INTERNATIONAL TELECOMMUNICATION UNION

ITU-T X.660

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(08/2004)

SERIES X: DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

OSI networking and system aspects – Naming, Addressing and Registration

Information technology – Open systems interconnection – Procedures for the operation of OSI registration authorities: General procedures and top arcs of the ASN.1 object identifier tree

CAUTION !

PREPUBLISHED RECOMMENDATION

This prepublication is an unedited version of a recently approved Recommendation. It will be replaced by the published version after editing. Therefore, there will be differences between this prepublication and the published version.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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INTERNATIONAL STANDARD ISO/IEC 9834-1

ITU-T RECOMMENDATION X.660

Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: General procedures and top arcs of the ASN.1 Object Identifier tree

Summary

This Recommendation | International Standard defines a generic registration-hierarchical-name tree and the specific form of this RH-name tree called an ASN.1 Object Identifier (OID) tree, including registration of the top-level arcs of the OID tree. It specifies procedures that are referenced by other parts of the ITU-T Rec. X.660 series | ISO/IEC 9834 multi-part standard for the operation of International Registration Authorities.

Source

This version of ITU-T Recommendation X.660 was prepared by ITU-T Study Group 17 (2001-2004) and approved on …….. An identical text is also published as ISO/IEC 9834-1.

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ITU-T RECOMMENDATION

Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities: General procedures and top arcs of the ASN.1 Object Identifier tree

1 Scope

This Recommendation | International Standard:

a) specifies a Registration-Hierarchical-name-tree (RH-name-tree) which is a generic tree structure for allocations made by Registration Authorities, and the ASN.1 object identifier tree which is a specific instance of the RH-name-tree;

b) registers the three top-level arcs of the ASN.1 object identifier tree;

c) specifies procedures which are generally applicable to registration in the context of an RH-name-tree;

d) provides guidelines for the establishment and operation of International Registration Authorities;

e) provides guidelines for additional Recommendations | International Standards which choose to reference the procedures in this Recommendation | International Standard.

NOTE 1 – This Recommendation | International Standard does not exclude or disallow the use of any syntactic forms of names or any naming domains for registration purposes provided that the domains ensure non-ambiguity within their scope. This Recommendation | International Standard is intended to cover those cases where the registration-hierarchical-name is appropriate.

NOTE 2 – Information about registration for specific objects is contained in separate Recommendations | International Standards.

This Recommendation | International Standard applies to registration by Recommendations | International Standards, by International Registration Authorities, and by any other Registration Authority.

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.

2.1 Identical Recommendations | International Standards

– ITU-T Recommendation X.207 (1993) | ISO/IEC 9545:1994, *Information technology – Open Systems Interconnection – Application Layer Structure.*

– ITU-T Recommendation X.501 (2001) | ISO/IEC 9594-2:2001, *Information technology – Open Systems Interconnection – The Directory: Models*.

– ITU-T Recommendation X.520 (2001) | ISO/IEC 9594-6:2001, *Information technology – Open Systems Interconnection – The Directory: Selected attribute types.*

– ITU-T Recommendation X.650 (1996) | ISO/IEC 7498-3:1997, *Information processing systems – Open Systems Interconnection – Basic Reference Model: Naming and addressing.*

– ITU-T Recommendation X.662 (2004) | ISO/IEC 9834-3:2004, *Information technology – Open Systems Interconnection – Procedures for the operation of OSI Registration Authorities – Part 3: Registration of Object Identifier arcs for joint ISO and ITU-T work.*

– ITU-T Recommendation X.680 (2002) | ISO/IEC 8824-1:2002, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*

– ITU-T Recommendation X.681 (2002) | ISO/IEC 8824-2:2002, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification*.

– ITU-T Recommendation X.690 (2002) | ISO/IEC 8825-1:2002, *Information technology – ASN.1 encoding Rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER), and Distinguished Encoding Rules (DER)*.

– ITU-T Recommendation X.691 (2002) | ISO/IEC 8825-2:2002, *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*.

– ITU-T Recommendation X.693 (2002) | ISO/IEC 8825-4:2002, *Information technology – ASN.1 encoding rules: Specification of XML Encoding Rules (XER)*.

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

2.2 Paired Recommendations | International Standards equivalent in technical content

– ITU-T Recommendation F.400/X.400 (1999), *Message handling services: Message handling systems and service overview*.

ISO/IEC 10021-1:1999, *Information technology – Text Communication – Message Handling Systems (MHS) – Part 1: System and Service Overview*.

2.3 Additional references

– ITU-T Recommendation X.121 (2000), International numbering plan for public data networks.

– ISO 3166-1:1997, C*odes for the representation of names of countries and their subdivisions – Part 1: Country codes.*

– ISO 3166-2:1998, C*odes for the representation of names of countries and their subdivisions – Part 2: Country subdivision code.*

– ISO 3166-3:1999, C*odes for the representation of names of countries and their subdivisions – Part 3: Code for formerly used names of countries.*

– ISO/IEC 6523-1:1998, *Information technology – Structure for the identification of organizations and organization parts – Part 1: Identification of organization identification schemes.*

– ISO/IEC 6523-2:1998, *Information technology – Structure for the identification of organizations and organization parts – Part 2: Registration of organization identification schemes.*

– ISO 8571-1:1988, *Information processing system – Open Systems Interconnection – File transfer, access and management. Part 1: General introduction.*

3 Definitions

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

3.1 Organization definition

This Recommendation | International Standard uses the following term defined in ISO/IEC 6523-1:

organization.

3.2 OSI Reference Model terms

This Recommendation | International Standard uses the following terms defined in ITU-T Rec. X.650 | ISO/IEC 7498-3:

a) name;

b) naming authority;

c) naming domain;

d) synonym.

3.3 Application Layer Structure terms

This Recommendation | International Standard uses the following terms defined in ISO/IEC 9545:

a) application-entity-title;

b) application-process-title.

3.4 ASN.1 terms

This Recommendation | International Standard uses the following terms defined in ITU-T Rec. X.680 | ISO/IEC 8824-1:

a) object;

b) object descriptor type;

c) object identifier type.

This Recommendation | International Standard uses the following term defined in ITU-T Rec. X.681 | ISO/IEC 8824-2:

information object.

3.5 Directory terms

This Recommendation | International Standard uses the following terms defined in ITU-T Rec. X.500 | ISO/IEC 9594-1:

a) Directory;

b) Directory name.

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

a) attribute;

b) attribute type;

c) attribute value;

d) attribute value assertion;

e) object class;

f) relative distinguished name.

3.6 Additional definitions

3.6.1 additional secondary identifier: A secondary identifier for an arc of the ASN.1 OID tree that is assigned from time-to-time by a simple Resolution of the relevant ITU-T Study Group and ISO Sub-Committee without requiring any change to this or any other International Standard (see A.5.5).

3.6.2 administrative role (of a Registration Authority): Assigning and making available unambiguous names according to the Recommendation | International Standard defining the procedures for the authority.

3.6.3 International Registration Authority: A Registration Authority (see 3.6.8) acting at the international level according to the procedures for its operation defined in the relevant Recommendation | International Standard (see clause 7).

3.6.4 object (of interest): Anything in some world, generally the world of telecommunications and information processing or some part thereof,

a) which is identifiable (can be named); and

b) which may be registered.

NOTE – Examples of objects are ASN.1 modules (see ITU-T Rec. X.680 | ISO/IEC 8824-1), information objects (see ITU-T Rec. X.681 | ISO/IEC 8824-2) and managed objects (see ITU-T Rec. X.722 | ISO/IEC 10165-4).

3.6.5 object identifier tree: A specific form of an RH-name-tree whose root corresponds to this Recommendation | International Standard and whose nodes correspond to registration authorities responsible for allocating arcs from a parent node.

3.6.6 primary value: A value of a specified type (integer, in the case of the ASN.1 OID tree) assigned to an arc of the RH-name-tree that can be used to provide an unambiguous identification of that arc.

NOTE – For the ASN.1 OID tree, the primary value of an arc is referred to as a primary integer value.

3.6.7 registration: The assignment of an unambiguous name to an object in a way which makes the assignment available to interested parties.

3.6.8 registration authority: An entity such as an organization, a standard or an automated facility that performs registration of one or more types of objects (see also International Registration Authority).

NOTE – For this Recommendation | International Standard the above definition of registration authority extends the term to cover registration by organizations acting at international, regional and national levels and by other means. For clarity, the term International Registration Authority is used in this Recommendation | International Standard to refer to an organization performing registration at the international level.

3.6.9 registration-hierarchical-name: A name which is unambiguous within the registration-hierarchical-name-tree and which is assigned by registration. The semantic form of this name is structured according to the rules in clause 6.

3.6.10 registration-hierarchical-name-tree: A tree whose nodes correspond to objects that are registered and whose non-leaf nodes may be registration authorities.

3.6.11 registration procedures: The specified procedures for performing registration and amending (or deleting) existing registrations.

3.6.12 secondary value: A value of some type (an ASN.1 "identifier" in the case of the ASN.1 OID tree) associated with an arc that provides additional identification useful for human readers, but that does not in general unambiguously identify that arc, and is not normally included in computer communications.

NOTE – In the case of the ASN.1 OID tree, the secondary value of an arc is referred as a secondary identifier.

3.6.13 sponsoring authority: An organization recognized by the requirements of this Recommendation | International Standard to receive proposals for registration and to submit applications accordingly to an International Registration Authority (see 7.2).

3.6.14 technical role (of a registration authority): Recording definitions of the objects to which names are assigned and verifying that these definitions are in accordance with the Recommendation | International Standard defining the form of the definition.

4 Abbreviations

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

ACSE	Association Control Service Element
ASN.1	Abstract Syntax Notation One
DCC	Data Country Code
DIT	Directory Information Tree
DNIC	Data Network Identification Code
DSA	Directory System Agent
DUA	Directory User Agent
FTAM	File Transfer, Access and Management
ISP	International Standardized Profile
ITU-R	International Telecommunications Union (Radiocommunication Sector)
MHS	Message Handling Systems
OID	Object Identifier
OSI	Open Systems Interconnection
RDN	Relative Distinguished Name
RH-name	Registration-Hierarchical-name

RH-name-tree	Registration-Hierarchical-name-tree
ROA	Recognized Operating Agency
TSB	Telecommunication Standardization Bureau

5 Registration

5.1 Overview

5.1.1 Many Recommendations | International Standards define certain objects for which unambiguous identification is required. This is achieved by registration.

NOTE – Examples of these objects are given in 3.6.1.

5.1.2 Registration is the assignment of a name to an object in a way which makes the assignment available to interested parties. It is carried out by a registration authority.

5.1.3 Registration can be effected by a Recommendation | International Standard, by publishing in the Recommendation | International Standard the names and the corresponding definitions of object. Such a mechanism requires amendment of the Recommendation | International Standard for each registration, and hence is not appropriate in cases where the registration activity is high.

5.1.4 Alternatively, registration can be effected by permitting one or more organizations to act as registration authorities to perform registration on a flexible basis.

5.1.5 The form of name used (see 6.1.5) and the management of the registration naming domain ensures independent assignment of unambiguous names by different registration authorities.

5.2 Management of the registration naming domain

5.2.1 The management of the entire registration naming domain is accomplished by a process of delegation of authority. In this process the registration authority responsible for a given naming domain may partition that naming domain. In doing so, it may or may not delegate the registration responsibility for the naming domain formed by each partition to a subordinate registration authority. The naming of a partition does not necessarily imply authority to register objects under that partition. This delegation of registration responsibility can be applied repeatedly with a subordinate registration authority partitioning further the naming domain for which it is responsible and delegating responsibility for those partitions to registration authorities subordinate to it.

5.2.2 The registration authority responsible for a given naming domain must assign a name to the partition of that naming domain that a given sub-authority will manage. The name assigned shall be globally unambiguous, and shall be concatenated as a prefix to all names assigned by that sub-authority. The repeated application of this process through a hierarchy of registration agents ensures the generation of unambiguous names. The generation of names for registration purposes is discussed further in clause 6.

NOTE – An organization, a Recommendation | International Standard or an automated facility can be the registration authority for more than one partition of a naming domain.

5.3 Operation

5.3.1 A registration authority may concern itself only with unambiguous assignment of names (the administrative role) or may in addition need to concern itself with recording definitions of objects and verifying that these definitions are in accordance with the Recommendation | International Standard defining the form of the definition (the technical role).

5.3.2 The criteria for registering an object may vary among registration authorities. It is the responsibility of each authority to establish those criteria. A registration authority may also choose to define criteria for any authorities which are subordinate to it.

NOTE – Among the criteria to be considered in the registration of an object is the level at which registration is appropriate. For example it may be that the definition of an object registered by a particular registration authority may find wide use beyond the community serviced by that registration authority. Although the assigned name is globally unambiguous and can be used outside that community, it may be desirable to restate the definition in the style acceptable to the larger community of interest. If so, the restated definition should be registered with the registration authority appropriate for that larger community.

5.3.3 Synonyms are created when an instance of a type of object is registered more than once. There may be valid reasons for creating synonyms, e.g. the Directory aliases. It is difficult to detect occurrences of synonyms. In case where synonyms are undesirable it may be possible to reduce the number by such means as technical review or administrative fees (in the case of registration authorities). It must be decided in each case whether this is necessary and practical.

NOTE – There is no practical way to ensure that the same object has not been registered by multiple registration authorities and the procedures in this Recommendation | International Standard do not ensure that only a single name is assigned to an object.

6 Registration-hierarchical-names

6.1 The generic RH-name-tree

6.1.1 The RH-name-tree is a generic concept that applies to any form of hierarchical naming in which a name is constructed by the concatenation of values of arcs starting from the root of a tree and proceeding to one of its leaves. RH-name-trees differ in the sort of values assigned to arcs (typically names or numbers or attribute type-value pairs). All of Directory names, MHS names, and ASN.1 object identifiers are hierarchical names that are supported by a specific form of RH-name-tree.

6.1.2 The introduction here of the RH-name-tree concept is intended to make it possible to specify procedures that are applicable to registration authorities related to all three naming conventions. The use of this term should be restricted to standards that address at least two of the specific naming structures that the term RH-name-tree encompasses.

6.1.3 The RH-name-tree is a tree whose root corresponds to this Recommendation | International Standard and whose leaf and non-leaf nodes correspond to objects that are registered. Non-leaf nodes correspond to registration authorities where registration responsibility has been delegated to them by a superior node.

6.1.4 The arcs from a given node to its immediate subordinates are unambiguously identified within the scope of the node by each of one or more primary values of different types. These primary values are assigned by the registration authority corresponding to the superior node. Thus, any path from the root to a node provides an unambiguous name for that node by concatenating (in order) the primary values of a given type for the arcs on the path. An arc may also have secondary values associated with it that are not necessary for the unambiguous identification of the arc, but that can appear in human-readable notation (in addition to the primary values) in order to describe more clearly the nature of an object identified by a path through the RH-name-tree.

NOTE – If any arc is not assigned a primary value of a given type, then the node identified by the arc and all of its subordinates can only be referenced using names constructed with primary values of a different type.

6.1.5 The types of values assigned by a registration authority can include integer values, alphanumeric values and other types of values. The contents of character sets and composition rules for values formed at subordinate arcs should be defined in registration authority procedure standards. The contents of character sets and composition rules may be further constrained or extended by subordinate registration authorities taking into consideration the expected use of the resulting values in different forms of name.

NOTE – To keep to a minimum the number of values assigned to top-level arcs in the RH-name-tree, it is desirable that the types of values assigned to arcs be generic, i.e., applicable to many name forms.

6.1.6 Where a given set of registration authorities assigns values of more than one type, the significance, if any, of the relationship between the resultant names (generated as defined in 6.2) is outside the scope of this document.

6.1.7 The generation of some specific forms of name for registration purposes is defined in the Annexes to this Recommendation | International Standard. The generation of other forms of name is also defined in other registration authority documents or in relevant Recommendations | International Standards.

6.2 The specific RH-name-tree for ASN.1 object identifiers

6.2.1 An object identifier type, as specified in ITU-T Rec. X.680 | ISO/IEC 8824-1, is an ASN.1 type whose abstract values are associated with a specific form of RH-name. The semantics of an object identifier value are defined by reference to an **object identifier tree**. Each arc of the tree is labelled with a primary value that is a non-negative integer value. The integer value is unbounded except that:

a) the top-level arcs are restricted to three arcs numbered `0` to `2`; and

b) the arcs beneath root arcs `0` and `1` are restricted to forty arcs numbered `0` to `39`.

NOTE – This enables optimized encodings to be used in which the values of the top two arcs for all arcs under top-level arcs `0` and `1`, and arcs `0` to `47` under top-level arc `2` encode in a single octet in an object identifier encoding (see the ITU-T Rec. X.690 series | ISO/IEC 8825 multi-part Standard).

6.2.2 An arc may (but need not) also have associated with it one or more secondary values that are identifiers that are human-readable values. The identifiers of an arc are required to commence with a lowercase letter, and to contain only letters, digits, and hyphens. The last character shall not be a hyphen, nor shall there be two consecutive hyphens in the name (see ITU-T Rec. X.680 | ISO/IEC 8824-1, 11.3).

6.2.3 From any given vertex, the primary integer value for arcs from that vertex are all required to be distinct.

NOTE – No requirement is placed on the secondary identifiers (but see 6.2.6).

6.2.4 Each object to be identified is allocated precisely one vertex (normally, but not necessarily, a leaf), and no other object (of the same or a different type) is allocated to that same vertex. Thus, an object is uniquely and unambiguously identified by the sequence of primary integer values (object identifier component values) labelling the arcs in a path from the root to the vertex allocated to the object.

NOTE 1 – The authorities allocating integer values and identifiers to object identifier components for the top-level arcs are identified in Annex A.

6.2.5 An object identifier value is semantically an ordered list of object identifier component values. Starting with the root of the object identifier tree, each object identifier component value identifies an arc in the object identifier tree. The last object identifier component value identifies an arc leading to a vertex to which an object has been assigned. It is this object that is identified by the object identifier value.

6.2.6 The significant part of an object identifier component is the primary integer value of the arc. The secondary identifiers (if present) aid human readability but are not used in computer communication. It is not recommended that the same identifier be used for two objects that are registered under the same node.

NOTE 1 – In general, an object is a class of information (for example, a file format), rather than an instance of such a class (for example, an individual file). It is thus the class of information (defined by some referenceable specification), rather than the piece of information itself, that is assigned a place in the tree.

NOTE 2 – It is recommended that, whenever a Recommendation, International Standard or other document assigns object identifier values to identify objects, there should be an appendix or annex which summarizes the assignments made therein. It is also recommended that an authority assigning an object identifier value to identify an object should also assign a value of ASN.1 type ObjectDescriptor (see ITU-T Rec. X.680 | ISO/IEC 8824-1, clause 44) to describe that object.

NOTE 3 – ITU-T Rec. X.680 | ISO/IEC 8824-1, clause 31, defines a number of syntactic forms for the specification of object identifier values within an ASN.1 module. Where these syntactic forms make no use of ASN.1 value references, they are independent of the ASN.1 environment and can be used to specify object identifier values outside of ASN.1 modules. Examples of the ASN.1 syntactic forms for the specification of object identifier values are given in ITU-T Rec. X.680 | ISO/IEC 8824-1, clause 31. There are also defined representations for an object identifier value specified relative to a given position in the object identifier tree.

NOTE 4 – ITU-T Rec. X.690 series | ISO/IEC 8825 multi-part standard defines encodings of object identifier values that can be used in computer communication.

7 International Registration Authorities

NOTE – Although this clause applies only to International Registration Authorities, other registration authorities may wish to implement similar rules for their operation.

7.1 Requirement for an International Registration Authority

The identification of, and formal agreement on the need for, an International Registration Authority is established in the Recommendation | International Standard which defines the type of object. Procedures which are generally applicable to the operation of International Registration Authorities are defined in this clause. Procedures which are specific to the type of object are defined in a separate Recommendation | International Standard developed for that purpose.

NOTE – The identity of the organization operating any specific International Registration Authority can be obtained from the ITU-T TSB or ISO Central Secretariat.

7.2 Operation of International Registration Authorities

7.2.1 Each International Registration Authority shall maintain a register of the names assigned to objects and (where the registration authority performs a technical role) the associated definitions of the objects. The form of name to be used and the form of register entry are defined in a separate Recommendation | International Standard.

7.2.2 With regard to the initial assignment of names and definitions to objects and of subsequent additions to the register, the responsibilities of an International Registration Authority shall be as follows:

a) to receive from Sponsoring Authorities (see 7.3) proposals for register entries;

b) to process proposals for entries according to the procedures specified in the applicable Recommendation | International Standard;

c) to record names for each register entry that is accepted, in accordance with the procedures specified in the applicable Recommendation | International Standard;

d) to promulgate the register entries according to the procedures specified in the applicable Recommendation | International Standard, and

e) to convey the results in a specified form to the appropriate Sponsoring Authority when the processing of a proposal has been completed.

7.2.3 With regard to deletions from the register, the responsibilities of an international Registration Authority shall be as follows:

a) to receive proposals from Sponsoring Authorities (see 7.3);

b) to process the proposals for deletion, according to the procedures specified in the applicable Recommendation | International Standard;

c) to promulgate the register deletions according to the procedures specified in the applicable Recommendation | International Standard; and

d) to convey the results in a specified form to the appropriate Sponsoring Authority when the processing of a proposal has been completed.

NOTE – The name of a deleted object should not be re-used.

7.3 Sponsoring Authorities

7.3.1 A Sponsoring Authority is the ITU-T TSB | any ISO/IEC JTC 1 Technical Committee or Subcommittee, an administration | national body, or a liaison organization.

7.3.2 The responsibilities of a Sponsoring Authority shall be as follows:

a) to receive proposals concerning objects from within their respective countries or organization;

b) to effect any necessary rationalizations or coordination of these proposals and to forward them to the International Registration Authority; and

c) to make known within their respective countries or organizations the decisions taken on their proposals as transmitted to them by the International Registration Authority.

8 Contents of registration procedures for objects of a particular type

8.1 Registration procedures for objects of a particular type may be specified in a separate Recommendation | International Standard. A clear distinction shall be made in these registration procedures between those procedures which apply in general to registration for the type of object, and those which apply to the specific International Registration Authority (if any) established by the Recommendation | International Standard.

8.2 The contents of each Recommendation | International Standard shall include:

a) the justification of the need for the registration;

b) a statement of the scope of objects to be registered;

c) references to the Recommendation | International Standard in which the type of object is defined and to any other applicable Recommendations | International Standards, together with identification of the ITU-T Study Group | ISO/IEC JTC 1 Subcommittee responsible for the definition of the type of object;

d) definitions and abbreviations used in the registration procedures;

e) a statement whether the registration requires a registration authority to perform a technical role;

f) a specification of the contents of register entries, including at least:

   1) the name assigned to the object;

   2) the name of the organization that proposed the entry;

   3) the dates of submission/registration;

   4) the definition of the object (where the registration authority performs a technical role);

g) identification of those clauses of this Recommendation | International Standard which apply together with the specification of any necessary amendments to be applied to those clauses for the purposes of the specific registration;

h) for an International Registration Authority, a complete specification of the procedures (manual or automated) to be applied to create, interrogate, modify, delete or audit registered items. This includes any access restrictions imposed on these operations. In particular, the following are specified:

1) the method used to determine whether a request for registration or deletion should be accepted.

NOTE – This may include (but it is not limited to) administration approval | national body vote or national body exception (where silence means tacit acceptance), or automated processes. The following criteria for rejection of a proposal may be relevant:

a) incomplete or incomprehensible definition;

b) existence of an identical or similar entry in the register;

c) the proposed entry is not one of the permitted entries;

d) the proposed entry does not conform to a Recommendation | International Standard listed in the References of the appropriate Recommendation | International Standard;

e) the justification for inclusion in the register is not adequate.

2) how rejections shall be resolved;

3) whether modification of register entries or reuse of the names of register entries is allowed and (if so) a specification of mechanisms to allow this to happen; and

4) the procedures to be applied to determine whether and how the register shall be updated to include relationships to further Recommendation | International Standards,

i) identification of any propagation/notification requirements associated with registered items.

NOTE – For example there should be a statement on whether the registered information is to be made available to users through a Recommendation | International Standard or an International Standardized Profile (ISP), or by application to the International Registration Authority; and, in the case of application to the International Registration Authority, a description of the procedure to be followed by people or organizations which need to obtain registered information;

j) examples of register entries (in one or more Annexes to the Recommendation | International Standard).

8.3 Each Recommendation | International Standard shall specify the form of RH-name to which it applies.

NOTE – Some individual Recommendations | International Standards apply to the registration of objects that are to be accessible using the Directory Service (see Annexes B and C). In order for this to be possible, in some cases it may be necessary to identify, and possibly specify, an appropriate object class to define what information is held in the Directory entry for an instance of each object class.

9 Progression of registration procedures for objects of a particular type

The registration procedures for objects of a particular type may be specified in a separate Recommendation | International Standard. The progression of such a Recommendation | International Standard follows the procedures defined below:

a) identification and formal agreement that a new Recommendation | International Standard is required, and identification and agreement on the requirements for registration shall be stated in any International Standard or prospective Recommendation | International Standard which gives rise to the need for registration.

NOTE – A Recommendation | International Standard is normally appropriate for any object where either (see also Annex D):

1) an explicit International Registration Authority is needed because of the expected frequency of new or amended registrations at the international level; or

2) a number of Recommendations | International Standards have identified the need for registration for a type of object, but, because of the complexity of the information necessary to define instances of the type, it is judged to be desirable to specify this information in a separate document; or

3) registration procedures to be used by organizations requiring registration for their own purposes cannot be adequately described by a reference only to this Recommendation | International Standard from another Recommendation | International Standard.

b) assignment of the development of a new Recommendation | International Standard to a specific ITU-T Study Group | Working Group of an ISO/IEC JTC 1 Subcommittee;

c) generation and approval of a New Work Item proposal using normal ISO/IEC JTC 1 procedures, or, if necessary, the generation and approval of a new Question using normal ITU-T procedures;

d) progression of the Recommendation | International Standard to become a Recommendation | International Standard according to normal procedures.

NOTE 1 – Where an International Registration Authority is necessary for the operation of a base Recommendation | International Standard, the base Recommendation | International Standard normally receives final approval only when the relevant Recommendation | International Standard specifying the procedures for the registration authority is at least a draft Recommendation | at the draft International Standard ballot stage, and an organization has been nominated to act as the registration authority. Where an International Registration Authority is not necessary, this constraint does not apply.

NOTE 2 – The criteria to be applied in the choice of a body which is proposed for an International Registration Authority are determined by ITU-T or ISO/IEC JTC 1 as appropriate. The proposal of an organization to the ITU-T TSB or JTC 1 to act as an International Registration Authority requires at the same time the provision by the submitter of the proposal of an estimate of the activity expected at the international level (e.g., volume of requests for registration per year).

NOTE 3 – In cases where modification of the operation of a Registration Authority requires modification to a Recommendation | International Standard, this modification must follow normal procedures for changing Recommendations | International Standards.

Annex A

The top-level arcs of the ASN.1 Object Identifier tree

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

This Annex specifies the top-level arcs of the registration tree for object identifiers.

A.1 Top-level assignment of object identifier component values

A.1.1 There are three top-level arcs. The assignment of values and identifiers, and the authority for assignment of subsequent component values, are as follows:

Value	*Identifier*	*Authority for subsequent assignments*
`0`	`itu-t`	Administered by ITU-T (See A.2)
`1`	`iso`	Administered by ISO (See A.3)
`2`	`joint-iso-itu-t`	Jointly-administered by ISO and ITU-T (See A.4)

NOTE – The ASN.1 encoding of object identifier values specified in ITU-T Rec. X.690 | ISO/IEC 8825-1 requires that there be only three arcs allocated from the root node (with primary integer values of `0`, `1`, and `2`), and at most forty arcs from the first two of these arcs (with primary integer values of `0` to `39`). (See also 6.2.1.)

A.1.2 The identifiers `itu-t`, `iso` and `joint-iso-itu-t`, assigned above, may each be used without their associated primary integer value as a "NameForm" (see ITU-T Rec. X.680 | ISO/IEC 8825-1, 31.3) and identify the corresponding primary integer value.

NOTE – The use of the "NameAndNumberForm" in new specifications for these and for subordinate arcs is nonetheless recommended where additional secondary identifiers (see A.5) have already been assigned to the arc.

A.1.3 The identifiers `ccitt` and `joint-iso-ccitt` are synonyms for `itu-t` and `joint-iso-itu-t`, respectively, and thus may appear in object identifier values, and also identify the corresponding primary integer value.

A.2 ITU-T-administered assignment of object identifier component values

A.2.1 Arcs beneath top-level arc `0` are administered by the ITU-T. All decisions related to these arcs, other than the assignment of additional secondary identifiers to top-level arc `0` (see A.5), will be recorded as amendments to this Recommendation | International Standard, but such changes to the joint text will be regarded as Editorial changes by ISO.

NOTE – The assignment of additional secondary identifiers requires joint agreement, as there is a requirement that all secondary identifiers are distinct across all the top-level arcs.

A.2.2 Six arcs are specified from the node identified by `itu-t`. The assignment of values and identifiers is:

Value	*Identifier*	*Authority for subsequent assignments*
`0`	`recommendation`	See A.2.3
`1`	`question`	See A.2.4
`2`	`administration`	See A.2.5
`3`	`network-operator`	See A.2.6
`4`	`identified-organization`	See A.2.7
`5`	`r-recommendation`	See A.2.8

The first five identifiers may be used without their associated integer value as a "NameForm" (see ITU-T Rec. X.680 | ISO/IEC 8824-1, 31.3) and identify the corresponding primary integer values. The identifier `r-recommendation` shall not be used as a "NameForm".

NOTE – This is because only identifiers that were present in the initial version of this Recommendation | International Standard can be used as a "NameForm", in order to avoid backwards compatibility problems for related software.

A.2.3 The arcs below `recommendation` have the value `1` to `26` with assigned identifiers of `a` to `z`. Arcs below these have the numbers of ITU-T (and CCITT) Recommendations in the series identified by the letter. Arcs below this

are determined as necessary by the ITU-T (and CCITT) Recommendations. The identifiers **a** to **z** may be used as a "NameForm", and identify the corresponding primary integer value.

A.2.4 The arcs below **question** have primary integer values corresponding to ITU-T Study Groups, qualified by the Study Period. The value is computed by the formula:

Study Group number + (Study Period * 32)

where "Study Period" has the value 0 for 1984-1988, 1 for 1988-1992, etc., and the multiplier is 32 decimal.

The arcs below each Study Group have the primary integer values corresponding to the Questions assigned to that Study Group. Arcs below this are determined as necessary by the group (e.g., Working Party or special Rapporteur group) assigned to study the question.

NOTE – This arc has never been used.

A.2.5 The arcs below **administration** have the values of Data Country Codes (DCCs) as defined in ITU-T Rec. X.121. Arcs below this are determined as necessary by the Administration of the country identified by the DCC.

A.2.6 The arcs below **network-operator** have the primary integer values of Data Network Identification Codes (DNICs) as defined in ITU-T Rec. X.121. Arcs below this are determined as necessary by the Administration or ROA identified by the DNIC.

A.2.7 The arcs below **identified-organization** are assigned primary integer values by the ITU TSB in accordance with the procedures specified in ITU-T Rec. X.669. Arcs below this are determined as necessary by the identified organization.

NOTE – Organizations which may find this arc useful include:

- recognized operating agencies not operating a public data network;
- scientific and industrial organizations;
- regional standards organizations; and
- multi-national organizations.

A.2.8 The arcs below **r-recommendation** are determined by the ITU-R in accordance with procedures defined by ITU-R.

NOTE – An additional secondary identifier of **itu-r** has been allocated to the top-level arc **0** for use with the **r-recommendation** arc. This allows object identifiers such as **{itu-r(0) r-recommendation(5) ...}**.

A.3 ISO-administered assignment of object identifier component values

A.3.1 Arcs beneath top-level arc **1** are administered by the ISO. All decisions related to these arcs, other than the assignment of additional secondary identifiers to top-level arc **1** (see A.5), will be recorded as amendments to this Recommendation | International Standard, but such changes to the joint text will be regarded as Editorial changes by ITU-T.

NOTE – The assignment of synonyms requires joint agreement, as there is a requirement that all secondary identifiers are distinct across all the top-level arcs.

A.3.2 Four arcs are specified from the node identified by **iso(1)**. The assignment of values and identifiers is:

Value	*Identifier*	*Authority for subsequent assignments*
0	**standard**	See A.3.3
1	**registration-authority**	See A.3.4
2	**member-body**	See A.3.5
3	**identified-organization**	See A.3.6

These identifiers may be used without their associated integer value as a "NameForm" (see ITU-T Rec. X.680 | ISO/IEC 8824-1, 31.3) and identify the corresponding integer value.

A.3.3 The arcs below **standard** shall each have the value of the number of an International Standard published by ISO or IEC. Where the International Standard is multi-part, there shall be an additional arc for the part number, unless this is specifically excluded in the text of the International Standard. Further arcs shall have values as defined in that International Standard.

NOTE – If a non-multipart International Standard allocates object identifiers, and subsequently becomes a multipart International Standard, it shall continue to allocate object identifiers as if it were a single part International Standard.

EXAMPLE: The "FTAM PCI" abstract-syntax information object, defined in ISO 8571, has been assigned the object identifier value:

{iso(1) standard(0) ftam(8571) abstract-syntax(2) pci(1)}

A.3.4 The arcs below **registration-authority** are assigned to those International Standards that, in one or more of their parts, specify the procedures for the operation of a registration authority. Arc numbers from 1 to 10 are reserved to identify a part of the ISO/IEC 9834 multi-part Standard, and the value of the arc is the number of that part. For other International Standards, the arc number is the number of the International Standard. In all cases, the identified International Standard or part of the ISO/IEC 9834 multi-part Standard allocates subsequent arcs.

A.3.5 The arcs immediately below **member-body** shall have primary integer values of a numeric country code (without the leading zeros), as specified in ISO 3166, that identifies the ISO National Body in that country (see Note). The "NameForm" of object identifier component is not permitted for these arcs. Arcs below the "country code" are allocated by the identified ISO National Body.

NOTE – The existence of a country code in ISO 3166 does not necessarily imply that there is an ISO National Body representing that country or that the ISO Member Body for that country administers a scheme for the allocation of object identifier components.

A.3.6 The arcs immediately below **identified-organization** shall have primary integer values that are the values of an International Code Designator (ICD) allocated by the Registration Authority for ISO/IEC 6523-2 that identify an issuing organization specifically registered by that authority as allocating object identifier components (see Notes 1 and 2). The arcs immediately below the ICD shall have values of an "organization code" allocated by the issuing organization in accordance with ISO/IEC 6523-2.

NOTE 1 – The requirement that issuing organizations are recorded by the Registration Authority for ISO/IEC 6523 as allocating object identifier components ensures that only numerical values in accordance with this International Standard are allocated.

NOTE 2 – The declaration that an issuing organization allocates object identifier components does not preclude the use of these codes for other purposes.

A.4 Assignment of object identifier component values jointly administered by ISO and ITU-T

A.4.1 The allocation of arcs under the jointly-administered top-level arc **2** are determined by agreement between the ITU-T Study Group and the ISO Sub-Committee that are responsible for the maintenance and development of this Recommendation | International Standard, in accordance with ITU-T Rec. X.662 | ISO/IEC 9834-3.

NOTE – The jointly agreed assignment of one or more arcs, and responsibility for the nodes beneath those arcs to an organization may result in joint agreement on the addition of synonyms for the top-level arc **2**. Such synonyms are allocated in accordance with A.5.

A.4.2 The arcs below **joint-iso-itu-t** have values that are assigned and agreed from time to time by a Registration Authority established by ITU-T and ISO/IEC to identify either areas of joint ITU-T and ISO/IEC standardization activity, or to provide allocations to other international organizations requiring object identifier namespace, in accordance with ITU-T Rec. X.662 | ISO/IEC 9834-3.

A.4.3 The arcs beneath each arc identified by the mechanisms of A.4.1 shall be allocated in accordance with mechanisms established when the arc is allocated.

NOTE – It is expected that this will involve delegation of authority to the joint agreement of ITU-T and ISO Rapporteurs for a joint area of work, or to an international organization.

A.4.4 (For information). The following object identifier has been assigned to the area of joint work on registration procedures by ITU-T and ISO/IEC:

{joint-iso-itu-t(2) registration-procedures(17)}

Related Recommendations | International Standards or other Recommendations | International Standards are assigned domains by the assignment of values to arcs beneath this object identifier. Where a Recommendation | International Standard specifies the operation of an international Registration Authority it will, in general, assign the use of the arcs for which it is responsible to that authority.

EXAMPLE: ITU-T Rec. X.661 | ISO/IEC 9834-2 assigns the use of arcs for which it is responsible to the International Registration Authority for Document Types. Thus, the object identifier for the third registered instance of the Document Type information object is:

{joint-iso-itu-t(2) registration-procedures(17) document-types(2) binary(3)}

A.4.5 (For information). The area of joint registration within a country has been assigned (by the Registration Authority specified in ITU-T Rec. X.662 | ISO/IEC 9834-3) the object identifier:

{joint-iso-itu-t(2) country(16)}

The values assigned to country-name arcs under this object-identifier are the integer values of the numeric-3 codes of ISO 3166 (without leading zeros).

The node identified by a country-name arc may be used to assign object identifiers within a country. The administration of this node is not prescribed by this Recommendation | International Standard, but it is recommended that a single national Registration Authority be determined by the joint decision of the country's ITU-T Administration and ISO/IEC National Body. The assignment of registration responsibilities within a country is a national decision.

A.5 Assignment of additional secondary identifiers to the top-level arcs

A.5.1 Assignment of additional secondary identifiers to the top-level arcs shall be made from time-to-time (only) by Resolutions of the ITU-T Study Group and the ISO Sub-Committee responsible for this Recommendation | International Standard, in accordance with the following sub-clauses.

NOTE 1 – It will be normal to assign such additional secondary identifiers when an international organization is given responsibility for one or more nodes beneath top-level arc `2` (`joint-iso-itu-t`), but this is not a requirement. Assignment of additional secondary identifiers to top-level arcs `0` and `1` are expected to be rare, and to reflect the need for synonyms to correctly reflect the organizations responsible for some lower-level arcs, or the needs of changing organization names.

NOTE 2 – Examples of where assignment of additional secondary identifiers for arcs `0` and `1` might be appropriate would be the sharing of a number-space for lower-level arcs between, for example, ISO and IEC standards.

A.5.2 Such assignments shall be recorded and published in accordance with A.5.5.

A.5.3 These additional secondary identifiers shall not be used in a "NameForm" (see ITU-T Rec. X.680 | ISO/IEC 8825-1, 31.3), nor shall a "NameForm" be used in the specification of any subordinate arcs if these additional secondary identifiers are used.

NOTE – This condition is imposed to avoid the need for frequent updates to software that needs to know the primary integer value, for example, for inclusion in an encoding of the object identifier.

A.5.4 Assignment of additional secondary identifiers shall require a resolution for the addition of the following register entry to the register of secondary identifiers for top-level arcs:

(1) The top-level arc number (`0`, `1` or `2`) to which the additional secondary identifier is to be assigned. Example: `0`	(2) The additional secondary identifier that is to be assigned to that top-level arc. Example: **`org-x`**
(3) Contact (officer) of the international organization identified. Example: **`Standards liaison officer.`**	(4) Conditions for use of the additional secondary identifier. (For examples, see the notes below.)

NOTE 1 – It is expected that the ITU-T Study Group and the ISO Sub-Committee will ensure that all secondary identifiers allocated to top-level arcs are unique across all top-level arcs.

NOTE 2 – The conditions for use of the additional secondary identifier are expected to relate to object identifier values in which specified lower-level arcs are included (see A.2.8).

EXAMPLE – An **`itu-r`** secondary identifier is permitted for top-level arc `0` if and only if the object identifier began with **`{0 0 x}`**, where **`x`** was a primary integer value assigned to a series of ITU-R Recommendations. This permits value notations of:

```
{itu-r(0) r-recommendation(5)  br(101) ...}
```

EXAMPLE – An **`iec`** secondary identifier might be permitted for top-level arc `1` if and only if the object identifier began with **`{1 0 x}`**, where **`x`** was the number of an IEC Standard and not an ISO Standard. This would permit object identifier value notations of:

```
{iec(1)  standard(0) 2579 ... }
```

EXAMPLE – An org-x secondary identifier might be permitted for top-level arc **2** if and only if the object identifier began with **`{2 x}`**, where **`x`** was a primary integer value assigned to organization ORG-X. Assuming that the registration in accordance with ITU-T Rec. X.662 | ISO/IEC 9834-3 had assigned the secondary identifier **`tech-com`**, this would permit value notations of (for example):

```
{org-x(2) tech-com(x) web-services(0) ... }
```

NOTE – These examples do not imply that the additional secondary identifiers have been assigned. They are for illustration only.

A.5.5 Approval of additional secondary identifiers for the top-level arcs `0`, `1` or `2` shall be made as follows:

a) determination in ITU-T that a register entry be added for top-level arc `0` in accordance with A.5.3, with approval in ISO for the assignment of the additional secondary identifier (by simple Resolution of the applicable ISO Sub-Committee); or

b) determination in ISO that a register entry be added for top-level arc `1` in accordance with A.5.3, with approval in ITU-T for the assignment of the additional secondary identifier (by simple resolution of the applicable ITU-T Study Group); or

c) determination as part of (or following) the allocation of one or more arcs to an international organization that an additional secondary identifier be assigned to top-level arc `2` (by simple Resolution of both the applicable ITU-T Study Group and the applicable ISO Sub-Committee).

A.5.6 Following the approval of additional secondary identifiers as specified in A.5.3 and A.5.4, the ITU TSB shall be requested to add the proforma in A.5.3 to the Register. The ITU TSB shall provide to each meeting of the relevant ITU-T Study Group and of the relevant ISO Sub-Committee a copy of the current register of additional secondary identifiers for the top-level arcs, if these have been changed since the last meeting.

Annex B
Derivation of Directory names

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

B.1 In accordance with the provisions of clause 6, Directory names for registration purposes are generated by a set of registration authorities when

a) the values assigned to the arcs of the RH-name-tree are relative distinguished names (RDN), as defined in ITU-T Rec. X.501 | ISO/IEC 9594-2; and

b) the top level arcs of the RH-name-tree are assigned RDN values with the "countryName" attribute type as defined in ITU-T Rec. X.520 | ISO/IEC 9594-6 and with attribute values taken from the country codes defined in ISO 3166, in full accordance with ITU-T Rec. X.521 | ISO/IEC 9594-6.

NOTE – Attribute types and values for top level arcs which do not represent countries are not assigned by this Recommendation | International Standard but may be assigned in the future. The assignment of additional attribute types is not to be taken to imply support by the Directory for these new attribute types.

B.2 The Directory name for a node is obtained by taking the RDN values, in order, as Directory name components, as specified in ITU-T Rec. X.502 | ISO/IEC 9594-2.

EXAMPLE: The Directory name form of an Application-process-title for an analysis package run by the Reading Design Office of XYZ Fastening plc in the UK could be:

```
{countryName = "GB", organizationName = "Superstitch Fastenings plc",
organizationalUnitName = "Reading Design Office", commonName = "Analysis Package"}
```

B.3 The administration of the registration authority identified by a "countryName" arc is not prescribed by this Recommendation | International Standard. While it is preferred that a single national registration authority be determined by the joint decision of the country's ITU-T administration and ISO/IEC national body, the assignment of registration responsibilities within a country is a national decision.

B.4 The existence of multiple name forms does not imply their support by the Directory nor does it imply any requirement to map from one name form to another.

B.5 There are some circumstances in which it is appropriate for object identifiers to be transformed into Directory names and used for Directory access. This annex defines three attribute types, an object class and a name form for this purpose.

B.6 The attribute types are:

a) An attribute type for the first component of an object identifier:

```
oidC1 ATTRIBUTE ::= {
      WITH SYNTAX INTEGER
      EQUALITY MATCHING RULE integerMatch
      ID {id-oidC1}}
```

Integer match is defined in ITU-T Rec. X.520 | ISO/IEC 9594-6.

b) An attribute type for the second component of an object identifier:

```
oidC2 ATTRIBUTE ::= {
      WITH SYNTAX INTEGER
      EQUALITY MATCHING RULE integerMatch
      ID {id-oidC2}}
```

c) An attribute type for the remaining components of an object identifier:

```
oidC ATTRIBUTE ::= {
            WITH SYNTAX INTEGER
            EQUALITY MATCHING RULE integerMatch
            ID {id-oidC}}
```

B.7 The following definition provides an alias object class for a "country level" alias entry:

```
oidRoot OBJECT-CLASS ::= {
            SUBCLASS OF alias
            MUST CONTAIN {oidC1 | oidC2 | oidC }
            ID {id-oidRoot}}
```

B.8 The following definition provides a name form to permit "country level" entry directly subordinate to the root:

```
oidRootNf NAME-FORM ::= {
            NAMES oidRoot
            WITH ATTRIBUTES {oidC1 | oidC2 | oidC }
            ID {id-oidRootNf}}
```

B.9 The use of the attribute types is illustrated in Annex D.

B.10 The following ASN.1 module **OidDirectoryNameDef** includes all of the ASN.1 type and value definitions contained in this annex.

```
OidDirectoryNameDef {joint-iso-itu-t registration-procedures(17) module(1)
oidDirectoryNameDef(1)}

DEFINITIONS ::=

BEGIN

-- EXPORTS All --

IMPORTS

      ATTRIBUTE, MATCHING-RULE, OBJECT-CLASS, NAME-FORM, alias
            FROM InformationFramework {joint-iso-itu-t ds(5) module(1)
                        informationFramework(1) 4}

      integerMatch
            FROM SelectedAttributeTypes {joint-iso-itu-t ds(5) module(1)
                        selectedAttributeTypes(5) 4};

-- Attribute types --

oidC1 ATTRIBUTE ::= {
            WITH SYNTAX            INTEGER
            EQUALITY MATCHING RULE integerMatch
            ID                id-oidC1}

oidC2 ATTRIBUTE ::= {
            WITH SYNTAX            INTEGER
            EQUALITY MATCHING RULE integerMatch
            ID                id-oidC2}

oidC ATTRIBUTE ::= {
            WITH SYNTAX            INTEGER
            EQUALITY MATCHING RULE integerMatch
            ID                id-oidC}

-- Object class definition --

oidRoot OBJECT-CLASS ::= {
            SUBCLASS OF       { alias }
            MUST CONTAIN      { oidC1 | oidC2 | oidC }
            ID          id-oidRoot }

-- Name form --

oidRootNf NAME-FORM ::= {
            NAMES       oidRoot
            WITH ATTRIBUTES  {oidC1 | oidC2 | oidC}
            ID          id-oidRootNf }

-- Object identifier assignments --

id OBJECT IDENTIFIER ::= {joint-iso-itu-t registration-procedures(17) module(1)
directory-defs(2)}

id-oidC1 OBJECT IDENTIFIER ::=     {id 0}

id-oidC2 OBJECT IDENTIFIER ::=     {id 1}

id-oidC OBJECT IDENTIFIER ::=      {id 2}

id-oidRoot OBJECT IDENTIFIER ::=   {id 3}

id-oidRootNf OBJECT IDENTIFIER ::={id 4}

END
```

Annex C
Derivation together of object identifiers and Directory names

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

C.1 In accordance with the provisions of clause 6, object identifiers and Directory names are generated together for registration purposes by a set of registration authorities when:

a) the provisions of both Annex A and Annex B are met; and

b) the object identifier form of name is generated under the **{joint-iso-itu-t(2) country(16) *country-name*}** arc.

Example:

RH-name (alphanumeric value)	*RDN (Distinguished Name)*
countryName = US	C = US (C = US)
stateOrProvinceName = Hawaii	SP = Hawaii (C = US,SP = Hawaii)
organizationName = Gregory'sDolphins	O = Gregory's Dolphins (C = US,SP = Hawaii, O = Gregory's Dolphins)
organizationalUnitName = Shipping Department	OU = Shipping Department (C = US,SP = Hawaii, O = Gregory's Dolphins, U = Shipping Department)

RH-name (integer value)	*Object identifier*
joint-iso-itu-t(2)	**{joint-iso-itu-t(2)}**
country(16)	**{joint-iso-itu-t(2) country(16)}**
country-name(840)	**{joint-iso-itu-t(2) country(16) us(840)}**
state-or-province(46)	**{joint-iso-itu-t(2) country(16) us(840) hawaii(46)}**
organization(3125)	**{joint-iso-itu-t(2) country(16) us(840) hawaii(46) gregorysDolphins(3125)}**
organizational-unit(3)	**{joint-iso-itu-t(2) country(16) us(840) hawaii(46) gregorysDolphins(3125) shippingDepartment(3)}**

C.2 The existence of multiple forms of name does not imply their support by the Directory nor does it imply any requirement to map from one form of name to another.

Annex D

Object identifier based Directory names

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

D.1 Transformation of object identifiers into Directory names

D.1.1 The transformation of an object identifier into a Directory name involves the creation of the Directory name as a sequence of object identifier components. All three attribute types defined in B.6 are used for the formation of an RDN for the first level of the DIT (identifying a country) from the first three components of an object identifier; subsequent RDNs are formed from single components of the object identifier taken in sequence. Thus an object identifier such as:

```
{iso(1) member-body(2) fr(250) type-org(1) abc(9999) marketing-department(999)}
```

would be transformed into the following Directory name:

{{oidC1=1, oidC2=2, oidC=250}}, {oidC=1}, {oidC=9999}, {oidC=999}}

D.1.2 It should be noted that it is the responsibility of the user of the Directory to carry out the transformation into a Directory name of an object identifier that is to be used for Directory lookup and for the presentation of the Directory name to a DSA via a DUA. Similarly, it is the responsibility of the user of the Directory to derive an object identifier from an object identifier component based name retrieved from the Directory. The only requirement on DSAs is that they are configured to support the attribute types for object identifier component.

D.2 The use of object-identifier-based Directory names

D.2.1 The object identifier based Directory name can be used as the distinguished name for an object. Alternatively, where an object has a conventional distinguished name as well as an object identifier (e.g., an application-process), it can be assigned both forms of Directory name through the use of Directory alias naming. This is illustrated in Figure D.1.

D.2.2 In principle, each entry below the root of the DIT may have an alias name. Such an alias name establishes an object identifier component based RDN that can be used in Directory access. Thus, Figure D.1 shows an alias name for a country entry ("FR") that is an RDN composed of three object identifier components.

D.2.3 It is thus possible to create entries for objects that have:

a) only a conventional distinguished name, e.g., *Albert Durand* in Figure D.1;

b) only an object identifier component based name form, e.g., *(application context definition)* in Figure D.1;

c) dual name forms, e.g., in Figure D.1 *organization ABC* has the distinguished name:

{C=FR, O=ABC}

with the corresponding alias name:

{{oidC1=1, oidC2=2, oidC=250}}, {oidC=1},{oidC=9999}}.

NOTE – The construction of distinguished names consisting of RDNs of object identifier form followed by conventional RDNs may be considered by some organizations as not retaining the user friendly nature of conventional distinguished names.

D.2.4 It should be noted that it is not necessary to generate aliases for all intermediate nodes in a path traversing the tree (e.g., see OU = XY in Figure D.1). Conversely, it is not necessary for all object entries in the alias environment to be actual alias entries (e.g., see node below OIDC = 1 in Figure D.1).

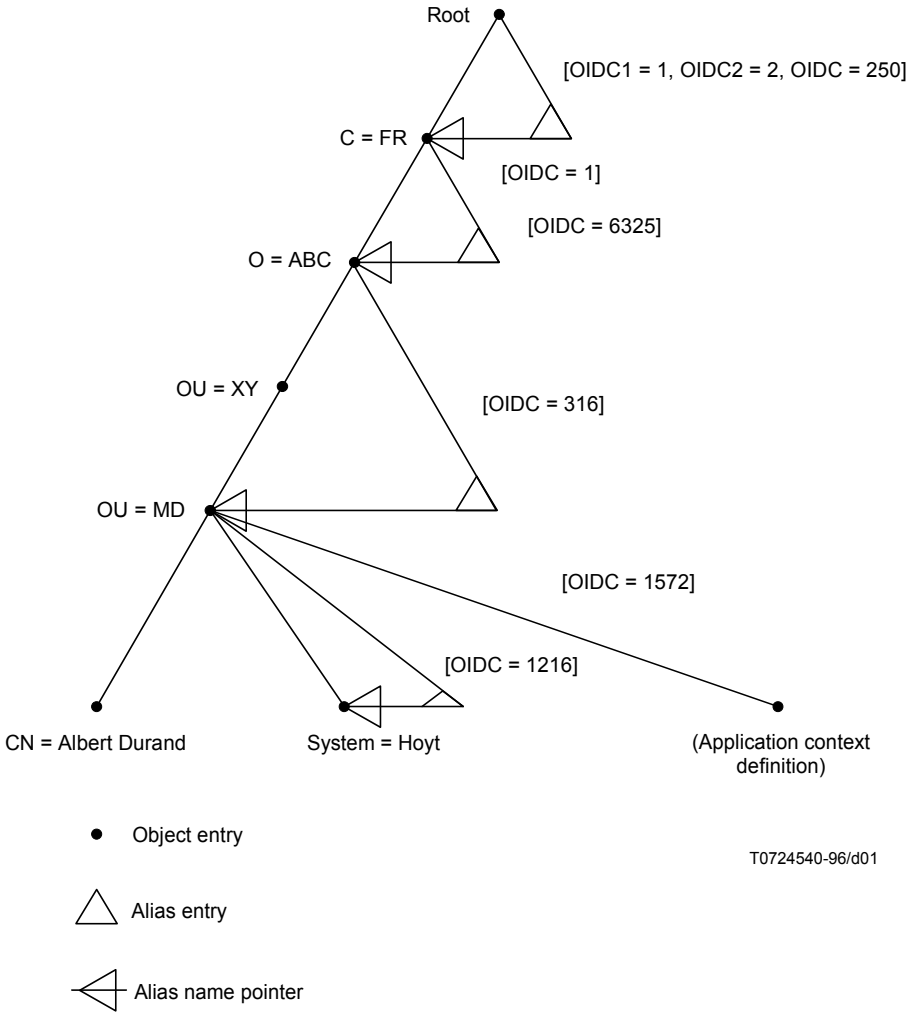

Figure D.1 – The use of Alias Names

Annex E
References to this Recommendation | International Standard

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

E.1 Where a Recommendation | International Standard defines types of objects for which unambiguous identification of instances of the type are required, then it establishes a requirement for registration.

E.2 The writers of the Recommendation | International Standard determine, for each such name, the appropriate forms of registration. There are four main options which arise:

a) registration in the Recommendation | International Standard which defines the type of object;

b) registration in Recommendations | International Standards referencing the Recommendation | International Standard which defines the type of object;

c) registration by any International | Registration Authority;

d) registration by any organization which requires to act as a registration authority.

E.3 Registration in the Recommendation | International Standard which defines the type of object is generally only appropriate if the number of registrations is small and likely to be changed infrequently. (A current example is the definition of names for FTAM constraint-set fields which, if necessary, will be extended by amendment). If this is the only registration considered appropriate, the following text should be included in the relevant Recommendation | International Standard:

> "The names to be used in this field are specified in Annex... An International Registration Authority covering this type of object is not currently intended."

There would be no reference to ITU-T Rec. X.660 | ISO/IEC 9834-1.

E.4 Registrations in Recommendations | International Standards referencing the Recommendation | International Standard which defines the type of object is appropriate if the names and corresponding definitions are closely tied to those Recommendations | International Standards. (A current example is ACSE application-context fields and presentation abstract syntax fields). If this is the only registration considered appropriate, the following text should be included in the relevant Recommendation | International Standard:

> "The names to be used in this field are specified in the Recommendations | International Standards referencing this Recommendation | International Standard. The name shall be defined in accordance with ITU-T Rec. X.660 | ISO/IEC 9834-1. An International Registration Authority covering this type of object is not currently intended."

The referencing Recommendation | International Standard will assign a name in accordance with ITU-T Rec. X.660 | ISO/IEC 9834-1, but need not reference ITU-T Rec. X.660 | ISO/IEC 9834-1.

E.5 Registration by an International Registration Authority requires the development of a new Recommendation | International Standard. If this is the only registration considered appropriate, the Recommendation | International Standard which defines the type of object should contain the text:

> "This Recommendation | International Standard requires an International Registration Authority for... The procedures governing the Authority and the form of register entries are specified in ITU-T Rec. X... | ISO/IEC..."

NOTE – In this case the Recommendation | International Standard which defines types of objects will not normally receive final approval until the relevant Recommendation | International Standard is a consented Recommendation | draft International Standard at ballot stage and an organization has been nominated as the registration authority.

E.6 Where registration by any organization which has a need is considered appropriate, two further criteria need to be examined. These are:

a) are there any special relationships (requiring explanation) between these names and other names?

b) is a more detailed specification (beyond that which can be inferred from the Recommendation | International Standard which defines the type of object) needed of the information which would constitute registration?

E.7 Examples where E.6 a) would be true is AE-title, AP-title, etc. in ACSE. In this case a Recommendation | International Standard in the ITU-T Rec. X.660 series | ISO/IEC 9834 multi-part standard would normally be appropriate, with text in the Recommendation | International Standard which defines the type of object saying:

> "ITU-T Rec. X... | ISO/IEC 9834-... specifies requirements for the assigning of names to..."

E.8 There are no current examples where E.6 b) is considered to be true, but in such cases the Recommendation | International Standard which defines the type of object contain text saying:

> "ITU-T Rec. X... | ISO/IEC 9834-... specifies the information which is needed for registration of..."

E.9 If neither E.6 a) nor E.6 b) is true, and this is the only form of registration proposed, then the Recommendation | International Standard which defines the type of object would contain the text:

> "The assignment of names for ... shall be in accordance with the general procedures and of the form specified in ITU-T Rec. X.660 | ISO/IEC 9834-1.
>
> Organizations wishing to assign such names shall find an appropriate superior in the naming tree of ITU-T Rec. X.660 | ISO/IEC 9834-1 and request that an arc be assigned to them.
>
> NOTE – This includes ITU-T administrations, ISO/IEC national bodies, organizations with International Code Designators (ICDs) assigned in accordance with ISO 6523, telecommunications administrations and ROAs."

A separate Recommendation | International Standard is not required.

E.10 Where more than one form of registration is considered appropriate, combinations of the above texts should be included. In particular, in cases where registration can be allowed by any organization which requires to act as a registration authority, but public international (or national) registration is nevertheless desirable, a Recommendation | International Standard should be developed which sets out the options and specifies the operation of an International Registration Authority (if it is established). In this last case, the Recommendation | International Standard which defines the type of object should contain text saying:

> "ITU-T Rec. X.... | ISO/IEC 9834-... specifies registration of..."