INTERNATIONAL STANDARDIZED PROFILE

ISO/IEC ISP 10616

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Information technology — International Standardized Profile FDI11 — Directory data definitions — Common Directory Use (Normal)

Technologies de l'information — Profil normalisé international FDI11 — Définitions de données du répertoire — Utilisation commune du répertoire (normale)

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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 or 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 JTC1. In addition to developing International Standards, ISO/IEC JTC1 has created a Special Group on Functional Standardization for the elaboration of International Standardized Profiles.

An International Standardized Profile is an internationally agreed, harmonized document which identifies a standard or group of standards, together with options and parameters, necessary to accomplish a function or set of functions.

Draft International Standardized Profiles are circulated to national bodies for voting. Publication as an International Standardized Profile requires approval by at least 75 % of the national bodies casting a vote.

This International Standardized Profile ISO/IEC ISP 10616 was prepared with the collaboration of

- Asia-Oceania Workshop (AOW);
- European Workshop for Open Systems (EWOS);
- Open Systems Environment Implementors' Workshop (OIW).

Annexes A to D form an integral part of this International Standardized Profile. Annexes E and F are for information only.

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Introduction

The concept and structure of International Standardized Profiles for Information Systems are laid down in the Technical Report ISO/IEC TR 10000. The purpose of an International Standardized Profile is to recommend when and how certain information technology standards shall be used. This International Standardized Profile specifies application profile FDI11 as defined in the Technical Report ISO/IEC TR 10000-2.

This International Standardized Profile one of a set of International Standardized Profiles relating to the Directory (see TR 10000-2).

This International Standardized Profile profiles information to be stored within the Directory which is common to a variety of applications. Information which is specific to certain applications may be specified by other Profiles.

To support the implementation of the Directory as defined by CCITT Rec. X.500-series I ISO/IEC 9594, this ISP gives requirements that are applicable to implementations of DSAs. Additionally, these requirements may guide Directory users and administrative authorities in defining their needs for the use of the Directory.

The primary objective of this International Standardized Profile is to define the minimum capabilities that DSAs must have to support a basic common view of Directory information. It does this by specifying minimum set of structure and naming elements for the DIT which a DSA must be capable of holding, and other minimum schema requirements.

This International Standardized Profile does not limit DSAs to these minimum capabilities - a DSA that complies with this International Standardized Profile and has no additional information handling (storage, retrieval and modification) capabilities may not be adequate for many purposes, and implementors are strongly encouraged to provide such additional capabilities.

Likewise, this International Standardized Profile does not limit Naming Authorities in any way, e.g., restrict their selection of object classes or naming attributes to those which are required to be supported by this International Standardized Profile. Rather, it guarantees that selections made within the scope of this International Standardized Profile will be within the capabilities of DSAs compliant with it.

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Information technology - International Standardized Profile FDI 11 - Directory data definitions - Common Directory Use (Normal)

1 Scope

1.1 General

This International Standardized Profile profiles information to be stored within the Directory which is common to a variety of applications. Information which is specific to certain applications may be profiled by other International Standardized Profiles.

The Directory has been designed to support multiple applications, drawn from a wide range of possibilities. The nature of the totality of applications supported will govern which objects are stored in the Directory. Applications may be very specific, such as the provision of distribution lists for electronic mail, or generic, such as the 'inter-personal communications directory' application. The Directory provides the opportunity to exploit commonalities among applications.

To support the implementation of the Directory as defined by CCITT Rec. X.500-series I ISO/IEC 9594, this International Standardized Profile gives requirements that are applicable to implementations of Directory System Agents (DSAs). Additionally, these requirements may guide Directory users and administrative authorities in use of the Directory.

The primary objective of this International Standardized Profile is to define the minimum capabilities that DSAs have to support. It does this by specifying minimum set of structure and naming elements for a conformant DSA and other minimum schema requirements (see 5.1).

This International Standardized Profile does not limit DSAs to these minimum capabilities - a DSA that complies with this International Standardized Profile and has no additional information handling (storage, retrieval and modification) capabilities may not be adequate for many purposes, and implementors are strongly encouraged to provide such additional capabilities.

Likewise, it does not limit Naming Authorities in any way, e.g., restrict their selection of object classes or naming attributes to those which are required to be supported by this International Standardized Profile. Rather, it guarantees that selections made within the scope of this International Standardized Profile will be within the capabilities of DSAs compliant with this International Standardized Profile.

In addition, interworking between DSAs which comply with this International Standardized Profile will be greatly facilitated on this minimum basis of structure and naming rules.

Clause 6 defines the minimum set of structure and naming elements for entries representing objects commonly used by multiple applications. Other International Standardized Profiles may refer to this clause and make use of the defined minimum structure, and may extend this structure for application specific information. The minimum structure is defined within the scope of annex B of CCITT X.521 I ISO/IEC 9594-7 which is not an integral part of the specification.

Clause 7 deals with object classes which are common to multiple applications. Clauses 8 and 9 deal with attribute types and attribute syntaxes, respectively, used by entries belonging to these object classes. This is done by reference to and within the scope of CCITT Rec. X.520 I ISO/IEC 9594-6 and CCITT Rec. X.521 I ISO/IEC 9594-7.

The Directory Access Protocol (DAP) and the Directory System Protocol (DSP), as defined by CCITT Rec. X.500 series I ISO/IEC 9594, can be used to access information stored in a Directory Information Base (DIB) fragment which is profiled by this International Standardized Profile.

NOTE - This International Standardized Profile is a profile for the 1988 edition of the Directory Specifications and introduces some additional concepts which have subsequently been introduced into the 1993 edition of the Directory Specifications. These concepts include

- types of object classes : abstract, structural or auxiliary;
- structure elements which correspond to structure rules and name forms; and
- the Protocol Information attribute.

These concepts are no longer aligned with the 1993 edition of the Directory Specifications.

1.2 Position within the taxonomy

This International Standardized Profile is identified in ISO/IEC TR 10000-2 as "FDI11 - Directory data definitions - Common Directory Use (Normal)".

1.3 Scenario

A Directory user (e.g., an application-process), by means of its associated Directory User Agent (DUA), obtains Directory information by accessing directly or indirectly one or more DSAs of the Directory (see figure 1).

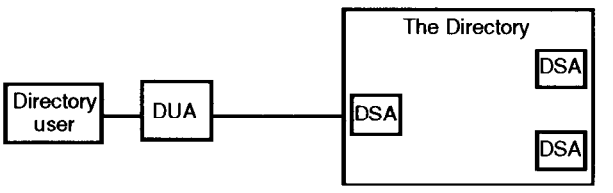


Figure 1 - Access to the Directory

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2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this International Standardized Profile. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this International Standardized Profile are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and CCITT maintains published editions of its current Recommendations.

This International Standardized Profile profiles the 1988 edition of the Directory Specifications.

Corrigenda to the base standards referenced : See annex C for a complete list of these documents which are used in this International Standardized Profile.

2.1 Paired Recommendations I International Standards equivalent in technical content

- CCITT Recommendation X.208:1988, *Data Communications - Open Systems Interconnection (OSI)- 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, *Data Communications - Open Systems Interconnection (OSI)- 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.500:1988, *Data Communication Networks - The Directory - Overview of Concepts, Models and Services.*
- ISO/IEC 9594-1:1990, *Information technology - Open Systems Interconnection - The Directory - Part 1: Overview of concepts, models and services.*
- CCITT Recommendation X.501:1988, *Data Communication Networks - The Directory - Models.*
- ISO/IEC 9594-2:1990, *Information technology - Open Systems Interconnection - The Directory - Part 2: Models.*
- CCITT Recommendation X.509:1988, *Data Communication Networks - The Directory - Authentication Framework.*
- ISO/IEC 9594-8:1990, *Information technology - Open Systems Interconnection - The Directory - Part 8: Authentication framework.*
- CCITT Recommendation X.511:1988, *Data Communication Networks - The Directory - Abstract Service Definition.*
- ISO/IEC 9594-3:1990, *Information technology - Open Systems Interconnection - The Directory - Part 3: Abstract service definition.*
- CCITT Recommendation X.518:1988, *Data Communication Networks - The Directory - Procedures for Distributed Operation.*
- ISO/IEC 9594-4:1990, *Information technology - Open Systems Interconnection - The Directory - Part 4: Procedures for distributed operation.*
- CCITT Recommendation X.519:1988, *Data Communication Networks - The Directory - Protocol Specification.*
- ISO/IEC 9594-5:1990, *Information technology - Open Systems Interconnection - The Directory - Part 5: Protocol specifications.*
- CCITT Recommendation X.520:1988, *Data Communication Networks - The Directory - Selected Attribute Types.*
- ISO/IEC 9594-6:1990, *Information technology - Open Systems Interconnection - The Directory - Part 6: Selected attribute types.*
- CCITT Recommendation X.521:1988, *Data Communication Networks - The Directory - Selected Object Classes.*
- ISO/IEC 9594-7:1990, *Information technology - Open Systems Interconnection - The Directory - Part 7: Selected object classes.*

2.2 Additional references

- CCITT Recommendation T.61:1988, *Character Repertoire and Coded Character Sets for the International Teletex Service .*
- CCITT Recommendation X.581:1992, *Directory Access Protocol - Protocol Implementation Conformance Statement (PICS) Proforma.*
- CCITT Recommendation X.582:1992, *Directory System Protocol - Protocol Implementation Conformance Statement (PICS) Proforma.*

NOTE - Implementors are advised to refer also to the Directory Implementor's Guide of CCITT (see annex E).

- ISO/IEC 2022:1994, *Information technology - Character code structure and extension techniques.*
- ISO 3166:1988, *Codes for the representation of the names of countries.*
- ISO/IEC TR 10000-1:1992, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 1: Framework.*
- ISO/IEC TR 10000-2:1994, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 2: Principles and Taxonomy for OSI Profiles.*

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3 Definitions

For the purposes of this International Standardized Profile, the following definitions apply.

3.1 General

3.1.1 auxiliary object class: A kind of object class used to specify mandatory and optional attributes that may be associated as a package with entries having various structural object classes.

3.1.2 structural object class: A kind of object class used in the structural specification of the DIT. Each object entry has a specific associated structural object class which specifies its allowed position in the DIT and its name form.

3.1.3 structure element: An element of a structure rule specification for the DIT.

Other terms are used as defined in CCITT Rec. X.500:1988 series I ISO/IEC 9594:1990.

3.2 Support level

To specify the support level of protocol features for this International Standardized Profile, the following terminology is defined.

3.2.1 mandatory; m : Mandatory requirement for support. A feature (object class, attribute type, attribute syntax) is supported by a DSA implementation if the DSA is able to process the feature in accordance with the base standard or as specified in this International Standardized Profile (see also clauses 7.1, 8.1 and 9).

3.2.2 optionally supported; o : The support of the feature (object class, attribute type, attribute syntax) is left to the implementor of the DSA.

4 Abbreviations

Following abbreviations are used as defined in CCITT Rec. X.500 series I ISO/IEC 9594 or in ISO/IEC TR 10000-1 :

AVA	Attribute Value Assertion
DAP	Directory Access Protocol
DIB	Directory Information Base
DIT	Directory Information Tree
DSA	Directory System Agent
DSP	Directory System Protocol
DUA	Directory User Agent
ISP	International Standardized Profile
PRL	Profile Requirements List
RDN	Relative Distinguished Name

5 Conformance

Conformance to this International Standardized Profile concerns the type of information which DSAs shall support. Call for support of a certain type of information means that a DSA shall be able to store in and retrieve from its DIB fragment information of that type.

This ability of a DSA shall be capable of being tested by setting up suitable test suites. The conformance statements of this International Standardized Profile lay down the range of information for suitable DSA test suites.

In practice, the behaviour of an actual DSA may depend on multiple conditions, like access control, or schema or other restrictions applied for administrative reasons. Therefore test suites, even if applicable in principle, cannot be performed successfully in all situations. A DSA is conformant according to this International Standardized Profile if the DSA, after suitable set-up, is able to successfully carry out test suites within the range of information defined in this International Standardized Profile.

NOTE - Suitable set-up is implied within this International Standardized Profile.

5.1 DSA Conformance

DSA conformance requirements involve

a) the support of the minimum set of structure and naming elements as specified in clause 6;

b) the support of object classes as specified in clause 7;

c) the support of attribute types as specified in clause 8; and

d) the provision of checking rules and matching rules as specified in clause 9.

In addition, a PICS shall be provided stating support or non-support of each option on object classes and attribute types identified in A.6.4, and of the regional requirements on T61Strings as identified in A.6.5.4.

NOTE - It is not required of a DSA to be capable of removing or modifying entries immediately subordinate to the root since this may affect multiple DSAs.

5.2. DUA Conformance

DUAs typically need schema information as outlined in this International Standardized Profile for a sensible use of the Directory. However, this International Standardized Profile makes no statements about DUA conformance.

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6 Minimum set of structure and naming elements for DIT

The purpose of clause 6 is to define a minimum set of structure and naming elements for a DIT. This provides locations for entries of selected object classes, allowing different applications to retrieve common information in a unified way. Conformant implementations shall be at least capable of holding entries which lie within this minimum DIT structure. Conformant implementations may, in addition, be capable of holding entries which lie outside this structure.

NOTES

1 The requirements of clause 6 are less restrictive than the DIT structures as suggested in ISO/IEC 9594-7, annex B.

2 It is recommended that DSAs should not be limited to these minimum structure rules, but should rather be freely configurable with respect to the schema that can be supported.

3 This International Standardized Profile only requires a conformant implementation to be able to ensure compliance with the structure rules defined in this ISP. It is not required to be able to ensure compliance with the full set of structure rules defined in CCITT Rec. X.521 | ISO/IEC 9594-7, annex B.

6.1 Structure elements

In order to specify the minimum set of structure and naming elements, A.6.5.1 lists a set of structure elements for selected object classes. Entries which comply with one of these elements form the minimum structure capability of the DIT. Compliance of entries to structure elements is defined in the following.

Specification of a structure element involves

- assigning an identifier to it;
- indicating the structural object class to which it applies;
- indicating its superior structure elements; and
- indicating the naming attributes of the structural object class to which it applies.

The structural object class of an entry is the single object class which regulates the naming attribute(s) which the entry must have in relation to the immediate superior of this entry. In addition, the structural object class regulates the presence of attributes in the same way as other object classes.

For the purpose of the definition of the minimum set of structure and naming elements, the structural object class is defined by the 'Structural Object Class' column of A.6.5.1.

An entry complies with a structure element if

- its superior entry complies with at least one of the superior structure elements;
- it is associated with the structural object class; and
- its RDN is formed using the naming attribute(s).

The form of an entry's name is determined by the structure element with which the entry complies: the attribute(s) for the entry's RDN are provided by the naming attribute(s) indicated by this structure rule and the form of the superior's name (which is part of entry´s name) is determined by the superior structure element. If there are multiple structure elements for the same object class, multiple forms for naming entries of this object class are assigned by these structure elements.

A.6.5.1 specifies structure elements for the minimum DIT structure. The first row is for descriptive purposes only, there is no root entry and thus no object class and no structure element for the root.

6.2 Object class relationships

For the purposes of this International Standardized Profile, the ruling structural object class of an entry (i.e. the one to which the structure elements described above relate) shall be taken as that of the lowermost registered structural object class for the entry (i.e. the one which has no registered subclasses).

Thus, the ruling structural object class for an entry of object class DSA shall be considered to have dSA as its ruling structural object class, and not applicationEntity (of which dSA is a subclass). Any entry that contains an object class that is a subclass of a standard object class (such as device or organization) is not within the scope of these structure elements (although a DSA may support them).

This International Standardized Profile calls for support of entries which comply with one of the structure elements listed in A.6.5.1 (this implies their association with the structural object class and its superclass(es)). However, this International Standardized Profile makes no requirement or restriction on the possession or otherwise by entries complying with these structure elements, of auxiliary object classes and associated attributes. The possession of such object classes and attributes is allowed by CCITT Rec. X.500 | ISO/IEC 9594 according to the concept of unregistered object classes (see CCITT Rec. X.501 | ISO/IEC 9594-2, note in 9.4.1).

6.3 Auxiliary object classes

This International Standardized Profile identifies one auxiliary object class ISP Application Entity for entries in the DIT (see A.6.5.2). Other ISPs may refer to the structure elements of A.6.5.1 and may identify additional (auxiliary) object classes for these elements, thus extending the minimum DIT.

7 Object Classes

7.1 Standard Object Classes

Standard object classes defined within CCITT Rec. X.521 | ISO/IEC 9594-7 shall be supported as specified in A.6.4.1.1.

Support of these object classes by a DSA conformant with this International Standardized Profile requires the DSA to be able to store, modify and retrieve, via Directory operations, an entry of its fragment of the DIT, if the entry

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is associated with supported object classes and the following conditions are fulfilled:

a) The entry lies within the DIT structure described in clause 6 and in A.6.5.1;

b) The entry contains all MUST CONTAIN attributes of its object classes;

c) The entry contains no other than MUST CONTAIN and MAY CONTAIN attributes of its object classes.

Conformant DSAs shall accept entries which explicitly indicate Top in their object class attribute. Indication of object class Top is optional according to CCITT Rec. X.501 | ISO/IEC 9594-2, 9.4.2 .

Support of a standard object class implies support of its mandatory attribute types (see A.6.4.2.1) and support of its optional attribute types (see A.6.4.2.1 and A.6.4.2.2) for which support is claimed for the DSA.

A conformant DSA shall reject requests for creation or modification of entries that as a consequence would not fulfill the condition b) and shall reply with an update error indicating an object class violation.

A conformant DSA may accept or reject requests for creation or modification of entries that as a consequence would not fulfill one or more of the conditions a) and c), depending on whether or not the scope of the schema operated by the DSA exceeds the scope of the schema laid down in this International Standardized Profile.

In particular, a conformant DSA may, but is not required to, accept entries which have additional attributes not identified by any of its object classes. Such entries are allowed by the base standard according to the concept of unregistered object classes (see CCITT Rec. X.501 | ISO/IEC 9594-2, note in 9.4.1).

The above condition a) is not applicable for entries of object class alias, as clause 6 gives no rules for such entries. A conformant DSA shall allow the addition of alias objects if the name of the alias entry has a correct form (according to clause 6) with respect to the structural object class of the aliased object. This implies that a conformant DSA shall at least support alias entries in those positions where entries of the structural object class of the aliased entry shall be supported.

7.2 Additional Object Classes

The following additional object classes are defined for optional support by conformant DSA implementations (see also A.6.4.1.2).

Support of an additional object class implies support of its attribute types (see A.6.4.2.2) for which support is claimed for the DSA.

7.2.1 ISP Application Entity

The ISP Application Entity object class is used to define entries representing ISP related application entities. It describes information about underlying lower layer protocols and upper layer profiles which are implemented, AETitle and the supported transfer syntaxes of that application entity.

```
ispApplicationEntity   OBJECT-CLASS   -- Auxiliary
    MAY CONTAIN        {
                protocolInformation,
                ulProfileInformation,
                applicationEntityOID,
                transferSyntaxesSupported        }
::=   { iso(1) standard(0)  fdi11(10616)
      object-class(6)  1 }
```

Note - This object class must be auxiliary since it may be required to be applicable to any subclass of Application Entity, e.g. DSA.

7.2.2 Use of the ISP Application Entity Object Class

As the ISP Application Entity object class is an auxiliary object class, entries shall not be created based on this object class only, but have to be combined with a structural object class.

The ISP Application Entity object class is intended to provide additional attributes to the Application Entity object class or any of its subclasses. The 1988 edition of the Directory Specifications specifies that when an entry is created from more than one object, an unregistered object class has to be defined to combine the characteristics ot those object classes.

NOTE - The unregistered object class facility, available in the 1988 edition of the Directory Specifications, is deprecated in the 1993 edition in favour of the use of DIT content rules.

An implementation that claims conformance to the ISP Application Entity object class shall be able to store, modify and retrieve entries associated with the ISP Application Entity object class combined with the Application Entity object class and with the DSA object class.

8 Attribute Types

8.1 Standard Attributes Types

The attribute types listed in A.6.4.2.1 are defined in CCITT Rec. X.520 | ISO/IEC 9594-6. They are used in conjunction with the standard object classes specified in A.6.4.1.1, as either mandatory or optional attributes. They shall be supported as specified in A.6.4.2.1.

A DSA conformant with this International Standardized Profile shall support an attribute type as follows:

a) The DSA shall perform, on the original inclusion or on a subsequent modification attempt of an attribute, the checking algorithm which is associated with the syntax of the attribute, when required (see 9.1.1 and 9.2);

b) The DSA shall check that the number of attribute values complies with the MultiValued element of the attribute definition;

c) The DSA shall check that the attribute value(s) conform with the bounds defined in CCITT X.520 annex C (which is not an integral part of ISO/IEC 9594-6);

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d) The DSA shall support the matching algorithm, if any, that is associated with the syntax of the attribute (see 9.3), and shall execute this matching algorithm in a manner that conforms with CCITT Rec. X.500 series | ISO/IEC 9594 requirements as clarified in 9.3.

8.2 Additional Attribute Types

The following additionally defined attribute types are defined for optional support by conformant DSA implementations (see also A.6.4.2.2).

8.2.1 Protocol Information

In the 1993 edition of the Directory Specifications, a Protocol Information attribute type has been included, which is used by this International Standardized Profile as part of the ISP Application Entity object class specification. This attribute type definition is copied here for easy reference, and it is re-defined in the style of the 1988 edition.

```
protocolInformation      ATTRIBUTE
  WITH ATTRIBUTE SYNTAX     ProtocolInformation
  MATCHES FOR EQUALITY
  ::=  { joint-iso-ccitt(2) ds(5) attributeType(4)  48 }

ProtocolInformation      ::=     SEQUENCE  {
     nAddress     OCTET STRING,
     profiles     SET OF OBJECT IDENTIFIER   }
```

The Protocol Information attribute type is intended to supplement the Presentation Address attribute type by allowing profile information to be associated with some or all network addresses listed in the nAddress component of the Presentation Address attribute. A Protocol Information attribute lists only those network addresses to which profile information is associated, and for each such network address one or more object identifiers referring to lower layer profile specifications.

It is necessary to allocate object identifiers to such profile specifications for this attribute type to be useful. Transport layer ISPs have such object identifiers allocated.

Two values of the Protocol Information attribute type shall match if and only if they have identical nAddress values, i.e., if the two compared octet strings are of the same length and corresponding octets are identical.

8.2.2 Upper Layer Profile Information

The Upper Layer Profile Information attribute type associates with each application entity the object identifiers of the profiles which are implemented for that application entity.

```
ulProfileInformation      ATTRIBUTE
  WITH ATTRIBUTE-SYNTAX  OBJECT IDENTIFIER
       MATCHES FOR EQUALITY
       MULTIPLE VALUE
  ::=  { iso(1) standard(0) fdi11(10616)
                attributeType(5) 1 }
```

8.2.3 Application Entity OID

The Application Entity OID attribute type specifies the object identifier which is assigned to the application entity.

```
applicationEntityOID     ATTRIBUTE
  WITH ATTRIBUTE-SYNTAX  OBJECT IDENTIFIER
  SINGLE VALUE
  EQUALITY MATCHING RULE
                objectIdentifierMatch
::=  { iso(1) standard(0) fdi11(10616)
                attributeType(5) 2 }
```

8.2.4 Transfer Syntaxes Supported

The Transfer Syntaxes Supported attribute type specifies the object identifier(s) of transfer syntax(es) and/or the encoding rules that the object (an OSI application entity) supports.

```
transferSyntaxesSupported     ATTRIBUTE
  WITH ATTRIBUTE-SYNTAX  OBJECT IDENTIFIER
  EQUALITY MATCHING RULE
                objectIdentifierMatch
  MULTIPLE VALUE
::=  { iso(1) standard(0)  fdi11(10616)
                attributeType(5) 3 }
```

9 Attribute Syntaxes

Implementations conformant with this International Standardized Profile shall support the attribute syntaxes as listed in A.6.5.2 (they are explicitly defined in CCITT Rec. X.520 | ISO/IEC 9594-6).

Support of an attribute syntax implies

a) the ability to check values of a supported attribute syntax for syntactical correctness in compliance with limitations as defined by CCITT X.520, annex C and additional rules stated in this clause; and

b) the ability to perform matches for equality, for matching substring, and for relative ordering if required by the attribute syntax definition, according to rules defined in CCITT Rec. X.520 | ISO/IEC 9594-6 and additional rules stated in this International Standardized Profile, 9.4.

9.1 Handling of T61Strings

Many attribute syntaxes make use of T61Strings. The following subclauses 9.1.1 to 9.1.3 indicate how these shall be handled for checking and matching.

NOTE - This clause identifies the use of character set registration entry 126, right-hand part of Latin/Greek, within attributes using the T61String attribute syntax. As this character set is not permitted by ISO/IEC 8824 to appear in the datatype T61String, support for character set registration entry 126 is optional.

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9.1.1 Checking of T61Strings

9.1.1.1 The following T.61 features and related encodings shall be supported within T61Strings in the context of the Directory :

a) Sets G0, G1, C0, C1 only;

b) No shifts shall be permitted;

c) Designation sequences for the repertoire 102 (Teletex primary) shall be permitted only to G0;

Designation sequences for the repertoires 103 (Teletex supplementary), 126 (Right-hand part of Latin/Greek), 87 (Japanese) shall be permitted only to G1;

No other designation sequences shall be permitted;

d) Default designations and invocations shall be as follows :

102 is designated to G0, and G0 is invoked to the left-hand part;

103 is designated to G1, and G1 is invoked to the right-hand part;

106 is designated to C0, and C0 is invoked to the left-hand (primary) control functions;

107 is designated to C1, and C1 is invoked to the right-hand (supplementary) control functions;

e) Redundant designation sequences are permitted.

9.1.1.2 A consequence of these rules is :

a) 102 is permanently mapped onto G0, which is in turn permanently mapped onto the left-hand part. No invocation (shift) is permitted;

b) 103, 126, 87 are permitted to be mapped to G1 for use with the right-hand part only;

c) If 103 is not supported, any use of the right-hand part must be preceded by an appropriate designation sequence.

The support of 102 is mandatory; the support of 103, 126 and 87 is optional, subject to regional requirements (see A.6.5.4).

9.1.1.3 The following shall not be permitted :

a) Shifts LS0, LS1, LS2, LS3, LS1R, LS2R, LS3R, SS2, SS3;

b) Designation sequences

102 to G1, G2, G3;

103, 126, 87 to G0, G2, G3

c) Format effectors BS, LF, FF, CR;

d) Control sequences SUB, IGS;

e) Presentation Control Functions;

f) ESC sequences other than those given as permitted in the list above;

g) Use of single-byte positions in 102 and 103 that are not assigned to graphic characters including diacriticals;

h) Non-spacing elements not immediately followed by a graphic character.

T61Strings that contain elements that are not permitted by this list shall be regarded as an error. Other situations that (although not against T.61 rules) are not included in this list may be tolerated as a local option, or may generate an error.

9.1.1.4 T61Strings that use an unsupported repertoire (e.g. 87 or 126) shall be tolerated, but any checking (e.g. for unassigned encodings) is optional.

9.1.2 T61String and PrintableString Matching Rules

Two strings shall match for equality, using a specified matching rule, if and only if

a) they are compatible with the ASN.1 type specified for the matching rule; and

b) they are identical when compared name-by-name for each graphical character in the strings, subject to rules relating to

- Handling of initial, middle and final spaces;

- Case (e.g., SMALL XXX may or may not match CAPITAL XXX, depending on the matching rule);

- Any other special factors;

- as defined for the corresponding matching rule in the base standards.

For definition of the names of graphical character, reference should be made to the standards defining each graphical character repertoire.

Other forms of matching (e.g. substring matching) shall similarly rest on name-by-name comparison.

The matching of two strings that contain (unknown) characters in an unsupported character set shall be subject to local options.

If a DSA does not support the matching rule for such an unknown character set, then the matching for characters on the right-hand side of the code table shall be octet-by-octet within the context of matching designators.

9.1.3 Further Matching Rules

9.1.3.1 small_d_with_stroke and small_eth_Icelandic

Since small_d_with_stroke and small_eth_Icelandic map to the same capital - capital_D_with_stroke, Icelandic_eth - both corresponding lower case letters shall be taken as matching. This avoids T61String matching being intransitive.

9.1.3.2 Sigmas

In 126, terminal sigma shall match small greek letter sigma, and shall map to the same capital Greek letter sigma.

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9.1.3.3 Greek letters in 103

The omega and mu Greek letters in 103 shall match corresponding letters in 126.

9.1.3.4 Soft hyphen in 126

In 126, soft hyphen shall be ignored for matching purposes.

9.1.3.5 No-break space in 126

In 126, no-break space shall be taken as equivalent to an ordinary space.

9.2 Checking Rules

Any attribute value within a modify operation argument (AddEntry, ModifyEntry or ModifyRDN) which is provided for holding shall be checked by a conformant DSA according to checking rules defined by the base standard and extended in this subclause. Additionally, those values within a purported name which are used for decision by a DSA in the name resolution process shall be checked.

Values which are to be propagated either within an argument or a result to another DSA, or which are to be resolved in the name resolution process by other DSAs, shall not, if checked, give rise to an error response by a conformant DSA.

Checks for attributes that support equality matching shall be performed for

a) compliance with the basic encoding rules as defined in ISO/IEC 8825 (CCITT X.209) for the ASN.1 data type associated with the attribute syntax of the value;

b) compliance with ASN.1 data types (e.g. T.61 character set);

c) compliance with upper and lower bounds, when defined for the attribute syntax within the attribute type definition;

d) compliance with any additional checking rules specified within this clause.

Checks for attributes that do not support equality matching may optionally be performed; i.e. checking is not mandatory (see CCITT Rec. X.501 | ISO/IEC 9594-2, 9.6.2).

9.3 Additional Checking Rules

This subclause describes additional checking rules (beyond those implied directly by the Directory Standards).

The following additional checks shall be performed for supported attribute syntaxes.

9.3.1 Distinguished Name

For each of the AVAs of the name, the value shall be in accordance with the rules associated with the attribute type.

For checking the DSA has to know all attribute types used within the Distinguished Name. Any such attribute type shall support equality matching. All AVAs within one RDN shall have distinct attribute types.

9.3.2 Case Exact String

If the string is a T61String, the checking shall be carried out as specified in 9.1.1.

9.3.3 Case Ignore String

Same as for Case Exact String attribute syntax.

9.3.4 Case Ignore List

Each element in the list that is a T61String shall have no other characters than those for Case Exact String attribute syntax.

9.3.5 Integer

If other standards or ISPs require the support of a certain range for an interger, then this range shall be supported by a conformant implementation. Such a limitation may be policed by checking rules, i.e., may lead to an attribute syntax error.

9.3.6 Syntax of Country Name

The two character value shall correspond to a valid ISO 3166 two-letter code.

9.4 Matching Rules

9.4.1 Use of Normalization

Most matching algorithms in the Directory can be conveniently defined in terms of a two-step process:

a) Take the checked reference value, and the value to be matched, and, if necessary, reduce them to a canonical (i.e. standard) form (normalization); and

b) Carry out the comparison in the specified way (e.g. equality, substrings or ordering) using the appropriate rules for the value - character string, integer, boolean, etc.

NOTES

1 This procedure does not work for presentation addresses, for which the base standard defines a matching procedure which is not commutative - if A matches B, then B need not match A (see CCITT Rec. X.520 | ISO/IEC 9594-6, 5.9.1).

2 The combination of normalization and comparison are used to describe the external behavior of matching algorithms and may be replaced, in a particular implementation, by equivalent procedures.

9.4.2 Ordering of String Attributes

The lexical ordering of character strings (when supported) may be subject to local rules.

9.4.3 Basic Character String Normalization

This applies to syntaxes that use Printable String and T61String ASN.1 types without tightly defining the syntax of the sequence of characters themselves:

- Case Ignore String
- Case Exact String
- Printable String

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- Numeric String

Whatever the encoding of the string (e.g. Printable String or T61String), remove leading and trailing spaces; intermediate spaces become single spaces (see CCITT Rec. X.520 | ISO/IEC 9594-6, 6.2); replace all remaining characters by a suitable canonical encoding of the name of the character.

NOTE - As an example,

"[sp]Time[sp][sp]Flies[sp][sp]"

becomes "Time[sp]Flies"

Matching may be done character-by-character on the resulting sequence of character names.

This normalization process can be considered as a logical mapping from one ASN.1 representation (e.g. T61String) onto a new ASN.1 representation whose value comprises the character names in sequence. This representation forms a canonical encoding of the character string as a whole.

9.4.4 ASN.1 Normalization

This may be considered a conceptual pre-requisite for all normalizations, and is suitable in its own right as the normalization for some of the defined attribute types:

a) Convert constructed strings to primitive strings;

b) Reduce all value encoding to a standard form, particularly:

- Boolean (TRUE has multiple values);
- Integer, Enumerated (remove superfluous leading octets);
- Bitstring (remove 0 trailing octets, and adjust trailing bits in such a way as to discard the trailing 0 bits in the last remaining octet);
- UTC Time (reduce to the 'Z' form of the encoding);
- Convert character strings to the canonical ASN.1 encoding, as described in 9.4.3;

c) Place SET components in a standard order (using any suitable ordering algorithm, e.g. sensitive to ASN.1 tag of components, and capable of recursive application to inner elements).

The application of this form of normalization permits the octet-by-octet comparison of two ASN.1 encoding values to establish that the encoded data is identical. It can, however, fail with IMPLICIT encoding, since the implicit tagging hides the precise nature of elements, and can prevent accurate normalization.

9.5 Additional Matching Rules

This subclause describes additional matching rules (beyond those directly implied by the Directory Standards).

The following additional matching algorithms shall be performed for supported attribute syntaxes.

9.5.1 Case Ignore String

Two strings shall be compared character by character. Two characters are regarded as equal, if and only if the name of those characters in the appropriate Register differ at most by one name having SMALL where the other name has CAPITAL. Normalization of characters within Case Ignore String thus includes a process such as:

Replace each character whose name begins with SMALL by that character whose name is equivalent but begins with CAPITAL. For each character whose name does not begin with SMALL no replacement is required.

9.5.2 Case Ignore List

For each element in the SEQUENCE, carry out normalization as for Case Ignore String syntax. To facilitate matching, particularly for substrings, normalization may be considered in terms of a representation which uses a delimiter between elements in place of the ASN.1 separation.

NOTE - As an example,

```
SEQUENCE OF {
        PrintableString     {"EWOS"}
        PrintableString     {"Rue de Stassart"}
        PrintableString     {"Brussels"}
            }
```

may be represented for comparison purposes as:

```
T61String   {
        "EWOS[CR]Rue de Stassart[CR]Brussels"
            }
```

The [CR] is legal in T61Strings in general (although not when they are being used as normal attribute values).

9.5.3 UTC Time

If the seconds field is absent, it shall be inserted and set to 00, and the form converted to 'Z' form.

NOTE - This normalization strategy does not match times where the stored form omits the seconds field, and the compared form contains it, e.g. 880426191926Z and 880426191926Z. (It might have been expected that these two forms, which coincide in time to within a few seconds, would be considered identical.)

9.6 Unsupported Attributes

A DSA shall return a suitable error if an operation requires it to act on or store an attribute or AVA of type unsupported by the DSA. This constraint applies even for AVAs that are contained in attributes that take names as values, since the DSA will be unable correctly to match the attribute values without this attribute information.

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Annex A

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Profile Requirements List of FDI11 Common Directory Use

In the event of a discrepancy becoming apparent in the body of this International Standardized Profile and the tables in this annex, this annex is to take precedence.

This annex specifies the constraints and characteristics of this International Standardized Profile on what shall or may appear in an implementor's PICS for an implementation conformant to this International Standardized Profile.

This annex is based on the Directory Access Protocol PICS Proforma of Recommendation CCITT X.581. It uses only a selection of the tables of CCITT X.581 which are necessary for the specification of the ISP status. The numbering of the base PICS Proforma is retained in order to facilitate for an implementor to fill in the respective PICS Proforma.

The terminology of conformance requirements is used as defined in 3.2.

A.1 to A.5

No requirements stated in this International Standardized Profile.

A.6 Capabilities and options

A.6.1 to A.6.3

No requirements stated in ISO/IEC ISP 10616.

A.6.4 Directory schema

A.6.4.1 Object classes

A.6.4.1.1 Standard object classes (see 7.1)

The table below indicates the conformance requirements of ISO/IEC ISP 10616 on standard object classes.

Ref. no.	Object Class	Base Standard	Profile	Note
1	top	m	m	An entry shall not only belong to the top object class

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2	alias	m	m	
3	country	o	m	
4	locality	o	m	
5	organization	o	m	
6	organizationalUnit	o	m	
7	person	o	m	
8	organizationalPerson	o	m	
9	organizationalRole	o	m	
10	groupOfNames	o	m	
11	residentialPerson	o	m	
12	applicationProcess	o	m	
13	applicationEntity	o	m	
14	dSA	m	m	
15	device	o	m	
16	strongAuthenticationUser	o	o	
17	certificationAuthority	o	o	

A.6.4.1.2 Other object classes

The table below indicates the conformance requirements of ISO/IEC ISP 10616 on other object classes as defined in 7.2.

Ref. no.	Object Class	Base Standard	Profile	Note
1	ispApplicationEntity	-	o	see 7.2

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A.6.4.2 Attribute types

A.6.4.2.1 Standard attribute types (see 8.1)

The table below indicates the conformance requirements of ISO/IEC ISP 10616 on standard attribute types.

Ref. no.	Attribute type	Base Standard	Profile	Note
0	objectClass	m	m	
1	aliasedObjectName	o	m	
2	knowledgeInformation	o	o	
3	commonName	o	m	
4	surname	o	m	
5	serialNumber	o	m	
6	countryName	o	m	
7	localityName	o	m	
8	stateOrProvinceName	o	m	
9	streetAddress	o	m	
10	organizationName	o	m	
11	organizationalUnitName	o	m	
12	title	o	m	
13	description	o	m	
14	searchGuide	o	m	
15	businessCategory	o	m	
16	postalAddress	o	m	
17	postalCode	o	m	
18	postOfficeBox	o	m	
19	physicalDeliveryOfficeName	o	m	
20	telephoneNumber	o	m	

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21	telexNumber	o	m	
22	teletexTerminalIdentifier	o	m	
23	facsimileTelephoneNumber	o	m	
24	x121Address	o	m	
25	internationalISDNNumber	o	m	
26	registeredAddress	o	m	
27	destinationIndicator	o	m	
28	preferredDeliveryMethod	o	m	
29	presentationAddress	o	m	
30	supportedApplicationContext	o	m	
31	member	o	m	
32	owner	o	m	
33	roleOccupant	o	m	
34	seeAlso	o	m	
35	userPassword	o	m	
36	userCertificate	o	o	
37	cACertificate	o	o	
38	authorityRevocationList	o	o	
39	certificateRevocationList	o	o	
40	crossCertificatePair	o	o	

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A.6.4.2.2 Other attribute types (see 8.2)

The table below indicates the conformance requirements of ISO/IEC ISP 10616 on other attribute types as defined in 8.2.

Ref. no.	Attribute type	Base Standard	Profile	Note
1	protocolInformation	-	o	see 8.2.1
2	ulProfileInformation	-	o	see 8.2.2
3	applicationEntityOID	-	o	see 8.2.3
4	transferSyntaxesSupported	-	o	see 8.2.4

A.6.5 Other information

A.6.5.1 Minimum set of structure and naming elements (see 6.1)

The table below defines the structure elements for the minimum set of structure and naming elements for the DIT.

Ref. no.	Structure Element	Structural Object Class	Superior Struct. Element	Naming Attribute	Note
1	0	Root			
2	1	Country	0	Country Name	
3	2	Locality	0,1	State or Province Name	
4	3	Locality	0, 1, 2, 3	Locality Name	see notes 1, 3
5	4	Organization	0, 1, 2, 3	Organization Name	
6	5	Organizational Unit	4, 5, 6, 7	Organizational Unit Name	see note 4
7	6	Organizational Unit	4, 5, 6, 7	Locality Name	see note 4
8	7	Organizational Unit	4, 5, 6, 7	Locality Name, Organizational Unit Name	see note 4
9	8	Organizational Person	4, 5, 6, 7	Common Name	
10	9	Organizational Person	4, 5, 6, 7	Common Name, Organizational Unit Name	
11	10	Organizational Role	4, 5, 6, 7	Common Name	
12	11	Group of Names	2, 3, 4, 5, 6, 7	Common Name	
13	12	Residential Person	2, 3	Common Name	

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14	13	Residential Person	2, 3	Common Name, Street Address	
15	14	Application Process	4, 5, 6, 7	Common Name	
16	15	Application Entity	4, 5, 6, 7, 14	Common Name	see note 2
17	16	Device	4, 5, 6, 7	Common Name	
18	17	DSA	15	Common Name	

NOTES

1 CCITT Rec. X.500 series | ISO/IEC 9594 suggest that entries of object class locality can be immediate subordinates of organization entries. It is suggested that ISO/IEC ISP 10616 use organizational unit entries named by locality names instead, as this seems to be the appropriate semantic of such entries. Even if the organizational unit is identified by a locality name, it is in fact an organizational unit.

2 The inclusion of superior structural elements 4, 5, 6 and 7 is not within the scope of CCITT Rec. X.521 | ISO/IEC 9594-7, annex B; it does however reflect the merging of Application Process and Application Entity implied by CCITT Rec. X.521 | ISO/IEC 9594-7, note in 6.13.

3 Although the recursive nature of structure element 3 specifies a chain with an arbitrary number of locality entries, the minimum set of structure and naming elements contains not more than 5 locality entries in a chain, i. e. up to 5 localities in a chain shall be supported. This does not prevent conformant DSAs from supporting more than 5 localities in a chain.

4 Although the recursive nature of structure elements 5, 6 and 7 specifies a chain with an arbitrary number of organizational unit entries, the minimum set of structure and naming elements contains not more than 8 organizational unit entries in a chain, i. e. up to 8 organizational units in a chain shall be supported. This does not prevent conformant DSAs from supporting more than 8 organizational units in a chain!

A.6.5.2 Attribute syntaxes (see clause 9)

The table below indicates the conformance requirements of ISO/IEC ISP 10616 on standard attribute syntaxes .

Ref. no.	Attribute syntaxes	Base Standard	Profile	Note
1	caseIgnoreStringSyntax	m	m	see 9.1, 9.3.3, 9.4.3, 9.5.2, note
2	caseExactStringSyntax	m	m	see 9.1, 9.3.2, 9.4.3, note
3	distinguishedNameSyntax	o	m	see 9.3.1, 9.5.1
4	printableStringSyntax	o	m	see 9.1.2, 9.4.3

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5	numericStringSyntax	o	m	see 9.4.3
6	caseIgnoreListSyntax	o	m	see 9.3.4, 9.5.3
7	booleanSyntax	o	m	see 9.4.4
8	integerSyntax	o	m	see 9.3.5, 9.4.4
9	octetStringSyntax	o	m	
10	uTCTimeSyntax	o	m	see 9.4.4, 9.5.4
11	telephoneNumberSyntax	o	m	
12	objectIdentifierSyntax	o	m	
NOTE - Support of Case Ignore String and Case Exact String syntaxes mandates support of both choices: Printable String syntax and T61 String syntax.				

Support requirements are defined for those attribute syntaxes which are implied by in-line definition within attribute type definitions as listed below.

Ref. no.	Attribute type implying attribute syntaxes	Base Standard	Profile	Note
13	countryName	o	m	see 9.3.6
14	searchGuide	o	m	
15	postalAddress	o	m	
16	telexNumber	o	m	
17	teletexTerminalIdentifier	o	m	
18	facsimileTelephoneNumber	o	m	
19	x.121Address	o	m	
20	iSDNAddress	o	m	
21	destinationIndicator	o	m	
22	preferredDeliveryMethod	o	m	
23	presentationAddress	o	m	
24	protocolInformation	-	o	see 8.2.1

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A.6.5.3 Regional requirements for support of T61String (see 9.1)

The following table defines regional requirements for the support of graphic character repertoires in T61Strings.

Ref. no.	Region	Registration number 102	Registration number 103	Registration number 126	Registration number 87
1	Asia-Oceania	m	o	o	o
2	Europe	m	m	o	o
3	North America	m	o	o	o

NOTE - The regions are defined by the scope of the Regional OSE/OSI Workshops AOW, EWOS and OIW.

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Annex B

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FDI11 Directory Definitions in ASN.1

This annex includes all of the ASN.1 type and value definitions contained in ISO/IEC ISP 10616 in the form of the ASN.1 module FDI11DirectoryDefinitions.

```
FDI11DirectoryDefinitions        { iso(1) standard(0) fdi11(10616) modules(1) fdi11Definitions(1) }
DEFINITIONS        ::=
BEGIN
-- Exports everything --
IMPORTS
    top, alias, country, locality, organization, organizationalUnit, person, organizationalPerson, organizationalRole,
    groupOfNames, residentialPerson, applicationProcess, applicationEntity, dSA, device, strongAuthenticationUser,
    certificationAuthority
    FROM    SelectedObjectClasses    { joint-iso-ccitt(2) ds(5) modules(1) selectedObjectClasses(6) }
    objectClass, aliasedObjectName, knowledgeInformation, commonName, surname, serialNumber, countryName,
    localityName, stateOrProvinceName, streetAddress, organizationName, organizationalUnitName, title, description,
    searchGuide, businessCategory, postalAddress, postalCode, postOfficeBox, physicalDeliveryOfficeName,
    telephoneNumber, telexNumber, teletexTerminalIdentifier, facsimileTelephoneNumber, x121Address,
    internationalISDNNumber, registeredAddress, destinationIndicator, preferredDeliveryMethod, presentationAddress,
    supportedApplicationContext, member, owner, roleOccupant, seeAlso, userPassword, userCertificate, cACertificate,
    authorityRevocationList, certificateRevocationList, crossCertificatePair,
    caseIgnoreStringSyntax, caseExactStringSyntax, distinguishedNameSyntax, printableStringSyntax,
    numericStringSyntax, caseIgnoreListSyntax, booleanSyntax, integerSyntax, octetStringSyntax, uTCTimeSyntax,
    telephoneNumberSyntax, objectIdentifierSyntax
    FROM    SelectedAttributeTypes    { joint-iso-ccitt(2) ds(5) modules(1) selectedAttributeTypes(5) } ;

-- object classes --
ispApplicationEntity        OBJECT-CLASS    -- Auxiliary
        MAY CONTAIN        {
                protocolInformation,
                ulProfileInformation,
                applicationEntityOID,
                transferSyntaxesSupported        }
::=        { iso(1) standard(0) fdi11(10616) object-class(6) 1 }

-- attribute types --
protocolInformation ATTRIBUTE
        WITH ATTRIBUTE SYNTAX        ProtocolInformation
        MATCHES FOR EQUALITY
::=        { joint-iso-ccitt(2) ds(5) attributeType(4) 48 }
```


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```
ProtocolInformation        ::=    SEQUENCE  {
        nAddress      OCTET STRING,
        profiles                 SET OF OBJECT IDENTIFIER   }


ulProfileInformation  ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX          OBJECT IDENTIFIER
        MATCHES FOR EQUALITY
        MULTIPLE VALUE
::=       { iso(1) standard(0)  fdi11(10616) attributeType(5) 1 }

applicationEntityOID          ATTRIBUTE
       WITH ATTRIBUTE-SYNTAX  OBJECT IDENTIFIER
        SINGLE VALUE
        EQUALITY MATCHING RULE         objectIdentifierMatch
::=       { iso(1) standard(0) fdi11(10616)  attributeType(5) 2 }

transferSyntaxesSupported          ATTRIBUTE
       WITH ATTRIBUTE-SYNTAX  OBJECT IDENTIFIER
        EQUALITY MATCHING RULE         objectIdentifierMatch
        MULTIPLE VALUE
::=       { iso(1) standard(0)  fdi11(10616)  attributeType(5) 3 }

END
```


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Annex C

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Amendments and corrigenda

International standards are subject to constant review and revision by ISO/IEC Technical Committee concerned and by CCITT. The following amendments and corrigenda are approved by ISO/IEC JTC1 and by CCITT, but at the date of publication of ISO/IEC ISP 10616 they were not yet incorporated in the text of the corresponding base standards as referenced in ISO/IEC ISP 10616. The amendments and corrigenda as listed below are considered as normative references in ISO/IEC ISP 10616.

ISO/IEC 9594-2:1988/Cor.1	resolving defects 006, 021
ISO/IEC 9594-2:1988/Cor.2	resolving defects 036, 037
ISO/IEC 9594-3:1988/Cor.1	resolving defects 001, 007, 012, 014, 020, 032
ISO/IEC 9594-3:1988/Cor.2	resolving defects 038, 042
ISO/IEC 9594-3:1988/Cor.3	resolving defect 052
ISO/IEC 9594-3:1988/Cor.4	resolving defects 041, 054, 060, 063, 068, 069
ISO/IEC 9594-4:1988/Cor.1	resolving defects 004, 010, 011, 012, 013, 022, 023, 025, 026, 027, 029
ISO/IEC 9594-4:1988/Cor.2	resolving defects 002, 034, 048, 050, 059
ISO/IEC 9594-4:1988/Cor.3	resolving defects 024, 062, 065, 066
ISO/IEC 9594-5:1988/Cor.1	resolving defect 052
ISO/IEC 9594-7:1988/Cor.1	resolving defect 005
ISO/IEC 9594-7:1988/Cor.2	resolving defect 055
ISO/IEC 9594-8:1988/Cor.1	resolving defects 009, 015, 016, 019, 031

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Annex D

(normative)

Profile Object Identifier

ISO/IEC ISP 10616 is identified by the following object identifier

{ iso(1) standard(0) fdi11(10616) profile(0) single(1) edition1(1) }

"Common Directory Use - Edition 1"

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Annex E

(informative)

Bibliography

This annex identifies documents related to the Directory which are referenced for information.

D.1 CCITT documents

CCITT Directory Implementor's Guide, Version 7, November 1992.

D.2 Character sets in T61Strings

Table D.1 lists the character sets in T61Strings together with their ISO international registration numbers.

Table D.1 - Character sets in T61String

Reg. number	Name	Reference
87	Japanese graphic character set for information interchange	JIS C 6226:1983
102	Primary Latin graphic character set	CCITT T.61
103	Supplementary Latin graphic character set	CCITT T.61
106	Teletex primary set of control functions	CCITT T.61
107	Teletex supplementary set of control functions	CCITT T.61
126	Right-hand part of the Latin/Greek alphabet	ISO 8859-7:1987, Information processing - 8-bit single-byte coded graphic character sets - Part7 : Latin/Greek alphabet

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Annex F

(informative)

Application profiles for the Directory

This annex of ISO/IEC ISP 10616 is the recommendation of a structure and the outline of the contents of an application specific format profile for the application use of the Directory.

Application specific profiles for the use of the Directory provide information which is specific to particular applications, and is intended to be stored within the Directory.

An application that has the need for application specific information to be stored in the Directory which is not supported by ISO/IEC 10616 or by another format profile, shall specify this information in an application specific profile for the use of the Directory as identified in TR 10000-2.

Note - It is for further study whether a Directory format profile for applications using other applications which are using the Directory (EDI using MHS using the Directory, for example) is within the scope of this annex or whether there are additional requirements.

Conformance of a DSA to an application specific format profile for the use of the Directory should guarantee the ability to store the information required to support this application with the Directory. The dynamic behavior of the application using this information is out of the scope of such a format profile. Also, no conformance requirements on DUAs are given within such a such a format profile created on the basis of this annex (see F.1.6.2).

F.1 Template for an application specific Directory profile

This clause contains a template for a format profile "x -application" use of the Directory. Plain text of this clause is intended for literal inclusion in such a format profile; italic text gives some guidance on the special text to be provided by a profile writer specifying such an application specific format profile. The expression "x-application" shall be substituted by the name of the application (e.g. MHS, FTAM, ...).

The structure of a Profile "x-application" use of the Directory is as defined in ISO/IEC TR 10000-1.

F.1.1 Introduction

The following text should be used in the corresponding clause of the application specific Directory format profile.

The concept and structure of International Standardized Profiles for Information Systems are laid down in the Technical Report ISO/IEC TR 10000. The purpose of an International Standardized Profile is to recommend when and how certain Information Technology standards shall be used. This International Standardized Profile ISO/IEC ISP xxxxx specifies application profile FDI xx as defined in ISO/IEC TR 10000-2.

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ISO/IEC ISP xxxxx is one of a set of International Standardized Profiles relating to the Directory (see TR 10000-2).

Include application specific introductional text as appropriate, preferrably the text of the "Executive Summary" of the profile as described in ISO/IEC TR 10000-1.

F.1.2 Scope

F.1.2.1 General

The following text should be used in the corresponding clause 1.1 of the application specific Directory format profile.

ISO/IEC ISP 10616 profiles information to be stored within the Directory which is common to a variety of applications. ISO/IEC ISP xxxxx augments this information with x-application specific information.

Statements and conformance requirements stated in ISO/IEC ISP 10616 for the information profiled by ISO/IEC ISP 10616 are also valid for the application specific information profiled by this International Standardized Profile.

ISO/IEC ISP xxxxx specifies the use of the Directory, by x-applications, using existing object class and attribute type definitions from the Directory specifications themselves, and additional definitions.

These existing and additional definitions are also intended to support the use of the Directory by users of x-applications.

A global overview on the scope of the x-application Directory use should be added to this clause, i.e. ,indicating the services intended to be provided (for example: "Mapping of Directory name to O/R-Address").

F.1.2.2 Position within the taxonomy

The following text should be used in the corresponding clause 1.2 of the application specific Directory format profile.

ISO/IEC ISP xxxxx is identified in ISO/IEC TR 10000-2 as "i*nsert title of the x-application profile here*".

F.1.2.3 Scenario

An x-application specific description of a scenario may be given here.

F.1.3 Normative References

References should be included as required and as mandated by ISO/IEC TR 10000-1, including a reference to TR 10000 and to ISO/IEC ISP 10616.

F.1.4 Definitions

Definitions should be included as required.

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F.1.5 Abbreviations

Abbreviations should be included as required.

F.1.6 Conformance

F.1.6.1 DSA Conformance

The following text should be used in the corresponding clause 5.1 of the application specific Directory format profile.

Conformance to ISO/IEC ISP xxxxx implies conformance to ISO/IEC ISP 10616, i.e., as a precondition to conform to ISO/IEC ISP xxxxx, a Directory System Agent shall fulfill the conformance requirements as stated in ISO/IEC ISP 10616.

In addition, a Directory System Agent shall after suitable set up be capable of storing modifying and retrieving entries which fulfill all of the following conditions:

- The entry lies within the scope of the minimum set of structure and naming elements of the DIT specified in clause 6;
- The entry's object classes are part of the set of mandatory object classes (as specified in clause 7) and the subset of optional object classes (see clause 7) for which support is claimed for the DSA;
- The entry's attributes are part of the set of mandatory attribute types (as specified in clause 8) and the subset of optional attribute types (see clause 8) for which support is claimed for the DSA.

Storage and modification of entry information imply checking and matching of attribute values for which equality matching is defined for that attribute type; thus a conformant DSA shall be able to perform the checking and matching algorithms for any such attribute syntaxes as specified in clause 9.

The requirements formulated in ISO/IEC ISP 10616 with respect to supported object classes, supported attribute types and supported attribute syntaxes according to ISO/IEC ISP 10616 are also valid for the additional supported object classes, supported attribute types and supported attribute syntaxes according to ISO/IEC ISP xxxxx.

F.1.6.2 DUA Conformance

The following text should be used in the corresponding clause 5.2 of the application specific Directory format profile.

DUAs typically need schema information as outlined in ISO/IEC ISP xxxxx to support x-application use of the Directory. However, ISO/IEC ISP xxxxx makes no statements about DUA conformance.

F.1.7 DIT Structure

The following text should be used in the corresponding clause 6 of the application specific Directory format profile.

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The purpose of this clause is to relate information specified in ISO/IEC ISP xxxxx to the minimum set of structure and naming elements defined in ISO/IEC ISP 10616 and thus to provide locations for entries of selected object classes.

The DIT structure which shall as a minimum be supported by implementations claiming conformance to ISO/IEC ISP xxxxx is the superset of

- structure elements listed in ISO/IEC ISP 10616, and
- structure elements listed in table 1 below.

Table 2 defines how additional object classes defined in clause 7 are related to these structure elements.

Note - Adding structure elements by means of table 1 may lead to entries being inaccessible by DUAs that support only the minimum DIT structure of ISO/IEC ISP 10616.

This DIT structure is supported in the sense that a conformant DSA shall be capable of storing, modifying and retrieving entries which are part of a tree with this structure (for a more formal definition see ISO/IEC ISP 10616).

Table 1 - Structure elements for the supported DIT structure

Structure Element	Structural Object Class	Superior Struct. Element	Naming Attribute	Note

This table - if present - should be moved to to the PRL of ISO/IEC ISP xxxxx (see F.1.11) and the reference "table 1" in the text replaced by a reference to the corresponding subclause of the PRL.

The list of structure elements for the supported DIT structure shall be provided in table 1. If no structural object class beyond those in ISO/IEC ISP 10616 is required, no structure element has to be defined, and table 1 and the related text should be omitted.

Table 2 - Additional object classes for structure elements of minimum DIT and those listed in table 1

Structure Element	Structural Object Class	Auxiliary Object Classes

This table - if present - should be moved to the PRL of ISO/IEC ISP xxxxx (see F.1.11) and the reference to table 1 in the text replaced by a reference to the corresponding subclause of the PRL.

An object class can normally be classified either as a structural object class (thus appearing in the 2nd column of table 1) or as an auxiliary object class (and could then appear in the 3rd column of table 2). (Note that ISO/IEC 9594-2 formally defines structural and auxiliary object classes, and also gives the possibility of an "abstract object class").

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A new structural object class should be defined only for a really new kind of object. If a new kind of object can be derived from an object already defined in ISO/IEC ISP 10616 and only certain properties are not represented by appropriate attributes, the existing object classes should be augmented by auxiliary object classes (the preferred method) or subclasses..

For a structural object class a structure element shall be specified in table 1. A structure element specifies an intended position for this type of entry (i.e. associated with this structural object class) in the DIT. A structure element provides a recursive specification of the position: the type of allowed superiors is indicated by reference to a superior structure element.

The referenced superior structure element shall be defined

- *either in ISO/IEC ISP 10616, thus attaching corresponding entries to the minimum DIT specified in ISO/IEC ISP 10616 clause 6 table 1, or*
- *in the x-application specific profile, thus attaching corresponding entries to the specific part of DIT, which itself may be either attached to the minimum DIT or forming a subtree starting at the DIT root of its own.*

The structure elements in table 1 shall be identified differently from those in ISO/IEC ISP 10616, so that they can be referenced uniquely within x-application specific Directory profiles. Therefore it is recommended to start the identifier for structure elements with "a profile identifier (e.g. FDI 2-, i.e., identifying structure elements by FDI2-1, FDI2-2, ...).

The choice of naming attributes for the structural object classes affects not only the DSA which holds the information, but also DSAs which hold references to entries of these classes. There is no problem if attributes defined in ISO/IEC ISP 10616 are used for naming, but the use of other attributes might result in requirements not only for the DSA which holds the information (which is addressed by the conformance requirements), but, due to name resolution, also for other DSAs which use that name (e.g. cross-references, subordinate references, naming prefix). These may not be subject to the same conformance requirements! Even if interworking is possible under certain conditions ("strange" naming attributes must not be used for the root of a naming context, for example), it is recommended to use attributes defined in ISO/IEC ISP 10616 for naming, if adequate.

For an auxiliary object class at least one row has to be provided in table 2 to indicate which type of entries may be enhanced by this object class. The type of entries to be extended is indicated by reference to a structure element which is defined

- *either in ISO/IEC ISP 10616 table A.6.4.1.1 or A.6.4.1.2, thus enhancing entries of the minimum DIT, or*
- *in the x-application specific Directory profile, thus enhancing entries of the x-application specific part of DIT.*

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F.1.8 Object Classes

The following text should be used in the corresponding clause 7 of the application specific Directory format profile.

The following object classes shall be supported in addition to those specified in ISO/IEC ISP 10616:

A list of object classes supported additionally to those of ISO/IEC ISP 10616 shall be provided.

Additionally, either a definition of the Object Class or a reference to a standard which defines it, is required.

If a new object class is to be defined, the definition must include a conformance specification using the OBJECT CLASS macro defined in CCITT Rec. X.501 | ISO/IEC 9594-29.4.6.

Defining and using a new object class can introduce interworking problems, and, where possible, existing object classes should be made use of. For example, a DUA cannot give a textual description of an object identifier without having had this description configured in; the more it knows about the object class attribute values, the better service it can provided in accessing an entry.

The use of existing object classes is particularly desirable in the case of structural object classes, which affect at least potentially, the acceptable positions in the DIT of corresponding entries.

If a new kind of object needs to be defined, it may be covered in its general description by a pre-existing object class. For example, a "secretary" as a new kind of object may be covered accurately "organizational person", even though the description of "organizational person" is only fractionally complete description of secretaries in general. For the coverage of the new object to be accurate the mandatory and optional attributes of the existing object class (and its superclass) must also be compatible with the new object; otherwise re-use of this particular object class is out of the question.

If an existing object class is found whose description and definition covers the new kind of object, however incomplete, two techniques are available to rectify the differences between the requirements of the new objects and the provisions of the existing object class (and its superclasses):

- *If the mandatory and optional attributes that are additionally to be supported for a set that may be useful for a variety kinds of object (i.e. described by a variety of object class), these should be specified by an auxiliary object class. For example, MHS-user can be used with a variety of kinds of objects - organizations, devices, etc..*

- *If the mandatory and optional attributes are naturally associated with a single kind of object, or if it is necessary to discriminate for a particular external reason between an object an some more special form of the same object, a new object class may be defined which is a subclass of the existing one. For example, DSAs are defined as a special kind of application entity, and are thus subclass of the latter.*

In exceptional cases, both techniques may be used in combination.

If there is no alternative, a new object class may be defined which is a subclass of the special object class "top".

If a new structural object class is defined, at least one new structure element needs to defined for it in table 1.

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F.1.9 Attribute Types

The following text should be used in the corresponding clause 8 of the application specific Directory format profile.

The following attribute types shall be supported in addition to those specified in ISO/IEC ISP 10616:

A list of attribute types supported additionally to those of ISO/IEC ISP 10616 shall be provided.

Additionally, either a definition of the attribute type or a reference to a standard, which defines it, is required. If a new attribute type is to be defined, the definition must include a formal specification using the ATTRIBUTE macro defined in CCITT Rec. X.501 | ISO/IEC 9594-2 9.5.3. A decision is particularly required on

- *whether the attribute is single-valued or not;*
- *size constraints if necessary;*
- *ASN.1 syntax of values;*
- *whether to specify the syntax in-line or by reference to a well-known attribute syntax (e.g. as registered in ISO(IEC 9594-6 (CCITT X.520));*
- *the matching rules that are required of an attribute syntax.*

Note that even if the value syntaxes are defined inline, using an ASN-1 type, a full definition, including matching rules, if any, and special checking rules need to be given as discussed in F.1.10.

NOTE - In the 1993 edition of the Directory Specifications, attribute syntaxes need not be registered. They are included in the definition of the attribute type.

A value syntax shall not start with "SET OF" unless required for certain purposes; the "multi-value-feature" of attributes shall be used instead.

A "cross reference list" of object classes using the attribute types, as provided by ISO/IEC ISP 10616, is not required.

Defining a new attribute type can introduce interworking problems, and a careful decision must be made about whether to do this rather than use a nearly appropriate existing attribute.

Both DUAs and DSAs will provide degraded services in respect of attributes which they do not "understand"; while this may be unimportant in a closed region of the Directory, where administrations can ensure that the necessary support is provided, in more general use of the Directory, the consequences may be worse than those of using a "near-miss" attribute.

Clearly, an attribute with unrelated semantics cannot be used, neither can one with inadequate syntax (i.e. that fails to provide the necessary information).

New attributes are easier to introduce if they do not support equality matching (or any other form of matching than "present"). This is because they do not then require special support for checking and matching.

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Note - Use of such attributes is limited, for they can neither be searched nor individual values deleted (only the complete attribute).

With this exception, when defining a new attribute type, attribute syntaxes defined in ISO/IEC ISP 10616 should be used for preference instead of defining it in the x-application specific profile. If an existing attribute is to be used, the usage must lie within the defined semantics of the attribute type, but may be more specifically defined and qualified.

Note - The upgrade to support a new attribute syntax might require major changes to existing software! (This may not be true for new object classes and attribute types.)

F.1.10 Attribute Syntaxes

The following text should be used in the corresponding clause 9 of the application specific Directory format profile.

The following attribute syntaxes shall be supported in addition to those specified in ISO/IEC ISP 10616:

A list of attribute syntaxes supported additionally to those of ISO/IEC ISP 10616 may have to be provided. If possible, no attribute syntax should be supported additionally (see note above) in which case clause 9 and corresponding references in subclause 5.1 on DSA conformance should be removed.

If additional attribute syntaxes are used, either a definition of the attribute syntax or a reference to a standard, which defines it, is required.

If a new attribute syntax is to be defined, the definition must include a formal specification using the ATTRIBUTE-SYNTAX macro defined in CCITT Rec. X.501 | ISO/IEC 9594-2 9.6.4. In order to preserve consistency, this macro should be used even in the case of inline syntax definition (without issuing an object identifier).

There may be additional checking and/or matching rules for attribute syntaxes specified (see CCITT Rec. X.520 | ISO/IEC 9594-6, 9.6 and ISO/IEC ISP 10616 for examples). See also the following note.

NOTE - If for two attribute types the attribute values have different ASN.1 syntaxes, or they have the same ASN.1 syntax but different matching rules, the two attribute types have different attribute syntaxes. The use of BIT STRING as a value syntax is at present undefined and should be done in consultation with the Regional OSI Workshops.

F.1.11 Normative annex Profile Requirements List

A PRL shall be provided as a normative annex as mandated by ISO/IEC TR 10000-1. This annex should be based on the structure of a PICS Proforma as written in CCITT X.581 and the structure and the mandatory and optional requirements of ISO/IEC ISP 10616, annex A.

This PRL should also contain table 1 and table 2 as described in F.1.7.

F.1.12 Additional annexes

Additional normative and informative annexes may be added as required.

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