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TECHNICAL CORRIGENDUM 1

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Information technology — Open Systems Interconnection — Systems Management: Management knowledge management function

TECHNICAL CORRIGENDUM 1

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

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to International Standard ISO/IEC 10164-16:1997 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology.*

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

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

TECHNICAL CORRIGENDUM 1

1) Subclause 2.1

Insert the following references alphanumerically:

- ITU-T Recommendation X.710 (1997) | ISO/IEC 9595:1998, *Information technology – Open Systems Interconnection – Common management information service.*
- ITU-T Recommendation X.711 (1997) | ISO/IEC 9596-1:1998, *Information technology – Open Systems Interconnection – Common management information protocol: Specification.*

2) Subclause 2.2

Remove the following paired references:

- 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.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.710 (1991), *Common management information service definition for CCITT applications.*

  ISO/IEC 9595:1991, *Information technology – Open Systems Interconnection – Common management information service definition.*
- CCITT Recommendation X.711 (1991), *Common management information protocol specification for CCITT applications.*

  ISO/IEC 9596-1:1991, *Information technology – Open Systems Interconnection – Common management information protocol – Part 1: Specification.*

3) Subclause 13.1

Replace "CCITT Rec. X.209 | ISO/IEC 8825" *with* "ITU-T Rec. X.690 | ISO/IEC 8825-1".

4) Sublause A.2.4

a) *Remove the following* **IMPORTS** *statement*:

```
RelativeDistinguishedName
    FROM InformationFramework {joint-iso-ccitt(2) ds(5) modules(1) informationFramework(1)}
    -- NOTE – This Recommendation | International Standard imports
    -- RelativeDistinguishedName from CCITT Rec. X.501 (1988) | ISO/IEC 9594-2:1990.
    -- The specification for this syntax can now be found in an informative
    -- annex of ITU-T Rec. X.711 (1997) | ISO/IEC 9596-1:1998.
```

b) *In the* **IMPORTS FROM CMIP-1**, *insert the following before* **Scope**:

"RelativeDistinguishedName,"

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c) *In the* **IMPORTS FROM Attribute-ASN1Module**, *insert the following before* **NameBinding**:

"DMI-TYPE-IDENTIFIER,"

d) *Remove* **"GdmoAttributeId ::= OBJECT IDENTIFIER"**.

e) *Replace the production for* **ImplementedValues** *with the following ASN.1 production*:

```
"MKMF-VALUES ::= DMI-TYPE-IDENTIFIER
ImplementedValues ::= SET OF SEQUENCE {
      attributeId     MKMF-VALUES&.id ({ImplementedValuesSet}),
      defaultValue    [1] EXPLICIT MKMF-VALUES.&Value ({ImplementedValuesSet} {@.attributeId}) OPTIONAL,
      initialValue    [2] EXPLICIT MKMF-VALUES.&Value ({ImplementedValuesSet} {@.attributeId}) OPTIONAL,
      minValue        [3] EXPLICIT MKMF-VALUES.&Value ({ImplementedValuesSet} {@.attributeId}) OPTIONAL,
      maxValue        [4] EXPLICIT MKMF-VALUES.&Value ({ImplementedValuesSet} {@.attributeId}) OPTIONAL
}
ImplementedValuesSet MKMF-VALUES ::= {...}
"
```


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INTERNATIONAL STANDARD

ISO/IEC 10164-16

First edition
1997-05-15

AMENDMENT 1
1998-12-15

Information technology — Open Systems Interconnection — Systems Management: Management knowledge management function

AMENDMENT 1: Extension for General Relationship Model

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

AMENDEMENT 1: Extension pour modèle général de relation



Reference number
ISO/IEC 10164-16:1997/Amd.1:1998(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 ISO/IEC 10164-16:1997 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 33, *Distributed application services*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. X.750/Amd.1.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

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

AMENDMENT 1

Extension for General Relationship Model

1) Subclause 3.6

Add references to these SMO-defined terms inserted among existing terms in alphabetical order:

e) managed object class

and renumber the list as from the existing e) *which becomes* f), *to the end.*

2) Subclause 3.11

Add references to these GRM-defined terms inserted before and after existing term in alphabetical order:

binding;

binding support;

managed relationship class;

relationship cardinality;

relationship management notification;

relationship management operation;

role cardinality;

relationship mapping specification;

relationship class specification;

role;

unbinding;

unbinding support.

3) Clause 4

Insert the following abbreviation by alphabetical order:

GRM General relationship model

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4) Clause 6

In this clause change:

- *Definition knowledge*: Information on the formal specification of managed object classes, name bindings, etc., e.g. templates for classes, name bindings.

to:

- *Definition knowledge*: Information on the formal specification of managed object classes and managed relationship classes and related specifications, e.g. templates for classes, attributes, name bindings.

Add an X *in the Table 1 cell in the* Definition knowledge *column in the* Relationship knowledge *row.*

5) Subclause 6.3

In the 2nd item:

relationship role bindings

to:

relationship mapping specifications

6) Subclauses 6.3, 6.5, 7.1.1.1, 8.1.1.2, Table 8, A.2.1 and A.2.3

In subclauses 6.3, 6.5, 7.1.1.1, 8.1.1.2, Table 8, and in behaviour text in A.2.1 and A.2.3, replace each occurrence of the term relationship class *that is not preceded by* managed *with the term defined in GRM* managed relationship class *but do not change the label* **supportedRelationshipClassList**.

7) Subclause 7.1.2

In this subclause change GDMO and ASN.1 specifications *to* GDMO, GRM and ASN.1 specifications.

8) Subclauses 7.1.2, 8.1.2.12, 8.6.2 and A.3.3

In subclauses 7.1.2, 8.1.2.12, 8.6.2 and A.3.3, change all occurrences of GDMO template(s) *to* template(s).

9) Subclause 7.3

Add an X *in the four Table 2 cells that are in either the* Definition managed objects *or* Definition Directory objects *columns and that are in either the* Managed object class knowledge *or* Relationship knowledge *rows. Change both occurrences of* X (Note 7) *to* X *and eliminate Note 7.*

10) New subclauses 8.1.2.12 and 8.1.2.13

Renumber subclause 8.1.2.12 as 8.1.2.14 and insert two new subclauses before it:

8.1.2.12 Relationship class template managed object

The relationship class template managed object represents a GRM relationship class specification.

The relationship class template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) derived from;

b) behaviour.

Its optional, read-only attributes are:

a) supports;

b) qualified by;

c) role specifier.

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8.1.2.13 Relationship mapping template managed object

The relationship mapping template managed object represents a GRM relationship mapping specification.

The relationship mapping template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) mapped relationship class;

b) behaviour;

c) role mapping specification;

d) registered as.

Its optional, read-only attributes are:

a) relationship object;

b) operations mapping.

11) Subclause 8.6.2

In this subclause, change the two occurrences of GDMO specifications *to* GDMO, GRM or ASN.1 specifications.

Append to this subclause the following paragraphs:

The Directory auxiliary class relationship class template is defined for inclusion in Directory entries of Directory structural class Registered information and represents a GRM relationship class specification. It must contain the attributes Derived from and Behaviour. It may contain the attributes Supports, Qualified by, and Role specifier.

The Derived from attribute identifies the immediate superclasses of a managed relationship class. The Behaviour attribute specifies the behaviour associated with the managed relationship class. The Supports attribute defines the relationship management operations and notifications that a managed relationship supports. The Qualified by attribute specifies the attributes that are associated with the managed relationship as a whole. The Role specifier attribute identifies the roles associated with the managed relationship class.

The Directory auxiliary class Relationship mapping template is defined for inclusion in Directory entries of Directory structural class Registered information and represents a GRM relationship mapping specification. It must contain the attributes Behaviour, Mapped relationship class, Role mapping specification set, and Registered as. It may contain the attributes Relationship object and Operations mapping.

The Behaviour attribute defines the behaviour associated with the relationship mapping. The Mapped relationship class attribute specifies the managed relationship class to which the represented relationship mapping is related. The Role mapping specification set attribute identifies candidate managed object classes that may fulfil a given role. The Registered as attribute contains the object identifier of the represented relation mapping. The Relationship object attribute indicates the class of a relationship object that shall represent the managed relationship. The Operations mapping attribute specifies the mapping of a relationship management operation to one or more systems management operations.

12) Subclause 11.1.1.2

Add entries to Table 6 for relationship class template and relationship mapping template *(inserting before the entry for the template class).*

13) Subclause 11.1.5.1

Add entries to Table 9 for the new attributes mentioned in the new subclauses 8.1.2.12 and 8.1.2.13.

14) Subclause 11.1.5.2

Insert in Table 14 the following entries before the entry for the template class:

Relationship class template	managementRelationshipClass
Relationship mapping template	managementRelationshipMapping

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15) Subclause 11.1.6.1

Insert in Table 15 the following entries before the entry for the template class:

relationshipClassTemplate	managementRelationshipClass
relationshipMappingTemplate	managementRelationshipMapping

16) Subclause 11.2.1.2

Add to Table 17 the following entries (inserting in alphabetical order):

Mapped relationship class	mappedRelationshipClass
Operations mapping	operationsMapping
Qualified by	qualifiedBy
Relationship object	relationshipObject
Role mapping specification set	roleMappingSpecificationSet
Role specifier	roleSpecifier
Supports	supports

17) Subclause A.1

In this subclause change:

--%PRAGMA version BIT STRING {v1990(0), v1994(1)} ::= {v1990, v1994}

to:

--<ASN1.Version 1990, 1994 MKMD >--

18) Subclause A.2.4

In this subclause change:

--%PRAGMA version BIT STRING {v1990(0), v1994(1)} ::= v1990

to:

--<ASN1.Version 1990 RepertoireASN1Module >--

Also in this subclause change:

FROM Attribute-ASN1Module {joint-iso-ccitt(2) ms(9) smi(3) part2(2) asn1Module(2)}

to:

FROM Attribute-ASN1Module {joint-iso-itu-t(2) ms(9) smi(3) part2(2) asn1Module(2) 1}

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19) Subclause A.3.1

Add to this subclause these managed object class definitions (inserting in alphabetical order):

```
relationshipClassTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY relationshipClassPackagePACKAGE
        BEHAVIOUR relationshipClassBehaviour BEHAVIOUR DEFINED AS !
            A managed object with this behaviour represents a RELATIONSHIP CLASS template.
            !;;
        ATTRIBUTES
            derivedFrom GET,
            behaviour GET;;;
        CONDITIONAL PACKAGES
            relationshipClassSupportsPackage        PACKAGE
                BEHAVIOUR relationshipClassSupportsBehaviour BEHAVIOUR DEFINED AS !
                    A managed object with this behaviour represents a template that was defined with the SUPPORTS
                    construct.
                    !;;
                ATTRIBUTES
                    supports GET;
            REGISTERED AS {MKMD.mkmPackage 5}; PRESENT IF "managed object represents a template that was
                    defined with the SUPPORTS construct",
            relationshipClassQualifiedByPackage    PACKAGE
                BEHAVIOUR relationshipClassQualifiedByBehaviour BEHAVIOUR DEFINED AS !
                    A managed object with this behaviour represents a template that was defined with the QUALIFIED
                    BY construct.
                    !;;
                ATTRIBUTES
                    qualifiedBy GET;
            REGISTERED AS {MKMD.mkmPackage 6}; PRESENT IF "managed object represents a template that was
                    defined with the QUALIFIED BY construct",
            relationshipClassRoleSpecifierPackage   PACKAGE
                BEHAVIOUR relationshipClassRoleSpecifierBehaviour BEHAVIOUR DEFINED AS !
                    A managed object with this behaviour represents a template that was defined with the role-specifier
                    supporting production.
                    !;;
                ATTRIBUTES
                    roleSpecifier GET;
            REGISTERED AS {MKMD.mkmPackage 7}; PRESENT IF "managed object represents a template that was
                    defined with the role-specifier supporting production";
REGISTERED AS {MKMD.mkmMObjectClass 16};

        relationshipMappingTemplate MANAGED OBJECT CLASS
            DERIVED FROM        template;
            CHARACTERIZED BY relationshipMappingPackage PACKAGE
            BEHAVIOUR relationshipMappingBehaviour BEHAVIOUR DEFINED AS !
                A managed object with this behaviour represents a RELATIONSHIP MAPPING template.
                !;;
            ATTRIBUTES
                mappedRelationshipClass GET,
                behaviour GET,
                roleMappingSpecificationSet GET,
                registeredAs GET;;;
            CONDITIONAL PACKAGES
                relationshipMappingRelationshipObjectPackage PACKAGE
                    BEHAVIOUR    relationshipMappingRelationshipObjectBehaviour    BEHAVIOUR DEFINED AS !
                        A managed object with this behaviour represents a template that was defined with the
                        RELATIONSHIP OBJECT construct.
                        !;;
                    ATTRIBUTES
                        relationshipObject GET;
                REGISTERED AS {MKMD.mkmPackage 8}; PRESENT IF "managed object represents a template that
                        was defined with the RELATIONSHIP OBJECT construct",
```


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```
        relationshipMappingOperationsMappingPackage PACKAGE
            BEHAVIOUR relationshipMappingOperationsMappingBehaviour BEHAVIOUR DEFINED AS !
                A managed object with this behaviour represents a template that was defined with the
                OPERATIONS MAPPING construct.
                !;;
            ATTRIBUTES
                operationsMapping GET;
        REGISTERED AS {MKMD.mkmPackage 9}; PRESENT IF "managed object represents a template that
                was defined with the OPERATIONS MAPPING construct";
REGISTERED AS {MKMD.mkmMObjectClass 17};
```

20) Subclause A.3.3

In this subclause change:

```
BEHAVIOUR derivedFromBehaviour BEHAVIOUR DEFINED AS !
    This set-valued attribute identifies the immediate superclasses of a managed object class.
    !;;
```

to:

```
BEHAVIOUR derivedFromBehaviour BEHAVIOUR DEFINED AS !
    This set-valued attribute identifies the immediate superclasses of a managed object class or managed
    relationship class.
    !;;
```

Add to subclause A.3.3 these attribute definitions (inserting in alphabetical order):

```
mappedRelationshipClass ATTRIBUTE
    WITH ATTRIBUTE SYNTAX GrmAttributeDefinitionModule.MappedRelationshipClass;
    MATCHES FOR EQUALITY;
REGISTERED AS {MKMD.mkmAttribute 46};

operationsMapping ATTRIBUTE
    WITH ATTRIBUTE SYNTAX GrmAttributeDefinitionModule.OperationsMapping;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {MKMD.mkmAttribute 47};

qualifiedBy ATTRIBUTE
    WITH ATTRIBUTE SYNTAX GrmAttributeDefinitionModule.QualifiedBy;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {MKMD.mkmAttribute 48};

relationshipObject ATTRIBUTE
    WITH ATTRIBUTE SYNTAX GrmAttributeDefinitionModule.RelationshipObject;
    MATCHES FOR EQUALITY;
REGISTERED AS {MKMD.mkmAttribute 49};

roleMappingSpecificationSet ATTRIBUTE
    WITH ATTRIBUTE SYNTAX GrmAttributeDefinitionModule.RoleMappingSpecificationSet;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {MKMD.mkmAttribute 50};

roleSpecifier ATTRIBUTE
    WITH ATTRIBUTE SYNTAX GrmAttributeDefinitionModule.RoleSpecifier;
    MATCHES FOR EQUALITY;
REGISTERED AS {MKMD.mkmAttribute 51};

supports ATTRIBUTE
    WITH ATTRIBUTE SYNTAX GrmAttributeDefinitionModule.Supports;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
REGISTERED AS {MKMD.mkmAttribute 52};
```


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21) Subclause A.3.5

In this subclause change:

--%PRAGMA version BIT STRING {v1990(0), v1994(1)} ::= {v1990, v1994}

to:

--<ASN1.Version 1990, 1994 DefinitionASN1Module >--

Also in subclause A.3.5 change:

FROM Attribute-ASN1Module {joint-iso-ccitt(2) ms(9) smi(3) part2(2) asn1Module(2)}

to:

FROM Attribute-ASN1Module {joint-iso-itu-t(2) ms(9) smi(3) part2(2) asn1Module(2) 1}

Add to the same subclause this new ASN.1 module (after END of DefinitionASN1Module):

```
-- <ASN1.Version 1990, 1994 GrmAttributeDefinitionModule >--
GrmAttributeDefinitionModule {joint-iso-itu-t(2) ms(9) function(2) part16(16) asn1Modules(2) 6}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
-- EXPORTS everything;
IMPORTS
DefinedType, Identifier, OptionallyRegisteredAs, TemplateLabel, TemplateList
    FROM DefinitionASN1Module {joint-iso-itu-t(2) ms(9) function(2) part16(16) asn1Modules(2) 1}
    -- this Recommendation | International Standard
;
LabelAndParameters          ::= SEQUENCE {
                                    label                       TemplateLabel,
                                    parameters                  TemplateList OPTIONAL}
MappedRelationshipClass     ::= TemplateLabel
MappingPair                 ::= SEQUENCE {
                                    relationshipOperation       RelationshipOperation,
                                    mapsTo                      MapsTo}
MapsTo                      ::= SET OF MapsToPair
MapsToPair                  ::= SEQUENCE {
                                    systemsMgtOperation         SystemsMgtOperation,
                                    roleOrRelationshipObject    RoleOrRelationshipObject}
OperationsMapping           ::= SET OF MappingPair
OptionalIdentifier          ::= CHOICE {
                                    present                     Identifier,
                                    absent                      NULL}
OptionalIdentifierAndRole   ::= SEQUENCE {
                                    optionalOperationName       OptionalIdentifier,
                                    optionalRoleName            Identifier OPTIONAL}
OptionalLabelAndParameters  ::= SEQUENCE {
                                    label                       TemplateLabel OPTIONAL,
                                    parameters                  TemplateList OPTIONAL}
QualifiedBy                 ::= TemplateList
RelationshipObject          ::= SEQUENCE {
                                    class                       TemplateLabel,
                                    qualifies                   TemplateList OPTIONAL}
RelationshipOperation       ::= CHOICE {
                                    establish                   [0] EXPLICIT OptionalIdentifier,
                                    terminate                   [1] EXPLICIT OptionalIdentifier,
                                    query                       [2] OptionalIdentifierAndRole,
                                    notify                      [3] EXPLICIT OptionalIdentifier,
                                    userDefined                 [4] EXPLICIT OptionalIdentifier,
                                    bind                        [5] OptionalIdentifierAndRole,
                                    unbind                      [6] OptionalIdentifierAndRole}
```


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```
Representation                ::= CHOICE {
                                    nameBindingSuperior                [0] TemplateLabel,
                                    nameBindingSubordinate             [1] TemplateLabel,
                                    attribute                          [2] TemplateLabel,
                                    relationshipObjectPointer          [3] TemplateLabel,
                                    operation                          NULL}
RoleMappingSpecification      ::= SEQUENCE {
                                    role                               Identifier,
                                    relatedClasses                     TemplateList,
                                    representedBy                      [0] EXPLICIT Representation OPTIONAL,
                                    qualifies                          [1] TemplateList OPTIONAL}
RoleMappingSpecificationSet   ::= SET OF RoleMappingSpecification
RoleOrRelationshipObject      ::= CHOICE {
                                    role                               Identifier,
                                    relationshipObject                 NULL}
RoleSpecifier                 ::= SEQUENCE {
                                    role                               Identifier,
                                    compatibleWith                     [0] TemplateLabel OPTIONAL,
                                    permittedRoleCardinality           [1] DefinedType OPTIONAL,
                                    requiredRoleCardinality            [2] DefinedType OPTIONAL,
                                    bindingSupport                     [3] EXPLICIT OptionalIdentifier OPTIONAL,
                                    unbindingSupport                   [4] EXPLICIT OptionalIdentifier OPTIONAL,
                                    permittedRelationshipCardinality   [5] DefinedType OPTIONAL,
                                    optionalRegisteredAs               OptionallyRegisteredAs}
SupportedChoice               ::= CHOICE {
                                    establish                          [0] EXPLICIT OptionalIdentifier,
                                    terminate                          [1] EXPLICIT OptionalIdentifier,
                                    query                              [2] EXPLICIT OptionalIdentifier,
                                    notify                             [3] EXPLICIT OptionalIdentifier,
                                    userDefined                        [4] EXPLICIT OptionalIdentifier}
Supports                      ::= SET OF SupportedChoice
SystemsMgtOperation           ::= CHOICE {
                                    get                                [0] LabelAndParameters,
                                    replace                            [1] LabelAndParameters,
                                    add                                [2] LabelAndParameters,
                                    remove                             [3] LabelAndParameters,
                                    create                             [4] OptionalLabelAndParameters,
                                    delete                             [5] TemplateList,
                                    action                             [6] LabelAndParameters,
                                    notification                       [7] LabelAndParameters}
END
```

22) Subclause A.4.1

In this subclause, in the **DERIVED FROM** *section, remove the extraneous blank between the* double-quote *and* **CCITT**.

Also, in this subclause, in the **ATTRIBUTES** *section, change:*

discoveryId;

to:

discoveryId GET;

23) Subclause A.4.5

In this subclause change:

--%PRAGMA version BIT STRING {v1990(0), v1994(1)} ::= {v1990, v1994}

to:

--<ASN1.Version 1990, 1994 DiscoveryASN1Module >--

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Also in this subclause change:

FROM InformationFramework {joint-iso-ccitt(2) ds(5) modules(1) informationFramework(1)}
-- ITU-T Rec.X.501 | ISO/IEC 9594-2

to:

FROM InformationFramework {joint-iso-itu-t(2) ds(5) modules(1) informationFramework(1) 2}
-- NOTE – This Recommendation | International Standard imports
-- RelativeDistinguishedName from CCITT Rec. X.501 (1988) | ISO/IEC 9594-2:1990.
-- The specification for this syntax can now be found in an informative
-- annex of ITU-T Rec. X.711 (1997) | ISO/IEC 9596-1:1998.

In the same subclause, in the production for **MITSearch**, *ensure that blank space is apparent between* **discoveryScope** *and* **Scope**.

24) Subclause B.1

In this subclause change:

--%PRAGMA version BIT STRING {v1990(0), v1994(1)} ::= v1994

to:

--< ASN1.Version 1994 RepertoireDirectoryASN1Module >--

25) Subclause B.2

In this subclause change:

--%PRAGMA version BIT STRING {v1990(0), v1994(1)} ::= v1994

to:

--< ASN1.Version 1994 DefinitionDirectoryASN1Module >--

Add to this subclause this new ASN.1 module (after **END** *of DefinitionDirectoryASN1Module):*

--<ASN1.Version 1994 GrmDefinitionDirectoryASN1Module >--
GrmDefinitionDirectoryASN1Module {joint-iso-itu-t(2) ms(9) function(2) part16(16) asn1Modules(2) 7}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
-- EXPORTS everything;
IMPORTS
ATTRIBUTE, OBJECT-CLASS, CONTENT-RULE
FROM InformationFramework {joint-iso-itu-t(2) ds(5) modules(1) informationFramework(1) 2}
-- ITU-T Rec. X.501 | ISO/IEC 9594-2
behaviour, derivedFrom, managementTemplate, registeredAs, registeredInformation
FROM DefinitionDirectoryASN1Module
{joint-iso-itu-t(2) ms(9) function(2) part16(16) asn1Modules(2) 4}
-- this Recommendation | International Standard
MappedRelationshipClass, MappingPair, RelationshipObject, RoleMappingSpecification, RoleSpecifier, SupportedChoice
FROM GrmAttributeDefinitionModule
{joint-iso- itu-t(2) ms(9) function(2) part16(16) asn1Modules(2) 6}
-- this Recommendation | International Standard
mkmDirectoryObjectClass, mkmDirectoryAttributeType
FROM MKMD {joint-iso- itu-t(2) ms(9) function(2) part16(16) asn1Modules(2) 5}
-- this Recommendation | International Standard
;

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```
managementRelationshipClass OBJECT-CLASS  ::=  {
        SUBCLASS OF     managementTemplate
        KIND            auxiliary
        MUST CONTAIN    { derivedFrom |
                        behaviour }
        MAY CONTAIN     { supports |
                        qualifiedBy |
                        roleSpecifier }
        ID              { mkmDirectoryObjectClass 16 }}

managementRelationshipMapping OBJECT-CLASS    ::=  {
        SUBCLASS OF     managementTemplate
        KIND            auxiliary
        MUST CONTAIN    { mappedRelationshipClass |
                        behaviour |
                        roleMappingSpecificationSet |
                        registeredAs }
        MAY CONTAIN     { relationshipObject |
                        operationsMapping }
        ID              { mkmDirectoryObjectClass 17 }}

-- Definition of DIT content rules
-- Only one of the specified auxiliary object classes can be
-- included in a given entry of class registeredInformation
registeredManagementRelationshipInformationCR      CONTENT-RULE ::= {
        STRUCTURAL OBJECT CLASS         registeredInformation
        AUXILIARY OBJECT CLASS          { managementRelationshipClass |
                                        managementRelationshipMapping }}

-- Definition of used attributes
mappedRelationshipClass ATTRIBUTE ::=  {
        WITH SYNTAX     MappedRelationshipClass
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 47 }}

operationsMapping ATTRIBUTE  ::=  {
        WITH SYNTAX     MappingPair
        ID              { mkmDirectoryAttributeType 48 }}

qualifiedBy ATTRIBUTE     ::=  {
        WITH SYNTAX     TemplateLabel
        ID              { mkmDirectoryAttributeType 49 }}

relationshipObject ATTRIBUTE   ::=  {
        WITH SYNTAX     RelationshipObject
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 50 }}

roleMappingSpecificationSet ATTRIBUTE         ::=  {
        WITH SYNTAX     RoleMappingSpecification
        ID              { mkmDirectoryAttributeType 51 }}

roleSpecifier ATTRIBUTE    ::=  {
        WITH SYNTAX     RoleSpecifier
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 52 }}

supports ATTRIBUTE   ::=  {
        WITH SYNTAX     SupportedChoice
        ID              { mkmDirectoryAttributeType 53 }}
END
```

26) Annexes A to F

Add this footnote to the titles of Annexes A to F (and renumber the existing two footnotes):

1) Users of this Recommendation | International Standard may freely reproduce the contents of this annex so that it can be used for its intended purpose.

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27) Subclause C.1.3

In this subclause, add the following text after the line:

– Not applicable or out of scope

The value of 'm' in Status column for the receiving of parameters, of tables of type MICS or PICS, 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.

28) Subclause C.4

In Table C.3, add these rows in index order (after existing rows):

17	Relationship class template managed object class	c6		
18	Relationship mapping template managed object class	c6		

In Table C.5, change the status from m *to* o *and add the following Note to the table:*

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

In Table C.6, add these rows in index order (after existing rows):

17	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.85-E.90	relationship class template managed object class	–	c26			
18	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.91-E.96	relationship mapping template managed object class	–	c27			

Following Table C.6, add these conditions after existing ones:

c26: if C.3/17a then m else –

c27: if C.3/18a then m else –

29) Subclause D.3.1

In Table D.1, add these rows in index order (after existing rows for first set of columns and before second set of columns):

50	mappedRelationshipClass	{MKMD.mkmAttribute 46}	–	–		o.4	
51	operationsMapping	{MKMD.mkmAttribute 47}	–	–		o.4	
52	qualifiedBy	{MKMD.mkmAttribute 48}	–	–		o.4	
53	relationshipObject	{MKMD.mkmAttribute 49}	–	–		o.4	
54	roleMappingSpecificationSet	{MKMD.mkmAttribute 50}	–	–		o.4	
55	roleSpecifier	{MKMD.mkmAttribute 51}	–	–		o.4	
56	supports	{MKMD.mkmAttribute 52}	–	–	–	o.4	

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In Table D.1, add these rows in index order (after existing rows for second set of columns):

50	–		–		–		–		
51	–		–		–		–		
52	–		–		–		–		
53	–		–		–		–		
54	–		–		–		–		
55	–		–		–		–		
56	–		–		–		–		

30) New subclauses E.3.16 and E.3.17

At the end of Annex E (after Table E.84), add the new subclauses E.3.16 and E.3.17 and the following tables:

E.3.16 Relationship class template managed object class

Table E.85 – Relationship class template 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	relationshipClassTemplate	{MKMD.mkmMObjectClass 16}		

If the answer to the actual class question in Table E.85 is No, the supplier of the implementation shall fill in the actual class support Table E.86.

Table E.86 – Actual class support

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

Table E.87 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		
2	relationshipClassSupports Package	{MKMD.mkmPackage 5}	–			
3	relationshipClassQualifiedByPackage	{MKMD.mkmPackage 6}	–			
4	relationshipClassRoleSpecifierPackage	{MKMD.mkmPackage 7}	–	o		

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Table E.88 – Relationship class template managed object attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Set by create		Get	
				Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c76	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c77	
7	derivedFrom	{MKMD.mkmAttribute 10}	–	x		m	
8	behaviour	{MKMD.mkmAttribute 15}	–	x		m	
9	supports	{MKMD.mkmAttribute 52}	–	x		c78	
10	qualifiedBy	{MKMD.mkmAttribute 48}	–	x		c79	
11	roleSpecifier	{MKMD.mkmAttribute 51}	–	x		c80	

c76: if (not E.85/1b) then m else –
c77: if E.87/1a then m else –
c78: if E.87/2a then m else –
c79: if E.87/3a then m else –
c80: if E.87/4a then m else –

Table E.88 *(concluded)*

Index	Replace		Add		Remove		Set to default		Additional information
	Status	Support	Status	Support	Status	Support	Status	Support	
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		–		–		–		
8	x		–		–		–		
9	x		–		–		–		
10	x		–		–		–		
11	x		–		–		–		

Table E.89 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c77		

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Table E.89 *(concluded)*

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.90 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailableViaThisAction	{MKMD.mkmParameter 1}		c77		

E.3.17 Relationship mapping template managed object class

Table E.91 – Relationship mapping template 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	relationshipMappingTemplate	{MKMD.mkmMObjectClass 17}		

If the answer to the actual class question in Table E.91 is No, the supplier of the implementation shall fill in the actual class support Table E.92.

Table E.92 – Actual class support

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

Table E.93 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		
2	relationshipMappingRelationshipObjectPackage	{MKMD.mkmPackage 8}	–			
3	relationshipMappingOperationsMapp ingPackage	{MKMD.mkmPackage 9}	–			

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Table E.94 – Relationship mapping template managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c81	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c82	
7	mappedRelationshipClass	{MKMD.mkmAttribute 46}	–	x		m	
8	behaviour	{MKMD.mkmAttribute 15}	–	x		m	
9	roleMappingSpecificationSet	{MKMD.mkmAttribute 50}	–	x		m	
10	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	
11	relationshipObject	{MKMD.mkmAttribute 49}	–	x		c83	
12	operationsMapping	{MKMD.mkmAttribute 47}	–	x		c84	

c81: if (not E.91/1b) then m else –

c82: if E.93/1a then m else –

c83: if E.93/2a then m else –

c84: if E.93/3a then m else –

Table E.94 *(concluded)*

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

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Table E.95 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c82		

Table E.95 *(concluded)*

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.96 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailabl eViaThisAction	{MKMD.mkmParameter 1}		c82		

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INTERNATIONAL STANDARD

ISO/IEC 10164-16

First edition
1997-05-15

Information technology — Open Systems Interconnection — Systems Management: Management knowledge management function

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

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Contents

		Page
1	Scope	1
2	Normative references	1
	2.1 Identical ITU-T Recommendations | International Standards	2
	2.2 Paired ITU-T Recommendations | International Standards equivalent in technical content	3
	2.3 Additional references	3
3	Definitions	3
	3.1 Basic reference model definitions	4
	3.2 Application layer structure definitions	4
	3.3 OSI conformance testing definitions	4
	3.4 Directory definitions	4
	3.5 Management framework definitions	5
	3.6 Systems management overview definitions	5
	3.7 CMIS definitions	5
	3.8 Management information model definitions	5
	3.9 Guidelines for the definition of managed objects definitions	6
	3.10 Requirements and guidelines for ICS proformas associated with OSI management definitions	6
	3.11 General relationship model definitions	6
	3.12 Additional definitions	6
4	Abbreviations	6
5	Conventions	7
6	Requirements	8
	6.1 Managed object class knowledge	8
	6.2 Managed object class instance knowledge	9
	6.3 Relationship knowledge	9
	6.4 MIS-user knowledge	9
	6.5 Management information definition knowledge	9
7	Model	9
	7.1 Management knowledge managed objects	10
	7.2 Management knowledge Directory objects	11
	7.3 Relationship between management knowledge requirements and model	17
8	Generic definitions	18
	8.1 Managed objects	18
	8.2 Name bindings	22
	8.3 Actions	23

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STD.ISO 10164-16-ENGL 1997 ■ 4851903 0709872 366 ■

8.4 Compliance 24
8.5 Generic definitions from the Object management function 24
8.6 Directory objects 24

9 Service definition 26
9.1 Introduction 26
9.2 Management knowledge managed objects 27
9.3 Notification services 27
9.4 Action services 27
9.5 Directory services 28

10 Systems management functional units 28

11 Protocol and abstract syntax 29
11.1 Abstract syntax 29
11.2 Get textual representation elements of procedure 33
11.3 Management information tree search elements of procedure 35
11.4 Negotiation of functional units 36
11.5 CMIP features 36

12 Relationships with other functions and the Directory 36

13 Conformance 36
13.1 Static conformance 36
13.2 Dynamic conformance 37
13.3 Management implementation conformance statement requirements 37

Annex A – Management knowledge managed objects 38
A.1 Allocation of object identifiers 38
A.2 Repertoire managed object definitions 38
A.3 Definition managed object definitions 41
A.4 Discovery managed object definitions 51

Annex B – Management knowledge Directory objects 53
B.1 Repertoire Directory object definitions 53
B.2 Definition Directory object definitions 54

Annex C – MCS proforma 60
C.1 Introduction 60
C.2 Identification of the implementation 61
C.3 Identification of the documents in which the management information is defined 62
C.4 Management conformance summary 62

Annex D – MICS proforma 67
D.1 Introduction 67
D.2 Instructions for completing the MICS proforma to produce an MICS 67
D.3 Statement of conformance to the management information 67

Annex E – MOCS proforma 71
E.1 Introduction 71
E.2 Instructions for completing the MOCS proforma to produce an MOCS 71
E.3 Statements of conformance to the managed object classes 71

Annex F – MRCS proforma 101
F.1 Introduction 101
F.2 Instructions for completing the MRCS proforma for name binding to produce an MRCS 101
F.3 Statement of conformance to the name binding 101

Annex G – Guidelines for use of management knowledge objects 103

Annex H – Access options for the definition knowledge directory tree 104

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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 10164-16 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.750.

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: Usage metering function for accounting purposes*

— *Part 11: Metric objects and attributes*

— *Part 12: Test Management Function*

— *Part 13: Summarization Function*

— *Part 14: Confidence and diagnostic test categories*

— *Part 15: Scheduling function*

— *Part 16: Management knowledge management function*

— *Part 17: Change over function*

— *Part 18: Software management function*

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— *Part 19: Management domain and management policy management functions*

— *Part 20: Time management function*

— *Part 21: Command sequencer*

— *Part 22: Response time monitoring function*

Annexes A to F form an integral part of this part of ISO/IEC 10164. Annexes G and H are for information only.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

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

1 Scope

This Recommendation | International Standard defines the Management knowledge management function. The Management knowledge management function is a Systems Management function which may be used by an application process in a centralized or decentralized management environment to interact for the purpose of systems management, as defined by the OSI Management framework, CCITT Rec. X.700 and ISO/IEC 7498-4. This Recommendation | International Standard defines a function which consists of generic definitions and services. This function is positioned in the application layer of the OSI reference model, ITU-T Rec. X.200 | ISO/IEC 7498-1, and is defined according to the model provided by ITU-T Rec. X.207 | ISO/IEC 9545. The role of systems management functions is described by CCITT Rec. X.701 | ISO/IEC 10040.

This Recommendation | International Standard:

- identifies the set of requirements satisfied by the function;
- provides a model for the behaviour of management knowledge objects;
- specifies the management requirements of the function and how these are realized by specification of managed objects and their behaviour or by specification of Directory objects;
- specifies the mapping of these services onto the CMIS services;
- specifies the abstract syntax of the parameters of the MAPDUs that will be used to refer to managed objects and their characteristics.

This Recommendation | International Standard does not:

- define the nature of any implementation intended to provide the Management knowledge management function;
- specify the manner in which management is to be accomplished by the user of the Management knowledge management function;
- define the nature of any interactions which result in the use of the Management knowledge management function;
- specify the services necessary for the establishment, normal and abnormal release of a management association;
- define the interactions which result by the simultaneous use of several management functions;
- define connection establishment or authorization requirements for the use of these functions or for any associated activity;
- preclude the definition of further management knowledge object classes.

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 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 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.

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2.1 Identical ITU-T Recommendations | International Standards

- ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model.*
- ITU-T Recommendation X.207 (1993) | ISO/IEC 9545:1994, *Information technology – Open Systems Interconnection – Application Layer structure.*
- ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services.*
- ITU-T Recommendation X.217 (1995) | ISO/IEC 8649:1996 *Information technology – Open Systems Interconnection – Service definition for the Association Control Service Element.*
- ITU-T Recommendation X.501 (1993) | ISO/IEC 9594-2:1995, *Information technology – Open Systems Interconnection – The Directory: Models.*
- ITU-T Recommendation X.511 (1993) | ISO/IEC 9594-3:1995, *Information technology – Open Systems Interconnection – The Directory: Abstract service definition.*
- ITU-T Recommendation X.520 (1993) | ISO/IEC 9594-6:1995, *Information technology – Open Systems Interconnection – The Directory: Selected attribute types.*
- ITU-T Recommendation X.521 (1993) | ISO/IEC 9594-7:1995, *Information technology – Open Systems Interconnection – The Directory: Selected object classes.*
- ITU-T Recommendation X.680 (1994) | ISO/IEC 8824-1:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*
- ITU-T Recommendation X.681 (1994) | ISO/IEC 8824-2:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- ITU-T Recommendation X.682 (1994) | ISO/IEC 8824-3:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- ITU-T Recommendation X.683 (1994) | ISO/IEC 8824-4:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications.*
- ITU-T Recommendation X.690 (1994) | ISO/IEC 8825-1:1995, *Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER).*
- 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.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.*
- 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.*
- ITU-T Recommendation X.725 (1995) | ISO/IEC 10165-7:1996, *Information technology – Open Systems Interconnection – Structure of management information: General relationship model.*
- CCITT Recommendation X.730 (1992) | ISO/IEC 10164-1:1993, *Information technology – Open Systems Interconnection – Systems Management: Object Management Function.*
- CCITT Recommendation X.735 (1992) | ISO/IEC 10164-6:1993, *Information technology – Open Systems Interconnection – Systems Management: Log control function.*
- ITU-T Recommendation X.741 (1995) | ISO/IEC 10164-9:1995, *Information technology – Open Systems Interconnection – Systems Management: Objects and attributes for access control.*

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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.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.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 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.*

- CCITT Recommendation X.711 (1991), *Common management information protocol specification for CCITT applications.*

  ISO/IEC 9596-1:1991, *Information technology – Open Systems Interconnection – Common management information protocol – Part 1: Specification.*

2.3 Additional references

- ISO/IEC ISP 11183-1:1992, *Information technology – International Standardized Profiles AOM1n OSI Management – Management Communications – Part 1: Specification of ACSE, presentation and session protocols for the use by ROSE and CMISE.*

- ISO/IEC ISP 11183-2:1992, *Information technology – International Standardized Profiles AOM1n OSI Management – Management Communications – Part 2: CMISE/ROSE for AOM12 – Enhanced Management Communications.*

- ISO/IEC ISP 11183-3:1992, *Information technology – International Standardized Profiles AOM1n OSI Management – Management Communications – Part 3: CMISE/ROSE for AOM11 – Basic Management Communications.*

3 Definitions

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

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3.1 Basic reference model definitions

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

a) open system;

b) (N)-protocol data unit;

c) systems management;

d) systems management application entity.

3.2 Application layer structure definitions

This Recommendation | International Standard makes use of the following term defined in ITU-T Rec. X.207 | ISO/IEC 9545:

– application service element.

3.3 OSI conformance testing definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.290 and ISO/IEC 9646-1 and ITU-T Rec. X.296 and ISO/IEC 9646-7:

a) ICS proforma;

b) implementation conformance statement;

c) PICS proforma;

d) protocol implementation conformance statement.

3.4 Directory definitions

This Recommendation | International Standard makes use of the following terms defined in ITU-T Rec. X.501 | ISO/IEC 9594-2:

a) alias entry;

b) attribute;

c) auxiliary object class;

d) Directory entry;

e) Directory information tree;

f) Directory name;

g) Directory object class;

h) Directory system agent;

i) Directory user agent;

j) distinguished name;

k) DIT content rule;

l) relative distinguished name;

m) structural object class;

n) subordinate;

o) superior;

p) the Directory.

NOTE – The terms "attribute", "distinguished name", "relative distinguished name", "subordinate" and "superior" are defined in both ITU-T Rec. X.501 | ISO/IEC 9594-2 and either CCITT Rec. X.710 and ISO/IEC 9595 or CCITT Rec. X.720 | ISO/IEC 10165-1 because of similarities between the Directory model and the Management information model. However, the uses of these terms in the two models are not identical in all details. The context of use, a Directory object or a managed object, identifies the appropriate definition.

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3.5 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.

3.6 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) generic definitions;
d) managed system;
e) managed object conformance statement;
f) management information;
g) management information conformance statement;
h) management operation;
i) manager;
j) manager role;
k) managing system;
l) MICS proforma;
m) MIS-user;
n) MOCS proforma;
o) notification;
p) notification type;
q) systems management application service element;
r) systems management functional unit.

3.7 CMIS definitions

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

a) attribute;
b) common management information service element;
c) common management information service(s);
d) set-valued (attribute).

3.8 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) allomorphic class;
d) attribute group;
e) attribute identifier;
f) attribute type;
g) behaviour;
h) characteristic;

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i) conditional package;

j) containment;

k) distinguished name;

l) instantiation;

m) mandatory package;

n) name binding;

o) naming tree;

p) package;

q) parameter;

r) relative distinguished name;

s) specialization;

t) subclass;

u) superclass;

v) subordinate (object);

w) superior (object).

3.9 Guidelines for the definition of managed objects definitions

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

a) managed object class definition;

b) template.

3.10 Requirements and guidelines for ICS proformas associated with OSI management definitions

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

a) managed relationship conformance statement;

b) management conformance summary;

c) MCS proforma;

d) MRCS proforma.

3.11 General relationship model definitions

This Recommendation | International Standard makes use of the following term defined in ITU-T Rec. X.725 | ISO/IEC 10165-7:

– managed relationship.

3.12 Additional definitions

3.12.1 management knowledge object: A managed object or a Directory object that makes management knowledge available.

4 Abbreviations

For the purposes of this Recommendation | International Standard, the following abbreviations apply:

ACSE	Association Control Service Element
ASE	Application Service Element
ASN.1	Abstract Syntax Notation One

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CMIP	Common Management Information Protocol
CMIS	Common Management Information Service
CMISE	Common Management Information Service Element
Cnf	Confirm
DIT	Directory Information Tree
DKDT	Definition Knowledge Directory Tree
DSA	Directory System Agent
DUA	Directory User Agent
GDMO	Guidelines for the Definition of Managed Objects
ICS	Implementation Conformance Statement
Id	Identifier
Ind	Indication
ISP	International Standardized Profile
MAPDU	Management Application Protocol Data Unit
MCS	Management Conformance Summary
MICS	Management Information Conformance Statement
MIS	Management Information Service
MKM	Management Knowledge Management Function
MOCS	Managed Object Conformance Statement
MRCS	Managed Relationship Conformance Statement
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
RDN	Relative Distinguished Name
Req	Request
Rsp	Response
SMAE	Systems Management Application Entity
SMAPM	Systems Management Application Protocol Machine
SMASE	Systems Management Application Service Element

5 Conventions

This Recommendation | International Standard defines services for the Management knowledge management function following the descriptive conventions defined in ITU-T Rec. X.210 | ISO/IEC 10731.

The following notation is used in the service parameter tables:

M	The parameter is mandatory
C	The parameter is conditional
(=)	The value of the parameter is identical to the corresponding parameter in the interaction described by the preceding related service primitive
U	The use of the parameter is a service-user option
–	The parameter is not present in the interaction described by the primitive concerned
P	The parameter is subject to the constraints imposed by ITU-T Rec. X.710 and ISO/IEC 9595.

NOTE – The parameters which 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

Open systems which are participating, or may participate, in OSI Systems Management associations require specific knowledge in order to determine the peer open systems with which to associate, to enable association and to fulfil the functions of OSI Systems Management. Particular requirements, categorized by field of knowledge, are listed herein.

Three types of management knowledge are identified:

- *Repertoire knowledge*: Information on what the managed system is capable of performing. There are three categories of capabilities:
  - managed object class capabilities;
  - managed relationship class capabilities;
  - function capabilities.

  There is a need for a manager to be able to discover capabilities of managed systems without accessing each managed system.
- *Definition knowledge*: Information on the formal specification of managed object classes, name bindings, etc., e.g. templates for classes, name bindings.
- *Instance knowledge*; Information regarding what managed objects and managed relationships are made visible by a managed system and what systems management application entities can be used to establish an association to a managed system that makes a given managed object visible.

Knowledge sharing mechanisms shall preserve all access control requirements upon the open systems about which information is provided. In particular, knowledge sharing mechanisms for the purpose of OSI Systems Management shall not expose information to a given user if that user is otherwise prohibited from obtaining that information when using OSI Systems Management services.

The requirements necessary to acquire repertoire, definition and instance knowledge are subdivided into the following five major categories (see Table 1).

Table 1 – Requirements

		Types of management knowledge		
Subclause	Major categories	Repertoire knowledge	Definition knowledge	Instance knowledge
6.1	Managed object class knowledge	X		
6.2	Managed object class instance knowledge			X
6.3	Relationship knowledge	X		X
6.4	MIS-user knowledge	X		X
6.5	Management information definition knowledge		X	

6.1 Managed object class knowledge

There is a need to determine the following repertoire knowledge:

- the managed object classes that can be made available by a given managed system;
- the constraints imposed upon managed objects of a given class (e.g. the implemented value set for a given attribute);
- for a given managed object class, the conditional packages that are always included and those that are never included in an instance of the class;
- the initial values of an instance of a particular class that can be created in a given managed system;
- the supported allomorphs for each supported managed object class.

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6.2 Managed object class instance knowledge

Without obligatory recourse to the CMIS multiple object selection functional unit, there is a need to determine the following instance knowledge:

- the instances of a given managed object class made visible by a given managed system;
- the managed systems making a given managed object visible;
- how many instances of a given managed object class are made visible by a given managed system.

6.3 Relationship knowledge

There is a need to determine the following repertoire knowledge:

- the relationship classes supported by a given managed system;
- the relationship role bindings, including name bindings, that may exist between managed object classes made visible by a given managed system;

as well as the following instance knowledge:

- the relationship instances that exist between managed objects made visible by a given managed system or by different managed systems.

6.4 MIS-user knowledge

There is a need to determine the following repertoire knowledge:

- the SMAE titles of the managed systems or managing systems with which management associations can be established;
- the presentation addresses of those SMAEs;
- the application contexts supported by those SMAEs, including the syntaxes and identifiers of information associated with those application contexts;
- which functional units for SMASE, CMISE, ACSE and any additional ASEs used for management purposes are supported by those SMAEs for systems management associations;
- which standard profiles are supported,

as well as the following instance knowledge:

- given a global name of a managed object, the systems management application entities that can be used to establish an association to a managed system that makes the managed object visible.

6.5 Management information definition knowledge

There is a need to determine the following definition knowledge:

- the formal definitions of management information, including managed object classes, name bindings, test categories, relationship classes and all attendant information;

  NOTE – Where a Directory service is available, some or all of this information may be held in and made available through such a Directory service. Definitions for such a solution are provided in Annex B;
- which management information definitions are understood by a given managing system?

7 Model

This model discusses how information on various types of management knowledge can be made available. This information is specified as:

1) managed objects according to the Guidelines for the definition of managed objects, CCITT Rec. X.722 | ISO/IEC 10165-4; or
2) Directory objects according to The Directory: Models, ITU-T Rec. X.501 | ISO/IEC 9594-2.

These management knowledge objects are described in 7.1 and 7.2 respectively.

This model is consistent with the way standardized management knowledge is specified in CCITT Rec. X.701 | ISO/IEC 10040.

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7.1 Management knowledge managed objects

The model for managed objects which are used to store and share particular aspects of management knowledge follows.

7.1.1 Repertoire managed objects

Repertoire managed objects satisfy the requirement to identify information on what a managed system is capable of performing.

7.1.1.1 Repertoire managed objects

Repertoire managed objects satisfy requirements for determining the managed object classes, name bindings, managed relationship classes and CMIP profiles which are supported by a managed system.

Managed objects of the repertoire managed object class make available lists of the managed object classes supported by the managed system. This list includes actual classes and allomorphic classes. A list of name bindings and a list of relationship classes supported by the managed system are also made available. An instance of the repertoire managed object that represents the managed system components that support communications also has an attribute that identifies the CMIP profiles that are supported by the managed system.

The use of a fixed relative distinguished name for naming a repertoire managed object allows for a common way to access that repertoire managed object. Therefore, a name binding is provided to support the containment of a repertoire managed object within a system managed object, with a fixed relative distinguished name. If a managed system has any repertoire managed objects, it must have one named under system with the RDN value of "REP1". The repertoire information may also be made available by other means, for instance using the Directory.

An instance of the repertoire managed object class may contain subordinate managed object class repertoire managed objects, each of which makes available knowledge of the conditional packages supported for a particular managed object class.

7.1.1.2 Managed object class repertoire managed objects

Managed object class repertoire managed objects and their subclasses identify information pertaining to the implementation of a managed object class. They may be named by the managed object class repertoire Id attribute, the value of which is the object identifier of the class for which implementation information is represented. They may be contained within a repertoire managed object.

A managed object class repertoire managed object has a set-valued attribute to identify the conditional packages supported by the implementation.

A managed object class repertoire managed object may have a set-valued attribute to identify the implemented values (e.g. initial values, value ranges and default values).

7.1.2 Definition managed objects

Definition managed objects satisfy the requirement to identify management information definitions.

Knowledge of definitions is required during association. Some managing systems will only be able to make limited use of definition knowledge gained during association. For example, simple managing systems will find the classes of managed object managed by a managed system to be of use if and only if they already have support for those classes or compatible classes.

Other managing systems will have greater capability in that they will be able to interpret definitions shared during association thereby providing users with some capability to manage managed objects of hitherto unknown classes. For example, a managing system may be able to ask a managed system which actions are supported by a particular managed object class. For those actions already known to the interrogating managing system, support is already available. For unknown actions, it may be possible to obtain further information, such as the syntax of requests.

Inevitably, such interrogation will lead to information which cannot be used without knowledge of its semantics. However there is no reason in principle why descriptions of managed object classes cannot be made available to intelligent users and there is no reason in principle why such users should be prohibited from using such information. A case in point is the event report: whilst a managing system which has not hitherto known of a particular notification cannot be expected to take particular action upon receiving such a notification, there may be a requirement for as much as possible of the information about that notification to be made available to users. This could entail requests to the issuing managed system for the GDMO specification of the notification and for the syntax of its argument. This would facilitate decoding of the notification and display of its argument.

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There are two approaches to the specification of definition managed objects. Either the definition managed object contains specifications as a textual form attribute or it has attributes which represent elements of specifications. The former is very simple and facilitate sharing of the information in the same format as it might be received from any textual source. The latter provides OSI Management with access to every feature of the specification.

The granularity at which definition knowledge should be shared can be determined by examining the requirements of the users of such information. Users fall into two categories – those that wish to browse the information, such as to determine the attributes of a particular managed object class, for example, and those that wish to interpret it, such as an ASN.1 or GDMO compiler. Interpreters generally will use text input. Browsers may wish simply to retrieve the information in its textual form and scan it at their leisure. However, some may wish access to specific elements of knowledge to determine the feasibility and potential value of attempting to manage managed objects of hitherto unknown classes. For example, such information may be required for configuring event forwarding discriminators.

There are three types of definition managed objects: document managed objects, template managed objects and ASN.1 module managed objects. Document managed objects represent a collection of templates and ASN.1 modules, and have attributes which identify the name and identifier of the document, as specified by GDMO, and the GDMO and ASN.1 specifications in textual form. Template managed objects are contained within document managed objects, are named by the GDMO template label and have attributes which represent the template constructs. ASN.1 module managed objects are contained within document managed objects, are named by the ASN.1 module reference and have attributes representing the registered object identifier, if any, the ASN.1 version and the ASN.1 module in textual form.

Two name bindings are provided to support the containment of a document managed object within a system managed object. These name bindings do not preclude additional name bindings, that would allow definition information to be accessed by use of Directory services or through third parties by use of systems management services.

7.1.3 Discovery managed objects

Discovery managed objects satisfy the requirements to identify managed objects made visible by a managed system.

Discovery of the managed objects that a system makes visible is required, independent of the level of CMIP capability possessed. Conformance to CMIP does not require the implementation of scoping capabilities. This precludes the use of scoping over the managed objects made visible by a managed system. The concept of a discovery managed object satisfies this need.

The discovery managed object employs a tree discovery action. The action argument has the base object, the required scope of the search and an optional class request parameter. The response is a set of rooted tree structures that together cover the requested scope under the requested base object. Each rooted tree has the distinguished name of its root but does not repeat common name components within its structure, i.e. only the RDN is used to identify subordinate managed objects.

The action response shall, if specified in the request, also report the managed object class of each managed object in the scope of the search.

The action response may be split across multiple linked replies. The manager can construct the complete set of managed objects that are within the specified scope by combining the contents of all linked replies.

The use of a fixed relative distinguished name for naming the discovery managed object allows for a common way to access the discovery managed object. Therefore, a name binding is provided to support the containment of a discovery managed object within a system managed object, with a fixed relative distinguished name.

7.2 Management knowledge Directory objects

The strength of the Directory is the provision of relatively static information. Therefore, in the context of Management knowledge management, Directory objects are used to store repertoire knowledge related to managed systems (e.g. the presentation address of a systems management application entity) and definition knowledge (see Figure 1).

7.2.1 Repertoire Directory objects

The requirement to identify MIS-users can be met by the use of repertoire Directory objects. The use of the Directory (as described in Figure 1) satisfies the requirements for the following repertoire knowledge:

- Directory name of a systems management application entity;
- presentation address of a systems management application entity;
- application contexts supported by a systems management application entity;
- functional units supported by a systems management application entity;

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- CMIP profiles supported by a systems management application entity;
- list of the managed objects made visible by a systems management application entity;
- given a global name of a managed object, which systems management application entities can be used to establish an association to a managed system that makes the managed object visible.

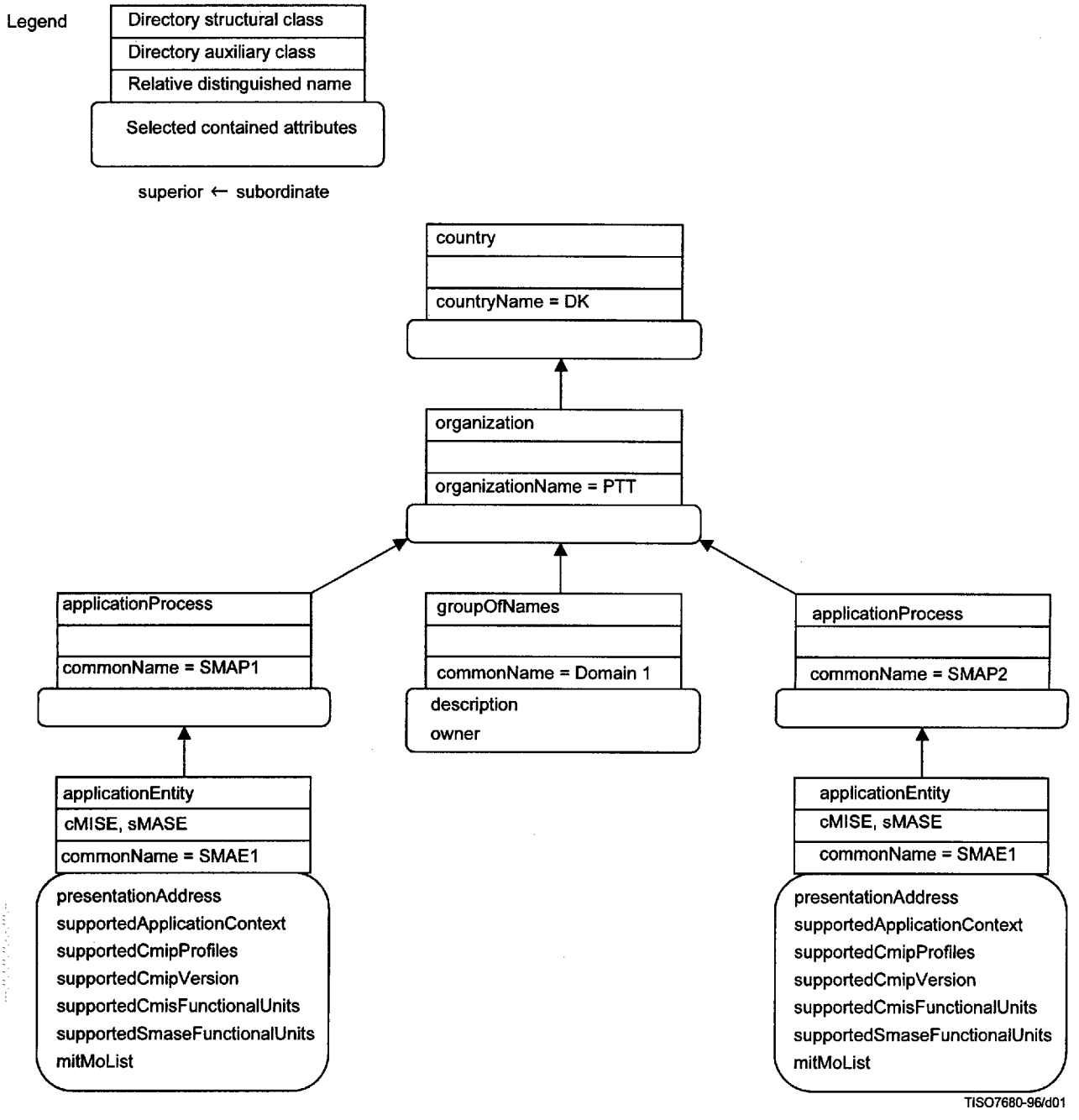


Figure 1 – Use of the Directory for repertoire knowledge

Repertoire knowledge on the systems management application entities of managing and managed systems is provided in the Directory by instances of the Directory structural object class Application Entity. The specific characteristics of systems management application entities are covered by the definition of the Directory auxiliary object classes Systems management application service element and Common management information service element which will be included in an instance of class Application Entity. An instance of class Application Entity may contain attributes that make available the presentation address and the supported application contexts.

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The auxiliary object class Systems management application service element makes available the supported systems management application service functional units. It may also have an attribute that identifies the managed object classes supported and optionally lists the managed objects of a class that remain in existence for a relatively long time.

The auxiliary object class Common management information service element makes available the supported common management information service functional units, the supported CMIP version and the supported CMIP profiles.

A manager can use the information stored in the Directory in the following way (see Figure 2):

1) if a manager does not know the managed systems it may manage, the manager reads the list of the Directory entries representing managed systems from the member attribute of a Directory entry of class groupOfNames {countryName = DK, organizationName = PTT, commonName = Domain1};

2) in order to find the systems management application entities that can be used to establish an association to the managed system it wants to operate on, the manager issues a Directory Search operation using the name returned above and requests that the presentation address, and optionally other protocol-related information such as the supported application contexts or supported CMIS functional units, be returned. In order to find the systems management application entity that is best suited to the needs of the manager, the search can be based on the values of attributes defined by the structural Directory object class Application Entity, for example, Supported application context, or on the values of attributes defined by the Directory auxiliary object classes Systems management application service element and Common management information service element, for example, Supported SMASE functional units or Supported CMIP version;

3) the manager selects one systems management application entity from the returned list of application entities that satisfies the needs of the manager and uses the obtained presentation address to establish a management association with the managed system it wants to operate on.

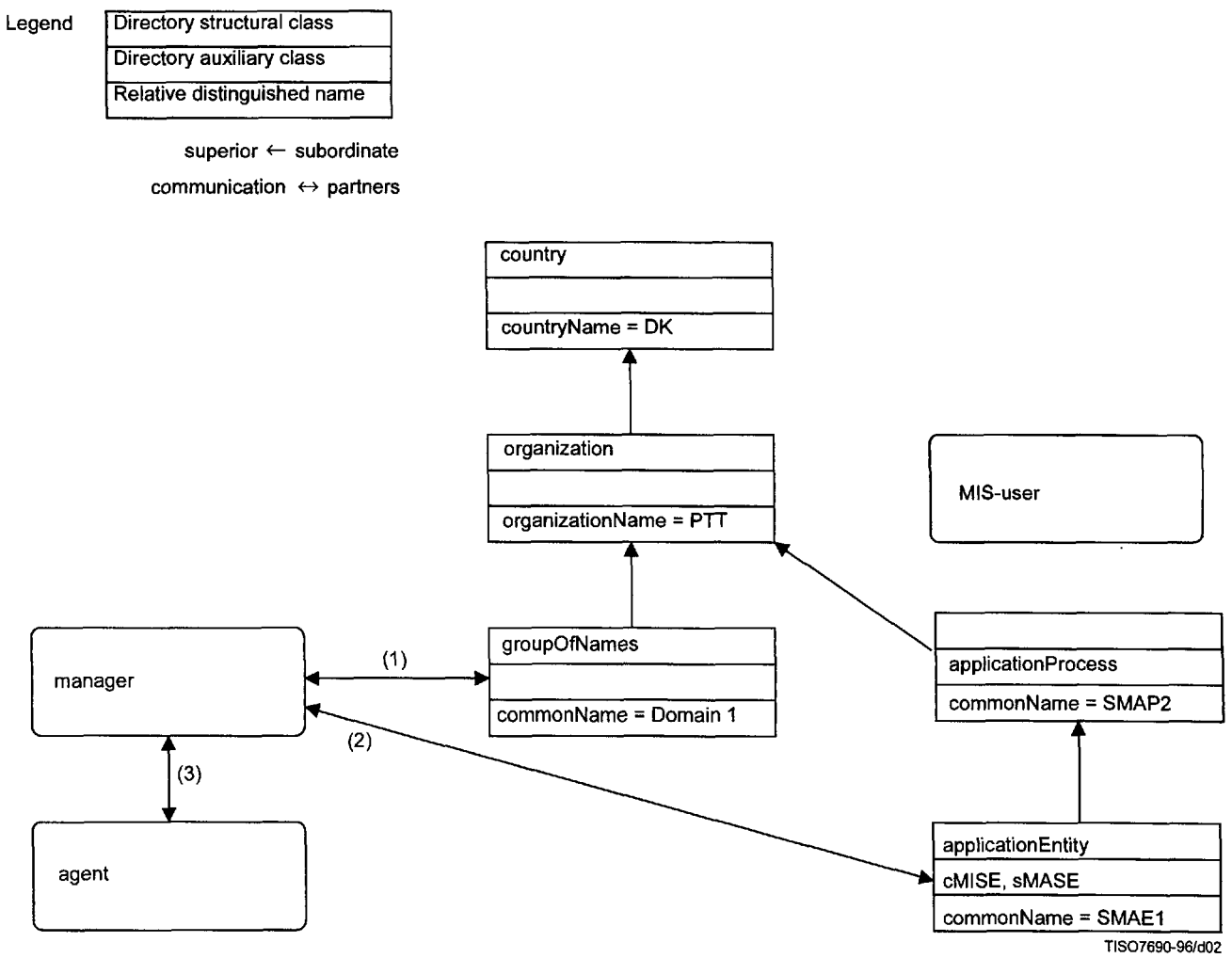


Figure 2 – Example of a manager using repertoire Directory objects

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An agent can use the information stored in the Directory in the following way (see Figure 3):

1) if an event report has to be forwarded to a manager, the agent obtains the manager's application entity title from the destination attribute of the event forwarding discriminator. The agent reads the presentation address of the systems management application entities from the Directory entry that is named by the manager's application entity title. (For the example, the manager's application entity title is {countryName = DK, organizationName = PTT, commonName = SMAP2, commonName = SMAE1}.) If the agent is also interested in other attributes, such as the supported CMIS and systems management functional units, it also reads them from the Directory entry;

2) the agent establishes a management association with the systems management application entity at the obtained presentation address.

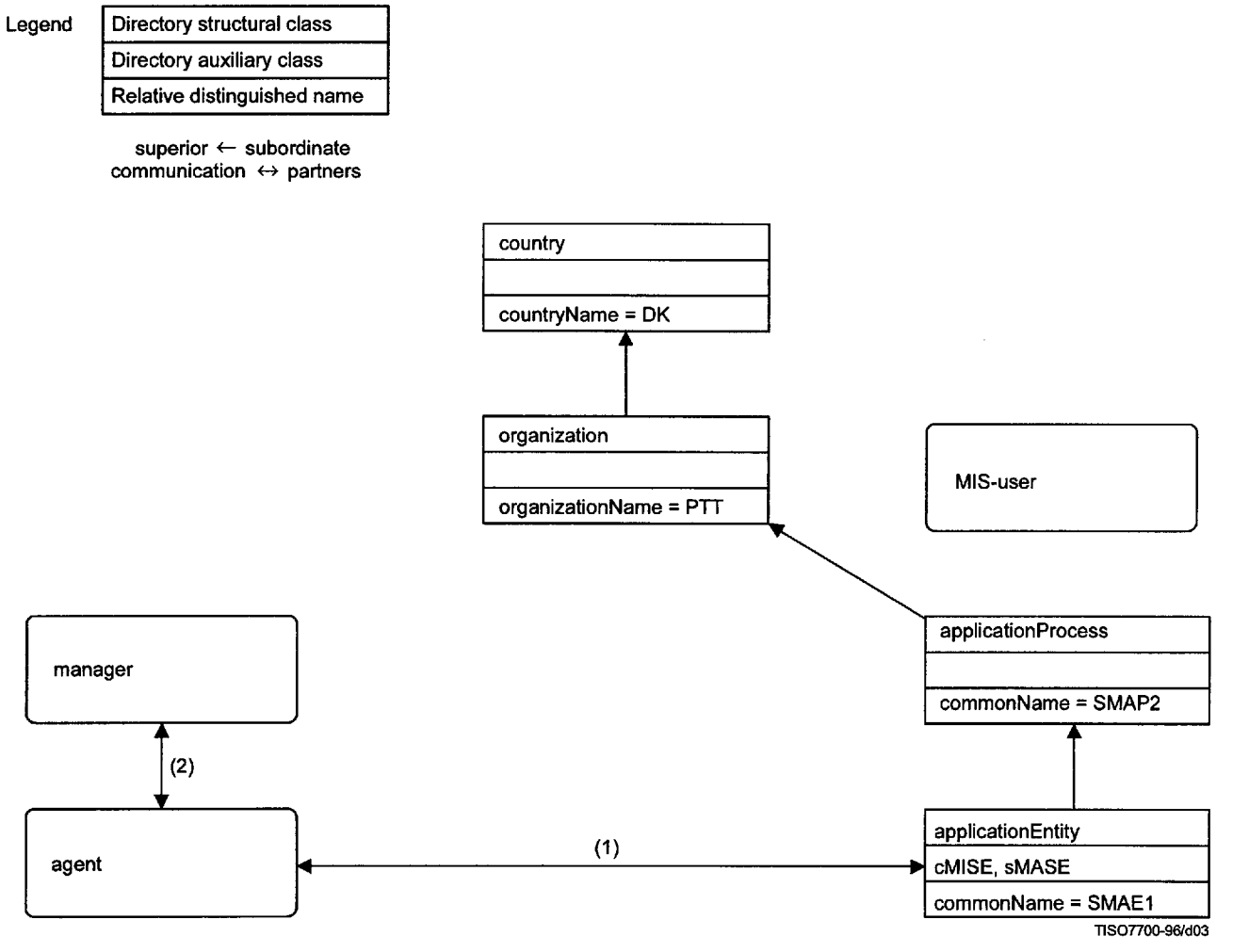


Figure 3 – Example of an agent using repertoire Directory objects

The distinguished name of the Directory entry representing a managed system, e.g. a Directory entry of class applicationProcess, can be used to construct the global names of managed objects made visible by that managed system.

NOTE 1 – The distinguished name of the Directory entry representing a managed system can be obtained as the final result of the resolution of Directory alias names.

Depending on the relative distinguished name that is used for naming the system managed object, the global names of the system managed object itself and all of its directly and indirectly contained managed objects can be constructed in the following way.

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If the system Id attribute is used to name the system managed object, the global name of a given managed object is constructed by prefixing its local distinguished name with the distinguished name of the Directory entry representing the managed system and the RDN of the system managed object. For example, if the managed system is represented by the Directory entry {countryName = DK, organizationName = PTT, commonName = SMAP1} (see Figure 4 a) the global name of the discriminator managed object is {countryName = DK, organizationName = PTT, commonName = SMAP1, systemId = xyz, discriminatorId = 1}.

NOTE 2 – This approach can also be used if the root of the local containment tree, instead of being an instance of system managed object class, is an instance of the network managed object class as defined in Recommendation M.3100.

If the system title attribute with the distinguished name syntax choice is used to name the system managed object, the value of the systemTitle attribute is set to the distinguished Directory entry representing the managed system. For example, if the managed system is represented by the Directory entry {countryName = DK, organizationName = PTT, commonName = SMAP1} (see Figure 4 b), the global name of the discriminator managed object is {systemTitle = {countryName = DK, organizationName = PTT, commonName = SMAP1}, discriminatorId = 1}.

If the system title attribute with the object identifier syntax choice is used to name the system managed object, the object identifier shall be mapped to the distinguished name of the Directory entry representing the managed system.

NOTE 3 – The mechanism to map the object identifier to a distinguished name is out of scope of this Recommendation | International Standard.

A manager can determine the systems management application entities that can be used to establish an association to a managed system that makes a given managed object visible in the following way (see Figure 4):

1) a) if the system Id attribute is used, the manager issues a Directory Read operation using the global name of the managed object. The Directory will return a NameError indicating the problem noSuchObject. Included with this error is the parameter matched which contains the lowest entry in the DIT that was matched. This partial name match identifies the Directory entry representing the managed system;

1) b) if the system title attribute is used, the manager extracts the value of the system title attribute which identifies the Directory entry representing the managed system;

2) in order to find the systems management applications entities that can be used to establish an association to the managed system, the manager then issues a Directory Search operation using the name of the Directory entry representing the managed system as obtained by step 1) a) or 1) b), respectively, and requests that the presentationAddress attribute, and optionally other protocol-related attributes such as Supported CMIS functional units, be returned. In order to find the systems management application entity that is best suited to the needs of the manager, the search can be based on the values of attributes defined by the structural Directory object class applicationEntity, for example supportedApplicationContext, or on the values of attributes defined by the auxiliary Directory object classes Systems management application service element and Common management information service element, for example Supported SMASE functional units, Supported CMIS functional units or Supported CMIP version attributes;

3) from the list of suitable systems management application entities that is returned as result of the Directory Search operation, the manager selects a systems management application entity and uses its associated presentation address (and optional other returned protocol-related information) to establish a management association.

7.2.2 Definition Directory objects

This model describes how to store management information definitions in the definition knowledge directory tree. It is based on the concept of the object identifier tree described in ITU-T Rec. X.680 | ISO/IEC 8824-1. It additionally allows the insertion of information definitions in the definition knowledge directory tree which have not been assigned an object identifier.

The entries in the Directory representing the definition knowledge directory tree are of the Directory structural class Registered information. Furthermore, Directory auxiliary classes can be defined that contain further information depending on the type of information to be registered. Instances of these auxiliary classes can be included in entries of class Registered information.

Constructing the distinguished name of a Registered information entry from a given object identifier is straightforward. Figure 5 shows the distinguished names for two of the definitions of CCITT Rec. X.721 | ISO/IEC 10165-2:

- the system managed object class which is registered as {joint-iso-ccitt(2) ms(9) smi(3) part2(2) managedObjectClass(3) 13};
- the Attribute-ASN1Module which is registered as {2 9 3 2 2 1}

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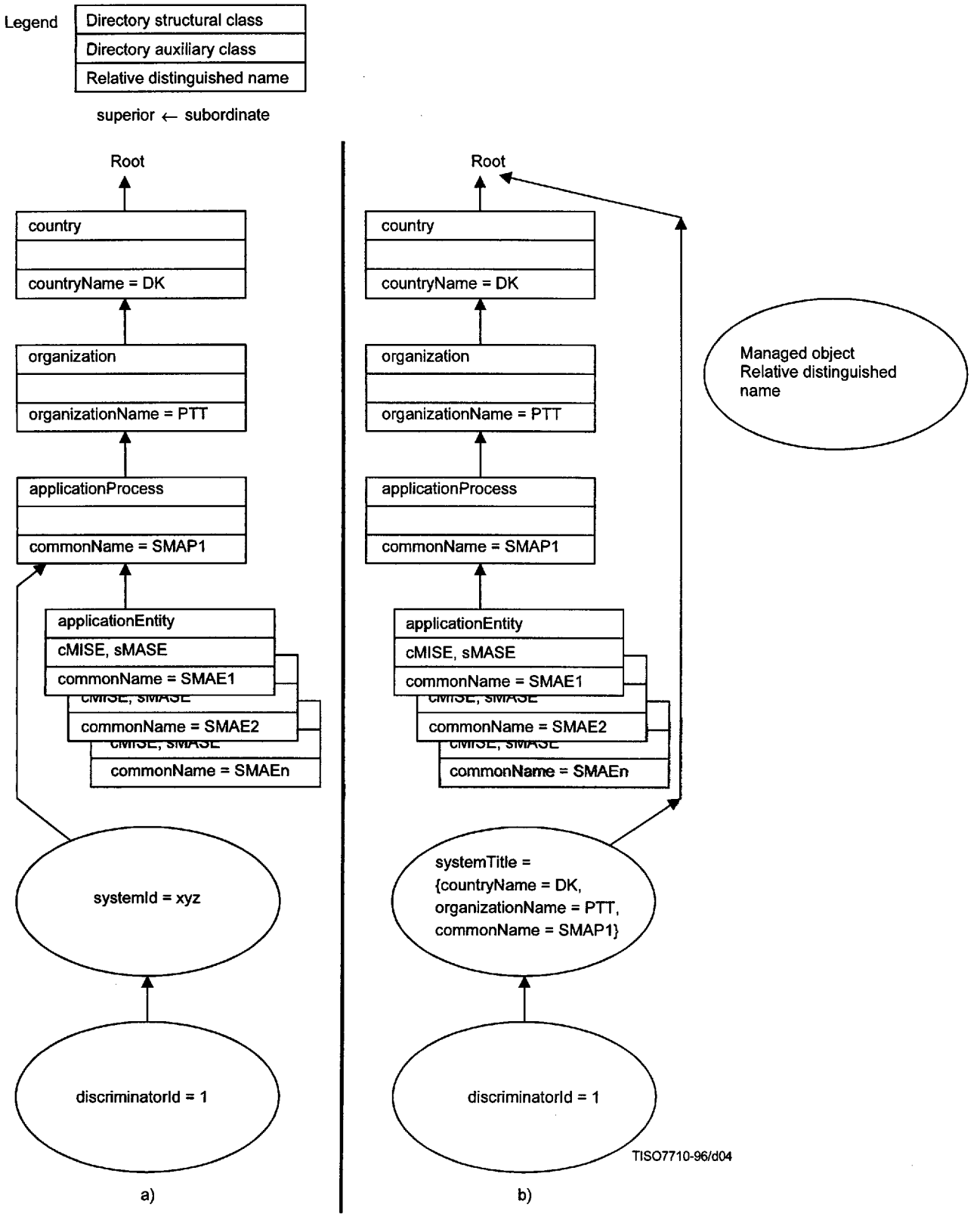


Figure 4 – Construction of an MKM global name

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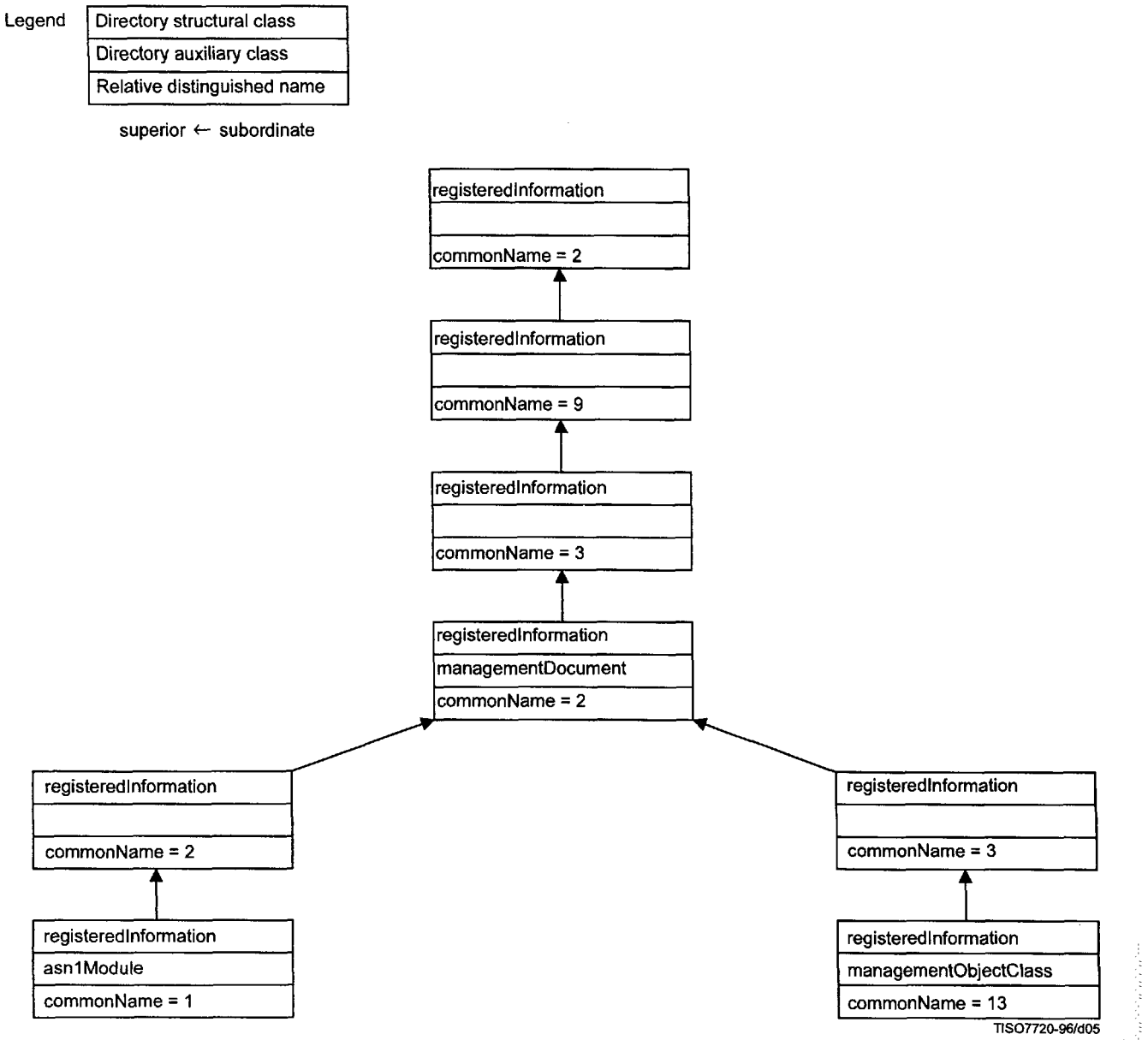


Figure 5 – Example of a definition knowledge directory tree

The object identifier value of { 2 9 3 2 3 13} is mapped to the distinguished name of {commonName = 2, commonName = 9, commonName = 3, commonName = 2, commonName = 3, commonName = 13}.

NOTE – Depending on where the definition knowledge directory tree is to be included in the global Directory information tree a prefix has to be added to this distinguished name (see Annex H).

7.3 Relationship between management knowledge requirements and model

Table 2 shows the relationship between the management knowledge requirements and the management knowledge objects defined in the model. An "X" indicates that the associated knowledge requirement is fulfilled by the corresponding management knowledge objects.

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Table 2 – Requirements and model

	Management knowledge objects				
Knowledge requirement	Repertoire managed objects	Definition managed objects	Discovery managed objects	Repertoire Directory objects	Definition Directory objects
Managed object class knowledge	X	–	–	X (Note 1)	–
Managed object class instance knowledge	–	–	X (Note 2)	X (Note 3)	–
Relationship knowledge (Note 4)	X (Note 5)	–	–	–	–
MIS-user knowledge	X (Note 6)	–	–	X	–
Management information definition knowledge	–	X (Note 7)	–	–	X (Note 7)

NOTES

1 Currently this Recommendation | International Standard defines repertoire Directory objects only to represent the managed object classes supported by a managed system.

2 Only managed objects made visible by a given managed system can be determined.

3 Only managed objects that exist for a fairly long period of time are expected to be registered.

4 Currently no management knowledge objects are defined specifically for representing relationship instance knowledge.

5 Currently the only information represented is the set of managed relationship classes and the set of name bindings supported by a managed system.

6 Currently only information about supported CMIP profiles is provided.

7 Currently definition knowledge includes support only for GDMO templates and ASN.1 modules.

8 Generic definitions

8.1 Managed objects

This Recommendation | International Standard defines management knowledge managed object classes, with their associated characteristics.

8.1.1 Managed objects for repertoire knowledge

8.1.1.1 Managed object class repertoire managed object

Managed object class repertoire managed objects identify supported capabilities for a particular managed object class.

The managed object class repertoire managed object class is defined as a subclass of the top managed object class defined in CCITT Rec. X.721 | ISO/IEC 10165-2. Its mandatory, read-only attributes are:

a) managed object class repertoire Id;

b) supported conditional package list.

Its optional, read-only attribute is:

c) implemented values.

The managed object class repertoire managed object supports the following notifications:

a) object creation;

b) object deletion;

c) attribute value change.

8.1.1.2 Repertoire managed object

Repertoire managed objects identify the managed object classes, managed relationship classes, name bindings and CMIP profiles supported by a system.

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A repertoire managed object may serve as the superior object for contained objects, each of which conveys knowledge pertaining to an implementation's support of a specific managed object class.

The repertoire managed object class is defined as a subclass of the top managed object class defined in CCITT Rec. X.721 | ISO/IEC 10165-2. Its mandatory, read-only attributes are:

a) repertoire Id;

b) supported name binding list;

c) supported managed object class list;

d) supported relationship class list.

Its optional, read-only attribute is:

e) supported CMIP profiles.

The repertoire managed object supports the following notifications:

a) object creation;

b) object deletion;

c) attribute value change.

8.1.2 Managed objects for definition knowledge

8.1.2.1 Action template managed object

The action template managed object represents a GDMO action specification.

The action template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) behaviour;

b) mode confirmed;

c) parameters;

d) with information syntax;

e) with reply syntax;

f) registered as.

8.1.2.2 ASN.1 module managed object

The ASN.1 module managed object represents in textual form the contents of an ASN.1 module.

The ASN.1 module managed object class is defined as a subclass of the top managed object class defined in CCITT Rec. X.721 | ISO/IEC 10165-2. Its mandatory, read-only attributes are:

a) ASN.1 module contents;

b) ASN.1 version;

c) module reference;

d) optionally registered as.

The ASN.1 module managed object also has an action to query the ASN.1 module contents.

The action response can use linked replies, if acceptable on the association, to return the textual version of the ASN.1 module contents.

8.1.2.3 Attribute group template managed object

The attribute group template managed object represents a GDMO attribute group specification.

The attribute group template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) group elements;

b) fixed;

c) description;

d) registered as.

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8.1.2.4 Attribute template managed object

The attribute template managed object represents a GDMO attribute specification.

The attribute template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) derived or with syntax choice;

b) matches for;

c) behaviour;

d) parameters;

e) optionally registered as.

8.1.2.5 Behaviour template managed object

The behaviour template managed object represents a GDMO behaviour specification.

The behaviour template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attribute is:

– defined as.

The behaviour template managed object also has an action to query the behaviour description.

The action response can use linked replies, if acceptable on the association, to return the textual version of the behaviour description.

8.1.2.6 Document managed object

The document managed object represents a document which contains GDMO and ASN.1 specifications so acts as a container for template managed objects.

The document managed object class is defined as a subclass of the top managed object class defined in CCITT Rec. X.721 | ISO/IEC 10165-2. Its mandatory, read-only attributes are:

a) document name;

b) document object identifier.

The document specification conditional package is present if the document managed object supports the textual representation of all of the GDMO and ASN.1 specifications contained within the document and, if present, has the following read-only attribute:

c) specification.

The conditional package also has an action to query the specification. If the conditional package is present, the document managed object responds to actions to get the textual representation of the GDMO and ASN.1 specifications contained within the document.

The action response can use linked replies, if acceptable on the association, to return the textual version of the specification.

If this conditional package is not present, the textual versions of the specifications may be sought from subordinate template managed objects.

8.1.2.7 Managed object class template managed object

The managed object class template managed object represents a GDMO managed object class specification.

The managed object class template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) derived from;

b) characterized by;

c) conditional packages;

d) registered as.

8.1.2.8 Name binding template managed object

The name binding template managed object represents a GDMO name binding specification.

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The name binding template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) subordinate managed object class;

b) named by superior object class;

c) with attribute;

d) behaviour;

e) create;

f) delete;

g) registered as.

8.1.2.9 Notification template managed object

The notification template managed object represents a GDMO notification specification.

The notification template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) behaviour;

b) mode confirmed;

c) parameters;

d) with information syntax;

e) and attribute Id's;

f) with reply syntax;

g) registered as.

8.1.2.10 Package template managed object

The package template managed object represents a GDMO package specification.

The package template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) behaviour;

b) attributes;

c) attribute groups;

d) actions;

e) notifications;

f) optionally registered as.

8.1.2.11 Parameter template managed object

The parameter template managed object represents a GDMO parameter specification.

The parameter template managed object class is defined as a subclass of the template managed object class. Its mandatory, read-only attributes are:

a) context;

b) syntax or attribute;

c) behaviour;

d) optionally registered as.

8.1.2.12 Template managed objects

The template managed object class is the managed object class from which managed object classes for representing GDMO templates may be derived. If only textual representations of GDMO templates are supported, then managed objects of the template managed object class are instantiated. It provides the naming attribute for managed objects representing templates and enables all such managed objects to be contained within document managed objects by the specification of a single name binding.

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The template managed object class is a subclass of the top managed object class defined in CCITT Rec. X.721 | ISO/IEC 10165-2. Its mandatory, read-only attribute is:

a) template name.

The template managed object may also have the template definition conditional package which, if present, has the following read-only attribute:

b) template definition.

The conditional package also has an action to query the template definition. If the conditional package is present, the template managed object responds to actions to get the textual representation of the template definition.

The action response can use linked replies, if acceptable on the association, to return the textual version of the template definition.

8.1.3 Managed objects for instance knowledge

8.1.3.1 Discovery managed object

The discovery managed object is used to determine all or selected subtrees of managed objects within a managed system's naming tree.

The discovery managed object class is a subclass of the top managed object class defined in CCITT Rec. X.721 | ISO/IEC 10165-2. Its mandatory, read-only attribute is:

– discovery Id.

The use of a name binding of discovery to system, with a fixed relative distinguished name value, allows for a common way to access the discovery managed object.

The discovery managed object responds to actions containing queries concerning subtrees of managed objects within a managed system's naming tree. The query specifies a base object and the required scope of the search.

The response is a set of rooted tree structures that together cover the requested scope under the requested base object. Each rooted tree has the distinguished name of its root but does not repeat common name components within its structure, i.e. only the RDN is used to identify subordinate managed objects.

8.2 Name bindings

8.2.1 Name bindings for repertoire knowledge

8.2.1.1 Managed object class repertoire – Repertoire

This name binding enables managed object class repertoire managed objects, and specializations thereof, to be contained within repertoire managed objects, and specializations thereof.

The managed object class repertoire Id attribute shall be used for naming. Its value is the object identifier for the managed object class Id which the repertoire is associated with.

8.2.1.2 Repertoire – System

This name binding enables repertoire managed objects, and specializations thereof, to be contained within system managed objects, and specializations thereof. The repertoire Id attribute shall be used for naming.

The use of a fixed relative distinguished name for a common way to access a repertoire managed object is provided by this name binding when the value "REP1" is used for the repertoire Id attribute.

8.2.2 Name bindings for definition knowledge

8.2.2.1 ASN.1 module – Document

This name binding enables ASN.1 module managed objects and their specializations to be contained within document managed objects, and specializations thereof, and to be identified by the module reference attribute.

8.2.2.2 Document – System

This name binding enables document managed objects and their specializations to be contained within system managed objects, and specializations thereof, and to be identified by the document object identifier attribute.

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8.2.2.3 Document – System2

This name binding enables document managed objects and their specializations to be contained within system managed objects, and specializations thereof, and to be identified by the document name attribute.

8.2.2.4 Template – Document

This name binding enables template managed objects and their specializations to be contained within document managed objects, and specializations thereof, and to be identified by the template name attribute.

8.2.3 Name bindings for instance knowledge

8.2.3.1 Discovery – System

This name binding enables discovery managed objects, and specializations thereof, to be contained within system managed objects, and specializations thereof.

The discovery Id attribute shall be used for naming. The use of a fixed relative distinguished name for a common way to access a discovery managed object is provided by this name binding when the value "DSC1" is used for the discovery Id attribute.

Subordinate to a given system managed object, there shall be only one allowed value for the discovery Id attribute, namely "DSC1".

8.3 Actions

This Recommendation | International Standard defines one action type for definition knowledge:

- get textual representation,

and defines one action type for instance knowledge:

- management information tree search.

For any managed object class that includes either of these action types, it is the role of the managed object class definer to fully detail the requirements that a managed object of that class has for responding to these actions.

8.3.1 Actions for definition knowledge

The get textual representation action argument has the attribute Id parameter. The response is the textual representation of the identified attribute's value sent as a sequence of line images.

The action response may be split across multiple linked replies.

The following describes the action parameters.

8.3.1.1 Attribute Id

The attribute Id parameter specifies the attribute of the managed object whose value is to be returned. The managed object class definition indicates the attributes that may be specified.

8.3.1.2 Textual representation

The textual representation parameter contains the response or, when linked replies are used, a contiguous portion of the response.

8.3.2 Actions for instance knowledge

The management information tree search action argument has the base object, the required scope of the search and an optional class request parameter. The response is a set of rooted tree structures that together cover the requested scope under the requested base object. Each rooted tree has the distinguished name of its root but does not repeat common name components within its structure, i.e. only the RDN is used to identify subordinate managed objects.

The action response shall, if specified in the request, also report the managed object class of each managed object in the scope of the search.

The action response may be split across multiple linked replies.

The following describes the action parameters.

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8.3.2.1 Base

The base parameter specifies the base of the managed system's subtree to be discovered.

8.3.2.2 Discovery scope

The discovery scope parameter specifies the scope of the managed system's subtree to be discovered. It has the same syntax as the CMIP scope.

8.3.2.3 Class request

The class request parameter is a boolean, that if true, specifies that the action result shall include managed object class information. The default value is false.

8.3.2.4 Rooted name tree

The rooted name tree parameter contains the identification of the root managed object and may also contain a recursively defined tree structure that describes a subtree requested in the management information tree search request. The recursively defined tree structure includes the RDNs for each managed object discovered. The class of each managed object discovered shall also be included if requested.

8.4 Compliance

Managed object class definitions may import the appropriate specification of managed objects, actions, parameters or attribute types defined in this Recommendation | International Standard. This is achieved by reference to the templates defined in this Recommendation | International Standard. The reference mechanism is defined in CCITT Rec. X.722 | ISO/IEC 10165-4.

8.5 Generic definitions from the Object management function

This Recommendation | International Standard makes use of following generic definitions in CCITT Rec. X.730 | ISO/IEC 10164-1:

- attribute value change notification;
- object creation notification;
- object deletion notification.

8.6 Directory objects

8.6.1 Repertoire Directory objects

The Directory auxiliary object classes Systems management application service element and Common management information service element are defined for inclusion in Directory entries representing application entities that makes use of OSI systems management. They shall be used in a DIT content rule together with the Directory structural object class Application Entity (see ITU-T Rec. X.521 | ISO/IEC 9594-7, 6.12) as described in the following.

The Directory auxiliary object class Systems management application service element must contain the attribute Supported SMASE functional units. The attribute Supported SMASE functional units specifies which functional units in which roles are supported by a systems management application entity. The Directory auxiliary object class Systems management application service element may contain the attributes Supports MKM global names and Management information tree managed object list. The Supports MKM global names attribute indicates whether a systems management application entity is able to handle global managed object names as described in this Recommendation | International Standard. The Management information tree managed object list attribute specifies the list of the managed object names made visible by that systems management application entity. For managed objects that exist only for a brief period of time, only the managed object class is expected to be registered in the list.

The Directory auxiliary object class Common management information service element must contain the attributes Supported CMIP version, Supported CMIP profiles and Supported CMIS functional units. The Supported CMIP version attribute indicates the versions of the common management information protocol the systems management application entity is able to handle. The Supported CMIP profiles attribute specifies the standardized CMIP profiles that are supported by a systems management application entity. The Supported CMIS functional units attribute specifies the CMIS functional units which are supported by a systems management application entity.

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8.6.2 Definition Directory objects

The Directory structural class Registered information represents an information object that has been assigned an object identifier as described in ITU-T Rec. X.680 | ISO/IEC 8824-1. It must contain the attribute commonName which is used for naming instances of this class. Its value is the last component of the object identifier that has been assigned to the represented information object.

Instances of this class may contain the attributes Name form, Information status and Additional information. The Name form attribute specifies the symbolic name of the object identifier component numeric form value stored in the commonName attribute. The Information status attribute indicates whether the information is:

- active, i.e. the information definition is fixed and can be used;
- deleted, i.e. the information definition is obsolete and should not be referenced by new information definitions; or
- preliminary, i.e. the information definition is provided for information purposes only but changes may occur in the future (for example during the progression of a Committee Draft to a Draft International Standard).

Additional information about the definition information including the date of creation and a comment on the definition is optionally stored in the attribute Additional information.

NOTE – Additional Directory auxiliary classes can be defined for inclusion in Registered information Directory entries.

The Directory auxiliary class Document is defined for inclusion in Directory entries of Directory structural class Registered information and represents a document which contains GDMO specifications. It must contain the attributes Document name, Document object identifier and Specification. The attribute Document name identifies the name of the document represented by an instance, e.g. CCITT Rec. X.721 | ISO/IEC 10165-2. The value of the attribute Document object identifier is that of the object identifier of the document which it represents, as specified in CCITT Rec. X.722 | ISO/IEC 10165-4. The attribute Specification may contain a representation of the GDMO specifications contained within the document.

The Directory auxiliary class Template is the Directory auxiliary class from which Directory auxiliary classes representing GDMO templates may be derived. It must contain the attribute Template name the value of which is that of the label of the GDMO template which is represented. It may contain the attribute Template definition which contains a textual representation of the GDMO template definition.

The Directory auxiliary class Managed object class template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO managed object class specifications. It must contain the attributes Derived from, Characterized by, Conditional packages and Registered as.

The Derived from attribute identifies the immediate superclasses of a managed object class. The Characterized by attribute specifies the mandatory packages of a managed object class while the Conditional packages attribute identifies the conditional packages and their conditions. The Registered as attribute contains the object identifier of the represented managed object class.

The Directory auxiliary class Package template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO package specifications. It must contain the attributes Behaviour, Attributes, Attribute groups, Actions, Notifications and Optionally registered as.

The Behaviour attribute specifies the behaviour associated with the package. The Attributes attribute identifies the attributes, and associated qualifiers and parameters, of the represented package. The Attribute groups attribute identifies the attribute groups, and associated attributes, of the represented package. The Actions attribute specifies the actions, and associated parameters, of the represented package. The Notifications attribute identifies the notifications, and associated parameters, of the represented package. The Optionally registered as attribute contains the object identifier of the represented package or null if no identifier has been assigned.

The Directory auxiliary class Parameter template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO parameter specifications. It must contain the attributes Context, Syntax or attribute, Behaviour and Optionally registered as. The Context attribute identifies the context of the represented parameter. The Syntax or attribute attribute identifies the syntax specification of the represented parameter. The Behaviour attribute specifies the behaviour associated with the parameter. The Optionally registered as attribute contains the object identifier of the represented parameter or null if no identifier has been assigned.

The Directory auxiliary class Name binding template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO name binding specifications. It must contain the attributes Subordinate managed object class, Named by superior object class, With attribute, Behaviour, Create, Delete and Registered as.

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The Subordinate managed object class attribute identifies the subordinate managed object classes of the represented name binding. The Named by superior object class attribute specifies the superior object classes of the represented name binding. The With attribute attribute identifies the naming attribute of the represented name binding. The Behaviour attribute specifies the behaviour associated with the name binding. The Create and Delete attributes contain the create element and delete element specifications of the represented name binding. If no create or delete element is present, then the corresponding attribute's value shall be null. The Registered as attribute contains the object identifier of the represented name binding.

The Directory auxiliary class Attribute template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO attribute specifications. It must contain the attributes Derived or with syntax choice, Matches for, Behaviour, Parameters and Optionally registered as. The Derived or with syntax choice attribute contains the syntax specification of the represented attribute. The Matches for attribute specifies the matching characteristics of the represented attribute. The Behaviour attribute specifies the behaviour associated with the represented attribute. The Parameters attribute identifies the parameters associated with the represented attribute. The Optionally registered as attribute contains the object identifier of the represented attribute or null if no identifier has been assigned.

The Directory auxiliary class Attribute group template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO attribute group specifications. It must contain the attributes Group elements, Fixed, Description and Registered as. The Group elements attribute specifies the elements of the represented attribute group. The Fixed attribute identifies the represented attribute group as being fixed or dynamic. The Description attribute contains the description of the represented attribute group. The Registered as attribute contains the object identifier of the represented attribute group.

The Directory auxiliary class Behaviour template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO behaviour specifications. It must contain the attribute Defined as that specifies the behaviour definition.

The Directory auxiliary class Action template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO action specifications. It must contain the attributes Behaviour, Mode confirmed, Parameters, With information syntax, With reply syntax and Registered as.

The Behaviour attribute specifies the behaviour associated with the represented action. The Mode confirmed attribute identifies the action as being confirmed or not. The Parameters attribute identifies the parameters associated with the represented action. The With information syntax attribute specifies the syntax of the action argument while the With reply syntax attribute contains the syntax of the action reply. The Registered as attribute contains the object identifier of the represented action.

The Directory auxiliary class Notification template is defined for inclusion in Directory entries of Directory structural class Registered information and represents the GDMO notification specifications. It must contain the attributes Behaviour, Mode confirmed, Parameters, With information syntax, And attribute Id's, With reply syntax and Registered as.

The Behaviour attribute specifies the behaviour associated with the represented notification. The Mode confirmed attribute identifies the notification as being confirmed or not. The Parameters attribute identifies the parameters associated with the represented notification. The With information syntax attribute specifies the syntax of the notification argument while the With reply syntax attribute contains the syntax of the notification reply. The And attribute Id's attribute specifies the assignments of attributes to fields of the notification's argument. The Registered as attribute contains the object identifier of the represented notification.

The Directory auxiliary class ASN.1 module is defined for inclusion in Directory entries of Directory structural class Registered information and represents the contents of an ASN.1 module. It must contain the attributes Module reference, ASN.1 module contents, Optionally registered as and ASN.1 version. The Module reference attribute identifies the name of the ASN.1 module. The ASN.1 module contents attribute holds the ASN.1 module contents in textual form. The ASN.1 version attribute identifies the version or versions of ASN.1 compilers that should be able to parse this module. The Optionally registered as attribute contains the object identifier of the represented ASN.1 module or null if no identifier has been assigned.

9 Service definition

9.1 Introduction

This function provides action services.

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9.2 Management knowledge managed objects

The PT-GET service can be used to retrieve information pertaining to management knowledge managed objects.

9.3 Notification services

No notifications are defined in this Recommendation | International Standard.

9.4 Action services

9.4.1 Get textual representation service definition

The get textual representation service maps onto the CMIS M-ACTION service as follows.

The get textual representation service uses the parameters defined in 8.3.1 in addition to the general M-ACTION service parameters defined in CCITT Rec. X.710 and ISO/IEC 9595. Table 3 lists the parameters for this service.

Table 3 – Get textual representation service

Parameter name	Req/Ind	Rsp/Cnf
Invoke identifier	P	P
Linked 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	M	C(=)
Action Information		
Attribute Id	M	–
Action result	–	M
Textual representation	–	M
Attribute not available this action	–	U
Errors	–	U (Note)
NOTE – If the response does not fit into a single PDU (e.g. if linked replies cannot be used), the CMIP error "ComplexityLimitation" may be returned.		

9.4.2 Management information tree search service definition

The management information tree search service maps onto the CMIS M-ACTION service as follows.

The management information tree search service uses the parameters defined in 8.3.2 in addition to the general M-ACTION service parameters defined in CCITT Rec. X.710 | ISO/IEC 9595. Table 4 lists the parameters for this service.

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Table 4 – Management information tree search service

Parameter name	Req/Ind	Rsp/Cnf
Invoke identifier	P	P
Linked 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	M	C(=)
Action Information		
Base	M	–
Discovery scope	M	–
Class request	U	–
Action result	–	M
Rooted name tree	–	M
Root object	–	M
Class of root	–	C (Note 1)
Subordinates	–	U
RDN	–	M
Managed object class (for subordinate)	–	C (Note 1)
Errors	–	U (Note 2)

NOTES

1 The managed object class of the root of the name tree and the managed object class of each subordinate in that tree shall be specified if the Class request parameter is true in the management information tree search service request; otherwise, the managed object class of the root of the name tree and the managed object class of each subordinate shall be omitted from the action response.

2 If the response does not fit into a single PDU (e.g. if the discovery scope is large and linked replies cannot be used), the CMIP error "ComplexityLimitation" may be returned.

9.5 Directory services

The Directory read and search operations can be used to retrieve information pertaining to management knowledge Directory objects.

10 Systems management functional units

This Recommendation | International Standard specifies no functional units. The managed object classes defined here provide specifications for a managed system to disseminate knowledge of its repertoire of capabilities, its management information definitions and its managed objects.

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The following functional units defined in CCITT Rec. X.730 | ISO/IEC 10164-1 may be negotiated for the purpose of managing management knowledge:

- control;
- monitor;
- objectEvents.

11 Protocol and abstract syntax

11.1 Abstract syntax

11.1.1 Managed objects

11.1.1.1 Referenced managed objects

This Recommendation | International Standard references the following support managed objects for which the abstract syntax is specified in CCITT Rec. X.721 | ISO/IEC 10165-2:

a) top;

b) system.

11.1.1.2 Defined managed objects

Tables 5, 6 and 7 identify the relationship between the managed objects described in 8.1 and the managed object template reference label specifications in Annex A.

Table 5 – Managed objects for repertoire knowledge

Managed object class name	Reference label
Managed object class repertoire	managedObjectClassRepertoire
Repertoire	repertoire

Table 6 – Managed objects for definition knowledge

Managed object class name	Reference label
Action template	actionTemplate
ASN.1 module	aSN1Module
Attribute group template	attributeGroupTemplate
Attribute template	attributeTemplate
Behaviour template	behaviourTemplate
Document	document
Managed object class template	managedObjectClassTemplate
Name binding template	nameBindingTemplate
Notification template	notificationTemplate
Package template	packageTemplate
Parameter template	parameterTemplate
Template	template

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Table 7 – Managed objects for instance knowledge

Managed object class name	Reference label
Discovery managed object	discoveryObject

11.1.2 Attributes

11.1.2.1 Attributes defined in this Recommendation | International Standard

Tables 8, 9 and 10 identify the relationship between the attributes mentioned in 8.1 and the attribute template reference label specifications in Annex A.

Table 8 – Attributes for repertoire knowledge

Attribute name	Reference label
Implemented values	implementedValues
Managed object class repertoire Id	managedObjectClassRepertoireId
Repertoire Id	repertoireId
Supported CMIP profiles	supportedCmipProfiles
Supported conditional package list	supportedConditionalPackageList
Supported managed object class list	supportedManagedObjectClassList
Supported name binding list	supportedNameBindingList
Supported relationship class list	supportedRelationshipClassList

11.1.3 Actions

Tables 11 and 12 identify the relationship between the actions described in 8.3 and the action reference label specifications in Annex A.

11.1.4 Notifications

11.1.4.1 Referenced notifications

This Recommendation | International Standard references the following events defined in CCITT Rec. X.730 | ISO/IEC 10164-1.

a) attribute value change notification;

b) object creation notification;

c) object deletion notification.

11.1.4.2 Notifications defined in this Recommendation | International Standard

No notifications are defined in this Recommendation | International Standard.

11.1.5 Directory object classes

11.1.5.1 Referenced Directory object classes

This Recommendation | International Standard references the following two Directory object classes for which the abstract syntax is defined in ITU-T Rec. X.501 | ISO/IEC 9594-2 and ITU-T Rec. X.521 | ISO/IEC 9594-7, respectively:

a) top;

b) applicationEntity.

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Table 9 – Attributes for definition knowledge

Attribute name	Reference label
Actions	actions
And attribute Id's	andAttributeIds
ASN.1 module contents	asn1ModuleContents
ASN.1 version	asn1Version
Attribute groups	attributeGroups
Attributes	attributes
Behaviour	behaviour
Characterized by	characterizedBy
Conditional packages	conditionalPackages
Context	context
Create	create
Defined as	definedAs
Delete	delete
Derived from	derivedFrom
Derived or with syntax choice	derivedOrWithSyntaxChoice
Description	description
Document name	documentName
Document object identifier	documentObjectIdentifier
Fixed	fixed
Group elements	groupElements
Matches for	matchesFor
Mode confirmed	modeConfirmed
Module reference	moduleReference
Named by superior object class	namedBySuperiorObjectClass
Notifications	notifications
Optionally registered as	optionallyRegisteredAs
Parameters	parameters
Registered as	registeredAs
Specification	specification
Subordinate managed object class	subordinateObjectClass
Syntax or attribute	syntaxOrAttribute
Template definition	templateDefinition
Template name	templateName
With attribute	withAttribute
With information syntax	withInformationSyntax
With reply syntax	withReplySyntax

Table 10 – Attributes for instance knowledge

Attribute name	Reference label
Discovery Id	discoveryId

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Table 11 – Actions for definition knowledge

Action name	Reference label
Get textual representation	getTextualRepresentation

Table 12 – Actions for instance knowledge

Action name	Reference label
Management information tree search	mITSearch

11.1.5.2 Defined Directory object classes

Tables 13 and 14 identify the relationship between the Directory object classes described in 8.6 and the Directory object reference label specifications in Annex B.

Table 13 – Directory objects for repertoire knowledge

Directory object class name	Reference label
Common management information service element	cMISE
Systems management application service element	sMASE

Table 14 – Directory objects for definition knowledge

Directory object class name	Reference label
ASN.1 module	asn1Module
Action template	managementAction
Attribute template	managementAttribute
Attribute group template	managementAttributeGroup
Behaviour template	managementBehaviour
Document	managementDocument
Name binding template	managementNameBinding
Notification template	managementNotification
Managed object class template	managementObjectClass
Package template	managementPackage
Parameter template	managementParameter
Template	managementTemplate
Registered information	registeredInformation

Table 15 shows the Directory auxiliary object classes to be included in entries of Directory class Registered information and the associated definition managed object classes.

11.1.6 Directory attributes

11.1.6.1 Referenced Directory attributes

This Recommendation | International Standard references Directory attributes for which the abstract syntax is defined in ITU-T Rec. X.520 | ISO/IEC 9594-6.

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Table 15 – Definition managed object classes and corresponding Directory auxiliary classes

Managed object class label	Directory auxiliary class label
actionTemplate	managementAction
aSN1Module	asn1Module
attributeGroupTemplate	managementAttributeGroup
attributeTemplate	managementAttribute
behaviourTemplate	managementBehaviour
document	managementDocument
managedObjectClassTemplate	managementObjectClass
nameBindingTemplate	managementNameBinding
notificationTemplate	managementNotification
packageTemplate	managementPackage
parameterTemplate	managementParameter
template	managementTemplate

11.1.6.2 Directory attributes defined in this Recommendation | International Standard

Tables 16 and 17 identify the relationship between the Directory attributes described in 8.6 and the attribute reference label specifications in Annex B.

Table 16 – Directory attributes for repertoire knowledge

Directory attribute name	Reference label
Management information tree managed object list	mitMoList
Supported CMIP profiles	supportedCmipProfiles
Supported CMIP version	supportedCmipVersion
Supported CMIS functional units	supportedCmisFunctionalUnits
Supported SMASE functional units	supportedSmaseFunctionalUnits
Supports MKM global names	supportsMKMglobalNames

11.2 Get textual representation elements of procedure

11.2.1 Manager role

11.2.1.1 Invocation

The get textual representation procedures are initiated by the get textual representation request primitive. On receipt of a get textual representation request primitive, the SMAPM shall construct an MAPDU and issue a CMIS M-ACTION request service primitive with parameters derived from the get textual representation request primitive.

11.2.1.2 Receipt of response

On receipt of a CMIS M-ACTION confirm service primitive containing an MAPDU responding to a get textual representation action and containing the linked identifier, the SMAPM shall issue a get textual representation confirmation primitive to the get textual representation service user with parameters derived from the CMIS M-ACTION confirm service primitive and indicate that the procedure is not yet complete.

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Table 17 – Directory attributes for definition knowledge

Directory attribute name	Reference label
Actions	actions
Additional information	additionalInformation
And attribute Ids	andAttributeIds
ASN.1 module contents	asn1ModuleContents
ASN.1 version	asn1Version
Attribute groups	attributeGroups
Attributes	attributes
Behaviour	behaviour
Characterized by	characterizedBy
Conditional packages	conditionalPackages
Context	context
Create	create
Defined as	definedAs
Delete	delete
Derived from	derivedFrom
Derived or with syntax choice	derivedOrWithSyntaxChoice
Description	description
Document name	documentName
Document object identifier	documentObjectIdentifier
Fixed	fixed
Group elements	groupElements
Information status	informationStatus
Matches for	matchesFor
Mode confirmed	modeConfirmed
Module reference	moduleReference
Named by superior object class	namedBySuperiorObjectClass
Name form	nameForm
Notifications	notifications
Optionally registered as	optionallyRegisteredAs
Parameters	parameters
Registered as	registeredAs
Specification	specification
Subordinate managed object class	subordinateObjectClass
Syntax or attribute	syntaxOrAttribute
Template definition	templateDefinition
Template name	templateName
With attribute	withAttribute
With information syntax	withInformationSyntax
With reply syntax	withReplySyntax

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On receipt of a CMIS M-ACTION confirm service primitive containing an MAPDU responding to a get textual representation action and *not* containing the linked identifier, the SMAPM shall issue a get textual representation confirmation primitive to the get textual representation service user with parameters derived from the CMIS M-ACTION confirm service primitive and indicate completion of the get textual representation procedure.

11.2.2 Agent role

11.2.2.1 Receipt of request

On receipt of a CMIS M-ACTION indication service primitive containing an MAPDU requesting the get textual representation service, the SMAPM shall, if the MAPDU is well formed, issue a get textual representation indication primitive to the get textual representation service user with parameters derived from the CMIS M-ACTION indication service primitive. Otherwise, the SMAPM shall construct an appropriate MAPDU containing notification of the error and shall issue a CMIS M-ACTION response service primitive with an error parameter present.

11.2.2.2 Response

If linked replies are to be sent in reply to a get textual representation request primitive, for all replies except the last, the SMAPM shall accept a get textual representation response primitive and shall construct an MAPDU containing a successful reply to the action and issue a CMIS M-ACTION response service primitive with parameters derived from the get textual representation request primitive and with the linked identifier.

The SMAPM shall accept a get textual representation response primitive and shall construct an MAPDU containing either the successful or an error reply to the action and issue a CMIS M-ACTION response service primitive with parameters derived from the get textual representation request primitive and without the linked identifier.

NOTE – If multiple responses are sent, the last contains only the invoke identifier.

11.3 Management information tree search elements of procedure

11.3.1 Manager role

11.3.1.1 Invocation

The management information tree search procedures are initiated by the management information tree search request primitive. On receipt of a management information tree search request primitive, the SMAPM shall construct an MAPDU and issue a CMIS M-ACTION request service primitive with parameters derived from the management information tree search request primitive.

11.3.1.2 Receipt of response

On receipt of a CMIS M-ACTION confirm service primitive containing an MAPDU responding to a management information tree search, the SMAPM shall issue a management information tree search confirmation primitive to the management information tree search service user with parameters derived from the CMIS M-ACTION confirm service primitive, thus completing the management information tree search procedure.

11.3.2 Agent role

11.3.2.1 Receipt of request

On receipt of a CMIS M-ACTION indication service primitive containing an MAPDU requesting the management information tree search service, the SMAPM shall, if the MAPDU is well formed, issue a management information tree search indication primitive to the management information tree search service user with parameters derived from the CMIS M-ACTION indication service primitive. Otherwise, the SMAPM shall construct an appropriate MAPDU containing notification of the error and shall issue a CMIS M-ACTION response service primitive with an error parameter present.

11.3.2.2 Response

The SMAPM shall accept a management information tree search response primitive and shall construct an MAPDU containing either the successful or an error reply to the action and issue a CMIS M-ACTION response service primitive with parameters derived from the management information tree search request primitive.

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11.4 Negotiation of functional units

This Recommendation | International Standard specifies no functional units.

11.5 CMIP features

If CMIP is used, support of local distinguished name is required by this function.

12 Relationships with other functions and the Directory

The Management knowledge management function uses the services defined in CCITT Rec. X.730 | ISO/IEC 10164-1 for the creation and deletion of management knowledge managed objects, the retrieval of their attributes and notifications of object creation, object deletion and attribute value changes.

Access control mechanisms for use with management knowledge managed objects are specified in ITU-T Rec. X.741 | ISO/IEC 10164-9.

The Management knowledge management function uses the services defined in ITU-T Rec. X.511 | ISO/IEC 9594-3 for the creation and deletion of management knowledge Directory objects and the retrieval of their attributes.

Access control mechanisms for use with management knowledge Directory objects are specified in ITU-T Rec. X.501 | ISO/IEC 9594-2.

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 one or more of these roles:

- manager role;
- agent role;
- Directory information user role;
- Directory information provider role.

A claim of conformance to at least one role shall be made in Table C.1.

If a claim of conformance is made for support in the manager role, the implementation shall support at least one management operation or notification of at least one of the managed objects specified by this Recommendation | International Standard. The conformance requirements in the manager role for those management operations or notifications are identified in Table C.2 and further tables referenced by Annex C.

If a claim of conformance is made for support in the agent role, the implementation shall support one or more instances of the managed object classes identified in Table C.3 and further tables referenced by Annex C.

If a claim of conformance is made for support in the Directory information user role, the implementation shall include a DUA capable of retrieving information from repertoire Directory objects or definition Directory objects.

If a claim of conformance is made for support in the Directory information provider role, the implementation shall include a DSA capable of providing information from repertoire Directory objects or definition Directory objects.

The implementation shall support the transfer syntax derived from the encoding rules specified in CCITT Rec. X.209 and ISO/IEC 8825 named {joint-iso-ccitt(2) asn1(1) basicEncoding (1)} for the abstract data types referenced by the definitions for which support is claimed.

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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, or MRCS proforma which conforms to this Recommendation | International Standard shall be technically identical to the proformas specified in Annexes C, D, E and F differing only as permitted by ITU-T Rec. X.724 | ISO/IEC 10165-6.

The supplier of an implementation which is claimed to conform to this Recommendation | International Standard shall complete a copy of the MCS proforma provided in Annex C 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.

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Annex A

Management knowledge managed objects

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

A.1 Allocation of object identifiers

This Recommendation | International Standard allocates the following object identifiers.

```
--%PRAGMA version BIT STRING {v1990(0), v1994(1)}   ::=  {v1990, v1994}
MKMD {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 5}
DEFINITIONS IMPLICIT TAGS  ::=
BEGIN
dmiAttribute                    OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) smi(3) part2(2) attribute(7)}
dmiNotification                 OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) smi(3) part2(2) notification(10)}
mkmDirectoryAttributeType       OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) standardSpecificExtension(0)
        directoryAttributeTypes(4)}
mkmDirectoryObjectClass         OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) standardSpecificExtension(0) directoryObjectClasses(6)}
mkmDirectoryNameForm            OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) standardSpecificExtension(0) directoryNameForms(7)}
mkmMObjectClass                 OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) managedObjectClass(3)}
mkmPackage                      OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) package(4)}
mkmParameter                    OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) parameter(5)}
mkmNameBinding                  OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) nameBinding(6)}
mkmAttribute                    OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) attribute(7)}
mkmAction                       OBJECT IDENTIFIER ::=
        {joint-iso-ccitt(2) ms(9) function(2) part16(16) action(9)}
END
```

A.2 Repertoire managed object definitions

A.2.1 Managed object classes

```
managedObjectClassRepertoire MANAGED OBJECT CLASS
        DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":top;
        CHARACTERIZED BY managedObjectClassRepertoirePackage PACKAGE
        BEHAVIOUR managedObjectClassRepertoireBehaviour BEHAVIOUR DEFINED AS !
            Managed objects with this behaviour issue the object creation notification upon creation, the object deletion
            notification upon deletion and the attribute value change notification upon a change of value of either the
            supported conditional package list attribute or the implemented values attribute.
            !;;
        ATTRIBUTES
            managedObjectClassRepertoireId GET,
            supportedConditionalPackageList GET;
        NOTIFICATIONS
            "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":attributeValueChange,
            "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":objectCreation,
            "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":objectDeletion;;;
        CONDITIONAL PACKAGES
            implementedValuesPackage PACKAGE
```


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```
        BEHAVIOUR implementedValuesPackageBehaviour BEHAVIOUR DEFINED AS !
            Presence of the implemented values conditional package implies that the managed object
            implementation supports the indicated implemented values for each of the managed object
            attributes indicated within the implemented values attribute.
            !;;
        ATTRIBUTES
            implementedValues GET;
    REGISTERED AS {MKMD.mkmPackage 2}; PRESENT IF "an instance supports it";
REGISTERED AS {MKMD.mkmMObjectClass 2};

repertoire MANAGED OBJECT CLASS
    DERIVED FROM "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":top;
    CHARACTERIZED BY repertoirePackage PACKAGE
    BEHAVIOUR repertoireBehaviour BEHAVIOUR DEFINED AS !
        An instance with this behaviour reflects system capabilities: when a system is enabled for support of new
        managed object classes, new managed relationship classes, new name bindings, or new CMIP profiles, or when
        existing support is disabled, the new capability shall be reflected in the values of the corresponding attributes.
        An instance with this behaviour shall emit the object creation notification upon creation, the object deletion
        notification upon deletion and the attribute value change notification upon a change of value of the supported
        managed object class list, supported relationship class list, supported name binding list, or supported CMIP
        profiles attribute.
        If a managed system has any instances of the repertoire managed object, it shall have one named under the
        system managed object with the value "REP1" for the repertoire Id attribute. A managed system may have
        multiple instances of the repertoire managed object.
        !;;
    ATTRIBUTES
        repertoireId GET,
        supportedNameBindingList GET,
        supportedManagedObjectClassList GET,
        supportedRelationshipClassList GET;
    NOTIFICATIONS
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":objectCreation,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":objectDeletion,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":attributeValueChange;;;
    CONDITIONAL PACKAGES
        supportedCmipProfilesPackage PACKAGE
            ATTRIBUTES
                supportedCmipProfiles GET;
        REGISTERED AS {MKMD.mkmPackage 1}; PRESENT IF "this managed object represents the managed
        system components that support communications";
REGISTERED AS {MKMD.mkmMObjectClass 1};
```

A.2.2 Name bindings

```
managedObjectClassRepertoire-repertoire NAME BINDING
    SUBORDINATE OBJECT CLASS
        managedObjectClassRepertoire AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS
        repertoire AND SUBCLASSES;
    WITH ATTRIBUTE managedObjectClassRepertoireId;
    BEHAVIOUR managedObjectClassRepertoire-repertoireBehaviour BEHAVIOUR DEFINED AS !
        The value of the managed object class repertoire Id attribute shall be the OBJECT IDENTIFIER for the
        managed object class with which the repertoire is associated.
        !;;
REGISTERED AS {MKMD.mkmNameBinding 2};

repertoire-system NAME BINDING
    SUBORDINATE OBJECT CLASS
        repertoire AND SUBCLASSES;
    NAMED BY SUPERIOR OBJECT CLASS
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":system AND SUBCLASSES;
    WITH ATTRIBUTE repertoireId;
    BEHAVIOUR repertoire-systemBehaviour BEHAVIOUR DEFINED AS !
        The use of a fixed relative distinguished name for a common way to access a repertoire managed object is
        provided by this name binding when the value "REP1" is used for the repertoire Id attribute.
        !;;
REGISTERED AS {MKMD.mkmNameBinding 1};
```


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A.2.3 Attributes

implementedValues ATTRIBUTE
WITH ATTRIBUTE SYNTAX RepertoireASN1Module.ImplementedValues;
BEHAVIOUR implementedValuesBehaviour BEHAVIOUR DEFINED AS !
This attribute represents class implementation information related to a set of attributes of a managed object class. This set-valued attribute shall not contain more than one element with the same attributeId value. The information provided applies only to instances of the class for which information is being provided: in other words, implementation information represented by this attribute is not inherited by derived classes.
The following information about an attribute can be represented:
- **initialValue: The value the attribute first takes when an instance of the class comes into existence.**
- **defaultValue: The value to which the attribute is set when a set-to-default management operation is applied to it.**
- **minValue: For an attribute of type INTEGER, REAL, or a subtype of either of these types, which has ranges for both its permitted and required values sets, minValue indicates the minimum value that the attribute can take in an instance of the class. minValue shall be greater than or equal to the smallest permitted value and less than or equal to the smallest required value.**
- **maxValue: For an attribute of type INTEGER, REAL, or a subtype of either of these types, which has ranges for both its permitted and required values sets, maxValue indicates the maximum value that the attribute can take in an instance of the class. maxValue shall be less than or equal to the largest permitted value and greater than or equal to the largest required value.**

!;;
REGISTERED AS {MKMD.mkmAttribute 6};

managedObjectClassRepertoireId ATTRIBUTE
WITH ATTRIBUTE SYNTAX RepertoireASN1Module.ManagedObjectClassRepertoireId;
MATCHES FOR EQUALITY;
BEHAVIOUR managedObjectClassRepertoireIdBehaviour BEHAVIOUR DEFINED AS !
The value of this attribute is the OBJECT IDENTIFIER with which the managed object class was registered.
!;;
REGISTERED AS {MKMD.mkmAttribute 2};

repertoireId ATTRIBUTE
WITH ATTRIBUTE SYNTAX RepertoireASN1Module.RepertoireId;
MATCHES FOR EQUALITY;
BEHAVIOUR repertoireIdBehaviour BEHAVIOUR DEFINED AS !
The repertoireId attribute is a distinguishing attribute suitable for naming.
!;;
REGISTERED AS {MKMD.mkmAttribute 1};

supportedCmipProfiles ATTRIBUTE
WITH ATTRIBUTE SYNTAX RepertoireASN1Module.SupportedCmipProfiles;
MATCHES FOR EQUALITY;
BEHAVIOUR supportedCmipProfilesBehaviour BEHAVIOUR DEFINED AS !
This attribute indicates the CMIP profiles supported by the system operating in the agent role. The following values are defined:
- **aom10(0): The managed system supports ISP 11183-1.**
- **aom11(1): The managed system supports ISP 11183-3.**
- **aom12(2): The managed system supports ISP 11183-2.**

!;;
REGISTERED AS {MKMD.mkmAttribute 4};

supportedConditionalPackageList ATTRIBUTE
WITH ATTRIBUTE SYNTAX RepertoireASN1Module.SupportedConditionalPackageList;
MATCHES FOR SET-COMPARISON, SET-INTERSECTION;
BEHAVIOUR supportedConditionalPackageListBehaviour BEHAVIOUR DEFINED AS !
This set-valued, read-only attribute identifies the conditional packages supported in the implementation of the managed object class.
!;;
REGISTERED AS {MKMD.mkmAttribute 5};

supportedManagedObjectClassList ATTRIBUTE
WITH ATTRIBUTE SYNTAX RepertoireASN1Module.SupportedManagedObjectClassList;
MATCHES FOR SET-COMPARISON, SET-INTERSECTION;
BEHAVIOUR supportedManagedObjectClassListBehaviour BEHAVIOUR DEFINED AS !
The supportedManagedObjectClassList attribute indicates the managed object classes, actual and allomorphic, supported by a system operating in the agent role.
!;;
REGISTERED AS {MKMD.mkmAttribute 3};

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```
supportedNameBindingList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX RepertoireASN1Module.SupportedNameBindingList;
        MATCHES FOR SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR supportedNameBindingListBehaviour BEHAVIOUR DEFINED AS !
            The supportedNameBindingList attribute indicates the name bindings supported by the system operating in
            the agent role.
            !;;
REGISTERED AS {MKMD.mkmAttribute 42};

supportedRelationshipClassList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX RepertoireASN1Module.SupportedRelationshipClassList;
        MATCHES FOR SET-COMPARISON, SET-INTERSECTION;
        BEHAVIOUR supportedRelationshipClassListBehaviour BEHAVIOUR DEFINED AS !
            The supportedRelationshipClassList attribute indicates the relationship classes supported by the system
            operating in the agent role.
            !;;
REGISTERED AS {MKMD.mkmAttribute 44};
```

A.2.4 Abstract syntax

```
--%PRAGMA version BIT STRING {v1990(0), v1994(1)}  ::= v1990
RepertoireASN1Module {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 0}
DEFINITIONS IMPLICIT TAGS  ::=
BEGIN
-- EXPORTS everything;
IMPORTS
NameBinding, Packages
        FROM Attribute-ASN1Module {joint-iso-ccitt(2) ms(9) smi(3) part2(2) asn1Module(2)}
        -- CCITT Rec. X.721 | ISO/IEC 10165-2
;
GdmoAttributeId                 ::=  OBJECT IDENTIFIER
GdmoObjectClass                 ::=  OBJECT IDENTIFIER
ImplementedValues       ::=  SET OF SEQUENCE {
        attributeId     GdmoAttributeId,
        defaultValue    [1] EXPLICIT ANY DEFINED BY attributeId OPTIONAL,
        initialValue    [2] EXPLICIT ANY DEFINED BY attributeId OPTIONAL,
        minValue        [3] EXPLICIT ANY DEFINED BY attributeId OPTIONAL,
        maxValue        [4] EXPLICIT ANY DEFINED BY attributeId OPTIONAL
}
ManagedObjectClassRepertoireId      ::=  GdmoObjectClass
RepertoireId                        ::=  GraphicString
SupportedCmipProfiles               ::=  BIT STRING {
        aom10(0),       -- the managed system supports ISP 11183-1
        aom11(1),       -- the managed system supports ISP 11183-3
        aom12(2)}       -- the managed system supports ISP 11183-2
SupportedConditionalPackageList ::=  Packages
SupportedManagedObjectClassList::=  SET OF GdmoObjectClass
SupportedNameBindingList        ::=  SET OF NameBinding
SupportedRelationshipClassList  ::=  SET OF OBJECT IDENTIFIER
END
```

A.3 Definition managed object definitions

A.3.1 Managed object classes

```
actionTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY  actionPackage  PACKAGE
        ATTRIBUTES
            behaviour GET,
            modeConfirmed GET,
            parameters GET,
            withInformationSyntax GET,
            withReplySyntax GET,
            registeredAs GET;;;
 REGISTERED AS {MKMD.mkmMObjectClass 12};
```


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```
aSN1Module MANAGED OBJECT CLASS
        DERIVED FROM        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":top;
        CHARACTERIZED BY aSN1ModulePackage    PACKAGE
        BEHAVIOUR aSN1ModuleBehaviour BEHAVIOUR DEFINED AS !
            When an instance of this class is named subordinate to a document managed object, the moduleReference
            attribute provides unique identification within the scope of that document managed object. A managed object
            with this behaviour supports the retrieval of the asn1ModuleContents attribute via the
            getTextualRepresentation action.
            !;;
        ATTRIBUTES
            moduleReference GET,
            asn1ModuleContents GET,
            asn1Version GET,
            optionallyRegisteredAs GET;
        ACTIONS
            getTextualRepresentation;;;
REGISTERED AS {MKMD.mkmMObjectClass 4};

attributeGroupTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY attributeGroupPackage        PACKAGE
        ATTRIBUTES
            groupElements GET,
            fixed GET,
            description GET,
            registeredAs GET;;;
REGISTERED AS {MKMD.mkmMObjectClass 10};

attributeTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY attributePackage    PACKAGE
        ATTRIBUTES
            derivedOrWithSyntaxChoice GET,
            matchesFor GET,
            behaviour GET,
            parameters GET,
            optionallyRegisteredAs GET;;;
REGISTERED AS {MKMD.mkmMObjectClass 9};

behaviourTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY behaviourPackage   PACKAGE
        BEHAVIOUR behaviourTemplateBehaviour BEHAVIOUR DEFINED AS !
            A managed object with this behaviour supports the retrieval of the definedAs attribute via the
            getTextualRepresentation action.
            !;;
        ATTRIBUTES
            definedAs GET;
        ACTIONS
            getTextualRepresentation;;;
REGISTERED AS {MKMD.mkmMObjectClass 11};

document MANAGED OBJECT CLASS
        DERIVED FROM        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":top;
        CHARACTERIZED BY documentPackage   PACKAGE
        BEHAVIOUR documentBehaviour BEHAVIOUR DEFINED AS !
            When an instance of this class is named subordinate to a system managed object, either the documentName or
            the documentObjectIdentifier attribute provides unique identification within the scope of that system managed
            object. When the documentName attribute is used for ITU-T Recommendations or for International
            Standards, it is formed as specified for a <standard-name> in 8.2(k) of CCITT Rec. X.722 (1992) |
            ISO/IEC 10165-4:1992.
            !;;
        ATTRIBUTES
            documentName GET,
            documentObjectIdentifier GET;;;
        CONDITIONAL PACKAGES
            documentSpecificationPackage      PACKAGE
```


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```
            BEHAVIOUR documentSpecificationBehaviour BEHAVIOUR DEFINED AS !
                A managed object with this behaviour supports the retrieval of the specification attribute via the
                getTextualRepresentation action.
                !;;
            ATTRIBUTES
                specification GET;
            ACTIONS
                getTextualRepresentation;
        REGISTERED AS {MKMD.mkmPackage 4}; PRESENT IF "document is available as a text string";
REGISTERED AS {MKMD.mkmMObjectClass 14};

managedObjectClassTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY  managedObjectClassPackage  PACKAGE
        ATTRIBUTES
            derivedFrom GET,
            characterizedBy GET,
            conditionalPackages GET,
            registeredAs GET;;;
REGISTERED AS {MKMD.mkmMObjectClass 5};

nameBindingTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY  nameBindingPackage     PACKAGE
        ATTRIBUTES
            subordinateObjectClass GET,
            namedBySuperiorObjectClass GET,
            withAttribute GET,
            behaviour GET,
            create GET,
            delete GET,
            registeredAs GET;;;
REGISTERED AS {MKMD.mkmMObjectClass 8};

notificationTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY  notificationPackage PACKAGE
        ATTRIBUTES
            behaviour GET,
            modeConfirmed GET,
            parameters GET,
            withInformationSyntax GET,
            andAttributeIds GET,
            withReplySyntax GET,
            registeredAs GET;;;
REGISTERED AS {MKMD.mkmMObjectClass 13};

packageTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY  packagePackage          PACKAGE
        ATTRIBUTES
            behaviour GET,
            attributes GET,
            attributeGroups GET,
            actions GET,
            notifications GET,
            optionallyRegisteredAs GET;;;
REGISTERED AS {MKMD.mkmMObjectClass 6};

parameterTemplate MANAGED OBJECT CLASS
        DERIVED FROM        template;
        CHARACTERIZED BY  parameterPackage  PACKAGE
        ATTRIBUTES
            context GET,
            syntaxOrAttribute GET,
            behaviour GET,
            optionallyRegisteredAs GET;;;
REGISTERED AS {MKMD.mkmMObjectClass 7};
```


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```
template MANAGED OBJECT CLASS
        DERIVED FROM        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":top;
        CHARACTERIZED BY templatePackage    PACKAGE
        BEHAVIOUR templateBehaviour BEHAVIOUR DEFINED AS !
            When an instance of this class is named subordinate to a document managed object, the templateName
            attribute provides unique identification within the scope of that document managed object.
            !;;
        ATTRIBUTES
            templateName GET;;;
        CONDITIONAL PACKAGES
            templateDefinitionPackage PACKAGE
                BEHAVIOUR templateDefinitionPackageBehaviour BEHAVIOUR DEFINED AS !
                    A managed object with this behaviour supports retrieval of the information of the
                    templateDefinition attribute via the getTextualRepresentation action.
                    !;;
                ATTRIBUTES
                    templateDefinition GET;
                ACTIONS
                    getTextualRepresentation;
            REGISTERED AS {MKMD.mkmPackage 3}; PRESENT IF !template is represented as text string!;
REGISTERED AS {MKMD.mkmMObjectClass 3};
```

A.3.2 Name bindings

```
aSN1Module-document NAME BINDING
        SUBORDINATE OBJECT CLASS            aSN1Module AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS      document AND SUBCLASSES;
        WITH ATTRIBUTE                      moduleReference;
REGISTERED AS {MKMD.mkmNameBinding 4};

document-system NAME BINDING
        SUBORDINATE OBJECT CLASS            document AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS
            "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":system AND SUBCLASSES;
        WITH ATTRIBUTE                      documentObjectIdentifier;
REGISTERED AS {MKMD.mkmNameBinding 6};

document-system2 NAME BINDING
        SUBORDINATE OBJECT CLASS            document AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS
            "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":system AND SUBCLASSES;
        WITH ATTRIBUTE                      documentName;
REGISTERED AS {MKMD.mkmNameBinding 7};

template-document NAME BINDING
        SUBORDINATE OBJECT CLASS            template AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS      document AND SUBCLASSES;
        WITH ATTRIBUTE                      templateName;
REGISTERED AS {MKMD.mkmNameBinding 3};
```

A.3.3 Attributes

```
actions ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Actions;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR actionsBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the actions, and associated parameters, of a package.
            !;;
REGISTERED AS {MKMD.mkmAttribute 18};

andAttributeIds ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.AndAttributeIds;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR andAttributeIdsBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the assignment of attributes to fields of a notification's argument.
            !;;
REGISTERED AS {MKMD.mkmAttribute 36};
```


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```
asn1ModuleContents ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.ASN1ModuleContents;
        MATCHES FOR                     EQUALITY, SUBSTRINGS;
        BEHAVIOUR asn1ModuleContentsBehaviour BEHAVIOUR DEFINED AS !
            This attribute holds the ASN.1 module contents in textual form.
            !;;
REGISTERED AS {MKMD.mkmAttribute 9};

asn1Version ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.ASN1Version;
        MATCHES FOR                     EQUALITY, SUBSTRINGS;
        BEHAVIOUR asn1VersionBehaviour BEHAVIOUR DEFINED AS !
            This attribute holds a bit string that has one bit set for each ASN.1 version to which the module conforms.
            !;;
REGISTERED AS {MKMD.mkmAttribute 45};

attributeGroups ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.AttributeGroups;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR attributeGroupsBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the attribute groups, and associated attributes, of a package.
            !;;
REGISTERED AS {MKMD.mkmAttribute 17};

attributes ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Attributes;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR attributesBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the attributes, and associated qualifiers and parameters, of a package.
            !;;
REGISTERED AS {MKMD.mkmAttribute 16};

behaviour ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Behaviour;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR behaviourBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the behaviours associated with an element of management information.
            !;;
REGISTERED AS {MKMD.mkmAttribute 15};

characterizedBy ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.CharacterizedBy;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR characterizedByBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the mandatory packages of a managed object class.
            !;;
REGISTERED AS {MKMD.mkmAttribute 11};

conditionalPackages ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.ConditionalPackages;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR conditionalPackagesBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the conditional packages, and their conditions, of a managed object class.
            !;;
REGISTERED AS {MKMD.mkmAttribute 12};

context ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Context;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR contextBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the context of a parameter.
            !;;
REGISTERED AS {MKMD.mkmAttribute 20};

create ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Create;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR createBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the create element specification of a name binding. If no create element is present, then
            this attribute's value shall be null.
            !;;
REGISTERED AS {MKMD.mkmAttribute 25};
```


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definedAs ATTRIBUTE
WITH ATTRIBUTE SYNTAX DefinitionASN1Module.DefinedAs;
MATCHES FOR EQUALITY;
BEHAVIOUR definedAsBehaviour BEHAVIOUR DEFINED AS !
This attribute contains the definition of a behaviour.
!;;
REGISTERED AS {MKMD.mkmAttribute 32};

delete ATTRIBUTE
WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Delete;
MATCHES FOR EQUALITY;
BEHAVIOUR deleteBehaviour BEHAVIOUR DEFINED AS !
This attribute identifies the delete element specification of a name binding. If no delete element is present, then this attribute's value shall be null.
!;;
REGISTERED AS {MKMD.mkmAttribute 26};

derivedFrom ATTRIBUTE
WITH ATTRIBUTE SYNTAX DefinitionASN1Module.DerivedFrom;
MATCHES FOR EQUALITY;
BEHAVIOUR derivedFromBehaviour BEHAVIOUR DEFINED AS !
This set-valued attribute identifies the immediate superclasses of a managed object class.
!;;
REGISTERED AS {MKMD.mkmAttribute 10};

derivedOrWithSyntaxChoice ATTRIBUTE
WITH ATTRIBUTE SYNTAX DefinitionASN1Module.DerivedOrWithSyntaxChoice;
MATCHES FOR EQUALITY;
BEHAVIOUR derivedOrWithSyntaxChoiceBehaviour BEHAVIOUR DEFINED AS !
This attribute identifies the syntax specification of an attribute.
!;;
REGISTERED AS {MKMD.mkmAttribute 27};

description ATTRIBUTE
WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Description;
MATCHES FOR EQUALITY;
BEHAVIOUR descriptionBehaviour BEHAVIOUR DEFINED AS !
This attribute contains the description of an attribute group.
!;;
REGISTERED AS {MKMD.mkmAttribute 31};

documentName ATTRIBUTE
WITH ATTRIBUTE SYNTAX DefinitionASN1Module.DocumentName;
MATCHES FOR EQUALITY, SUBSTRINGS;
BEHAVIOUR documentNameBehaviour BEHAVIOUR DEFINED AS !
This attribute identifies with a graphic string the document represented by the managed object. E.g. "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992" identifies the Definition of management information.
!;;
REGISTERED AS {MKMD.mkmAttribute 38};

documentObjectIdentifier ATTRIBUTE
WITH ATTRIBUTE SYNTAX DefinitionASN1Module.DocumentObjectIdentifier;
MATCHES FOR EQUALITY;
BEHAVIOUR documentObjectIdentifierBehaviour BEHAVIOUR DEFINED AS !
This attribute identifies with an ASN.1 object identifier value the document represented by the managed object. E.g. {2 9 3 2} identifies the Definition of management information, CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992 (as specified in the registration tables for Recommendation | International Standard documents for OSI Systems Management published in CCITT Rec. X.722 | ISO/IEC 10165-4).
!;;
REGISTERED AS {MKMD.mkmAttribute 39};

fixed ATTRIBUTE
WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Fixed;
MATCHES FOR EQUALITY;
BEHAVIOUR fixedBehaviour BEHAVIOUR DEFINED AS !
This attribute identifies an attribute group as being fixed or dynamic.
!;;
REGISTERED AS {MKMD.mkmAttribute 30};

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```
groupElements ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.GroupElements;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR groupElementsBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the elements of an attribute group.
            !;;
REGISTERED AS {MKMD.mkmAttribute 29};

matchesFor ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.MatchesFor;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR matchesForBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the matching characteristics of an attribute.
            !;;
REGISTERED AS {MKMD.mkmAttribute 28};

modeConfirmed ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.ModeConfirmed;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR modeConfirmedBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies an action or notification as being confirmed or not.
            !;;
REGISTERED AS {MKMD.mkmAttribute 33};

moduleReference ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Identifier;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR moduleReferenceBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the name of the ASN.1 module.
            !;;
REGISTERED AS {MKMD.mkmAttribute 8};

namedBySuperiorObjectClass ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.NamingObjectClass;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR namedBySuperiorObjectClassBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the superior object classes of a name binding.
            !;;
REGISTERED AS {MKMD.mkmAttribute 23};

notifications ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Notifications;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR notificationsBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the notifications, and associated parameters, of a package.
            !;;
REGISTERED AS {MKMD.mkmAttribute 19};

optionallyRegisteredAs ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.OptionallyRegisteredAs;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR optionallyRegisteredAsBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the identifier of the represented element of management information. If no identifier
            has been assigned, this attribute shall have a null value.
            !;;
REGISTERED AS {MKMD.mkmAttribute 43};

parameters ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Parameters;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR parametersBehaviour BEHAVIOUR DEFINED AS !
            This set-valued attribute identifies the parameters associated with an element of management information.
            !;;
REGISTERED AS {MKMD.mkmAttribute 13};

registeredAs ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.RegisteredAs;
        MATCHES FOR                     EQUALITY;
        BEHAVIOUR registeredAsBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the identifier of the represented element of management information.
            !;;
REGISTERED AS {MKMD.mkmAttribute 14};
```


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```
specification ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.Specification;
        BEHAVIOUR specificationBehaviour BEHAVIOUR DEFINED AS !
            This attribute contains a representation of only the GDMO and ASN.1 specifications and embedded comments
            contained within the document.
            !;;
REGISTERED AS {MKMD.mkmAttribute 40};

subordinateObjectClass ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.NamingObjectClass;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR subordinateObjectClassBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the subordinate managed object classes of a name binding.
            !;;
REGISTERED AS {MKMD.mkmAttribute 22};

syntaxOrAttribute ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.SyntaxOrAttribute;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR syntaxOrAttributeBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the syntax specification of a parameter.
            !;;
REGISTERED AS {MKMD.mkmAttribute 21};

templateDefinition ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.TemplateDefinition;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR templateDefinitionBehaviour BEHAVIOUR DEFINED AS !
            This attribute contains a text string representation of the GDMO template definition. In-line templates are not
            included in this text string, even if they appear in line in the document represented by the document managed
            object under which the template managed object is named. It is not necessary that GDMO comments be
            included in this representation.
            !;;
REGISTERED AS {MKMD.mkmAttribute 37};

templateName ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.TemplateName;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR templateNameBehaviour BEHAVIOUR DEFINED AS !
            This attribute names template managed objects. Its value is that of the label of the GDMO template which is
            represented.
            !;;
REGISTERED AS {MKMD.mkmAttribute 7};

withAttribute ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.WithAttribute;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR withAttributeBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the naming attribute of a name binding.
            !;;
REGISTERED AS {MKMD.mkmAttribute 24};

withInformationSyntax ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.WithSyntax;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR withInformationSyntaxBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the syntax of the argument of an action or notification.
            !;;
REGISTERED AS {MKMD.mkmAttribute 34};

withReplySyntax ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DefinitionASN1Module.WithSyntax;
        MATCHES FOR                 EQUALITY;
        BEHAVIOUR withReplySyntaxBehaviour BEHAVIOUR DEFINED AS !
            This attribute identifies the syntax of the reply to an action or notification.
            !;;
REGISTERED AS {MKMD.mkmAttribute 35};
```


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A.3.4 Actions and parameters

```
getTextualRepresentation ACTION
        BEHAVIOUR getTextualRepresentationBehaviour BEHAVIOUR DEFINED AS !
            The action returns a textual representation of the information in a single attribute of the managed object to
            which it is directed. The action response, which may be spread across multiple Linked Replies, consists of a
            sequence of line images. If there are multiple Linked Replies, the sequences from all of them are logically
            combined into a single, longer sequence of line images.
            For an attribute with the syntax DefinitionASN1Module.TextualRepresentation, the result of retrieving the
            attribute via this action and, if necessary, combining the contents of multiple Linked Replies, is identical to
            result of the get attribute value management operation.
            !;;
        PARAMETERS      attributeNotAvailableViaThisAction;
        WITH INFORMATION SYNTAX DefinitionASN1Module.AttributeId;
        WITH REPLY SYNTAX DefinitionASN1Module.TextualRepresentation;
REGISTERED AS {MKMD.mkmAction 2};

attributeNotAvailableViaThisAction PARAMETER
        CONTEXT     SPECIFIC-ERROR;
        WITH SYNTAX     DefinitionASN1Module.Null;
        BEHAVIOUR attributeNotAvailableViaThisActionBehaviour BEHAVIOUR DEFINED AS !
            This error indicates that retrieval of the requested attribute via the getTextualRepresentation action is not
            supported.
            !;;
REGISTERED AS {MKMD.mkmParameter 1};
```

A.3.5 Abstract syntax

```
-- %PRAGMA version BIT STRING {v1990(0), v1994(1)}  ::=  {v1990, v1994}
DefinitionASN1Module {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 1}
DEFINITIONS IMPLICIT TAGS  ::=
BEGIN
-- EXPORTS everything;
IMPORTS
ManagementExtension
        FROM Attribute-ASN1Module {joint-iso-ccitt(2) ms(9) smi(3) part2(2) asn1Module(2)}
        -- CCITT Rec. X.721 | ISO/IEC 10165-2
;
Actions             ::=  SET OF SEQUENCE {
                         action          [0] TemplateLabel,
                         parameter       [1] TemplateList OPTIONAL}
AdditionalProperties    ::=  SET OF ManagementExtension
AndAttributeIds     ::=  SET OF SEQUENCE{
                         fieldNameIdentifier,
                         attribute       TemplateLabel}
ASN1ModuleContents  ::=  TextualRepresentation
ASN1Version         ::=  BIT STRING {v1990(0), v1994(1)}
AttributeGroups     ::=  SET OF SEQUENCE {
                         group           TemplateLabel,
                         attributes TemplateList OPTIONAL}
AttributeId         ::=  OBJECT IDENTIFIER
Attributes      ::=  SET OF SEQUENCE{
                         attributeLabel TemplateLabel,
                         property            PropertyList,
                         parameterLabel      TemplateList OPTIONAL}
Behaviour           ::=  TemplateList
CharacterizedBy     ::=  TemplateList
ConditionalPackages     ::=  SET OF SEQUENCE {  label      TemplateLabel,
                                                condition  GraphicString}
Context             ::=  CHOICE {
                         keyword         SEQUENCE{  type-reference  DefinedType,
                                                    field           Identifier},
                         representation  ENUMERATED{     aCTION-INFO(0),
                                                         aCTION-REPLY(1),
                                                         eVENT-INFO(2),
                                                         eVENT-REPLY(3),
                                                         sPECIFIC-ERROR(4)}}
```


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```
Create                  ::=  CHOICE {present CreateSpecification, absent NULL}
CreateSpecification     ::=  SEQUENCE {
                             createModifier BIT STRING{ withReferenceObject(0),
                                                        withAutomaticInstanceNaming(1)}
                                                                OPTIONAL,
                             parameter          TemplateList OPTIONAL}
DefinedAs               ::=  TextualRepresentation
DefinedType             ::=  SEQUENCE { module          [0] Identifier OPTIONAL,
                                        reference       [1] Identifier}
DefinedValue            ::=  SEQUENCE { module          [0] Identifier OPTIONAL,
                                        reference       [1] Identifier}
Delete                  ::=  CHOICE {present DeleteSpecification, absent NULL}
DeleteSpecification     ::=  SEQUENCE {
                             deleteModifier ENUMERATED{         onlyIfNoContainedObjects(0),
                                                                deletesContainedObjects(1)} OPTIONAL,
                             parameter          TemplateList OPTIONAL}
DerivedFrom             ::=  TemplateList
DerivedOrWithSyntaxChoice ::=  CHOICE {
                             derivedFrom        [0] TemplateLabel,
                             withSyntaxChoice   [1] DefinedType}
Description             ::=  TextualRepresentation
DocumentName            ::=  GraphicString
DocumentObjectIdentifier    ::=  OptionallyRegisteredAs
Fixed                   ::=  BOOLEAN
GroupElements           ::=  TemplateList
Identifier              ::=  PrintableString(FROM("0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9" |
                                                  "A" | "B" | "C" | "D" | "E" | "F" | "G" | "H" | "I" | "J" | "K" | "L" | "M" |
                                                  "N" | "O" | "P" | "Q" | "R" | "S" | "T" | "U" | "V" | "W" | "X" | "Y" | "Z" |
                                                  "a" | "b" | "c" | "d" | "e" | "f" | "g" | "h" | "i" | "j" | "k" | "l" | "m" |
                                                  "n" | "o" | "p" | "q" | "r" | "s" | "t" | "u" | "v" | "w" | "x" | "y" | "z" | "-"))
LineImage               ::=  GraphicString -- each value of this type represents one complete line of text
MatchesFor              ::=  BIT STRING{ equality(0),
                                         ordering(1),
                                         substrings(2),
                                         setComparison(3),
                                         setIntersection(4)}
ModeConfirmed           ::=  BOOLEAN
NamingObjectClass       ::=  SEQUENCE{class             TemplateLabel,
                                       andSubclasses    BOOLEAN DEFAULT FALSE}
Notifications           ::=  SET OF SEQUENCE {
                             notification       [0] TemplateLabel,
                             parameter          [1] TemplateList OPTIONAL}
Null                    ::= NULL
OptionallyRegisteredAs  ::=  CHOICE {present OBJECT IDENTIFIER, absent NULL}
Parameters              ::=  TemplateList
PropertyList            ::=  SEQUENCE {
                             replaceWithDefault     [0] BOOLEAN DEFAULT FALSE,
                             defaultValue           [1] EXPLICIT ValueSpecifier OPTIONAL,
                             initialValue           [2] EXPLICIT ValueSpecifier OPTIONAL,
                             permittedValues        [3] DefinedType OPTIONAL,
                             requiredValues         [4] DefinedType OPTIONAL,
                             getReplace             [5] ENUMERATED{
                                                            gET(0),
                                                            rEPLACE(1),
                                                            gET-REPLACE(2)} OPTIONAL,
                             addRemove              [6] ENUMERATED{
                                                            aDD(0),
                                                            rEMOVE(1),
                                                            aDD-REMOVE(2)} OPTIONAL,
                             setByCreate            [7] BOOLEAN DEFAULT FALSE,
                             additionalProperties   [8] AdditionalProperties OPTIONAL}
RegisteredAs            ::=  OBJECT IDENTIFIER
Specification           ::=  TextualRepresentation
SyntaxOrAttribute           ::=  CHOICE {withSyntax     [0] DefinedType,
                                         attribute      [1] TemplateLabel}
TemplateDefinition      ::=  TextualRepresentation
TemplateList            ::=  SET OF TemplateLabel
```


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```
TemplateLabel::=  SEQUENCE{
                        localName       TemplateName,
                        documentId      CHOICE {
                                        documentName                DocumentName,
                                        documentObjectIdentifier    DocumentObjectIdentifier
                                                } OPTIONAL -- align with GDMO document identifier
                        }
TemplateName::=   PrintableString(FROM("0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9" |
                                "A" | "B" | "C" | "D" | "E" | "F" | "G" | "H" | "I" | "J" | "K" | "L" | "M" |
                                "N" | "O" | "P" | "Q" | "R" | "S" | "T" | "U" | "V" | "W" | "X" | "Y" | "Z" |
                                "a" | "b" | "c" | "d" | "e" | "f" | "g" | "h" | "i" | "j" | "k" | "l" | "m" |
                                "n" | "o" | "p" | "q" | "r" | "s" | "t" | "u" | "v" | "w" | "x" | "y" | "z" | "-" | "/"))
TextualRepresentation   ::=  SEQUENCE OF LineImage
ValueSpecifier          ::=  CHOICE{ valueReference     [0] DefinedValue,
                                     derivationRule     [1] TemplateLabel}
WithAttribute           ::=  TemplateLabel
WithSyntax              ::=  CHOICE { present DefinedType, absent NULL}
END
```

A.4 Discovery managed object definitions

A.4.1 Managed object classes

```
discoveryObject MANAGED OBJECT CLASS
        DERIVED FROM " CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":top;
        CHARACTERIZED BY discoveryObjectPackage PACKAGE
        BEHAVIOUR discoveryObjectBehaviour BEHAVIOUR DEFINED AS !
            A managed object with this behaviour responds to mITSearch action requests concerning subtrees of managed
            objects within a managed system's naming tree. The query specifies a base object and the required scope of the
            search.
            The response is a set of rooted tree structures that together cover the requested scope under the requested base
            object. Each rooted tree has the distinguished name of its root but does not repeat common name components
            within its structure, i.e. only the RDN is used to identify subordinate managed objects.
            !;;
        ATTRIBUTES
            discoveryId;
        ACTIONS
            mITSearch;;;
 REGISTERED AS {MKMD.mkmMObjectClass 15};
```

A.4.2 Name bindings

```
discovery-system NAME BINDING
        SUBORDINATE OBJECT CLASS discoveryObject AND SUBCLASSES;
        NAMED BY SUPERIOR OBJECT CLASS
            "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2:1992":system AND SUBCLASSES;
        WITH ATTRIBUTE      discoveryId;
        BEHAVIOUR discovery-systemBehaviour BEHAVIOUR DEFINED AS !
            The use of a fixed relative distinguished name for a common way to access a discovery managed object is
            provided by this name binding when the value "DSC1" is used for the repertoire Id attribute.
            Subordinate to a given system managed object, there shall be only one allowed value for the discovery Id
            attribute, namely "DSC1".
            !;;
 REGISTERED AS {MKMD.mkmNameBinding 5};
```

A.4.3 Attributes

```
discoveryId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX DiscoveryASN1Module.DiscoveryId;
        MATCHES FOR EQUALITY;
        BEHAVIOUR discoveryIdBehaviour BEHAVIOUR DEFINED AS !
            This attribute is used to identify an instance of the discovery managed object.
            !;;
 REGISTERED AS  {MKMD.mkmAttribute 41};
```


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A.4.4 Actions

mITSearch ACTION
BEHAVIOUR mitSearchBehaviour BEHAVIOUR DEFINED AS !
The argument has the base object, the required scope of the search and an optional class request parameter. The response has a tree structure, under any specified base managed object, without repeating common name components (i.e. only RDN components are sent).
It shall, if specified in the request, also report the managed object class type associated with each node in the tree.
!;;
WITH INFORMATION SYNTAX DiscoveryASN1Module.MITSearch;
WITH REPLY SYNTAX DiscoveryASN1Module.MITSearchResponse;
REGISTERED AS {MKMD.mkmAction 1};

A.4.5 Abstract syntax

```
--%PRAGMA version BIT STRING {v1990(0), v1994(1)}  ::=  {v1990, v1994}
DiscoveryASN1Module {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 2}
DEFINITIONS IMPLICIT TAGS  ::=
BEGIN
-- EXPORTS everything;
IMPORTS
RelativeDistinguishedName
        FROM InformationFramework {joint-iso-ccitt(2) ds(5) modules(1) informationFramework(1)}
        -- ITU-T Rec. X.501 | ISO/IEC 9594-2
GdmoObjectClass
        FROM RepertoireASN1Module {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 0}
        -- this Recommendation | International Standard
ObjectInstance, Scope
        FROM CMIP-1 {joint-iso-ccitt(2) ms(9) cmip(1) modules(0) protocol(3)}
        -- ITU-T Rec. X.711 and ISO/IEC 9596-1
;
DiscoveryId         ::=  GraphicString
MITSearch           ::=  SEQUENCE {
                         base              ObjectInstance,
                         discoveryScopeScope,
                         classRequest      BOOLEAN DEFAULT FALSE
                                                   -- if true, include class with MITSearchResponse
                         }
MITSearchResponse   ::=  SET OF RootedNameTree
NameTree            ::=  SEQUENCE {
                         rdnInfo           RDNInfo,
                         subordinates      SET OF NameTree OPTIONAL}
RDNInfo             ::=  SEQUENCE {
                         rdn               RelativeDistinguishedName,
                         moClass           GdmoObjectClass OPTIONAL}
RootedNameTree      ::=  SEQUENCE {
                         rootObject        ObjectInstance,
                         classOfRoot       GdmoObjectClass OPTIONAL,
                         subordinates      SET OF NameTree OPTIONAL}
END
```


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Annex B

Management knowledge Directory objects

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

B.1 Repertoire Directory object definitions

```
--%PRAGMA version BIT STRING {v1990(0), v1994(1)}  ::=  v1994
RepertoireDirectoryASN1Module {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 3}
DEFINITIONS IMPLICIT TAGS  ::=
BEGIN
-- EXPORTS everything;
IMPORTS
ATTRIBUTE, OBJECT-CLASS CONTENT-RULE
        FROM InformationFramework {joint-iso-ccitt(2) ds(5) modules(1) informationFramework(1) 2}
        -- ITU-T Rec. X.501 | ISO/IEC 9594-2
applicationEntity
        FROM SelectedObjectClasses {joint-iso-ccitt(2) ds(5) modules(1) selectedObjectClasses(6) 2}
        -- ITU-T Rec. X.521 | ISO/IEC 9594-7
bitStringMatch
        FROM SelectedAttributeTypes {joint-iso-ccitt(2) ds(5) modules(1) selectedAttributeTypes(5) 2}
        -- ITU-T Rec. X.520 | ISO/IEC 9594-6
ObjectInstance
        FROM CMIP-1 {joint-iso-ccitt(2) ms(9) cmip(1) modules(0) protocols(3)}
        -- CCITT Rec. X.711 and ISO/IEC 9596-1
FunctionalUnits, ProtocolVersion
        FROM    CMIP-A-ASSOCIATE-Information {joint-iso-ccitt(2) ms(9) cmip(1) modules (0)
        AssociateUserInfo(1)} -- CCITT Rec. X.711 and ISO/IEC 9596-1
FunctionalUnitPackage
        FROM SMASE-A-ASSOCIATE-Information {joint-iso-ccitt(2) ms(9) smo(0) negotiationAbstractSyntax(1)
        version1(1)} -- CCITT Rec. X.701 | ISO/IEC 10040
mkmDirectoryObjectClass, mkmDirectoryAttributeType
        FROM MKMD {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 5}
        -- this Recommendation | International Standard
GdmoObjectClass
        FROM RepertoireASN1Module {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 0}
        -- this Recommendation | International Standard
;
cMISE OBJECT-CLASS ::=  {
        KIND                auxiliary
        MUST CONTAIN        { supportedCmipVersion |
                            supportedCmipProfiles |
                            supportedCmisFunctionalUnits}
        ID                  { mkmDirectoryObjectClass 1}}
sMASE OBJECT-CLASS      ::=  {
        KIND                auxiliary
        MUST CONTAIN        { supportedSmaseFunctionalUnits}
        MAY CONTAIN         { mitMoList |
                            supportsMKMglobalNames}
        ID              { mkmDirectoryObjectClass 2}}
-- The "cMISE" and "sMASE" Directory auxiliary object
-- classes should be used together with the Directory
-- structural object class "applicationEntity".
InstanceIdList ::=  SET OF ObjectInstance
managementServiceElementsCR    CONTENT-RULE  ::=  {
        STRUCTURAL OBJECT CLASS         applicationEntity
        AUXILIARY OBJECT CLASS          { sMASE | cMISE}}
mitMoList ATTRIBUTE ::=  {
        WITH SYNTAX     MitMo
        ID              { mkmDirectoryAttributeType 1}}
MitMo   ::=  SEQUENCE {
        objectClass         GdmoObjectClass,
        instances           InstanceIdList OPTIONAL}
```


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```
supportedCmipProfiles ATTRIBUTE    ::=  {
        WITH SYNTAX     BIT STRING
        EQUALITY MATCHING RULE   bitStringMatch
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 43}}
supportedCmipVersion ATTRIBUTE    ::=  {
        WITH SYNTAX     ProtocolVersion
        EQUALITY MATCHING RULE   bitStringMatch
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 2}}
supportedCmisFunctionalUnits ATTRIBUTE ::=  {
        WITH SYNTAX     FunctionalUnits
        EQUALITY MATCHING RULE   bitStringMatch
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 3}}
supportedSmaseFunctionalUnits ATTRIBUTE     ::=  {
        WITH SYNTAX     FunctionalUnitPackage
        ID              { mkmDirectoryAttributeType 5}}
supportsMKMglobalNames ATTRIBUTE     ::=  {
        WITH SYNTAX     BOOLEAN
        EQUALITY MATCHING RULE   booleanMatch
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 44}}
END
```

B.2 Definition Directory object definitions

```
--%PRAGMA version BIT STRING {v1990(0), v1994(1)}  ::=  v1994
DefinitionDirectoryASN1Module {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 4}
DEFINITIONS IMPLICIT TAGS  ::=
BEGIN
-- EXPORTS everything;
IMPORTS
ATTRIBUTE, OBJECT-CLASS, CONTENT-RULE, NAME-FORM, objectIdentifierMatch
        FROM InformationFramework {joint-iso-ccitt(2) ds(5) modules(1) informationFramework(1) 2}
        -- ITU-T Rec. X.501 | ISO/IEC 9594-2
bitStringMatch, booleanMatch, caseExactMatch, commonName, directoryStringFirstComponentMatch, integerMatch
        FROM SelectedAttributeTypes {joint-iso-ccitt(2) ds(5) modules(1) selectedAttributeTypes(5) 2}
        -- ITU-T Rec. X.520 | ISO/IEC 9594-6
        -- Because directoryStringFirstComponentMatch is a case-ignore matching rule, some matches
        -- found by its use could fail an exact-case matching test.
Actions, AndAttributeIds, Attributes, AttributeGroups, ConditionalPackages, Context, Create, Delete,
DerivedOrWithSyntaxChoice, Identifier, NamingObjectClass, Notifications, OptionallyRegisteredAs, RegisteredAs,
SyntaxOrAttribute, TemplateLabel, TextualRepresentation, WithSyntax
        FROM DefinitionASN1Module {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 1}
        -- this Recommendation | International Standard
mkmDirectoryObjectClass, mkmDirectoryAttributeType, mkmDirectoryNameForm
        FROM MKMD {joint-iso-ccitt(2) ms(9) function(2) part16(16) asn1Modules(2) 5}
        -- this Recommendation | International Standard
;
-- Definition of the required Directory object classes
asn1Module OBJECT-CLASS ::=  {
        KIND            auxiliary
        MUST CONTAIN    { moduleReference |
                          asn1ModuleContents |
                          asn1Version |
                          optionallyRegisteredAs}
        ID              { mkmDirectoryObjectClass 15}}
managementAction OBJECT-CLASS    ::=  {
        SUBCLASS OF     managementTemplate
        KIND            auxiliary
        MUST CONTAIN    { behaviour |
                          modeConfirmed |
                          parameters |
                          withInformationSyntax |
                          withReplySyntax |
                          registeredAs}
        ID              { mkmDirectoryObjectClass 13}}
```


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```
managementAttributeGroup OBJECT-CLASS     ::=  {
        SUBCLASS OF       managementTemplate
        KIND              auxiliary
        MUST CONTAIN      { groupElements |
                          fixed |
                          description |
                          registeredAs}
        ID              { mkmDirectoryObjectClass 11}}
managementAttribute OBJECT-CLASS ::=  {
        SUBCLASS OF       managementTemplate
        KIND              auxiliary
        MUST CONTAIN      { derivedOrWithSyntaxChoice |
                          matchesFor |
                          behaviour |
                          parameters |
                          optionallyRegisteredAs}
        ID              { mkmDirectoryObjectClass 10}}
managementBehaviour OBJECT-CLASS      ::=  {
        SUBCLASS OF       managementTemplate
        KIND              auxiliary
        MUST CONTAIN      { definedAs}
        ID              { mkmDirectoryObjectClass 12}}
managementDocument OBJECT-CLASS       ::=  {
        KIND              auxiliary
        MUST CONTAIN      { documentName |
                          documentObjectIdentifier}
        MAY CONTAIN       { specification}
        ID              { mkmDirectoryObjectClass 4}}
managementNameBinding OBJECT-CLASS  ::=  {
        SUBCLASS OF       managementTemplate
        KIND              auxiliary
        MUST CONTAIN      { subordinateObjectClass |
                          namedBySuperiorObjectClass |
                          withAttribute |
                          behaviour |
                          create |
                          delete |
                          registeredAs}
        ID              { mkmDirectoryObjectClass 9}}}
managementNotification OBJECT-CLASS     ::=  {
        SUBCLASS OF       managementTemplate
        KIND              auxiliary
        MUST CONTAIN      { behaviour |
                          modeConfirmed |
                          parameters |
                          withInformationSyntax |
                          andAttributeIds |
                          withReplySyntax |
                          registeredAs}
        ID              { mkmDirectoryObjectClass 14}}
managementObjectClass OBJECT-CLASS     ::=  {
        SUBCLASS OF       managementTemplate
        KIND              auxiliary
        MUST CONTAIN      { derivedFrom |
                          characterizedBy |
                          conditionalPackages |
                          registeredAs}
        ID              { mkmDirectoryObjectClass 6}}
managementPackage OBJECT-CLASS  ::=  {
        SUBCLASS OF       managementTemplate
        KIND              auxiliary
        MUST CONTAIN      { behaviour |
                          attributes |
                          attributeGroups |
                          actions |
                          notifications |
                          optionallyRegisteredAs}
        ID              { mkmDirectoryObjectClass 7}}
```


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```
managementParameter OBJECT-CLASS      ::=  {
        SUBCLASS OF      managementTemplate
        KIND             auxiliary
        MUST CONTAIN     { context |
                         syntaxOrAttribute |
                         behaviour |
                         optionallyRegisteredAs}
        ID               { mkmDirectoryObjectClass 8}}
managementTemplate OBJECT-CLASS ::=  {
        KIND             auxiliary
        MUST CONTAIN     { templateName}
        MAY CONTAIN      { templateDefinition}
        ID               { mkmDirectoryObjectClass 5}}
registeredInformation OBJECT-CLASS ::=  {
        SUBCLASS OF      top
        MUST CONTAIN     { commonName}
        MAY CONTAIN      { nameForm |
                         informationStatus |
                         additionalInformation}
        ID               { mkmDirectoryObjectClass 3}}
-- Example structure rules for the registeredInformation Directory object class
-- using this name form are provided in Annex H
registeredInformationNameForm NAME-FORM  ::=  {
        NAMES            registeredInformation
        WITH ATTRIBUTES  { commonName}
        ID               { mkmDirectoryNameForm 1}}
-- Definition of DIT content rules
-- Only one of the specified auxiliary object classes can be
-- included in a given entry of class registeredInformation
registeredManagementInformationCR  CONTENT-RULE  ::=  {
        STRUCTURAL OBJECT CLASS      registeredInformation
        AUXILIARY OBJECT CLASS       { managementDocument |
                                     managementTemplate |
                                     managementObjectClass |
                                     managementPackage |
                                     managementParameter |
                                     managementNameBinding |
                                     managementAttribute |
                                     managementAttributeGroup |
                                     managementBehaviour |
                                     managementAction |
                                     managementNotification |
                                     asn1Module}}
-- Definition of used attributes
actions ATTRIBUTE      ::=  {
        WITH SYNTAX      Actions
        SINGLE VALUE     TRUE
        ID               { mkmDirectoryAttributeType 6}}
additionalInformation ATTRIBUTE      ::=  {
        WITH SYNTAX      AdditionalInformation
        SINGLE VALUE     TRUE
        ID               { mkmDirectoryAttributeType 7}}
AdditionalInformation  ::=  SEQUENCE {
        creationDate         GeneralizedTime    OPTIONAL,
        comment          GraphicString OPTIONAL}
andAttributeIds ATTRIBUTE ::=  {
        WITH SYNTAX      AndAttributeIds
        SINGLE VALUE     TRUE
        ID               { mkmDirectoryAttributeType 8}}
asn1ModuleContents ATTRIBUTE ::=  {
        WITH SYNTAX      TextualRepresentation
        ID               { mkmDirectoryAttributeType 14}}
asn1Version ATTRIBUTE      ::=  {
        WITH SYNTAX      BIT STRING
        EQUALITY MATCHING RULE   bitStringMatch
        SINGLE VALUE     TRUE
        ID               { mkmDirectoryAttributeType 45}}
```


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```
attributeGroups ATTRIBUTE::=  {
        WITH SYNTAX     AttributeGroups
        ID              {mkmDirectoryAttributeType 9}}
attributes ATTRIBUTE  ::=  {
        WITH SYNTAX     Attributes
        SINGLE VALUE    TRUE
        ID              {mkmDirectoryAttributeType 10}}
behaviour ATTRIBUTE  ::=  {
        WITH SYNTAX     TemplateLabel
        EQUALITY MATCHING RULE    directoryStringFirstComponentMatch
        ID              {mkmDirectoryAttributeType 11}}
characterizedBy ATTRIBUTE::=  {
        WITH SYNTAX     TemplateLabel
        EQUALITY MATCHING RULE    directoryStringFirstComponentMatch
        ID              {mkmDirectoryAttributeType 12}}
conditionalPackages ATTRIBUTE  ::=  {
        WITH SYNTAX     ConditionalPackages
        ID              {mkmDirectoryAttributeType 13}}
context ATTRIBUTE     ::=  {
        WITH SYNTAX     Context
        SINGLE VALUE    TRUE
        ID              {mkmDirectoryAttributeType 15}}
create ATTRIBUTE::=  {
        WITH SYNTAX     Create
        SINGLE VALUE    TRUE
        ID              {mkmDirectoryAttributeType 16}}
definedAs ATTRIBUTE  ::=  {
        WITH SYNTAX     TextualRepresentation
        ID              {mkmDirectoryAttributeType 17}}
delete ATTRIBUTE::=  {
        WITH SYNTAX     Delete
        SINGLE VALUE    TRUE
        ID              {mkmDirectoryAttributeType 18}}
derivedFrom ATTRIBUTE     ::=  {
        WITH SYNTAX     TemplateLabel
        EQUALITY MATCHING RULE    directoryStringFirstComponentMatch
        ID              {mkmDirectoryAttributeType 19}}
derivedOrWithSyntaxChoice ATTRIBUTE    ::=  {
        WITH SYNTAX     DerivedOrWithSyntaxChoice
        SINGLE VALUE    TRUE
        ID              {mkmDirectoryAttributeType 20}}
description ATTRIBUTE::=  {
        WITH SYNTAX     TextualRepresentation
        ID              {mkmDirectoryAttributeType 21}}
documentName ATTRIBUTE  ::=  {
        WITH SYNTAX     GraphicString
        EQUALITY MATCHING RULE    directoryStringFirstComponentMatch
        SINGLE VALUE    TRUE
        ID              {mkmDirectoryAttributeType 22}}
documentObjectIdentifier ATTRIBUTE  ::=  {
        WITH SYNTAX     OBJECT IDENTIFIER
        EQUALITY MATCHING RULE    objectIdentifierMatch
        SINGLE VALUE    TRUE
        ID              {mkmDirectoryAttributeType 23}}
fixed ATTRIBUTE  ::=  {
        WITH SYNTAX           booleanSyntax
        EQUALITY MATCHING RULE    booleanMatch
        SINGLE VALUE          TRUE
        ID              {mkmDirectoryAttributeType 24}}
groupElements ATTRIBUTE  ::=  {
        WITH SYNTAX     TemplateLabel
        EQUALITY MATCHING RULE    directoryStringFirstComponentMatch
        ID              {mkmDirectoryAttributeType 25}}
informationStatus ATTRIBUTE     ::=  {
        WITH SYNTAX     InformationStatus
        EQUALITY MATCHING RULE    integerMatch
        SINGLE VALUE    TRUE
        ID              {mkmDirectoryAttributeType 34}}
```


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```
InformationStatus ::= ENUMERATED {
        active(0), deleted(1), preliminary(2)}
matchesFor ATTRIBUTE ::= {
        WITH SYNTAX MatchesFor
        EQUALITY MATCHING RULE bitStringMatch
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 26}}
modeConfirmed ATTRIBUTE::= {
        WITH SYNTAX booleanSyntax
        EQUALITY MATCHING RULE booleanMatch
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 27}}
moduleReference ATTRIBUTE ::= {
        WITH SYNTAX Identifier
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 28}}
namedBySuperiorObjectClass ATTRIBUTE ::= {
        WITH SYNTAX NamingObjectClass
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 29}}
nameForm ATTRIBUTE ::= {
        WITH SYNTAX PrintableString
        EQUALITY MATCHING RULE caseExactMatch
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 30}}
notifications ATTRIBUTE ::= {
        WITH SYNTAX Notifications
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 31}}
optionallyRegisteredAs ATTRIBUTE ::= {
        WITH SYNTAX OptionallyRegisteredAs
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 46}}
parameters ATTRIBUTE ::= {
        WITH SYNTAX TemplateLabel
        EQUALITY MATCHING RULE directoryStringFirstComponentMatch
        ID { mkmDirectoryAttributeType 32}}
registeredAs ATTRIBUTE ::= {
        WITH SYNTAX RegisteredAs
        EQUALITY MATCHING RULE objectIdentifierMatch
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 33}}
specification ATTRIBUTE ::= {
        WITH SYNTAX TextualRepresentation
        ID { mkmDirectoryAttributeType 35}}
subordinateObjectClass ATTRIBUTE ::= {
        WITH SYNTAX NamingObjectClass
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 36}}
syntaxOrAttribute ATTRIBUTE ::= {
        WITH SYNTAX SyntaxOrAttribute
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 37}}
templateDefinition ATTRIBUTE ::= {
        WITH SYNTAX TextualRepresentation
        ID { mkmDirectoryAttributeType 38}}
templateName ATTRIBUTE ::= {
        WITH SYNTAX TemplateLabel
        EQUALITY MATCHING RULE directoryStringFirstComponentMatch
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 39}}
withAttribute ATTRIBUTE ::= {
        WITH SYNTAX TemplateLabel
        EQUALITY MATCHING RULE directoryStringFirstComponentMatch
        SINGLE VALUE TRUE
        ID { mkmDirectoryAttributeType 40}}
```


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```
withInformationSyntax ATTRIBUTE    ::=  {
        WITH SYNTAX     WithSyntax
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 41}}
withReplySyntax ATTRIBUTE      ::=  {
        WITH SYNTAX     WithSyntax
        SINGLE VALUE    TRUE
        ID              { mkmDirectoryAttributeType 42}}
END
```


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Annex C

MCS proforma

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

C.1 Introduction

C.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.

C.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.

C.1.3 Symbols, abbreviations and terms

For all annexes of this Recommendation | International Standard, 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 column:

m Mandatory

o Optional

c Conditional

x Prohibited

– Not applicable or out of scope

NOTES

1 'c', 'm' and 'o' are prefixed by "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 value of N) is required.

For all annexes of this Recommendation | International Standard, 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 column:

Y Implemented

N Not implemented

– No answer required

Ig The item is ignored (i.e. processed syntactically but not semantically)

C.1.4 Table format

Some of the tables in this Recommendation | International Standard have been split because the information is too wide to fit on the page. Where this occurs, the index numbers 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.

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

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When a table with subrows is too wide to fit on a page, the continuation table(s) have been constructed with index numbers identical to the index numbers in the corresponding rows of the first table and with subindex numbers corresponding to the subrows within each indexed row. For example, if Table X.1 has 2 rows and the continuation of Table X.1 has 2 subrows 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	Subindex	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	Subindex	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 tables. In the example, above, the reference X.1/1d corresponds with the fourth blank cell (that is, the cell in column G) for row with Index 1 and X.1/1.2b corresponds with the second blank cell (in column L) for row with Subindex 1.2.

C.2 Identification of the implementation

C.2.1 Date of statement

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

Date of statement

C.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 following box.

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C.2.3 Contact

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

C.3 Identification of the documents 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 documents which specify the management information to which conformance is claimed, in the following box.

ITU-T Recommendation X.750 (1996) | ISO/IEC 10164-16:1996, Management knowledge management function (Other documents to which conformance is claimed)

C.3.1 Technical corrigenda implemented

The supplier of the implementation shall enter the reference numbers of implemented technical corrigenda which modify the identified documents, in the following box.

C.3.2 Amendments implemented

The supplier of the implementation shall state the titles and reference numbers of implemented amendments to the identified documents, in the following box.

C.4 Management conformance summary

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

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

Table C.1 – Roles

Index	Roles supported	Status	Support	Additional information
1	Manager role	o.1		
2	Agent role	o.1		
3	Directory information user role	o.1		
4	Directory information provider role	o.1		

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The supplier of an implementation that claims support for this Recommendation | International Standard in only the Directory information user role or the Directory information provider role or both is not required to specify support in Tables C.2 to C.8.

The supplier of the implementation shall specify support for management information in the manager role, in Table C.2.

Table C.2 – Manager role minimum conformance requirement

Index	Item	Status	Support	Additional information
1	Operations on managed objects	c4		
2	Object creation notification	c4		
3	Object deletion notification	c4		
4	Attribute value change notification	c4		
c4: if C.1/1a then o.2 else –				

The supplier of the implementation shall specify support for management information in the agent role, in Table C.3. If additional subclasses of log records are supported, the supplier of the implementation shall list the classes in the Additional information column.

Table C.3 – Agent role minimum conformance requirement

Index	Item	Status	Support	Additional information
1	managedObjectClassRepertoire managed object class	c5		
2	repertoire managed object class	c6		
3	actionTemplate managed object class	c6		
4	asn1module	c6		
5	attributeGroupTemplate managed object class	c6		
6	attributeTemplate managed object class	c6		
7	behaviourTemplate managed object class	c6		
8	document managed object class	c7		
9	managedObjectClassTemplate managed object class	c6		
10	nameBindingTemplate managed object class	c6		
11	notificationTemplate managed object class	c6		
12	packageTemplate managed object class	c6		
13	parameterTemplate managed object class	c6		
14	Template managed object class	c6		
15	Discovery managed object class	c6		
16	Subclasses of log records associated with notifications emitted by the above managed objects	c8		

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

NOTE 1 – Condition c5 makes it mandatory to support the managedObjectClassRepertoire managed object class if the repertoire managed object class is supported.

c6: if C.1/2a then o.3 else –

c7: if (C.3/3a or C.3/4a or C.3/5a or C.3/6a or C.3/7a or C.3/9a or C.3/10a or C.3/11a or C.3/12a or C.3/13a or C.3/14a) then m else (if C.1/2a then o.3 else –)

NOTE 2 – Condition c7 makes it mandatory to support the document managed object class if at least one of the definition managed object classes is supported.

c8: if C.1/2a and C.4/1a then m else –

NOTE 3 – Condition c8 makes it mandatory, if logging is supported, to support the event log records associated with the notifications supported.

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Table C.4 – Logging of event records

Index		Status	Support	Additional information
1	Does the implementation support logging of event records in agent role?	c9		
c9:	if C.1/2a then o else –			

The supplier of the implementation shall provide information on claims of conformance to any of the documents summarized in Tables C.5 to C.8. For each document 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 C.5 to C.8, 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. The Support column is used by the supplier of the implementation to indicate completion of the referenced tables or referenced items.

Table C.5 – 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	Systems management application context	OBJECT IDENTIFIER	m			

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 C.6 – 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, objectDeletion and attributeValueChange records	–	c10			
2	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.1-E.4	managedObjectClass Repertoire managed object class	–	c11			
3	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.5-E.9	repertoire managed object class	–	c12			
4	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.10-E.15	actionTemplate managed object class	–	c13			
5	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.16-E.20	asn1module	–	c14			
6	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.21-E.26	attributeGroupTemplate managed object class	–	c15			
7	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.27-E.32	attributeTemplate managed object class	–	c16			

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Table C.6 *(concluded)* – **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
8	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.33-E.38	behaviourTemplate managed object class	–	c17			
9	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.39-E.44	document managed object class	–	c18			
10	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.45-E.50	managedObjectClassTemplate managed object class	–	c19			
11	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.51-E.56	nameBindingTemplate managed object class	–	c20			
12	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.57-E.62	notificationTemplate managed object class	–	c21			
13	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.63-E.68	packageTemplate managed object class	–	c22			
14	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.69-E.74	parameterTemplate managed object class	–	c23			
15	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.75-E.80	template managed object class	–	c24			
16	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables E.81-E.84	discovery managed object class	–	c25			

c10: if C.3/16a then m else –
c11: if C.3/1a then m else –
c12: if C.3/2a then m else –
c13: if C.3/3a then m else –
c14: if C.3/4a then m else –
c15: if C.3/5a then m else –
c16: if C.3/6a then m else –
c17: if C.3/7a then m else –
c18: if C.3/8a then m else –
c19: if C.3/9a then m else –
c20: if C.3/10a then m else –
c21: if C.3/11a then m else –
c22: if C.3/12a then m else –
c23: if C.3/13a then m else –
c24: if C.3/14a then m else –
c25: if C.3/15a then m else –

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Table C.7 – MRCS support summary

Index	Identification of the document that includes the MRCS proforma	Table numbers of MRCS 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	–	c26			
2	ITU-T Rec. X.750 | ISO/IEC 10164-16	Item F.1/1	repertoire-system name binding	–	c27			
3	ITU-T Rec. X.750 | ISO/IEC 10164-16	Item F.1/2	managedObjectClassRepertoire-repertoire name binding	–	c28			
4	ITU-T Rec. X.750 | ISO/IEC 10164-16	Item F.1/3	template-document name binding	–	c29			
5	ITU-T Rec. X.750 | ISO/IEC 10164-16	Item F.1/4	aSN1Module-document name binding	–	c30			
6	ITU-T Rec. X.750 | ISO/IEC 10164-16	Item F.1/5	discovery-system name binding	–	c31			
7	ITU-T Rec. X.750 | ISO/IEC 10164-16	Item F.1/6	document-system name binding	–	c32			
8	ITU-T Rec. X.750 | ISO/IEC 10164-16	Item F.1/7	document-system2 name binding	–	c32			

c26: if C.4/1a then o else –

c27: if C.3/2a then o else –

c28: if C.3/1a then o else –

c29: if (C.3/3a or C.3/5a or C.3/6a or C.3/7a or C.3/9a or C.3/10a or C.3/11a or C.3/12a or C.3/13a or C.3/14a) then o else –

c30: if C.3/4a then o else –

c31: if C.3/15a then o else –

c32: if C.3/8a then o else –

Table C.8 – 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	ITU-T Rec. X.750 | ISO/IEC 10164-16	Tables D.1 -D.3	Management operations	–	c33			
2	CCITT Rec. X.730 | ISO/IEC 10164-1	Table B.1	objectCreation, objectDeletion and attributeValueChange notifications	–	c34			

c33: if C.2/1a then m else –

c34: if C.2/2a or C.2/3a or C.2/4a then m else –

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Annex D

MICS proforma

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

D.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.

D.2 Instructions for completing the MICS proforma to produce an 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 managed object classes for which the management operations are supported. The supplier of the implementation shall state which items are supported in the tables that follow and if necessary, provide additional information.

D.3 Statement of conformance to the management information

D.3.1 Attributes

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

Table D.1 – Attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	o		o	
2	nameBinding	{MKMD.dmiAttribute 63}	–	–		o	
3	packages	{MKMD.dmiAttribute 66}	–	o		o	
4	allomorphs	{MKMD.dmiAttribute 50}	–	–		o	
5	implementedValues	{MKMD.mkmAttribute 6}	–	–		o.4	
6	managedObjectClassRepertoireId	{MKMD.mkmAttribute 2}	–	–		o.4	
7	repertoireId	{MKMD.mkmAttribute 1}	–	–		o.4	
8	supportedCmipProfiles	{MKMD.mkmAttribute 4}	–	–		o.4	
9	supportedConditionalPackageList	{MKMD.mkmAttribute 5}	–	–		o.4	
10	supportedManagedObjectClassList	{MKMD.mkmAttribute 3}	–	–		o.4	
11	supportedNameBindingList	{MKMD.mkmAttribute 42}	–	–		o.4	
12	supportedRelationshipClassList	{MKMD.mkmAttribute 44}	–	–		o.4	
13	actions	{MKMD.mkmAttribute 18}	–	–		o.4	
14	andAttributeIds	{MKMD.mkmAttribute 36}	–	–		o.4	
15	asn1ModuleContents	{MKMD.mkmAttribute 9}	–	–		o.4	
16	asn1Version	{MKMD.mkmAttribute 45}	–	–		o.4	
17	attributeGroups	{MKMD.mkmAttribute 17}	–	–		o.4	
18	attributes	{MKMD.mkmAttribute 16}	–	–		o.4	

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Table D.1 *(continued)* – **Attribute support**

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
19	behaviour	{MKMD.mkmAttribute 15}	–	–		o.4	
20	characterizedBy	{MKMD.mkmAttribute 11}	–	–		o.4	
21	conditionalPackages	{MKMD.mkmAttribute 12}	–	–		o.4	
22	context	{MKMD.mkmAttribute 20}	–	–		o.4	
23	create	{MKMD.mkmAttribute 25}	–	–		o.4	
24	definedAs	{MKMD.mkmAttribute 32}	–	–		o.4	
25	delete	{MKMD.mkmAttribute 26}	–	–		o.4	
26	derivedFrom	{MKMD.mkmAttribute 10}	–	–		o.4	
27	derivedOrWithSyntaxChoice	{MKMD.mkmAttribute 27}	–	–		o.4	
28	description	{MKMD.mkmAttribute 31}	–	–		o.4	
29	documentName	{MKMD.mkmAttribute 38}	–	–		o.4	
30	documentObjectIdentifier	{MKMD.mkmAttribute 39}	–	–		o.4	
31	fixed	{MKMD.mkmAttribute 30}	–	–		o.4	
32	groupElements	{MKMD.mkmAttribute 29}	–	–		o.4	
33	matchesFor	{MKMD.mkmAttribute 28}	–	–		o.4	
34	modeConfirmed	{MKMD.mkmAttribute 33}	–	–		o.4	
35	moduleReference	{MKMD.mkmAttribute 8}	–	–		o.4	
36	namedBySuperiorObjectClass	{MKMD.mkmAttribute 23}	–	–		o.4	
37	notifications	{MKMD.mkmAttribute 19}	–	–		o.4	
38	optionallyRegisteredAs	{MKMD.mkmAttribute 43}	–	–		o.4	
39	parameters	{MKMD.mkmAttribute 13}	–	–		o.4	
40	registeredAs	{MKMD.mkmAttribute 14}	–	–		o.4	
41	specification	{MKMD.mkmAttribute 40}	–	–		o.4	
42	subordinateObjectClass	{MKMD.mkmAttribute 22}	–	–		o.4	
43	syntaxOrAttribute	{MKMD.mkmAttribute 21}	–	–		o.4	
44	templateDefinition	{MKMD.mkmAttribute 37}	–	–		o.4	
45	templateName	{MKMD.mkmAttribute 7}	–	–		o.4	
46	withAttribute	{MKMD.mkmAttribute 24}	–	–		o.4	
47	withInformationSyntax	{MKMD.mkmAttribute 34}	–	–		o.4	
48	withReplySyntax	{MKMD.mkmAttribute 35}	–	–		o.4	
49	discoveryId	{MKMD.mkmAttribute 41}	–	–		o.4	

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

	Replace		Add		Remove		Set to default		
Index	Status	Support	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	–		–		–		–		
19	–		–		–		–		
20	–		–		–		–		
21	–		–		–		–		
22	–		–		–		–		
23	–		–		–		–		
24	–		–		–		–		
25	–		–		–		–		
26	–		–		–		–		
27	–		–		–		–		
28	–		–		–		–		
29	–		–		–		–		
30	–		–		–		–		
31	–		–		–		–		
32	–		–		–		–		
33	–		–		–		–		
34	–		–		–		–		
35	–		–		–		–		
36	–		–		–		–		
37	–		–		–		–		
38	–		–		–		–		
39	–		–		–		–		
40	–		–		–		–		
41	–		–		–		–		
42	–		–		–		–		
43	–		–		–		–		
44	–		–		–		–		
45	–		–		–		–		
46	–		–		–		–		
47	–		–		–		–		
48	–		–		–		–		
49	–		–		–		–		

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D.3.2 Actions

The specifier of a manager role implementation that claims to support the actions on the managed objects specified in this Recommendation | International Standard shall import a copy of Table D.2 and complete it.

Table D.2 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	mITSearch	{MKMD.mkmAction 1}	–	o.4		
2	getTextualRepresentation	{MKMD.mkmAction 2}	–	o.4		

Table D.2 *(concluded)* **– Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	MITSearch (INFORMATION SYNTAX)	–	c:m		
	1.1.1	base	–	c:m		
	1.1.2	discoveryScope	–	c:m		
	1.1.3	classRequest	–	c:o		
	1.2	NameTree (REPLY SYNTAX)	–	c:m		
	1.2.1	rdnInfo	–	c:m		
	1.2.2	subordinates	–	c:m		
2	2.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	2.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table D.3 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c40		
c40: if D.2/2a then m else –						

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Annex E

MOCS proforma

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

E.1 Introduction

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

E.2 Instructions for completing the MOCS proforma to produce an MOCS

The MOCS proforma contained in the annex is comprised of information in tabular form, in accordance with ITU-T Rec. X.724 | ISO/IEC 10165-6. The supplier of the implementation shall state which items are supported in the tables that follow and if necessary provide additional information[1)].

E.3 Statements of conformance to the managed object classes

E.3.1 Managed object class repertoire managed object class

Table E.1 – Managed object class repertoire 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	managedObjectClass Repertoire	{MKMD.mkmMObjectClass 2}		

If the answer to the actual class question in Table E.1 is No, the supplier of the implementation shall fill in the actual class support Table E.2.

Table E.2 – Actual class support

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

1) Instructions for MOCS proforma are specified in ITU-T Rec. X.724 | ISO/IEC 10165-6.

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Table E.3 – Managed object class repertoire managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c50	
5	managedObjectClassRepertoireId	{MKMD.mkmAttribute 2}	–	x		m	
6	supportedConditionalPackageList	{MKMD.mkmAttribute 5}	–	x		m	
7	implementedValues	{MKMD.mkmAttribute 6}	–	x		o	
c50: if E.1/1b then – else m							

Table E.3 *(concluded)* **– Managed object class repertoire managed object attribute support**

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		x		x		–		
7	x		x		x		–		

Table E.4 – 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	attributeValueChange	{MKMD.dmiNotification 1}		m			
2	objectCreation	{MKMD.dmiNotification 6}		m			
3	objectDeletion	{MKMD.dmiNotification 7}		m			

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Table E.4 *(concluded)* – **Notification support**

Index	Subindex	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	{MKMD.dmiAttribute 26}		o		
	1.2	attributeIdentifierList	{MKMD.dmiAttribute 8}		o		
	1.3	attributeValueChangeDefinition	{MKMD.dmiAttribute 10}		m		
	1.4	notificationIdentifier	{MKMD.dmiAttribute 16}		o		
	1.5	correlatedNotifications	{MKMD.dmiAttribute 12}		o		
	1.6	additionalText	{MKMD.dmiAttribute 7}		o		
	1.7	additionalInformation	{MKMD.dmiAttribute 6}		o		
2	2.1	sourceIndicator	{MKMD.dmiAttribute 26}		o		
	2.2	attributeList	{MKMD.dmiAttribute 9}		o		
	2.3	notificationIdentifier	{MKMD.dmiAttribute 16}		o		
	2.4	correlatedNotifications	{MKMD.dmiAttribute 12}		o		
	2.5	additionalText	{MKMD.dmiAttribute 7}		o		
	2.6	additionalInformation	{MKMD.dmiAttribute 6}		o		
3	3.1	sourceIndicator	{MKMD.dmiAttribute 26}		o		
	3.2	attributeList	{MKMD.dmiAttribute 9}		o		
	3.3	notificationIdentifier	{MKMD.dmiAttribute 16}		o		
	3.4	correlatedNotifications	{MKMD.dmiAttribute 12}		o		
	3.5	additionalText	{MKMD.dmiAttribute 7}		o		
	3.6	additionalInformation	{MKMD.dmiAttribute 6}		o		

E.3.2 Repertoire managed object class

Table E.5 – Repertoire 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	repertoire	{MKMD.mkmMObjectClass 1}		

If the answer to the actual class question in Table E.5 is No, the supplier of the implementation shall fill in the actual class support Table E.6.

Table E.6 – Actual class support

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

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Table E.7 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	supportedCmipProfilesPackage	{MKMD.mkmPackage 1}	–	o		

Table E.8 – Repertoire managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c51	
5	repertoireId	{MKMD.mkmAttribute 1}	–	x		m	
6	supportedCmipProfiles	{MKMD.mkmAttribute 4}	–	x		c52	
7	supportedNameBindingList	{MKMD.mkmAttribute 42}	–	x		m	
8	supportedManagedObjectClassList	{MKMD.mkmAttribute 3}	–	x		m	
9	supportedRelationshipClassList	{MKMD.mkmAttribute 44}	–	x		m	
c51: if (not E.5/1b) then m else – c52: if (E.7/1a) then m else –							

Table E.8 *(concluded)* **– Repertoire managed object attribute support**

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		x		x		–		
8	x		x		x		–		
9	x		x		x		–		

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Table E.9 – Notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Con-firmed	Non-confirmed	
1	attributeValueChange	{MKMD.dmiNotification 1}		m			
2	objectCreation	{MKMD.dmiNotification 6}		m			
3	objectDeletion	{MKMD.dmiNotification 7}		m			

Table E.9 *(concluded)* – Notification support

Index	Subindex	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	{MKMD.dmiAttribute 26}		o		
	1.2	attributeIdentifierList	{MKMD.dmiAttribute 8}		o		
	1.3	attributeValueChangeDefinition	{MKMD.dmiAttribute 10}		m		
	1.4	notificationIdentifier	{MKMD.dmiAttribute 16}		o		
	1.5	correlatedNotifications	{MKMD.dmiAttribute 12}		o		
	1.6	additionalText	{MKMD.dmiAttribute 7}		o		
	1.7	additionalInformation	{MKMD.dmiAttribute 6}		o		
2	2.1	sourceIndicator	{MKMD.dmiAttribute 26}		o		
	2.2	attributeList	{MKMD.dmiAttribute 9}		o		
	2.3	notificationIdentifier	{MKMD.dmiAttribute 16}		o		
	2.4	correlatedNotifications	{MKMD.dmiAttribute 12}		o		
	2.5	additionalText	{MKMD.dmiAttribute 7}		o		
	2.6	additionalInformation	{MKMD.dmiAttribute 6}		o		
3	3.1	sourceIndicator	{MKMD.dmiAttribute 26}		o		
	3.2	attributeList	{MKMD.dmiAttribute 9}		o		
	3.3	notificationIdentifier	{MKMD.dmiAttribute 16}		o		
	3.4	correlatedNotifications	{MKMD.dmiAttribute 12}		o		
	3.5	additionalText	{MKMD.dmiAttribute 7}		o		
	3.6	additionalInformation	{MKMD.dmiAttribute 6}		o		

E.3.3 Action template managed object class

Table E.10 – Action template 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	actionTemplate	{MKMD.mkmMObjectClass 12}		

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If the answer to the actual class question in Table E.10 is No, the supplier of the implementation shall fill in the actual class support Table E.11.

Table E.11 – Actual class support

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

Table E.12 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

Table E.13 – Action template managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c53	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c54	
7	behaviour	{MKMD.mkmAttribute 15}	–	x		m	
8	modeConfirmed	{MKMD.mkmAttribute 33}	–	x		m	
9	parameters	{MKMD.mkmAttribute 13}	–	x		m	
10	withInformationSyntax	{MKMD.mkmAttribute 34}	–	x		m	
11	withReplySyntax	{MKMD.mkmAttribute 35}	–	x		m	
12	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	
c53: if (not E.10/1b) then m else – c54: if E.12/1a then m else –							

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Table E.13 *(concluded)* **– Action template managed object attribute support**

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

Table E.14 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c54		

Table E.14 *(concluded)* **– Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.15 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c54		

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E.3.4 ASN.1 module managed object class

Table E.16 – ASN.1 module 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	aSN1Module	{MKMD.mkmMObjectClass 4}		

If the answer to the actual class question in Table E.16 is No, the supplier of the implementation shall fill in the actual class support Table E.17.

Table E.17 – Actual class support

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

Table E.18 – ASN.1 module managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c55	
5	moduleReference	{MKMD.mkmAttribute 8}	–	x		m	
6	asn1ModuleContents	{MKMD.mkmAttribute 9}	–	x		m	
7	asn1Version	{MKMD.mkmAttribute 45}	–	x		m	
8	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	
c55: if (not E.16/1b) then m else –							

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Table E.18 *(concluded)* **– ASN.1 module managed object attribute support**

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		–		–		–		
8	x		–		–		–		

Table E.19 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	m		

Table E.19 *(concluded)* **– Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	m		

Table E.20 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		m		

E.3.5 Attribute group template managed object class

Table E.21 – Attribute group template 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	attributeGroupTemplate	{MKMD.mkmMObjectClass 10}		

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If the answer to the actual class question in Table E.21 is No, the supplier of the implementation shall fill in the actual class support Table E.22.

Table E.22 – Actual class support

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

Table E.23 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

Table E.24 – Attribute group template managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c56	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c57	
7	groupElements	{MKMD.mkmAttribute 29}	–	x		m	
8	fixed	{MKMD.mkmAttribute 30}	–	x		m	
9	description	{MKMD.mkmAttribute 31}	–	x		m	
10	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	
c56: if (not E.21/1b) then m else – c57: if E.23/1a then m else –							

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Table E.24 *(concluded)* **– Attribute group template managed object attribute support**

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		x		x		–		
8	x		–		–		–		
9	x		–		–		–		
10	x		–		–		–		

Table E.25 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c57		

Table E.25 *(concluded)* **– Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.26 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c57		

E.3.6 Attribute template managed object class

Table E.27 – Attribute template 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	attributeTemplate	{MKMD.mkmMObjectClass 9}		

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If the answer to the actual class question in Table E.27 is No, the supplier of the implementation shall fill in the actual class support Table E.28.

Table E.28 – Actual class support

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

Table E.29 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

Table E.30 – Attribute template managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c58	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c59	
7	derivedOrWithSyntaxChoice	{MKMD.mkmAttribute 27}	–	x		m	
8	matchesFor	{MKMD.mkmAttribute 28}	–	x		m	
9	behaviour	{MKMD.mkmAttribute 15}	–	x		m	
10	parameters	{MKMD.mkmAttribute 13}	–	x		m	
11	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	
c58: if (not E.27/1b) then m else – c59: if E.29/1a then m else –							

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Table E.30 *(concluded)* – **Attribute template managed object attribute support**

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		–		–		–		
8	x		–		–		–		
9	x		x		x		–		
10	x		x		x		–		
11	x		–		–		–		

Table E.31 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c59		

Table E.31 *(concluded)* – **Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.32 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c59		

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E.3.7 Behaviour template managed object class

Table E.33 – Behaviour template 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	behaviourTemplate	{MKMD.mkmMObjectClass 11}		

If the answer to the actual class question in Table E.33 is No, the supplier of the implementation shall fill in the actual class support Table E.34.

Table E.34 – Actual class support

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

Table E.35 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

Table E.36 – Behaviour template managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c60	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c61	
7	definedAs	{MKMD.mkmAttribute 32}	–	x		m	
c60: if (not E.33/1b) then m else –							
c61: if E.35/1a then m else –							

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Table E.36 *(concluded)* **– Behaviour template managed object attribute support**

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		–		–		–		

Table E.37 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	m		

Table E.37 *(concluded)* **– Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	m		

Table E.38 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		m		

E.3.8 Document managed object class

Table E.39 – Document 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	document	{MKMD.mkmMObjectClass 14}		

If the answer to the actual class question in Table E.39 is No, the supplier of the implementation shall fill in the actual class support Table E.40.

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Table E.40 – Actual class support

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

Table E.41 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	documentSpecificationPackage	{MKMD.mkmPackage 4}	–	o		

Table E.42 – Document managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c62	
5	documentName	{MKMD.mkmAttribute 38}	–	x		m	
6	documentObjectIdentifier	{MKMD.mkmAttribute 39}	–	x		m	
7	specification	{MKMD.mkmAttribute 40}	–	x		c63	
c62: if (not E.39/1b) then m else – c63: if E.41/1a then m else –							

Table E.42 *(concluded)* **– Document managed object attribute support**

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		–		–		–		

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Table E.43 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c63		

Table E.43 *(concluded)* – Action support

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.44 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c63		

E.3.9 Managed object class template managed object class

Table E.45 – Managed object class template 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	managedObjectClassTemplate	{MKMD.mkmMObjectClass 5}		

If the answer to the actual class question in Table E.45 is No, the supplier of the implementation shall fill in the actual class support Table E.46.

Table E.46 – Actual class support

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

Table E.47 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

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Table E.48 – Managed object class template managed object attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Set by create		Get	
				Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c64	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c65	
7	derivedFrom	{MKMD.mkmAttribute 10}	–	x		m	
8	characterizedBy	{MKMD.mkmAttribute 11}	–	x		m	
9	conditionalPackages	{MKMD.mkmAttribute 12}	–	x		m	
10	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	

c64: if (not E.45/1b) then m else –
c65: if E.47/1a then m else –

Table E.48 *(concluded)* – Managed object class template managed object attribute support

Index	Replace		Add		Remove		Set to default		Additional information
	Status	Support	Status	Support	Status	Support	Status	Support	
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		x		x		–		
8	x		x		x		–		
9	x		x		x		–		
10	x		–		–		–		

Table E.49 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c65		

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Table E.49 *(concluded)* – **Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.50 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c65		

E.3.10 Name binding template managed object class

Table E.51 – Name binding template 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	nameBindingTemplate	{MKMD.mkmMObjectClass 8}		

If the answer to the actual class question in Table E.51 is No, the supplier of the implementation shall fill in the actual class support Table E.52.

Table E.52 – Actual class support

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

Table E.53 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

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Table E.54 – Name binding template managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c66	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c67	
7	subordinateObjectClass	{MKMD.mkmAttribute 22}	–	x		m	
8	namedBySuperiorObjectClass	{MKMD.mkmAttribute 23}	–	x		m	
9	withAttribute	{MKMD.mkmAttribute 24}	–	x		m	
10	behaviour	{MKMD.mkmAttribute 15}	–	x		m	
11	create	{MKMD.mkmAttribute 25}	–	x		m	
12	delete	{MKMD.mkmAttribute 26}	–	x		m	
13	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	

c66: if (not E.51/1b) then m else –
c67: if E.53/1a then m else –

Table E.54 *(concluded)* **– Name binding template managed object attribute support**

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

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Table E.55 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c67		

Table E.55 *(concluded)* **– Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.56 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c67		

E.3.11 Notification template managed object class

Table E.57 – Notification template 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	notificationTemplate	{MKMD.mkmMObjectClass 13}		

If the answer to the actual class question in Table E.57 is No, the supplier of the implementation shall fill in the actual class support Table E.58.

Table E.58 – Actual class support

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

Table E.59 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

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Table E.60 – Notification template managed object attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Set by create		Get	
				Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c68	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c69	
7	behaviour	{MKMD.mkmAttribute 15}	–	x		m	
8	parameters	{MKMD.mkmAttribute 13}	–	x		m	
9	withInformationSyntax	{MKMD.mkmAttribute 34}	–	x		m	
10	andAttributeIds	{MKMD.mkmAttribute 36}	–	x		m	
11	withReplySyntax	{MKMD.mkmAttribute 35}	–	x		m	
12	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	
c68: if (not E.57/1b) then m else – c69: if E.59/1a then m else –							

Table E.60 *(concluded)* **– Notification template managed object attribute support**

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

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Table E.61 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c69		

Table E.61 *(concluded)* **– Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.62 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c69		

E.3.12 Package template managed object class

Table E.63 – Package template 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	packageTemplate	{MKMD.mkmMObjectClass 6}		

If the answer to the actual class question in Table E.63 is No, the supplier of the implementation shall fill in the actual class support Table E.64.

Table E.64 – Actual class support

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

Table E.65 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

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Table E.66 – Package template managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c70	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c71	
7	behaviour	{MKMD.mkmAttribute 15}	–	x		m	
8	attributes	{MKMD.mkmAttribute 16}	–	x		m	
9	attributeGroups	{MKMD.mkmAttribute 17}	–	x		m	
10	actions	{MKMD.mkmAttribute 18}	–	x		m	
11	notifications	{MKMD.mkmAttribute 19}	–	x		m	
12	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	
c70: if (not E.63/1b) then m else – c71: if E.65/1a then m else –							

Table E.66 *(concluded)* **– Package template managed object attribute support**

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

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Table E.67 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c71		

Table E.67 *(concluded)* – Action support

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.68 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c71		

E.3.13 Parameter template managed object class

Table E.69 – Parameter template 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	parameterTemplate	{MKMD.mkmMObjectClass 7}		

If the answer to the actual class question in Table E.69 is No, the supplier of the implementation shall fill in the actual class support Table E.70.

Table E.70 – Actual class support

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

Table E.71 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

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Table E.72 – Parameter template managed object attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Set by create		Get	
				Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c72	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c73	
7	context	{MKMD.mkmAttribute 20}	–	x		m	
8	syntaxOrAttribute	{MKMD.mkmAttribute 21}	–	x		m	
9	behaviour	{MKMD.mkmAttribute 15}	–	x		m	
10	registeredAs	{MKMD.mkmAttribute 14}	–	x		m	

c72: if (not E.69/1b) then m else –
c73: if E.71/1a then m else –

Table E.72 *(concluded)* – Parameter template managed object attribute support*)*

Index	Replace		Add		Remove		Set to default		Additional information
	Status	Support	Status	Support	Status	Support	Status	Support	
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		
7	x		–		–		–		
8	x		–		–		–		
9	x		x		x		–		
10	x		–		–		–		

Table E.73 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c73		

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Table E.73 *(concluded)* – **Action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

Table E.74 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c73		

E.3.14 Template managed object class

Table E.75 – Template 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	template	{MKMD.mkmMObjectClass 3}		

If the answer to the actual class question in Table E.75 is No, the supplier of the implementation shall fill in the actual class support Table E.76.

Table E.76 – Actual class support

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

Table E.77 – Package support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	templateDefinitionPackage	{MKMD.mkmPackage 3}	–	o		

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Table E.78 – Template managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c74	
5	templateName	{MKMD.mkmAttribute 7}	–	x		m	
6	templateDefinition	{MKMD.mkmAttribute 37}	–	x		c75	
c74: if (not E.75/1b) then m else – c75: if E.77/1a then m else –							

Table E.78 *(concluded)* – Template managed object attribute support

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		
6	x		–		–		–		

Table E.79 – Action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	getTextualRepresentation	{MKMD.mkmAction 2}	–	c75		

Table E.79 *(concluded)* – Action support

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	AttributeId (INFORMATION SYNTAX)	–	c:m		
	1.2	TextualRepresentation (REPLY SYNTAX)	–	c:m		

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Table E.80 – Parameter support

Index	Parameter template label	Value of object identifier for parameter	Constraints and values	Status	Support	Additional information
1	attributeNotAvailable ViaThisAction	{MKMD.mkmParameter 1}		c75		

E.3.15 Discovery managed object class

Table E.81 – Discovery 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	discoveryObject	{MKMD.mkmMObjectClass 15}		

If the answer to the actual class question in Table E.81 is No, the supplier of the implementation shall fill in the actual class support Table E.82.

Table E.82 – Actual class support

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

Table E.83 – Discovery managed object attribute support

				Set by create		Get	
Index	Attribute template label	Value of object identifier for attribute	Constraints and values	Status	Support	Status	Support
1	objectClass	{MKMD.dmiAttribute 65}	–	x		m	
2	nameBinding	{MKMD.dmiAttribute 63}	–	x		m	
3	packages	{MKMD.dmiAttribute 66}	–	x		m	
4	allomorphs	{MKMD.dmiAttribute 50}	–	x		c76	
5	discoveryId	{MKMD.mkmAttribute 41}	–	x		m	
c76: if (not E.81/1b) then m else –							

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Table E.83 *(concluded)* **– Discovery managed object attribute support**

	Replace		Add		Remove		Set to default		
Index	Status	Support	Status	Support	Status	Support	Status	Support	Additional information
1	x		–		–		–		
2	x		–		–		–		
3	x		x		x		–		
4	x		x		x		–		
5	x		–		–		–		

Table E.84 – Discovery managed object action support

Index	Action type template label	Value of object identifier for action type	Constraints and values	Status	Support	Additional information
1	mITSearch	{MKMD.mkmAction 1}	–	m		

Table E.84 *(concluded)* **– Discovery managed object action support**

Index	Subindex	Action field name label	Constraints and values	Status	Support	Additional information
1	1.1	MITSearch (INFORMATION SYNTAX)	–			
	1.1.1	base	–	m		
	1.1.2	discoveryScope	–	m		
	1.1.3	classRequest	–	m		
	1.2	NameTree (REPLY SYNTAX)	–			
	1.2.1	rdnInfo	–	m		
	1.2.2	subordinates	–	m		

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Annex F

MRCS proforma

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

F.1 Introduction

The purpose of this MRCS proforma for name bindings is to provide a mechanism for a supplier which claims conformance to a name binding to provide conformance information in a standard form.

F.2 Instructions for completing the MRCS proforma for name binding to produce an MRCS

The supplier of the implementation shall state which items are supported in Table F.1 and if necessary provide additional information.[2)]

F.3 Statement of conformance to the name binding

Table F.1 – Name binding support

Index	Name binding template label	Value of object identifier for name binding	Constraints and values	Status	Support	Additional information
1	repertoire-system	{MKMD.mkmNameBinding 1}	One instance shall have repertoireId = "REP1"	o		
2	managedObjectClassRepertoire-repertoire	{MKMD.mkmNameBinding 2}		o		
3	template-document	{MKMD.mkmNameBinding 3}		o		
4	aSN1Module-document	{MKMD.mkmNameBinding 4}		o		
5	discovery-system	{MKMD.mkmNameBinding 5}	discoveryId shall be "DSC1"	o		
6	document-system	{MKMD.mkmNameBinding 6}		o		
7	document-system2	{MKMD.mkmNameBinding 7}		o		

Table F.1 *(continued)* **– Name binding support**

Index	Subindex	Operation	Constraints and values	Status	Support	Additional information
1	1.1	Create support		c:o		
	1.1.1	Create with reference object		c:x		
	1.1.2	Create with automatic instance naming		c:o		
	1.2	Delete support		c:o		
	1.2.1	Delete only if no contained objects		c:x		
	1.2.2	Delete contained objects		c:m		
2	2.1	Create support		c:o		
	2.1.1	Create with reference object		c:x		
	2.1.2	Create with automatic instance naming		c:o		

2) Instructions for MOCS proforma are specified in ITU-T Rec. X.724 | ISO/IEC 10165-6.

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Table F.1 *(concluded)* – **Name binding support**

Index	Subindex	Operation	Constraints and values	Status	Support	Additional information
	2.2	Delete support		c:o		
	2.2.1	Delete only if no contained objects		c:x		
	2.2.2	Delete contained objects		c:m		
3	3.1	Create support		c:o		
	3.1.1	Create with reference object		c:x		
	3.1.2	Create with automatic instance naming		c:o		
	3.2	Delete support		c:o		
	3.2.1	Delete only if no contained objects		c:x		
	3.2.2	Delete contained objects		c:m		
4	4.1	Create support		c:o		
	4.1.1	Create with reference object		c:x		
	4.1.2	Create with automatic instance naming		c:o		
	4.2	Delete support		c:o		
	4.2.1	Delete only if no contained objects		c:x		
	4.2.2	Delete contained objects		c:m		
5	5.1	Create support		c:o		
	5.1.1	Create with reference object		c:x		
	5.1.2	Create with automatic instance naming		c:o		
	5.2	Delete support		c:o		
	5.2.1	Delete only if no contained objects		c:x		
	5.2.2	Delete contained objects		c:m		
6	6.1	Create support		c:o		
	6.1.1	Create with reference object		c:x		
	6.1.2	Create with automatic instance naming		c:o		
	6.2	Delete support		c:o		
	6.2.1	Delete only if no contained objects		c:x		
	6.2.2	Delete contained objects		c:m		
7	7.1	Create support		c:o		
	7.1.1	Create with reference object		c:x		
	7.1.2	Create with automatic instance naming		c:o		
	7.2	Delete support		c:o		
	7.2.1	Delete only if no contained objects		c:x		
	7.2.2	Delete contained objects		c:m		

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Annex G

Guidelines for use of management knowledge objects

(This annex does not form an integral part of this Recommendation | International Standard)

These guidelines could be used to determine when a managing system gets the management knowledge from management knowledge managed objects and when from management knowledge Directory objects.

Table G.1 – Use of management knowledge objects

	Management knowledge managed objects	Management knowledge Directory objects
Dynamic or static information	Suitable for dynamic information (near real time)	Only for static information
Local or global knowledge	For local knowledge (exists on the managed systems)	Suitable for global knowledge
Access point	A presentation address of the managed system (non-fixed access point)	The well-known presentation address of the Directory (fixed access point)
Knowledge initialization	Management knowledge can be preconfigured in the product by the manufacturer	Management knowledge shall be stored in the Directory system beforehand

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Annex H

Access options for the definition knowledge directory tree

(This annex does not form an integral part of this Recommendation | International Standard)

The following options for accessing the Definition Knowledge Directory Tree (DKDT), defined in Annex B, were identified:

1) the root of DKDT is identical with the Directory root (this will have an impact on existing first level DSAs);
2) via an existing organization (e.g. ANSI) to be used as a "virtual root" for DKDT;
3) via a "service provider" type organization that would act as a repository for DKDT (i.e. it would make DKDT available on demand to interested parties).

If option 1 is used, a structure rule like the following is suggested:

```
dkdt1   STRUCTURE-RULE      ::= {
        NAME FORM           registeredInformationNameForm
        ID                  1}
```

If option 2 or 3 is used, a structure rule like the following is necessary:

```
dkdt2   STRUCTURE-RULE      ::= {
        NAME FORM           registeredInformationNameForm
        SUPERIOR RULES      {sr2 | sr3 | sr4}
        ID                  2}
```

sr2, sr3 and sr4 refer to structure rules defined in Annex B of ITU-T Rec. X.521 | ISO/IEC 9594-7.

To build the definition knowledge Directory tree, the following structure rule is required:

```
dkdt3   STRUCTURE-RULE      ::= {
        NAME FORM           registeredInformationNameForm
        SUPERIOR RULES      {dkdt1 | dkdt2 | dkdt3}
        ID                  3}
```


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