

INTERNATIONAL STANDARD

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Information technology — Open Systems Interconnection — Structure of management information: Requirements and guidelines for implementation conformance statement proformas associated with OSI management

*Technologies de l'information — Interconnexion de systèmes ouverts
(OSI) — Structure des informations de gestion: Exigences et principes
directeurs pour la mise en œuvre des proformes d'avis de conformité
associée à la gestion OSI*



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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 10165-6 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.724.

This second edition cancels and replaces the first edition (ISO/IEC 10165-6:1994), which has been technically revised.

ISO/IEC 10165 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Structure of management information*:

- *Part 1: Management Information Model*
- *Part 2: Definition of management information*
- *Part 4: Guidelines for the definition of managed objects*
- *Part 5: Generic management information*
- *Part 6: Requirements and guidelines for implementation conformance statement proformas associated with OSI management*
- *Part 7: General relationship model*

Annexes A to L form an integral part of this part of ISO/IEC 10165. Annexes M to R are for information only.

Introduction

This Recommendation | International Standard includes the modifications necessary to 10165-6 to cover all types of conformance claims associated with management information and an overview of the situation related to ICS proformas. The major part of the modifications are necessary for claims of conformance for systems supporting management information in the manager role. This Recommendation | International Standard also includes an issues list related to manager role ICS proformas.

The modifications are an attempt to satisfy the following requirements:

- the addition of manager role proformas should have minimal impact on existing ICS proformas;
- the proformas must be flexible enough for all possible conforming implementations;
- the proformas should be as compact as possible;
- the proformas should be easy to reference from Profile Requirements Lists;

Related work

The following related work is being performed to provide the complete framework for manager role ICS proformas:

- Guidance are given in 10040 – SMO on how specifications defining management information should define conformance requirements in the conformance clause.
- The basis for all claims of conformance to a specification are defined in the conformance clause of this Specification. For Specifications defining management information (including SMFs), which can be supported by a system in the manager role, the conformance clauses are being amended to contain a requirement that an implementation identifies the management information it supports in the manager role.
- Standards defining management information include or reference an MCS proforma. A supplier of an implementation should be able to use the MCS proforma to provide a summary of the management information supported in the agent role and/or the manager role.
- Standards defining management information are being amended to provide MICS proformas for all management information defined in those standards.

Current situation

Guidelines for the definition of proformas for conformance claims are defined in this Recommendation | International Standard. These guidelines are currently restricted to agent role conformance claims. Guidelines are given for MCS, MOCS and MRCS proformas.

The MIDS proforma defined in this Recommendation | International Standard cannot be used for conformance claims, it is only used as a building block in the construction of a MOCS proforma.

ICS proformas following these guidelines are currently being developed as amendments to standards defining management information. New standards are expected to include the proformas as they are developed.

Conformance claims for systems supporting the manager role cannot be made using the current MCS, MOCS and MRCS proformas. Manager role proformas are being added in the current standards to allow claims of conformance in the manager role. These proformas and guidelines to use them should be documented in this Recommendation | International Standard to ensure consistent use of manager role ICS proformas in all systems management standards.

Structure for ICS proformas related to OSI Management

A conformance claim for a system supporting management information can be structured in two levels. The first level is a summary of the implemented management information. This information is given in the MCS. The second level is the support of individual management information. This is given in MOCS, MICS and MRCS.

A MICS proforma (Management Information Conformance Statement) must be defined together with any definition of management information if claims in the manager role should be possible. The proforma can be used by an implementation to provide information on the options implemented. It can also be used as the basis for Profile Requirements Lists used in the definition of profiles.

For a system implementing agent role, the claim should include MCS, MOCS and MRCS. For a system implementing manager role, the claim should include MCS and MICS.

The conformance clause of a Specification defining management information should reference an MCS proforma where all requirements for support are explicitly defined. The conformance clause must identify the mandatory requirements and any optional requirements.

Proformas for conformance claims must in general be sufficiently flexible to enable all possible conformance claims allowed by this Specification. For standards defining management information some guidelines for the structure should be given in this Recommendation | International Standard (and in CCITT Rec. X.701 | ISO/IEC 10040).

The MICS proformas include an Additional Information column, that could be used to give information about how the management information is supported. The use of the Additional Information column is described in 5.2.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – STRUCTURE OF MANAGEMENT INFORMATION: REQUIREMENTS AND GUIDELINES FOR IMPLEMENTATION CONFORMANCE STATEMENT PROFORMAS ASSOCIATED WITH OSI MANAGEMENT

1 Scope

This Recommendation | International Standard provides requirements and guidelines for Management Conformance Summary (MCS) proformas, Management Information Conformance Statement (MICS) proformas, Managed Object Conformance Statement (MOCS) proformas, Management Information Definition Statement (MIDS) proformas, and Managed Relationship Conformance Statement (MRCS) proformas and for the specification of these proformas. These proformas are applicable to standards for OSI management including definitions of managed objects. The MCS proforma provides a summary of PICS proforma, MICS proforma, MOCS proforma and MRCS proforma. The PICS is a statement made by an implementor to claim conformance to a protocol specification. The MICS is a statement made by an implementor to claim conformance to management information in the manager role. The MOCS is a statement made by an implementor to claim conformance to a managed object class definition. The MRCS is a statement made by an implementor to claim conformance to a managed relationship definition, such as a name binding definition.

2 Normative references

The following 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 International 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 edition of the Recommendations and International Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- CCITT Recommendation X.701 (1992) | ISO/IEC 10040:1992, *Information technology – Open Systems Interconnection – Systems management 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.722 (1992) | ISO/IEC 10165-4:1992, *Information technology – Open Systems Interconnection – Structure of management information: Guidelines for the definition of managed objects*.

2.2 Paired ITU-T Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1)*.
- ISO/IEC 8824:1990, *Information technology – Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1)*.

- CCITT Recommendation X.290 (1992), *OSI conformance testing methodology and framework for protocol Recommendations for CCITT applications – General concepts*.
ISO/IEC 9646-1:1994, Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts.
- 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 (1995), *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.
- CCITT Recommendation X.700 (1992), *Management framework 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.

3 Definitions

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

3.1 ASN.1 definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.208 and ISO/IEC 8824:

- object identifier.

3.2 Management framework definitions

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

- managed object.

3.3 Conformance testing methodology definitions

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

- a) Protocol Implementation Conformance Statement (PICS);
- b) PICS proforma;
- c) system conformance statement.

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) managed object class;
- b) managed object conformance statement;
- c) Management Information Conformance Statement (MICS);
- d) MICS proforma;
- e) MOCS proforma;
- f) notification.

3.5 CMIS definitions

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

- attribute.

3.6 Management information model definitions

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

- a) action;
- b) actual class;
- c) attribute group;
- d) behaviour;
- e) characteristic;
- f) conditional package;
- g) instantiation;
- h) name binding;
- i) package;
- j) parameter;
- k) superclass;
- l) uninstantiable managed object class.

3.7 Guidelines for the definition of managed objects definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.722 | ISO/IEC 10165-4:

- template.

3.8 Implementation conformance statements definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.296 and ISO/IEC 9646-7:

- a) (ICS) item;
- b) (ICS) question;
- c) status (value);
- d) (support) answer.

3.9 Additional definitions

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

3.9.1 managed relationship conformance summary (MRCS): A statement by a supplier of a managed relationship implementation, stating the capabilities and options which have been implemented, and any features which have been omitted.

3.9.2 management conformance statement (MCS): 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.

3.9.3 management information definition statement (MIDS) proforma: A document, in the form of a questionnaire which is used in the construction of a MOCS proforma.

3.9.4 MCS proforma: A document, in the form of a questionnaire that when completed by the supplier of an implementation becomes the MCS.

3.9.5 MRCS proforma: A document, in the form of a questionnaire that when completed by the supplier of an implementation becomes the MRCS.

3.9.6 proforma specification: Standardized procedures for constructing a questionnaire that when completed by the supplier of an implementation becomes an implementation conformance statement.

4 Abbreviations

GDMO	Guidelines for the Definition of Managed Objects
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

5 Requirements and guidelines for specification and completion of proformas

Proforma specifications shall follow the style as documented in the annexes of this Recommendation | International Standard. Proforma specifications shall provide the information required by this Recommendation | International Standard. Additional tables may be included for other information, if needed.

5.1 Structure of proformas

The annexes of this Recommendation | International Standard specify the formats for MCS proforma, MICS proforma, MOCS proforma, MIDS proforma and MRCS proforma for name bindings. Thus, proforma specifications are provided by the annexes of this Recommendation | International Standard. MIDS proforma is used to construct MOCS proforma. The supplier of an implementation then fills in the blanks in the proforma to produce MCS, MICS, MOCS and MRCS for name bindings. Also, this Recommendation | International Standard specifies the format of MRCS proforma for name binding and that are summarized in an MCS proforma.

There are three levels of documentation pertaining to MCS, namely:

- guidelines or Recommendation | International Standard tools for the production of MCS proformas;
- an MCS proforma, associated with a standard related to OSI management, which is to be filled in by a supplier of the implementation and when filled in is an MCS – see c) below;
- an MCS prepared by a supplier of the implementation as part of a conformance claim to a standard related to OSI management.

It is a) that is the subject of this Recommendation | International Standard. MCS proformas b) will be expected to be produced in accordance with the MCS proforma specification in this Recommendation | International Standard.

There are three levels of documentation pertaining to MICS, namely:

- a) guidelines or Recommendation | International Standard tools for the production of MICS proformas;
- b) a MICS proforma, associated with a standard related to OSI management, which is to be filled in by a supplier of the implementation and when filled in is an MICS – see c) below;
- c) a MICS prepared by a supplier of the implementation as part of a conformance claim to a standard related to OSI management.

It is a) that is the subject of this Recommendation | International Standard. MICS proformas b) will be expected to be produced in accordance with the MICS proforma specification in this Recommendation | International Standard.

Similarly, there are three levels of documentation pertaining to MOCS, namely:

- a) guidelines or Recommendation | International Standard tools for the production of MOCS proformas;
- b) a MOCS proforma, associated with a managed object class definition, which is to be filled in by a supplier of the implementation and when filled in is a MOCS – see c) below;
- c) a MOCS prepared by a supplier of the implementation as part of a conformance claim to a managed object definition.

It is a) that is the subject of this Recommendation | International Standard. MOCS proformas b) will be expected to be produced in accordance with the MOCS proforma specification in this Recommendation | International Standard. Uninstantiable managed object classes do not require MOCS proformas.

In addition, there are two levels of documentation pertaining to MIDS, namely:

- a) guidelines or Recommendation | International Standard tools for the production of MIDS proformas;
- b) a MIDS proforma, which is used to construct a MOCS proforma.

It is a) that is the subject of this Recommendation | International Standard. MIDS proformas b) will be expected to be produced in accordance with the MIDS proforma specification in this Recommendation | International Standard.

In addition, there are three levels of documentation pertaining to MRCS for name bindings, namely:

- a) guidelines or Recommendation | International Standard tools for the production of MRCS proformas for name bindings;
- b) an MRCS proforma for name bindings, associated with a name binding definition, which is to be filled in by a supplier of the implementation and when filled in is an MRCS – see c) below;
- c) an MRCS for name bindings prepared by a supplier of the implementation as part of a conformance claim to a name binding definition.

It is a) that is the subject of this Recommendation | International Standard. MRCS proformas for name bindings b) will be expected to be produced in accordance with the MRCS proforma specification for name bindings in this Recommendation | International Standard.

5.2 General instructions

This Recommendation | International Standard provides instructions to construct MCS proforma specification, MICS proforma specification, MOCS proforma specification, MIDS proforma specification and MRCS proforma specification for name bindings. The annexes of this Recommendation | International Standard contain specification for the MCS proforma, MICS proforma, MOCS proforma, MIDS proforma, and MRCS proforma for name bindings in a tabular form, which uses the status and support columns as well as the notation used for filling in these columns introduced in CCITT Rec. X.291 and ISO/IEC 9646-2.

The purpose of the MCS proforma, MICS proforma, MOCS proforma, MIDS proforma, and MRCS proforma for name bindings is to provide a mechanism whereby a supplier of an implementation including OSI management may provide conformance information in a standard form. The purpose of the Annexes A to R is to provide guidance for proforma specifications.

Annex A contains a proforma for the MCS proforma. Annex B contains a proforma for the MOCS proforma. Annexes C, D, E and F contain proformas for the MIDS proforma for attributes, attribute groups, actions, and notifications, respectively. Annex G contains a proforma for the MRCS proforma for name bindings. Annexes H, I, J, K and L contain proformas for the MICS proforma for attributes, attribute groups, actions, notifications and create and delete, respectively. Annex M contains additional informative guidelines for proforma specification. Annex N contains additional informative guidelines for completion of proformas. Annex O provides an example of a MCS proforma specification, which is to be filled in by a supplier of an implementation. Annex P provides an example of MICS proforma specifications. Annex Q provides an example of a MOCS proforma specification, which is to be filled in by a supplier of an implementation. Annex R provides an example of a MRCS proforma specification for name binding, which is to be filled in by a supplier of an implementation.

The following common notations, defined in CCITT Rec. X.291 and ISO/IEC 9646-2 and ITU-T Rec. X.296 and ISO/IEC 9646-7 are used for the status value column:

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

NOTES

1 The notations "c", "m", "o" and "x" are prefixed by a "c:" when nested under a conditional or optional item of the same table.

2 The notation "o" may be suffixed by ".n" (where "n" is a unique number) for mutually exclusive or selectable options among a set of status values. The requirement for this numbered set shall be explicitly stated, preferably in a footnote to the relevant table.

The following common notations, defined in CCITT Rec. X.291 and ISO/IEC 9646-2 and ITU-T Rec. X.296 and ISO/IEC 9646-7 are used for the support answer column:

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

In the status column, the static requirements shall be stated. The status will be as follows:

- m For characteristics contained in mandatory packages or in conditional packages if the GDMO condition is always true.
- o For characteristics of conditional packages with GDMO conditions that indicate static optionality, e.g. "if instance supports it".
- cn For all other conditions, where "n" is a unique integer and "cn" is a reference to a conditional status expression as defined in CCITT Rec. X.291 and ISO/IEC 9646-2 and ITU-T Rec. X.296 and ISO/IEC 9646-7. (One possible form of this conditional status expression uses the answer to a textual question, such as "Does the implementation permit instantiation when {GDMO condition}?". However, when more precise notation can be used, the use of such a textual question is not recommended.).
- x For characteristic explicitly prohibited in the definition.
- For characteristics that are not mentioned in the definition.

When the status for a conditional package is or resolves to "m", then the characteristics of the package shall be implemented; and the characteristics are instantiated according to the dynamic rules specified in the GDMO condition associated with the package.

The "Constraints and values" columns of the tables in the annexes (which are to be filled in in the proforma specification if applicable) contain the constraints and values of the specific management information (e.g. name binding, attribute, attribute group, action, action field, notification, and notification field).

The "Additional information" columns of the tables in the annexes (which are to be filled in by the supplier of the implementation if applicable) contain additional information that is necessary for the use of the tables regarding support of the specific management information (e.g. name binding, attribute, attribute group, action, action field, notification, and notification field). This information may include, **if applicable**:

- a) any constraints regarding support of the management information;
- b) specific values which are supported;
- c) index information to reference an attribute, attribute group, action or notification of another MOCS, completed by the supplier of the implementation;
- d) mapping of the values of the management information (available at the managed object boundary) to values visible at other interfaces to the underlying resource (of which the management information is an abstraction);
- e) clarification of how constraints are met;
- f) supported parameters;
- g) sufficient information to reference the details of parameter(s), if a particular parameter or parameters are carried in a field of an action or notification;
- h) implementation specific constraints of permitted, required, default values and matching rules for attributes;
- i) implementation specific constraints of permitted and required values for action and notification arguments;
- j) identify the object classes for which the management operation is supported (relevant in MICS proformas);
- k) any restrictions in the support for the mapping of management operations to protocol interactions (relevant in MICS proformas);
- l) the conditions under which operations are issued and action taken on receipt of the notifications (relevant for MICS proformas).

When management information available at a managed object boundary is claimed to correspond to information available via another interface, then how the value of a piece of management information available at the managed object boundary is related to the information available at the other interface shall be specified in one of the following ways:

- a) specified by the standards and referenced as a footnote to the entry in the proforma, and therefore be part of what the supplier of the implementation indicates support of by filling in the support column;
- b) required/recommended by the standards to be specified by the supplier of the implementation; in such cases the proforma includes a footnote to the entry that the supplier of the implementation shall/may state the details of availability in the "Additional information" column;
- c) left unspecified in the proforma specification and by the supplier of the implementation.

Terminology, notation and concepts for conformance statements are described in CCITT Rec. X.290 and ISO/IEC 9646-1, CCITT Rec. X.291 and ISO/IEC 9646-2, and ITU-T Rec. X.296 and ISO/IEC 9646-7. The tables need to provide details of composite parameters to the level of detail that will remove ambiguity for the support of the subparameters. When the size of a proforma table exceeds the size of a page, the table can be either presented in landscape or split into a number of parts. Guidelines on how to split a table are given in the informative Annex H.

5.3 Instructions for MCS proforma specification

An MCS identifies an implementation and summarizes the PICS, MOCS and MRCS for which conformance is stated. The MCS proforma is formed by copying the MCS proforma specification in Annex A, and extending the tables of A.4, as required; this may include merging information from multiple other MCS proformas. Multiple MCS proformas can be merged into a single MCS (e.g. when combining proforma from more than one document). It is recommended to include additional tables in an MCS proforma to cover any general conformance requirements in a specification. Guidelines on the use of additional tables can be found in Annex O.

The proforma specification shall have the "Status" columns of all the summary tables filled in according to the base specification requirements. The Status column in these support summary tables is used to indicate whether the supplier of an implementation is required to complete the referenced tables or referenced items. Detailed conformance requirements are specified in the referenced tables or referenced items and are not changed by the value of the support summary Status column. To form an MCS from an MCS proforma a supplier of the implementation shall provide appropriate information in the boxes provided and also fill in the "Support" and, if appropriate, the "Additional

information" column of all the summary tables in the MCS proforma. The supplier of the implementation shall also fill in the table numbers of the completed tables which correspond to the table numbers of the identified source document, if the table numbers are different.

Refer to CCITT Rec. X.291 and ISO/IEC 9646-2 for instructions for PICS proforma specification. Refer to 5.4 for instructions for MOCS proforma specification. Also, 5.6 provides instructions for MRCS proforma for name bindings.

5.4 Instructions for MOCS proforma specification

The MOCS proforma specification is formed by copying Annex B, completing the tables except for the "Support" and "Additional information" columns, and extending the remaining tables to meet the requirements of the specification. MOCS for multiple managed object classes do not have to be documented in the same annex as long as the tables for each class are contiguous and separated from the tables for other classes. MOCS proforma shall provide tables for all the attributes, attribute groups, actions, notifications and parameters which are included in the managed object class definition whether derived from superclasses or added by refinement. The information in a MOCS proforma is obtained from base standards, MIDS proforma and other MOCS proforma. Refer to 5.5 for instructions for MIDS proforma specification.

To form a MOCS from a MOCS proforma, the supplier of the implementation shall fill in the "Support" and, if appropriate, "Additional information" columns of all the tables in the MOCS proforma.

- a) *Managed object class support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Managed object class template label), and 3 (Value of object identifier for class). The supplier of the implementation shall state whether or not all the mandatory features of the identified managed object class are supported in Column 4 (Support of all mandatory features), and shall state whether or not the actual class is the same as the managed object class to which conformance is claimed in Column 5. If the answer to the actual class question is no, the supplier of the implementation shall fill in the actual class support table provided.
- b) *Attribute support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Attribute template label), 3 (Value of object identifier for attribute), 5 (Status-Set by create), 7 (Status-Get), 9 (Status-Replace), 11 (Status-Add), 13 (Status-Remove), 15 (Status-Set to default) and, if applicable, 4 (Constraints and values). If the behaviour of the managed object specifies that a Create cannot set the value of the attribute or if a mandatory initial value is specified, then the proforma specification shall specify "x" for the status of the "Status-Set by create" column. Otherwise, if the attribute is replaceable or the behaviour of the managed object class specifies that the attribute is settable by Create, then the proforma specification shall specify "m" for the status of the "Status-Set by create" column. Otherwise, if the managed object class definition does not mention whether the attribute is settable by Create, the proforma shall specify "-" for the status of the "Status-Set by create" column. Otherwise, the proforma shall specify "o" or "cn" for the status of the "Status-Set by create" column as appropriate for the managed object class definition. The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported and shall indicate support for each of the operations for each attribute supported by filling in Columns 6 (Support-Set by create), 8 (Support-Get), 10 (Support-Replace), 12 (Support-Add), 14 (Support-Remove), 16 (Support-Set to default), and, if appropriate, 17 (Additional information).
- c) *Attribute group support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Attribute group template label), 3 (Value of object identifier for attribute group), 5 (Status-Get), 7 (Status-Set to default) and, if applicable, 4 (Constraints and values). The supplier of the implementation shall state whether or not the attribute groups specified by all the packages instantiated in a managed object class definition are supported and shall indicate support for each of the operations for each attribute group supported by filling in Columns 6 (Support-Get), 8 (Support-Set to default), and, if appropriate, 9 (Additional information).
- d) *Action support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Action template label), 3 (Value of object identifier for action type), 5 (Status), 8 (Subindex), 9 (Action field name label), 11 (Status) and, if applicable, 4 (Constraints and values) and 10 (Constraints and values). For each action, the proforma specification shall specify the requirements for each action argument in the subindex rows. The supplier of the implementation shall state whether or not the actions specified by all packages instantiated in a managed object of this class are supported by filling in Columns 6 (Support), 12 (Support), and if appropriate, 7 (Additional information) and 13 (Additional information).

- e) *Notification support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Notification template label), 3 (Value of object identifier for notification type), 5 (Status), 9 (Subindex), 10 (Notification field name label), 11 (Value of object identifier of attribute type associated with field), 13 (Status) and, if applicable, 4 (Constraints and values) and 12 (Constraints and values). For each notification, the proforma specification shall specify the requirements for each notification argument in the subindex rows. The supplier of the implementation shall state whether or not the notifications specified by all packages instantiated in a managed object of this class are supported by filling in Columns 6 (Support-Confirmed), 7 (Support-Non-confirmed), 12 (Support) and, if appropriate, 8 (Additional information) and 13 (Additional information).
- f) *Parameter support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Parameter template label), 3 (Value of object identifier for parameter), 5 (Status) and, if applicable, 4 (Constraints and values). The supplier of the implementation shall state whether or not the parameters specified by all the packages instantiated in a managed object of this class are supported by filling in Columns 6 (Support) and, if appropriate, 7 (Additional information).

5.5 Instructions for MIDS proforma specification

The MIDS proforma are specified to ensure consistent use of generic management information that is common to many managed object classes. MIDS proforma provide a means of specifying what a MOCS specification imports in order to comply with the document that specifies the MIDS proforma.

The status values specified within the MIDS proformas indicate what needs to be supported to comply with the generic definition. These requirements can only be made stronger (e.g. optional can be mandated) when imported into a specific MOCS proforma.

MIDS proforma by themselves do not specify a complete implementation conformance statement, and therefore cannot be used by the supplier of the implementation to state conformance.

Instructions for MIDS proforma specifications are given in the following subclauses.

5.5.1 Instructions for MIDS proforma specification for attributes

- a) *Attribute support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Attribute template label), 3 (Value of object identifier for attribute), 5 (Status-Set by create), 7 (Status-Get), 9 (Status-Replace), 11 (Status-Add), 13 (Status-Remove), 15 (Status-Set to default) and, if applicable, 4 (Constraints and values). If the behaviour of the managed object specifies that a Create cannot set the value of the attribute or if a mandatory initial value is specified, then the proforma specification shall specify "x" for the status of the "Status-Set by create" column. Otherwise, if the attribute is replaceable or the behaviour of the managed object class specifies that the attribute is settable by Create, then the proforma specification shall specify "m" for the status of the "Status-Set by create" column. Otherwise, if the managed object class definition does not mention whether the attribute is settable by Create, the proforma shall specify "-" for the status of the "Status-Set by create" column. Otherwise, the proforma shall specify "o" or "cn" for the status of the "Status-Set by create" column as appropriate for the managed object class definition. The remaining columns shall remain blank.
- b) *Parameter support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Parameter template label), 3 (Value of object identifier for parameter), 5 (Status) and, if applicable, 4 (Constraints and values). The remaining columns shall remain blank.

5.5.2 Instructions for MIDS proforma specification for attribute groups

- a) *Attribute group support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Attribute group template label), 3 (Value of object identifier for attribute group), 5 (Status-Get), 7 (Status-Set to default) and, if applicable, 4 (Constraints and values). The remaining columns shall remain blank.
- b) *Parameter support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Parameter template label), 3 (Value of object identifier for parameter), 5 (Status) and, if applicable, 4 (Constraints and values). The remaining columns shall remain blank.

5.5.3 Instructions for MIDS proforma specification for actions

- a) *Action support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Action template label), 3 (Value of object identifier for action type), 5 (Status), 8 (Subindex), 9 (Action field name label), 11 (Status) and, if applicable, 4 (Constraints and values) and 10 (Constraints and values). For each action, the proforma specifier shall specify the requirements for each action argument in the subindex rows. The remaining columns shall remain blank.
- b) *Parameter support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Parameter template label), 3 (Value of object identifier for parameter), 5 (Status) and, if applicable, 4 (Constraints and values). The remaining columns shall remain blank.

5.5.4 Instructions for MIDS proforma specification for notifications

- a) *Notification support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Notification template label), 3 (Value of object identifier for notification type), 5 (Status), 9 (Subindex), 10 (Notification field name label), 11 (Value of object identifier of attribute type associated with field), 13 (Status) and, if applicable, 4 (Constraints and values) and 12 (Constraints and values). For each notification, the proforma specifier shall specify the requirements for each notification argument in the subindex rows. The remaining columns shall remain blank.
- b) *Parameter support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Parameter template label), 3 (Value of object identifier for parameter), 5 (Status) and, if applicable, 4 (Constraints and values). The remaining columns shall remain blank.

5.6 Instructions for MRCS proforma specification for name bindings

The MRCS proforma specification for name bindings is formed by copying Annex G, completing the tables except for the "Support" and "Additional information" columns, and extending the tables to meet the requirements of the specification.

To form an MRCS for name bindings from an MRCS proforma for name bindings, the supplier of the implementation shall fill in the "Support" and, if appropriate, "Additional information" columns of all the tables in the MRCS proforma.

- a) *Name binding support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Name binding template label), 3 (Value of object identifier for name binding), 5 (Status), 8 (Subindex), 11 (Status) and, if applicable, 4 (Constraints and values) and 10 (Constraints and values). The supplier of the implementation shall state which name bindings are supported. The supplier of the implementation shall fill in Columns 6 (Support), 12 (Support) and, if applicable 7 (Additional information) and 13 (Additional information).
- b) *Parameter support table* – The proforma specification shall have filled in Columns 1 (Index), 2 (Parameter template label), 3 (Value of object identifier for parameter), 5 (Status) and, if applicable, 4 (Constraints and values). The remaining columns shall remain blank.

5.7 Instructions for MICS proforma specification

The MICS proforma is specified to document the detailed conformance requirements for manager role implementations and to enable a supplier of an implementation to claim conformance to the specification in the manager role.

The status values specified within the MICS proformas indicate what needs to be supported to conform to the specification.

Instructions for MICS proforma specifications are given in the following clauses.

5.7.1 Instructions for MICS proforma specification for attributes

The MICS proforma specification for attributes is formed by copying Annex H, completing the tables except for the "Support" and "Additional information" columns, and extending the tables to meet the requirements of the specification.

To form a MICS for attributes from a MICS proforma for attributes, the supplier of the implementation shall fill in the "Support" and, if appropriate, "Additional information" columns of all the tables in the MICS proforma.

a) *Attribute support table* – The proforma specification shall have filled in Columns:

- 1 (Index);
- 2 (Attribute template label);
- 3 (Value of object identifier for attribute);
- 5 (Status-Set by create).

If the behaviour of the attribute specifies that a Create cannot set the value of the attribute or if a mandatory initial value is specified, then the proforma specification shall specify "x" for the status of the "Status-Set by create" column. Otherwise, the proforma shall specify "o", "m" or "cn" for the status of the "Status-Set by create" column as appropriate for the conformance requirements of the specification.

- 7 (Status-Get);
- 9 (Status-Replace);
- 11 (Status-Add);
- 13 (Status-Remove);
- 15 (Status-Set to default),

and, if applicable:

- 4 (Constraints and values).

The remaining columns shall remain blank in the MICS proforma.

The supplier of the implementation (in producing the MICS from the MICS proforma) fill in Columns:

- 6, 8, 10, 12, 14, 16 (Support),

and, if applicable:

- 17 (Additional information) – The additional information shall be used to indicate any restrictions in the claim to support attribute oriented operations.

b) *Parameter support table* – The proforma specification shall have filled in Columns:

- 1 (Index);
- 2 (Parameter template label);
- 3 (Value of object identifier for parameter);
- 5 (Status),

and, if applicable:

- 4 (Constraints and values).

The remaining columns shall remain blank in the MICS proforma.

The supplier of the implementation (in producing the MICS from the MICS proforma) fill in Columns:

- 6 (Support),

and, if applicable:

- 7 (Additional information).

5.7.2 Instructions for MICS proforma specification for attribute groups

The MICS proforma specification for attribute groups is formed by copying Annex I, completing the tables except for the "Support" and "Additional information" columns, and extending the tables to meet the requirements of the specification.

To form a MICS for attribute groups from a MICS proforma for attribute groups, the supplier of the implementation shall fill in the "Support" and, if appropriate, "Additional information" columns of all the tables in the MICS proforma.

a) *Attribute group support table* – The proforma specification shall have filled in Columns:

- 1 (Index);
- 2 (Attribute group template label);
- 3 (Value of object identifier for attribute group);
- 5 (Status-Get);
- 7 (Status-Set to default),

and, if applicable:

- 4 (Constraints and values).

The remaining columns shall remain blank in the MICS proforma.

The supplier of the implementation (in producing the MICS from the MICS proforma) fill in Columns:

- 6, 8 (Support),

and, if applicable:

- 9 (Additional information) – The additional information shall be used to indicate any restrictions in the claim to support attribute group related operations.

b) *Parameter support table* – The proforma specification shall have filled in Columns:

- 1 (Index);
- 2 (Parameter template label);
- 3 (Value of object identifier for parameter);
- 5 (Status),

and, if applicable:

- 4 (Constraints and values).

The remaining columns shall remain blank in the MICS proforma.

The supplier of the implementation (in producing the MICS from the MICS proforma) fill in Columns:

- 6 (Support),

and, if applicable:

- 7 (Additional information) – The additional information shall be used to indicate any restrictions in the claim to support attribute group related operations.

5.7.3 Instructions for MICS proforma specification for actions

The MICS proforma specification for actions is formed by copying Annex J, completing the tables except for the "Support" and "Additional information" columns, and extending the tables to meet the requirements of the specification.

To form a MICS for notifications from a MICS proforma for actions, the supplier of the implementation shall fill in the "Support" and, if appropriate, "Additional information" columns of all the tables in the MICS proforma.

a) *Action support table* – The proforma specification shall have filled in Columns:

- 1 (Index);
- 2 (Action template label);
- 3 (Value of object identifier for action type);
- 5 (Status);
- 8 (Subindex);
- 9 (Action field name label);
- 11 (Status),

and, if applicable:

- 4 (Constraints and values); and
- 10 (Constraints and values).

For each action, the proforma specifier shall specify the requirements for each action argument in the subindex rows.

The remaining columns shall remain blank in the MICS proforma.

The supplier of the implementation (in producing the MICS from the MICS proforma) fill in Columns:

- 6, 12 (Support),

and, if applicable:

- 7, 13 (Additional information) – The additional information shall be used to indicate any restrictions in the claim to support the actions.

b) *Parameter support table* – The proforma specification shall have filled in Columns:

- 1 (Index);
- 2 (Parameter template label);
- 3 (Value of object identifier for parameter);
- 5 (Status),

and, if applicable:

- 4 (Constraints and values).

The remaining columns shall remain blank in the MICS proforma.

The supplier of the implementation (in producing the MICS from the MICS proforma) fill in Columns:

- 6 (Support),

and, if applicable:

- 7 (Additional information).

5.7.4 Instructions for MICS proforma specification for notifications

The MICS proforma specification for notifications is formed by copying Annex K, completing the tables except for the "Support" and "Additional information" columns, and extending the tables to meet the requirements of the specification.

To form a MICS for notifications from a MICS proforma for notifications, the supplier of the implementation shall fill in the "Support" and, if appropriate, "Additional information" columns of all the tables in the MICS proforma.

a) *Notification support table* – The proforma specification shall have filled in Columns:

- 1 (Index);
- 2 (Notification template label);
- 3 (Value of object identifier for notification type);
- 5 (Status);
- 9 (Subindex);
- 10 (Notification field name label);
- 11 (Value of object identifier of attribute type associated with field);
- 13 (Status),

and, if applicable:

- 4 (Constraints and values); and
- 12 (Constraints and values).

For each notification, the proforma specifier shall specify the requirements for each notification argument in the subindex rows. The remaining columns shall remain blank in the MICS proforma.

The supplier of the implementation (in producing the MICS from the MICS proforma) fill in Columns:

- 6, 7, 14 (Support),

and, if applicable:

- 8,15 (Additional information) – The additional information shall be used to indicate any restrictions in the claim to support the notifications.