. When a systems management function defines specific systems management services, then these services shall map directly onto the CMIS services.

In order to achieve this objective it is necessary for one of the systems management Recommendations | International Standards to detail the mapping between the operations and notifications that apply across a managed object boundary and the underlying communications services. This Recommendation | International Standard is used to document such mapping.

Currently, only the mapping onto CMIS are defined by this Recommendation | International Standard through the use of pass-through services.

Except where this Recommendation | International Standard describes specific services, the management operations and notifications that apply across a managed object boundary shall map onto the pass-through services of this Recommendation | International Standard as shown in Table 1.

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The management operations are described in CCITT Rec. X.720 | ISO/IEC 10165-1.

Table 1 – Mapping of pass-through services

SMI	Pass-through
Create	PT-CREATE
Delete	PT-DELETE
Action	PT-ACTION
Replace	PT-SET
Add	PT-SET
Remove	PT-SET
Replace-with-Default	PT-SET
Get	PT-GET
Notification	PT-EVENT-REPORT

8 Generic definitions

The set of generic notifications, parameters and semantics defined by this Recommendation | International Standard provide the detail for the following general parameters of the M-EVENT-REPORT service as defined by CCITT Rec. X.710 | ISO/IEC 9595:

- event type;
- event information;
- event reply.

All notifications are potential entries in a systems management log and this Recommendation | International Standard defines three managed object classes for this purpose. CCITT Rec. X.721 | ISO/IEC 10165-2 defines a generic event log record object class from which all entries are derived, the additional information being specified by the event information and event reply parameters.

8.1 Event type

This parameter defines the type of the event. The following three event types are defined in this Recommendation | International Standard:

- object creation: An indication that a managed object instance has been created. Where a managed object class is required to report the creation of a managed object instance, then that managed object class shall import the object creation notification type. The creation of a managed object within an open system can be as a result of a PT-CREATE service, or a local operation within the open system;
- object deletion: An indication that a managed object instance has been deleted. Where a managed object class is required to report the deletion of a managed object instance, then that managed object class shall import the object deletion notification type. The deletion of a managed object within an open system can be as a result of a PT-DELETE service, or a local operation within the open system;
- attribute value change: An indication that the attribute value(s) of a managed object has changed. This notification type is used to report one or more of the following:
  a) the addition of one or more new members to one or more set-valued attributes;
  b) the removal of one or more members from one or more set-valued attributes;

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c) the replacement of the value of one or more attributes;

d) the changing of the value of one or more attributes to their default value(s);

through either the internal operation of the resource or via management operation. This notification type shall not be used for conveying attribute value changes which have specific notification types already defined.

It is the role of the managed object class definer to fully detail the requirements that a managed object class has for generating one or more of the above notification types. For the attribute value change notification, this includes identifying which attributes, and which value changes to those attributes, are significant enough to warrant the notification being emitted.

8.2 Event information

The following parameters constitute the notification specific event information.

8.2.1 Object creation notification parameters

The following parameters are defined for the object creation notification.

8.2.1.1 Source Indicator

This parameter, when present, indicates the source of the operation that led to the generation of this notification type. It can have one of the following values:

- resource operation: The notification was generated in response to a creation effected through the internal operation of the resource;
- management operation: The notification was generated in response to a creation effected through an SMI management operation applied across the managed object boundary external to the managed object;
- unknown: It is not possible to determine the source of the operation.

8.2.1.2 Attribute list

This parameter, when present, contains a list of attributes and their values at the time the managed object was created. The managed object class definition may specify which attributes are to be included in the list. If the attribute list is not specified by the managed object class definition and the parameter is present in the notification, then all the attributes of the created managed object shall be included in the list.

8.2.1.3 Other information

The following parameters are also utilised. These parameters are defined by CCITT Rec. X.733 | ISO/IEC 10164-4:

- Additional information;
- Additional text;
- Correlated notifications;
- Notification identifier.

8.2.2 Object deletion notification parameters

The following parameters are defined for the object deletion notification.

8.2.2.1 Source Indicator

This parameter, when present, indicates the source of the operation that led to the generation of this notification type. It can have one of the following values:

- resource operation: The notification was generated in response to a deletion effected through the internal operation of the resource;
- management operation: The notification was generated in response to a deletion effected through an SMI management operation applied across the managed object boundary external to the managed object;
- unknown: It is not possible to determine the source of the operation.

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8.2.2.2 Attribute list

This parameter, when present, contains a list of attributes and their values just before the managed object was deleted. The managed object class definition may specify which attributes are to be included in the list. If this is not specified by the managed object class definition and the parameter is present in the notification, then all the attributes of the managed object shall be included in the list.

8.2.2.3 Other information

The following parameters are also utilised. These parameters are defined by CCITT Rec. X.733 | ISO/IEC 10164-4:

- Additional information;
- Additional text;
- Correlated notifications;
- Notification identifier.

8.2.3 Attribute value change notification parameters

The following parameters are defined for attribute value change notification.

8.2.3.1 Source indicator

This parameter, when present, indicates the source of the operation that led to the generation of this notification type. It can have one of the following values:

- resource operation: The notification was generated in response to an attribute value change effected through the internal operation of the resource;
- management operation: The notification was generated in response to a an attribute value change effected through an SMI management operation applied across the managed object boundary external to the managed object;
- unknown: It is not possible to determine the source of the operation.

8.2.3.2 Attribute identifier list

This parameter, when present, identifies the set of attributes whose value changes are being reported.

8.2.3.3 Attribute value change definition

This parameter set consists of a set of sequences of the three parameters: Attribute identifier, Old attribute value and New attribute value described below. Each individual sequence describes a single attribute value change. At least one new attribute value shall be present in this list.

8.2.3.3.1 Attribute identifier

This parameter identifies the attribute whose value change is being reported.

8.2.3.3.2 Old attribute value

This parameter, when present, identifies the old value of the attribute.

8.2.3.3.3 New attribute value

This parameter identifies the current value of the attribute.

8.2.3.4 Other information

The following parameters are also utilised. These parameters are defined by CCITT Rec. X.733 | ISO/IEC 10164-4:

- Additional information;
- Additional text;
- Correlated notifications;
- Notification identifier.

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8.3 Event reply

This Recommendation | International Standard does not specify information to be used in the event reply parameter.

8.4 Managed objects

8.4.1 Object creation record

An object creation record is a managed object class derived from the event log record object class defined in CCITT Rec. X.735 | ISO/IEC 10164-6. The object creation record object class represents information stored in logs resulting from object creation notification.

8.4.2 Object deletion record

An object deletion record is a managed object class derived from the event log record object class defined in CCITT Rec. X.735 | ISO/IEC 10164-6. The object deletion record object class represents information stored in logs resulting from object deletion notification.

8.4.3 Attribute value change record

An attribute value change record is a managed object class derived from the event log record object class defined in CCITT Rec. X.735 | ISO/IEC 10164-6. The attribute value change record object class represents information stored in logs resulting from attribute value change notification.

8.5 Compliance

Managed object class definitions support the function defined in this Recommendation | International Standard by incorporating the specification of the notification types defined in this Recommendation | International Standard through reference to the notification templates defined in CCITT Rec. X.721 | ISO/IEC 10165-2. The reference mechanism is defined in CCITT Rec. X.722 | ISO/IEC 10165-4.

The definition of the managed object class shall, for each imported notification, specify in the behaviour clause which of the optional and conditional parameters are to be utilized and any further restrictions on their use and their values. It is permissible to state that the use of a parameter remains optional.

9 Service definition

9.1 Introduction

This Recommendation | International Standard provides nine services, six of which are pass-through services. These are identified below together with the parameters that these services convey.

9.2 Object creation reporting service

This service allows an MIS-User, in the agent role, to report the creation of managed objects. It is defined both as a confirmed and as a non-confirmed service.

The object creation reporting service uses the parameters defined in clause 8 of this Recommendation | International Standard in addition to the general M-EVENT-REPORT service parameters defined in CCITT Rec. X.710 | ISO/IEC 9595.

Table 2 lists the parameters for the object creation reporting service.

The Event time, Correlated notifications and Notification identifier parameters may be assigned by the object emitting the notification or by the managed system.

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Table 2 – Object creation reporting parameters

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Mode	P	–
Managed object class	P	P
Managed object instance	P	P
Event type	M	C(=)
Event time	P	–
Event information		
Source indicator	U	–
Attribute list	U	–
Notification identifier	U	–
Correlated notifications	U	–
Additional text	U	–
Additional information	U	–
Current time	–	P
Event reply	–	–
Errors	–	P

9.3 Object deletion reporting service

This service allows an MIS-User, in the agent role, to report the deletion of managed objects. It is defined both as a confirmed and as a non-confirmed service.

The object deletion reporting service uses the parameters defined in clause 8 of this Recommendation | International Standard in addition to the general M-EVENT-REPORT service parameters defined in CCITT Rec. X.710 | ISO/IEC 9595.

Table 3 lists the parameters for the object deletion reporting service.

The Event time, Correlated notifications and Notification identifier parameters may be assigned by the object emitting the notification or by the managed system.

9.4 Attribute value change reporting service

This service allows an MIS-User, in the agent role, to report the changes in the values of managed object attributes. It is defined both as a confirmed and as a non-confirmed service.

The attribute value change reporting service uses the parameters defined in clause 8 of this Recommendation | International Standard in addition to the general M-EVENT-REPORT service parameters defined in CCITT Rec. X.710 | ISO/IEC 9595. Table 4 lists the parameters for the attribute value change reporting service.

The Event time, Correlated notifications and Notification identifier parameters may be assigned by the object emitting the notification or by the managed system.

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Table 3 – Object deletion reporting parameters

Parameter name	Req/Ind	Rsp/Cnf
Invoke identifier	P	P
Mode	P	–
Managed object class	P	P
Managed object instance	P	P
Event type	M	C(=)
Event time	P	–
Event information		
Source indicator	U	–
Attribute list	U	–
Notification identifier	U	–
Correlated notifications	U	–
Additional text	U	–
Additional information	U	–
Current time	–	P
Event reply	–	–
Errors	–	P

9.5 PT-ACTION service

The PT-ACTION service is used by a pass-through service-user to request a peer pass-through service-user to perform an action on managed object(s). It is defined as a confirmed and a non-confirmed service.

This general service is used to perform actions unless a specific service has been defined by one of the systems management functions.

Table 5 lists the parameters for the PT-ACTION service.

The parameters of this service are identical to those described in the M-ACTION service of CCITT Rec. X.710 | ISO/IEC 9595.

9.6 PT-CREATE service

The PT-CREATE service is used by an invoking pass-through service-user to request a peer pass-through service-user to create a new managed object complete with its identification and the values of its associated management information, and simultaneously to register its identification. It is defined as a confirmed service. This general service is used to create new managed objects unless a specific service has been defined by one of the systems management functions.

Table 6 lists the parameters for the PT-CREATE service.

The parameters of this service are identical to those described in the M-CREATE service of CCITT Rec. X.710 | ISO/IEC 9595.

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Table 4 – Attribute value change reporting parameters

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Mode	P	–
Managed object class	P	P
Managed object instance	P	P
Event type	M	C(=)
Event time	P	–
Event information		
Source indicator	U	–
Attribute identifier list	U	–
Attribute value change definition		
Attribute identifier	M	–
Old attribute value	U	–
New attribute value	M	–
Notification identifier	U	–
Correlated notifications	U	–
Additional text	U	–
Additional information	U	–
Current time	–	P
Event reply	–	–
Errors	–	P

9.7 PT-DELETE service

The PT-DELETE service is used by an invoking pass-through service-user to request a peer pass-through service-user to delete a managed object and to deregister its identification. It is defined as a confirmed service. This general service is used to delete managed objects unless a specific service has been defined by one of the systems management functions.

Table 7 lists the parameters for the PT-DELETE service.

The parameters of this service are identical to those described in the M-DELETE service of CCITT Rec. X.710 | ISO/IEC 9595.

9.8 PT-EVENT-REPORT service

The PT-EVENT-REPORT service is used by a pass-through service-user to report an event to a peer pass-through service-user. It is defined as a confirmed and a non-confirmed service. This general service is used to report events unless a specific service has been defined by one of the systems management functions.

Table 8 lists the parameters for the PT-EVENT-REPORTING service.

The parameters of this service are identical to those described in the M-EVENT-REPORT service of CCITT Rec. X.710 | ISO/IEC 9595.

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Table 5 – PT-ACTION parameters

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Link identifier	–	P
Mode	P	–
Base object class	P	–
Base object instance	P	–
Scope	P	–
Filter	P	–
Managed object class	–	P
Managed object instance	–	P
Access control	P	–
Synchronization	P	–
Action type	P	P
Action information	P	–
Current time	–	P
Action reply	–	P
Errors	–	P

Table 6 – PT-CREATE parameters

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Managed object class	P	P
Managed object instance	P	P
Superior object instance	P	–
Access control	P	–
Reference object instance	P	–
Attribute list	P	P
Current time	–	P
Errors	–	P

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Table 7 – PT-DELETE parameters

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Linked identifier	–	P
Base object class	P	–
Base object instance	P	–
Scope	P	–
Filter	P	–
Access control	P	–
Synchronization	P	–
Managed object class	–	P
Managed object instance	–	P
Current time	–	P
Errors	–	P

Table 8 – PT-EVENT-REPORT parameters

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Mode	P	–
Managed object class	P	P
Managed object instance	P	P
Event type	P	P
Event time	P	–
Event information	P	–
Current time	–	P
Event reply	–	P
Errors	–	P

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9.9 PT-GET service

The PT-GET service is used by a pass-through service-user to retrieve attribute values from a peer pass-through service-user. It is defined as a confirmed service. This general service is used to get attributes unless a specific service has been defined by one of the systems management functions.

Table 9 lists the parameters for the PT-GET service.

The parameters of this service are identical to those described in the M-GET service of CCITT Rec. X.710 | ISO/IEC 9595.

Table 9 – PT-GET parameters

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Linked identifier	–	P
Base object class	P	–
Base object instance	P	–
Scope	P	–
Filter	P	–
Access control	P	–
Synchronization	P	–
Attribute identifier list	P	–
Managed object class	–	P
Managed object instance	–	P
Current time	–	P
Attribute list	–	P
Errors	–	P

9.10 PT-SET service

The PT-SET service is used by an invoking pass-through service-user to request the modification of attribute values by a peer pass-through service-user. It is defined as a confirmed and a non-confirmed service. This general service is used to set attributes unless a specific service has been defined by one of the systems management functions.

Table 10 lists the parameters for the PT-SET service.

The parameters of this service are identical to those described in the M-SET service of CCITT Rec. X.710 | ISO/IEC 9595.

10 Functional units

Table 11 lists the functional units that are defined within this Recommendation | International Standard.

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Table 10 – PT-SET parameters

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Linked identifier	–	P
Mode	P	–
Base object class	P	–
Base object instance	P	–
Scope	P	–
Filter	P	–
Access control	P	–
Synchronization	P	–
Managed object class	–	P
Managed object instance	–	P
Modification list	P	–
Attribute list	–	P
Current time	–	P
Errors	–	P

Table 11 – Functional units

Function name	Functional units	Systems management services
Object Management	allEvents	All notifications 1)
	control	All services except notifications 2)
	monitor	PT-GET only
	objectEvents	Object creation reporting,
		Object deletion reporting, and
		Attribute value change reporting.

1) All systems management notification services which map onto the CMIS M-EVENT-REPORT service. This includes the PT-EVENT-REPORT service defined in this Recommendation | International Standard as well as systems management notification services defined by other systems management standards.

2) All systems management services which map onto the CMIS M-GET, M-SET, M-ACTION, M-CREATE and M-DELETE services. This includes the PT-GET, PT-SET, PT-ACTION, PT-CREATE and PT-DELETEservices defined by this Recommendation | International Standard as well as systems management services (except notification services) defined by other systems management standards.

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11 Protocol

11.1 Elements of procedure

11.1.1 Object creation reporting procedure

11.1.1.1 Agent role

11.1.1.1.1 Invocation

The object creation reporting procedures are initiated by the object creation reporting request primitive. On receipt of an object creation reporting request primitive, the SMAPM shall construct an MAPDU and issue a CMIS M-EVENT-REPORT request service primitive with parameters derived from the object creation reporting request primitive. In the non-confirmed mode, the procedure in 11.1.1.1.2 does not apply.

11.1.1.1.2 Receipt of response

On receipt of a CMIS M-EVENT-REPORT confirm primitive containing an MAPDU responding to an object creation reporting notification, the SMAPM shall issue an object creation reporting confirmation primitive to the object creation reporting service user with parameters derived from the CMIS M-EVENT-REPORT confirm service primitive, thus completing the object creation reporting procedure.

NOTE – The SMAPM ignores all errors in the received MAPDU. The object creation reporting service user may ignore such errors, or abort the association as a consequence of such errors.

11.1.1.2 Manager role

11.1.1.2.1 Receipt of request

On receipt of a CMIS M-EVENT-REPORT indication service primitive containing an MAPDU requesting the object creation reporting service, the SMAPM shall, if the MAPDU is well formed, issue an object creation reporting indication primitive to the object creation reporting service user with the parameters derived from the CMIS M-EVENT-REPORT response service primitive. Otherwise, the SMAPM shall in the confirmed mode construct an appropriate MAPDU containing notification of the error, and shall issue a CMIS M-EVENT-REPORT response service primitive with an error parameter present. In the non-confirmed mode, the procedure in 11.1.2.2 does not apply.

11.1.1.2.2 Response

In the confirmed mode, the SMAPM shall accept an object creation reporting response primitive and shall construct an MAPDU confirming the notification and issue a CMIS M-EVENT-REPORT response primitive with parameters derived from the object creation reporting response primitive.

11.1.2 Object deletion reporting procedure

11.1.2.1 Agent role

11.1.2.1.1 Invocation

The object deletion reporting procedures are initiated by the object deletion reporting request primitive. On receipt of an object deletion reporting request primitive, the SMAPM shall construct an MAPDU and issue a CMIS M-EVENT-REPORT request service primitive with parameters derived from the object deletion reporting request primitive. In the non-confirmed mode, the procedure in 11.1.2.1.2 does not apply.

11.1.2.1.2 Receipt of response

On receipt of a CMIS M-EVENT-REPORT confirm primitive containing an MAPDU responding to an object deletion reporting notification, the SMAPM shall issue an object deletion reporting confirmation primitive to the object deletion reporting service user with parameters derived from the CMIS M-EVENT-REPORT confirm service primitive, thus completing the object deletion reporting procedure.

NOTE – The SMAPM ignores all errors in the received MAPDU. The object deletion reporting service user may ignore such errors, or abort the association as a consequence of such errors.

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11.1.2.2 Manager role

11.1.2.2.1 Receipt of request

On receipt of a CMIS M-EVENT-REPORT indication service primitive containing an MAPDU requesting the object deletion reporting service, the SMAPM shall, if the MAPDU is well formed, issue an object deletion reporting indication primitive to the object deletion reporting service user with the parameters derived from the CMIS M-EVENT-REPORT response service primitive. Otherwise, the SMAPM shall in the confirmed mode construct an appropriate MAPDU containing notification of the error, and shall issue a CMIS M-EVENT-REPORT response service primitive with an error parameter present. In the non-confirmed mode, the procedure in 11.1.2.2.2 does not apply.

11.1.2.2.2 Response

In the confirmed mode, the SMAPM shall accept an object deletion reporting response primitive and shall construct an MAPDU confirming the notification and issue a CMIS M-EVENT-REPORT response primitive with parameters derived from the object deletion reporting response primitive.

11.1.3 Attribute value change reporting procedure

11.1.3.1 Agent role

11.1.3.1.1 Invocation

The attribute value change reporting procedures are initiated by the attribute value change reporting request primitive. On receipt of an attribute value change reporting request primitive, the SMAPM shall construct an MAPDU and issue a CMIS M-EVENT-REPORT request service primitive with parameters derived from the attribute value change reporting request primitive. In the non-confirmed mode, the procedure in 11.1.3.1.2 does not apply.

11.1.3.1.2 Receipt of response

On receipt of a CMIS M-EVENT-REPORT confirm primitive containing an MAPDU responding to an attribute value change reporting notification, the SMAPM shall issue an attribute value change reporting confirmation primitive to the reporting service user with parameters derived from the CMIS M-EVENT-REPORT confirm service primitive, thus completing the attribute value change reporting procedure.

NOTE – The SMAPM ignores all errors in the received MAPDU. The attribute value change reporting service user may ignore such errors, or abort the association as a consequence of such errors.

11.1.3.2 Manager role

11.1.3.2.1 Receipt of request

On receipt of a CMIS M-EVENT-REPORT indication service primitive containing an MAPDU requesting the attribute value change reporting service, the SMAPM shall, if the MAPDU is well formed, issue an attribute value change reporting indication primitive to the reporting service user with the parameters derived from the CMIS M-EVENT-REPORT response service primitive. Otherwise, the SMAPM shall in the confirmed mode construct an appropriate MAPDU containing notification of the error, and shall issue a CMIS M-EVENT-REPORT response service primitive with an error parameter present. In the non-confirmed mode, the procedure in 11.1.3.2.2 does not apply.

11.1.3.2.2 Response

In the confirmed mode, the SMAPM shall accept an attribute value change reporting response primitive and shall construct an MAPDU confirming the notification and issue a CMIS M-EVENT-REPORT response primitive with parameters derived from the attribute value change reporting response primitive.

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11.1.4 PT-CREATE procedure

11.1.4.1 Manager role

11.1.4.1.1 Invocation

The PT-CREATE procedures are initiated by the PT-CREATE request primitive. On receipt of a PT-CREATE request primitive, the SMAPM shall issue a CMIS M-CREATE request service primitive with parameters derived from the PT-CREATE request primitive.

11.1.4.1.2 Receipt of response

On receipt of a CMIS M-CREATE confirm service primitive responding to a PT-CREATE operation, the SMAPM shall issue a PT-CREATE confirmation primitive to the PT-CREATE service user with parameters derived from the CMIS M-CREATE confirm service primitive thus completing the PT-CREATE procedure.

11.1.4.2 Agent role

11.1.4.2.1 Receipt of request

On receipt of a CMIS M-CREATE indication service primitive requesting the PT-CREATE service, the SMAPM shall issue a PT-CREATE indication primitive to the PT-CREATE service user with parameters derived from the CMIS M-CREATE indication service primitive.

11.1.4.2.2 Response

The SMAPM shall accept a PT-CREATE response primitive and shall issue a CMIS M-CREATE response service primitive with parameters derived from the PT-CREATE response primitive.

11.1.5 PT-DELETE procedure

11.1.5.1 Manager role

11.1.5.1.1 Invocation

The PT-DELETE procedures are initiated by the PT-DELETE request primitive. On receipt of a PT-DELETE request primitive, the SMAPM shall issue a CMIS M-DELETE request service primitive with parameters derived from the PT-DELETE request primitive.

11.1.5.1.2 Receipt of response

On receipt of a CMIS M-DELETE confirm service primitive responding to a PT-DELETE operation, the SMAPM shall issue a PT-DELETE confirmation primitive to the PT-DELETE service user with parameters derived from the CMIS M-DELETE confirm service primitive thus completing the PT-DELETE procedure.

11.1.5.2 Agent role

11.1.5.2.1 Receipt of request

On receipt of a CMIS M-DELETE indication service primitive requesting the PT-DELETE service, the SMAPM shall issue a PT-DELETE indication primitive to the PT-DELETE service user with parameters derived from the CMIS M-DELETE indication service primitive.

11.1.5.2.2 Response

The SMAPM shall accept a PT-DELETE response primitive and shall issue a CMIS M-DELETE response service primitive with parameters derived from the PT-DELETE response primitive.

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11.1.6 PT-SET procedure

11.1.6.1 Manager role

11.1.6.1.1 Invocation

The PT-SET procedures are initiated by the PT-SET request primitive. On receipt of a PT-SET request primitive, the SMAPM shall issue a CMIS M-SET request service primitive with parameters derived from the PT-SET request primitive. In the non-confirmed mode, the procedure in 11.1.6.1.2 does not apply.

11.1.6.1.2 Receipt of response

On receipt of a CMIS M-SET confirm service primitive responding to a PT-SET operation, the SMAPM shall issue a PT-SET confirmation primitive to the PT-SET service user with parameters derived from the CMIS M-SET confirm service primitive thus completing the PT-SET procedure.

11.1.6.2 Agent role

11.1.6.2.1 Receipt of request

On receipt of a CMIS M-SET indication service primitive requesting the PT-SET service, the SMAPM shall issue a PT-SET indication primitive to the PT-SET service user with parameters derived from the CMIS M-SET indication service primitive. In the non-confirmed mode, the procedure in 11.1.6.2.2 does not apply.

11.1.6.2.2 Response

In the confirmed mode, the SMAPM shall accept a PT-SET response primitive and shall issue a CMIS M-SET response service primitive with parameters derived from the PT-SET response primitive.

11.1.7 PT-GET procedure

11.1.7.1 Manager role

11.1.7.1.1 Invocation

The PT-GET procedures are initiated by the PT-GET request primitive. On receipt of a PT-GET request primitive, the SMAPM shall issue a CMIS M-GET request service primitive with parameters derived from the PT-GET request primitive.

11.1.7.1.2 Receipt of response

On receipt of a CMIS M-GET confirm service primitive responding to a PT-GET operation, the SMAPM shall issue a PT-GET confirmation primitive to the PT-GET service user with parameters derived from the CMIS M-GET confirm service primitive thus completing the PT-GET procedure.

11.1.7.2 Agent role

11.1.7.2.1 Receipt of request

On receipt of a CMIS M-GET indication service primitive requesting the PT-GET service, the SMAPM shall issue a PT-GET indication primitive to the PT-GET service user with parameters derived from the CMIS M-GET indication service primitive.

11.1.7.2.2 Response

The SMAPM shall accept a PT-GET response primitive and shall issue a CMIS M-GET response service primitive with parameters derived from the PT-GET response primitive.

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11.1.8 PT-ACTION procedure

11.1.8.1 Manager role

11.1.8.1.1 Invocation

The PT-ACTION procedures are initiated by the PT-ACTION request primitive. On receipt of a PT-ACTION request primitive, the SMAPM shall issue a CMIS M-ACTION request service primitive with parameters derived from the PT-ACTION request primitive. In the non-confirmed mode, the procedure in 11.1.8.1.2 does not apply.

11.1.8.1.2 Receipt of response

On receipt of a CMIS M-ACTION confirm service primitive responding to a PT-ACTION operation, the SMAPM shall issue a PT-ACTION confirmation primitive to the PT-ACTION service user with parameters derived from the CMIS M-ACTION confirm service primitive thus completing the PT-ACTION procedure.

11.1.8.2 Agent role

11.1.8.2.1 Receipt of request

On receipt of a CMIS M-ACTION indication service primitive requesting the PT-ACTION service, the SMAPM shall issue a PT-ACTION indication primitive to the PT-ACTION service user with parameters derived from the CMIS M-ACTION indication service primitive. In the non-confirmed mode, the procedure in 11.1.6.2.2 does not apply.

11.1.8.2.2 Response

In the confirmed mode, the SMAPM shall accept a PT-ACTION response primitive and shall issue a CMIS M-ACTION response service primitive with parameters derived from the PT-ACTION response primitive.

11.1.9 PT-EVENT-REPORT procedure

11.1.9.1 Agent role

11.1.9.1.1 Invocation

The PT-EVENT-REPORT procedures are initiated by the PT-EVENT-REPORT request primitive. On receipt of a PT-EVENT-REPORT request primitive, the SMAPM shall issue a CMIS M-EVENT-REPORT request service primitive with parameters derived from the PT-EVENT-REPORT request primitive. In the non-confirmed mode, the procedure in 11.1.9.1.2 does not apply.

11.1.9.1.2 Receipt of response

On receipt of a CMIS M-EVENT-REPORT confirm service primitive responding to a PT-EVENT-REPORT operation, the SMAPM shall issue a PT-EVENT-REPORT confirmation primitive to the PT-EVENT-REPORT service user with parameters derived from the CMIS M-EVENT-REPORT confirm service primitive thus completing the PT-EVENT-REPORT procedure.

11.1.9.2 Manager role

11.1.9.2.1 Receipt of request

On receipt of a CMIS M-EVENT-REPORT indication service primitive requesting the PT-EVENT-REPORT service, the SMAPM shall issue a PT-EVENT-REPORT indication primitive to the PT-EVENT-REPORT service user with parameters derived from the CMIS M-EVENT-REPORT indication service primitive. In the non-confirmed mode, the procedure in 11.1.9.2.2 does not apply.

11.1.9.2.2 Response

In the confirmed mode, the SMAPM shall accept a PT-EVENT-REPORT response primitive and shall issue a CMIS M-EVENT-REPORT response service primitive with parameters derived from the PT-EVENT-REPORT response primitive.

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11.2 Abstract syntax

11.2.1 Managed objects

This Recommendation | International Standard references the following management support objects, the abstract syntax of which are specified in CCITT Rec. X.721 | ISO/IEC 10165-2:

a) objectCreationRecord;

b) objectDeletionRecord;

c) attributeValueChangeRecord.

11.2.2 Attributes

Table 12 identifies the relationship between the parameters defined in 8.2 and the attributes type specifications in CCITT Rec. X.721 | ISO/IEC 10165-2.

Table 12 – Parameter to attribute mapping

Parameter	Attribute Name
Source indicator	sourceIndicator
Attribute list	attributeList
Attribute identifier list	attributeIdentifierList
Attribute value change definition	attributeValueChangeDefinition

11.2.3 Attribute groups

There are no attribute groups defined by this Recommendation | International Standard.

11.2.4 Actions

There are no specific actions defined by this Recommendation | International Standard.

11.2.5 Notifications

Table 13 identifies the relationship between the notifications defined in 8.1 and the notification type specification in CCITT Rec. X.721 | ISO/IEC 10165-2.

Table 13 – Notifications

Event type	Notification type
Object creation	objectCreation
Object deletion	objectDeletion
Attribute value change	attributeValueChange

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11.3 Negotiation of functional units

This Recommendation | International Standard assigns the following object identifier value:

{joint-iso-ccitt ms(9) function(2) part1(1) functionalUnitPackage(1)}

as a value of ASN.1 type FunctionalUnitPackageId defined in CCITT Rec. X.701 | ISO/IEC 10040 to use for negotiating the availability of the following functional units:

- 0 allEvents;
- 1 control;
- 2 monitor;
- 3 objectEvents;

where the number identifies the bit position assigned to the functional unit as defined in clause 10.

Within the Systems management application context, the mechanism for negotiating functional units is described by CCITT Rec. X.701 | ISO/IEC 10040.

NOTE – The requirement to negotiate functional units is specified by the application context.

12 Relationships with other functions

Control of the reporting services defined in this Recommendation | International Standard is provided by mechanisms specified in CCITT Rec. X.734 | ISO/IEC 10164-5. The reporting services defined in this Recommendation | International Standard may exist independently of the control mechanisms of CCITT Rec. X.734 | ISO/IEC 10164-5.

Other systems management functions make use of the pass-through services specified in this Recommendation | International Standard for all operations and notifications that apply across a managed object boundary, except where specific services are defined by other systems management functions.

13 Conformance

There are two conformance classes: general conformance class and dependent conformance class. A system claiming to implement the elements of procedure for the object creation reporting, object deletion reporting and attribute value change reporting services defined in this Recommendation | International Standard shall comply with the requirements for either the general or the dependent conformance class as defined in the following sub-clauses. The supplier of the implementation shall state the class to which conformance is claimed.

13.1 General conformance class requirements

A system claiming general conformance to this Recommendation | International Standard shall support this systems management function for all managed object classes that import the management information defined by this Recommendation | International Standard.

13.1.1 Static conformance

The system shall

a) support the role of manager, agent or both, with respect to the objectEvent functional unit;

b) support the transfer syntax derived from the encoding rules specified in CCITT Rec. X.209 | ISO/IEC 8825 named {joint-iso-ccitt ans1(1) basic encoding(1)}, for the purpose of generating and interpreting the MAPDUs, defined by the abstract data types referenced in 11.2.5 of this Recommendation | International Standard.

13.1.2 Dynamic conformance

The system shall, in the role(s) for which conformance is claimed support the elements of procedure defined in this Recommendation | International Standard for the object creation reporting, object deletion reporting and the attribute value change reporting services .

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13.2 Dependent conformance class requirements

13.2.1 Static conformance

The system shall

a) supply a System Conformance Statement which identifies the standardized use of this systems management function;

b) support the transfer syntax derived from the encoding rules specified in CCITT Rec. X.209 | ISO/IEC 8825 and named {joint-iso-ccitt asn1(1) basic encoding(1)}, for the purpose of generating and interpreting the MAPDUs, defined by the abstract data types referenced in 11.2.5 of this Recommendation | International Standard, as required by a standard use of this systems management function.

13.2.2 Dynamic conformance

The system shall support the element of procedure, defined in this Recommendation | International Standard, as required by a standardized use of this systems management function.

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UDC 681.3:691.39

Descriptors: data processing, information interchange, network interconnection, open systems interconnection, application layer, management.

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