Recommendation X.520

THE DIRECTORY - SELECTED ATTRIBUTE TYPES [1)]

(Melbourne, 1988)

CONTENTS

0 *Introduction*

1 *Scope and field of application*

2 *References*

3 *Definitions*

4 *Notation*

SECTION 1 - *Selected Attribute Types*

5 *Definition of Selected Attribute Types*

5.1 System Attribute Types

5.2 Labelling Attribute Types

5.3 Geographical Attribute Types

5.4 Organizational Attribute Types

5.5 Explanatory Attribute Types

5.6 Postal Addressing Attribute Types

5.7 Telecommunications Addressing Attribute Types

5.8 Preferences Attribute Types

5.9 OSI Application Attribute Types

5.10 Relational Attribute Types

5.11 Security Attribute Types

SECTION 2 - *Attribute Syntaxes*

6 *Definition of Attribute Syntaxes*

6.1 Attribute Syntaxes Used by the Directory

6.2 String Attribute Syntaxes

6.3 Miscellaneous Attribute Syntaxes

Annex A - Selected Attribute Types in ASN.1

Annex B - Index of Attribute Types and Syntaxes

Annex C - Upper Bounds

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1) Recommendation X.520 and ISO 9594-6, Information Processing Systems - Open Systems Interconnection - The Directory - Selected attribute types, were developed in close collaboration and are technically aligned.

0 Introduction

0.1 This document, together with the others of the series, has been produced to facilitate the interconnection of information processing systems to provide directory services. The set of all such systems, together with the directory information which they hold, can be viewed as an integrated whole, called the Directory. The information held by the Directory, collectively known as the Directory Information Base (DIB), is typically used to facilitate communication between, with or about objects such as application entities, people, terminals, and distribution lists.

0.2 The Directory plays a significant role in Open Systems Interconnection, whose aim is to allow, with a minimum of technical agreement outside of the interconnection standards themselves, the interconnection of information processing systems:

- from different manufacturers;
- under different managements;
- of different levels of complexity; and
- of different ages.

0.3 This Recommendation defines a number of attribute types which may be found useful across a range of applications of the Directory. One particular use for many of the attributes defined herein is in the formation of names, particularly for the classes of object defined in Recommendation X.521. This Recommendation also defines a number of standard attribute syntaxes.

0.4 Annex A, which is part of this Recommendation, provides the ASN.1 notation for the complete module which defines the attributes and attribute syntaxes.

0.5 Annex B, which is not part of this Recommendation, provides an alphabetical index of attribute types, for easy reference.

1 Scope and field of application

1.1 This Recommendation defines a number of attribute types which may be found useful across a range of applications of the Directory.

1.2 Attribute types (and attribute syntaxes) fall into three categories, as described in 1.2.1 to 1.2.3.

1.2.1 Some attribute types (syntaxes) are used by a wide variety of applications or are understood and/or used by the Directory itself.

Note - It is recommended that an attribute type (syntax) defined in this document be used, in preference to the generation of a new one, whenever it is appropriate for the application.

1.2.2 Some attribute types (syntaxes) are internationally-standardized, but are application-specific. These are defined in the standards associated with the application concerned.

1.2.3 Any administrative authority can define its own attribute types (syntaxes) for any purpose. These are not internationally standardized, and are available to others beyond the administrative authority which created them only by bilateral agreement.

2 References

ISO 3166 - Codes for the representation of names of countries

Recommendation X.208	-	Open Systems Interconnection - Specification of Abstract Syntax Notation (ASN.1) (see also ISO 8824)
Recommendation X.501	-	The Directory - Models (see also ISO 9594-2)
Recommendation X.521	-	The Directory - Selected Object Classes (see also ISO 9594-7)
Recommendation E.123	-	Notation for National and International Telephone Numbers

3 Definitions

This Recommendation makes use of the following definitions from Recommendation X.501:

a) attribute type;

b) attribute syntax;

c) object class.

4 Notation

Attribute types and attribute syntaxes are defined in this document by the use of special notation, defined as ASN.1 macros in Recommendation X.501. There are two such macros, **ATTRIBUTE** and **ATTRIBUTE-SYNTAX**.

Two "generic" object identifiers (**attributeType** and **attributeSyntax**) are used in defining the object identifiers being allocated to attribute types and attribute syntaxes respectively. Their definitions can be found in Annex B of Recommendation X.501.

Examples of the use of the attribute types are described using an informal notation, where attribute type and value pairs are represented by an acronym for the attribute type, followed by an equals sign ("="), followed by the example value for the attribute.

SECTION 1 - *Selected Attribute Types*

5 Definition of Selected Attribute Types

This Recommendation defines a number of attribute types which may be found useful across a range of applications of the Directory.

5.1 *System Attribute Types*

These attribute types are concerned with information about objects known to the Directory.

5.1.1 *Object Class*

The Object Class attribute type, which is known to the Directory, is specified, except for the allocation of an object identifier, in Recommendation X.501.

objectClass ObjectClass ::= {attributeType 0}

5.1.2 *Aliased Object Name*

This attribute type is defined, except for the allocation of an object identifier, in Recommendation X.501.

aliasedObjectName AliasedObjectName ::= {attributeType 1}

5.1.3 *Knowledge information*

The Knowledge Information attribute type specifies a human readable accumulated description of knowledge mastered by a specific DSA.

```
knowledgeInformation ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX caseIgnoreStringSyntax
    ::= {attributeType 2}
```

5.2 *Labelling Attribute Types*

These attribute types are concerned with information about objects which has been explicitly associated with the objects by a labelling process.

5.2.1 *Common Name*

The Common Name attribute type specifies an identifier of an object. A Common Name is not a directory name; it is a (possibly ambiguous) name by which the object is commonly known in some limited scope (such as an organization) and conforms to the naming conventions of the country or culture with which it is associated.

An attribute value for common name is a string chosen either by the person or organization it describes or the organization responsible for the object it describes for devices and application entities. For example, a typical name of a person in an English-speaking country comprises a personal title (e.g. Mr, Ms, Dr, Professor, Sir, Lord), a first name, middle name(s), last name, generational qualifier (if any, e.g. Jr.) and decorations and awards (if any, e.g. QC).

Examples:

CN = "Mr. Robin Lachlan McLeod BSc(Hons) CEng MIEE"

CN = "Divisional Coordination Committee"

CN = "High Speed Modem".

Any variants should be associated with the named object as separate and alternative attribute values.

Other common variants should also be admitted, e.g. use of a middle name as a preferred first name; use of "Bill" in place of "William", etc.

```
commonName ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-common-name))
    ::= {attributeType 3}
```

5.2.2 *Surname*

The Surname attribute type specifies the linguistic construct which normally is inherited by an individual from the individual's parent or assumed by marriage, and by which the individual is commonly known.

An attribute value for Surname is a string, e.g. "McLeod".

```
surname ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-surname))
    ::= {attributeType 4}
```

5.2.3 *Serial Number*

The Serial Number attribute type specifies an identifier, the serial number of a device.

An attribute value for Serial Number is a printable string.

```
serialNumber ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        printableStringSyntax
            (SIZE(1..ub-serial-number))
    ::=  (attributeType 5}
```

5.3 *Geographical Attribute Types*

These attribute types are concerned with geographical positions or regions with which objects are associated.

5.3.1 *Country Name*

The Country Name attribute type specifies a country. When used as a component of a directory name, it identifies the country in which the named object is physically located or with which it is associated in some other important way.

An attribute value for country name is a string chosen from ISO 3166.

countryName ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
PrintableString (SIZE(2)) - IS 3166 codes only
MATCHES FOR EQUALITY
SINGLE VALUE
::= {attributeType 6}

The matching rule for values of this type is the same as that for **caseIgnoreStringSyntax**.

5.3.2 *Locality Name*

The Locality Name attribute type specifies a locality. When used as a component of a directory name, it identifies a geographical area or locality in which the named object is physically located or with which it is associated in some other important way.

An attribute value for Locality Name is a string, e.g. L = "Edinburgh".

localityName ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
caseIgnoreStringSyntax
SIZE(1..ub-locality-name))
::= {attributeType 7}

5.3.3 *State or Province Name*

The State or Province Name attribute type specifies a state or province. When used as a component of a directory name, it identifies a geographical subdivision in which the named object is physically located or with which it is associated in some other important way.

An attribute value for State or Province Name is a string, e.g. S = "Ohio".

stateOrProvinceName ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
caseIgnoreStringSyntax
(SIZE(1..ub-state-name))
::= {attributeType 8}

5.3.4 *Street Address*

The Street Address attribute type specifies a site for the local distribution and physical delivery in a postal address, i.e. the street name, place, avenue, and the house number. When used as a component of a directory name, it identifies the street address at which the named object is located or with which it is associated in some other important way.

An attribute value for Street Address is a string, e.g. "Arnulfstraße 60".

streetAddress ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
caseIgnoreStringSyntax
(SIZE(1..ub-street-address))
::= {attributeType 9}.

These attribute types are concerned with organizations and can be used to describe objects in terms of organizations with which they are associated.

5.4.1 *OrganizationName*

The Organization Name attribute type specifies an organization. When used as a component of a directory name it identifies an organization with which the named object is affiliated.

An attribute value for OrganizationName is a string chosen by the organization (e.g. O = "Scottish Telecommunications plc"). Any variants should be associated with the named Organization as separate and alternative attribute values.

```
organizationName ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-organization-name))
    ::=  {attributeType 10}.
```

5.4.2 *Organizational Unit Name*

The Organizational Unit Name attribute type specifies an organizational unit. When used as a component of a directory name it identifies an organizational unit with which the named object is affiliated.

The designated organizational unit is understood to be part of an organization designated by an OrganizationalName attribute.

It follows that if an Organizational Unit Name attribute is used in a directory name, it must be associated with an OrganizationName attribute.

An attribute value for Organizational Unit Name is a string chosen by the organization of which it is part (e.g. OU = "Technology Division"). Note that the commonly used abbreviation "TD" would be a separate and alternative attribute value.

Examples:

O = "Scottel",OU = "TD"

```
organizationalUnitName ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-organizational-unit-name))
    ::=  {attributeType 11}.
```

5.4.3 *Title*

The Title attribute type specifies the designated position or function of the object within an organization.

An attribute value for Title is a string.

Example:

T = "Manager,Distributed Applications"

```
title ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-title))
    ::= {attributeType 12}.
```

5.5 *Explanatory Attribute Types*

These attribute types are concerned with explanations (e.g. in a natural language) of something about an object.

5.5.1 *Description*

The Description attribute type specifies text which describes the associated object.

For example, the object "Standards Interest" might have the associated description "distribution list for exchange of information about intra-company standards development".

An attribute value for Description is a string.

```
description ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
    caseIgnoreStringSyntax
            (SIZE(1..ub-description))
    ::= {attributeType 13}.
```

be included in some entries expected to be a convenient base-object for the search operation, e.g. country or organization.

Search criteria consists of an optional identifier for the class of object sought and combinations of attribute types and logical operators to be used in the construction of a filter. It is possible to specify for each search criteria item the matching level, e.g. approximate match.

The Search Guide attribute may recur to reflect the various types of requests, e.g. search for a Residential Person or an Organizational Person, which may be fulfilled from the given base-object where the Search Guide is read.

```
searchGuide ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        Guide
    ::= {attributeType 14}

Guide ::=    SET {
    objectClass         [0]     OBJECT-CLASS OPTIONAL,
    criteria            [1]     Criteria}
Criteria ::=
    CHOICE{
        Type            [0]     CriteriaItem,
        and             [1]     SET OF Criteria,
        or              [2]     SET OF Criteria,
        not             [3]     Criteria

CriteriaItem
    CHOICE {
        equality                [0] AttributeType,
        substrings              [1] AttributeType,
        greaterOrEqual          [2] AttributeType,
        lessOrEqual             [3] AttributeType,
        approximateMatch        [4] AttributeType}
```

Example: The following is a potential value of the Search Guide attribute that could be stored in entries of object-class Locality to indicate how entries of object-class Residential Person might be found.

```
residential-person-guide  Guide ::= {
    objectClass residentialPerson,
        criteria and {
          type substrings commonName,
          type substrings streetAddress }}
```

The construction of a Filter from this value of Guide is straightforward.

Step (1) produces the intermediate Filter value:

```
intermediate-filter  Filter ::=  and {
    item substrings  {
          type commonName,
          strings {any T61String "Dubois" }}, - value supplied for Common Name
    item substrings {
          type streetAddress
          strings {any T61String "Hugo" }}}   - value supplied for Street Address
residential-person-filter    Filter  ::=  {
    and {
        item equality {
            objectClass,
            OBJECT-CLASS residentialPerson },
        intermediate-filter }}
```

5.5.3 *Business Category*

The Business Category attribute type specifies information concerning the occupation of some common objects, e.g. people. For example, this attribute provides the facility to interrogate the Directory about people sharing the same occupation.

```
businessCategory ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-business-category))
    ::=  {attributeType 15))
```

5.6 *Postal Addressing Attribute Types*

These attribute types are concerned with information required for physical postal delivery to an object.

5.6.1 *Postal address*

The Postal Address attribute type specifies the address information required for the physical delivery of postal messages by the postal authority to the named object.

An attribute value for Postal Address will be typically composed of selected attributes from MHS Unformatted Postal O/R Address version 1 according to Recommendation F.401 and limited to 6 lines of 30 characters each, including a Postal Country Name. Normally the information contained in such an address could include an addressee's name, street address, city, state or province, postal code and possibly a Post Office Box number depending on the specific requirements of the named object.

```
postalAddress ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX PostalAddress
        MATCHES FOR EQUALITY
    ::=  {attributeType 16}

PostalAddress ::= SEQUENCE SIZE(1..ub-postal-line) OF CHOICE {
    T61String (SIZE(1..ub-postal-string)),
        PrintableString (SIZE(1..ub-postal-string))}
```

The matching rule for values of this type is the same as that for **caseIgnoreListSyntax**.

5.6.2 *Postal Code*

The Postal Code attribute type specifies the postal code of the named object. If this attribute value is present it will be part of the object's postal address.

An attribute value for Postal Code is a string.

```
postalCode ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-postal-code))
    ::=  {attributeType 17}
```

5.6.3 *Post Office Box*

The Post Office Box attribute type specifies the Post Office Box by which the object will receive physical postal delivery. If present, the attribute value is part of the object's postal address.

```
postOfficeBox ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
        (SIZE(1..ub-post-office-box))
    ::= {attributeType 18}
```

5.6.4 *Physical Delivery Office Name*

The Physical Delivery Office Name attribute type specifies the name of the city, village, etc. where a physical delivery office is situated.

An attribute value for Physical Delivery Office Name is a string.

```
physicalDeliveryOfficeName ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-physical-office-name))
    ::=  (attributeType 19}.
```

5.7 *Telecommunications Addressing Attribute Types*

These attribute types are concerned with addressing information needed to communicate with the object using telecommunication means.

5.7.1 *Telephone Number*

The Telephone Number attribute type specifies a telephone number associated with an object.

An attribute value for Telephone Number is a string that complies with the internationally agreed format for showing international telephone numbers. Recommendation E.123 (e.g. "+44 582 10101").

```
telephoneNumber ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        telephoneNumberSyntax
    ::=  {attributeType 20}
```

5.7.2 *Telex Number*

The Telex Number attribute type specifies the telex number, country code, and answerback code of a telex terminal associated with an object.

```
telexNumber ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX TelexNumber
    ::=  {attributeType 21}

TelexNumber  ::=  SEQUENCE{
    telexNumber                 PrintableString,
        (SIZE(1..ub-telex-number)),
    countryCode                 PrintableString,
        (SIZE(1..ub-country-code)),
    answerback                  PrintableString,
        (SIZE(1..ub-answerback))}
```

5.7.3 *Teletex Terminal Identifier*

The Teletex Terminal Identifier attribute type specifies the Teletex terminal identifier (and optionally parameters) for a teletex terminal associated with an object.

An attribute value for Teletex Terminal Identifier is a string which complies with CCITT Recommendation F.200 and an optional set whose components are according to Recommendation T.62.

```
teletexTerminalIdentifier ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        TeletexTerminalIdentifier
    ::=  {attributeType 22}

TeletexTerminalIdentifier ::=  SEQUENCE {
    teletexTerminal         PrintableString
        (SIZE(1..ub-teletex-terminal-id)),
    parameters TeletexNonBasicParameters
        OPTIONAL}
```

5.7.4 *Facsimile Telephone Number*

The Facsimile Telephone Number attribute type specifies a telephone number for a facsimile terminal (and optionally its parameters) associated with an object.

An attribute value for the facsimile telephone number is a string that complies with the internationally agreed format for showing international telephone numbers, Recommendation E.1xx (e.g. "+81 3 347 7418") and an optional bit string (formatted according to Recommendation T.30).

```
facsimileTelephoneNumber ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        Facsimile TelephoneNumber
    ::= {attributeType 23}

FacsimileTelephoneNumber ::= SEQUENCE{
    telephoneNumber PrintableString
        (SIZE(1..ub-telephone-number)),
    parameters G3FacsimileNonBasicParameters
        OPTIONAL}
```

5.7.5 *X.121 Address*

The X.121 Address attribute type specifies an address as defined by CCITT Recommendation X.121 associated with an object.

```
x121Address ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        NumericString
            (SIZE(1..ub-x121-address))
    MATCHES FOR EQUALITY SUBSTRINGS
    ::= {attributeType 24}
```

The matching rules for values of this type are the same as those for **numericStringSyntax**.

5.7.6 *International ISDN Number*

The International ISDN Number attribute type specifies an International ISDN Number associated with an object.

An attribute value for International ISDN Number is a string which complies with the internationally agreed format for ISDN addresses given in CCITT Recommendation E.164.

```
internationalISDNNumber ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        NumericString
            (SIZE(1..ub-isdn-address))
    ::= {attributeType 25}
```

The matching rule for values of this type is the same as that for **numericStringSyntax**.

5.7.7 *Registered Address*

The Registered Address attribute type specifies a mnemonic for an address associated with an object at a particular city location. The mnemonic is registered in the country in which the city is located and is used in the provision of the Public Telegram Service (according to Recommendation F.1).

```
registeredAddress ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX PostalAddress
    ::= {attributeType 26}.
```

5.7.8 *Destination Indicator*

The Destination Indicator attribute type specifies (according to Recommendations F.1 and F.3) the country and city associated with the object (the addressee) needed to provide the Public Telegram Service.

An attribute value for Destination Indicator is a string.

```
destinationIndicator ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        PrintableString
            (SIZE(1..ub-destination-indicator))
```

- alphabetical characters only
MATCHES FOR EQUALITY SUBSTRINGS
::= {attributeType 27}

The matching rules for values of this type are the same as those for **caseIgnoreStringSyntax**.

5.8 *Preference Attribute Types*

These attribute types are concerned with the preferences of an object.

5.8.1 *Preferred Delivery Method*

The Preferred Delivery Method attribute type specifies the object's priority order regarding the method to be used for communicating with it.

```
preferredDeliveryMethod ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        SEQUENCE OF INTEGER {
            any-delivery-method      (0),
            mhs-delivery             (1),
            physical-delivery        (2),
            telex-delivery           (3),
            teletex-delivery         (4),
            g3-facsimile-delivery    (5),
            g4-facsimile-delivery    (6),
            ia5-terminal-delivery    (7),
            videotex-delivery        (8),
            telephone-delivery       (9)}
        SINGLE VALUE
    ::= {attributeType 28}
```

5.9 *OSI Application Attribute Types*

These attribute types are concerned with information regarding objects in the OSI Application Layer.

5.9.1 *Presentation Address*

The Presentation Address attribute type specifies a presentation address associated with an object representing an OSI application entity.

An attribute value for Presentation Address is a presentation address as defined in Recommendation X.200.

```
presentationAddress ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
            PresentationAddress
    MATCHES FOR EQUALITY
    SINGLE VALUE
    ::= {attributeType 29}

PresentationAddress    ::=    SEQUENCE
    pSelector          [0]    OCTET STRING OPTIONAL,
    sSelector          [1]    OCTET STRING OPTIONAL,
    tSelector          [2]    OCTET STRING OPTIONAL,
    nAddresses         [3]    SET SIZE(1..MAX) OF OCTET STRING}
```

The matching rule for values of this type is that a presented Presentation Address matches a stored one if and only if the selectors are equal and the presented nAddresses are a subset of the stored ones.

5.9.2 *Supported Application Context*

The Supported Application Context attribute type specifies the object identifier(s) of application context(s) that the object (an OSI application entity) supports.

supportedApplicationContext ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
objectIdentifierSyntax
::= {attributeType 30}

5.10 *Relational Attribute Types*

These attribute types are concerned with information regarding the objects which are related to a particular object in certain ways.

5.10.1 *Member*

The Member attribute type specifies a group of names associated with the object.

An attribute value for Member is a distinguished name.

member ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
distinguishedNameSyntax
::= {attributeType 31}

5.10.2 *Owner*

The Owner attribute type specifies the name of some object which has some responsibility for the associated object.

An attribute value for Owner is a distinguished name (which could represent a group of names) and can recur.

owner ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
distinguishedNameSyntax
::= {attributeType 32}

5.10.3 *Role Occupant*

The Role Occupant attribute type specifies the name of an object which fulfills an organizational role.

An attribute value for Role Occupant is a distinguished name.

roleOccupant ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
distinguishedNameSyntax
::= {attributeType 33}

5.10.4 *See Also*

The See Also attribute type specifies names of other Directory objects which may be other aspects (in some sense) of the same real world object.

An attribute value for See Also is a distinguished name.

seeAlso ATTRIBUTE
WITH ATTRIBUTE-SYNTAX
distinguishedNameSyntax
::= {attributeType 34}

5.11 *Security Attribute Types*

These attribute types are concerned with the security or security privileges of an object. These attribute types are specified, except for the allocation of an object identifier, in Recommendation X.509.

5.11.1 *User Password*

userPassword UserPassword
::= {attributeType 35}

5.11.2 *User Certificate*

userCertificate UserCertificate
::= {attributeType 36}

5.11.3 *CA Certificate*

cACertificate CACertificate
::= {attributeType 37}

5.11.4 *Authority Revocation List*

authorityRevocationList AuthorityRevocationList
::= {attributeType 38}

5.11.5 *Certificate Revocation List*

certificateRevocationList CertificateRevocationList
::= {attributeType 39}

5.11.6 *Cross Certificate Pair*

crossCertificatePair CrossCertificatePair
::= {attributeType 40}

SECTION 2 - *Attribute Syntaxes*

6 Definition of Attribute Syntaxes

6.1 *Attribute Syntaxes used by the Directory*

6.1.1 *Undefined*

The Undefined attribute syntax is intended for attributes whose values are not expected to be compared by the Directory.

Specifying this attribute syntax for an attribute is equivalent to specifying the data type **ANY** and no matching rules in the **ATTRIBUTE** macro for the attribute.

undefined ATTRIBUTE-SYNTAX
ANY
::= {attributeSyntax 0}

6.1.2 *Distinguished Name*

The Distinguished Name attribute syntax is intended for attributes whose values are distinguished names. It is defined, except for the allocation of an object identifier, in Recommendation X.501.

distinguishedNameSyntax DistinguishedNameSyntax
::= {attributeSyntax 1}

6.1.3 *Object Identifier*

The Object Identifier attribute syntax is intended for attributes whose values are object identifiers. It is defined, except for the allocation of an object identifier, in Recommendation X.501.

objectIdentifierSyntax ObjectIdentifierSyntax
::= {attributeSyntax 2}

6.2 *String Attribute Syntaxes*

In the syntaxes specified in 6.2.1 to 6.2.4, the following spaces are regarded as not significant:

- leading spaces (i.e. those preceding the first printing character);
- trailing spaces (i.e. those following the last printing character);
- multiple consecutive internal spaces (these are taken as equivalent to a single space character).

Attributes conforming to these syntaxes shall be matched in a form which omits those spaces which are not significant according to these rules.

6.2.1 *Case Exact String*

The Case Exact String attribute syntax is intended for attributes whose values are strings (either T.61 Strings or Printable Strings), where the case (upper or lower) is significant for comparison purposes (e.g. "Dundee" and "DUNDEE" do not match).

CaseExactString ATTRIBUTE-SYNTAX
CHOICE {T61String, PrintableString}
MATCHES FOR EQUALITY SUBSTRINGS
::= {attributeSyntax 3}

For two strings having this syntax to match for equality, the strings must be the same length and corresponding characters must be identical. A Printable String can be compared with a T.61 String: where the corresponding characters are both in the Printable String character set then comparison proceeds as normal. However if the character in the T.61 String is not in the Printable String character set then matching fails.

6.2.2 *Case Ignore String*

The Case Ignore String attribute syntax is intended for attributes whose values are strings (either T.61 Strings or Printable Strings), but where the case (upper or lower) is not significant for comparison purposes (e.g. "Dundee" and "DUNDEE" match).

caseIgnoreStringSyntax ATTRIBUTE-SYNTAX
CHOICE {T61String, PrintableString}
MATCHES FOR EQUALITY SUBSTRINGS
::= {attributeSyntax 4}

The rules for matching are identical to those for the Case Exact String attribute syntax, except that characters that differ only in their case are considered identical.

6.2.3 *Printable String*

The Printable String attribute syntax is intended for attributes whose values are Printable Strings.

printableStringSyntax ATTRIBUTE-SYNTAX
PrintableString
MATCHES FOR EQUALITY SUBSTRINGS
::= {attributeSyntax 5}

The rules for matching are identical to those for the Case Exact String attribute syntax.

6.2.4 *Numeric String*

The Numeric String attribute syntax is intended for attributes whose values are Numeric Strings.

numericStringSyntax ATTRIBUTE-SYNTAX
NumericString
MATCHES FOR EQUALITY SUBSTRINGS
::= {attributeSyntax 6}

The rules for matching are identical to those for the Case Exact String attribute syntax, except that all space characters are skipped during comparison.

6.2.5 *Case Ignore List*

The Case Ignore List attribute syntax is intended for attributes whose values are sequences of strings (either T.61 Strings or Printable Strings), but where the case (upper or lower) is not significant for comparison purposes.

caseIgnoreListSyntax ATTRIBUTE-SYNTAX
SEQUENCE OF
CHOICE {T61String, PrintableString}
MATCHES FOR EQUALITY SUBSTRINGS
::= {attributeSyntax 7}

Two Case Ignore Lists match for equality if and only if the number of strings in each is the same, and corresponding strings match. The latter matching is as for Case Ignore String attribute syntax (6.1.3).

6.3 *Miscellaneous Attribute Syntaxes*

6.3.1 *Boolean*

The Boolean attribute syntax is intended for attributes whose values are Boolean (i.e. represent true or false).

booleanSyntax ATTRIBUTE-SYNTAX
BOOLEAN
MATCHES FOR EQUALITY
::= {attributeSyntax 8}

Two attribute values of this syntax match for equality if they are both true or both false.

6.3.2 *Integer*

The Integer attribute syntax is intended for attributes whose values are integers.

integerSyntax ATTRIBUTE-SYNTAX
INTEGER
MATCHES FOR EQUALITY ORDERING
::= {attributeSyntax 9}

Two attribute values of this syntax match for equality if the integers are the same. The ordering rules for integers apply.

6.3.3 *Octet String*

The Octet String attribute syntax is intended for attributes whose values are Octet Strings.

octetStringSyntax ATTRIBUTE-SYNTAX
OCTET STRING
MATCHES FOR EQUALITY SUBSTRINGS ORDERING
::= {attributeSyntax 10}

For two strings having this attribute syntax to match, the strings must be the same length and corresponding octets must be identical. Ordering is determined by the ordering relation between the first octets to differ on comparing the strings from the beginning.

6.3.4 *UTC Time*

The UTC Time attribute syntax is intended for attributes whose values represent absolute time.

uTCTimeSyntax ATTRIBUTE-SYNTAX
UTCTime
MATCHES FOR EQUALITY ORDERING
::= {attributeSyntax 11}

Two attribute values of this syntax match for equality if they represent the same time. An earlier time is considered "less" than a later time.

6.3.5 *Telephone Number*

The Telephone Number attribute syntax is intended for attributes whose values are telephone numbers.

telephoneNumberSyntax ATTRIBUTE-SYNTAX
PrintableString
(SIZE{1..ub-telephone-number))
MATCHES FOR EQUALITY SUBSTRINGS
::= {attributeSyntax 12}

The rules for matching are identical to those for the Case Exact attribute syntax, except that all space and "-" characters are skipped during the comparison.

ANNEX A

(to Recommendation X.520)

Selected Attribute Types in ASN.1

This Annex is part of the Recommendation.

This Annex includes all of the ASN.1 type and value definitions contained in this Recommendation in the form of the ASN.1 module **SelectedAttributeTypes**.

```
SelectedAttributeTypes          {joint-iso-ccitt ds(5) modules(1)
                                selectedAttributeTypes(5)}

DEFINITIONS ::=
BEGIN

-- Exports everything --

IMPORTS
    informationFramework, authenticationFramework, attributeType,
    upperBounds
    FROM UsefulDefinitions              {joint-ISO-CCITT ds(5) modules(1)
                                        usefulDefinitions(0) },
    ATTRIBUTE, ATTRIBUTE-SYNTAX, AttributeType, OBJECT-CLASS,
    ObjectClass, AliasedObjectName,
    DistinguishedNameSyntax, ObjectIdentifierSyntax
        FROM InformationFramework informationFramework
    G3FacsimileNonBasicParameters,
    TeletexNonBasicParameters
        FROM MTSAbstractService         {joint-ISO-CCITT mhs-motis(6)
                                        mts(3) modules(0) mts-abstract-service(1)}
    UserCertificate, CACertificate, CrossCertificatePair, CertificateRevocationList,
    AuthorityRevocationList, UserPassword
        FROM AuthenticationFramework, authenticationFramework
        ub-answerback,
        ub-common-name, ub-surname, ub-serial-number,
        ub-locality-name, ub-state-name,
        ub-street-address, ub-organization-name,
        ub-organizational-unit-name, ub-title,
        ub-description, ub-business-category, ub-postal-line,
        ub-postal-string, ub-postal-code, ub-post-office-box,
        ub-physical-office-name, ub-telex-number,
        ub-country-code, ub-teletex-terminal-id,
        ub-telephone-number, ub-x121-address,
        ub-international-isdn-number, ub-destination-indicator,
        ub-user-password
            FROM UpperBounds upperBounds;

-- attribute types --

objectClass ObjectClass ::= {attributeType 0}

aliasedObjectName AliasedObjectName ::= {attributeType 1}

knowledgeInformation ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX caseIgnoreStringSyntax
    ::= {attributeType 2}

commonName ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-common-name))
    ::= {attributeType 3}

surname ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
```

```
            caseIgnoreStringSyntax
                (SIZE(1..ub-surname))
            ::= {attributeType 4}

serialNumber ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            printableStringSyntax
                (SIZE(1..ub-serial-number))
        ::= {attributeType 5}

countryName ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            PrintableString (SIZE(2)) -- IS 3166 codes only
        MATCHES FOR EQUALITY
        SINGLE VALUE
        ::= {attributeType 6}

localityName ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            caseIgnoreStringSyntax
                (SIZE(1..ub-locality-name))
        ::= {attributeType 7}

stateOrProvinceName ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            caseIgnoreStringSyntax
                (SIZE(1..ub-state-name))
        ::= {attributeType 8}

streetAddress ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            caseIgnoreStringSyntax
                (SIZE(1..ub-street-address))
        ::= {attributeType 9}

organizationName ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            caseIgnoreStringSyntax
                (SIZE(1..ub-organization-Name))
        ::= {attributeType 10}

organizationalUnitName ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            caseIgnoreStringSyntax
                (SIZE(1..ub-organizational-unit-name))
        ::= {attributeType 11}

title ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
                (SIZE(1..ub-title))
        ::= {attributeType 12}

description ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            caseIgnoreStringSyntax
                (SIZE(1..ub-description))
        ::= {attributeType 13}

searchGuide ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            Criteria
            ::= {attributeType 14}

Guide  ::=  SET {
        objectClass [0] OBJECT-CLASS OPTIONAL,
```

```
        criteria   [1]  Criteria }

Criteria ::=
    CHOICE {
        type [0]        CriteriaItem,
        and  [1]        SET OF Criteria
        or   [2]        SET OF Criteria
        not  [3]        Criteria}

CriteriaItem ::=
    CHOICE {
        equality        [0]     AttributeType
        substrings      [1]     AttributeType
        greaterOrEqual          [2]     AttributeType
        lessOrEqual     [3]     AttributeType
        approximateMatch        [4]     AttributeType

businessCategory ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-business-category))
    ::=  {attributeType 15}

postalAddress ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX PostalAddress
        MATCHES FOR EQUALITY
    ::= {attributeType 16}

PostalAddress ::= SEQUENCE SIZE(1..ub-postal-line) OF
    CHOICE {
        T61String (SIZE(1..ub-postal-string)),
        PrintableString (SIZE(1..ub-postal-string))}

postalCode ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-postal-code))
    ::=  {attributeType 17}

postOfficeBox ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
        (SIZE(1..ub-post-office-box))
    ::=  {attributeType 18}

physicalDeliveryOfficeName ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        caseIgnoreStringSyntax
            (SIZE(1..ub-physical-office-name))
    ::=  {attributeType 19}

telephoneNumber ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        telephoneNumberSyntax
    ::=  {attributeType 20}

telexNumber ATTRIBUTE

    WITH ATTRIBUTE-SYNTAX TelexNumber

    ::= {attributeType 21}

TelexNumber ::= SEQUENCE {
    telexNumber PrintableString
        (SIZE(1..ub-telex-number)),
    countryCode PrintableString,
        (SIZE(1..ub-country-code)),
    answerback PrintableString
```

```
        (SIZE(1..ub-answerback))}

teletexTerminalIdentifier ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            TeletexTerminalIdentifier
        ::= {attributeType 22}

TeletexTerminalIdentifier ::= SEQUENCE {
    teletexTerminalPrintableString
        (SIZE(1..ub-teletex-terminal-id)),
    parameters TeletexNonBasicParameters
        OPTIONAL}

facsimileTelephoneNumber ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        FacsimileTelephoneNumber
    ::= {attributeType 23}

FacsimileTelephoneNumber  ::=  SEQUENCE {
    telephoneNumber PrintableString
        (SIZE(1..ub-telephone-number)),
    parameters G3FacsimileNonBasicParameters OPTIONAL}

x121Address ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        NumericString
        (SIZE(1..ub-x121-address))
    MATCHES FOR EQUALITY SUBSTRINGS
    ::= {attributeType 24}

internationalISDNNumber ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        NumericString
            (SIZE(1..ub-isdn-address))
    ::= {attributeType 25}

registeredAddress ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX PostalAddress
    ::= {attributeType 26}
destinationIndicator ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        PrintableString
            (SIZE(1..ub-destination-indicator))
```

- alphabetical characters only

```
MATCHES FOR EQUALITY SUBSTRINGS
    ::= {attributeType 27}

preferredDeliveryMethod ATTRIBUTE
    WITH ATTRIBUTE-SYNTAX
        SEQUENCE OF INTEGER {
            any-delivery-method         (0),
            mhs-delivery                (1),
            physical-delivery           (2),
            telex-delivery              (3),
            teletex-delivery            (4),
            g3-facsimile-delivery       (5),
            g4-facsimile-delivery       (6),
            ia5-terminal-delivery       (7),
            videotex-delivery           (8),
            telephone-delivery          (9)}
```

```
        SINGLE VALUE
        ::= {attributeType 28}

presentationAddress ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
                PresentationAddress
        MATCHES FOR EQUALITY
        SINGLE VALUE
        ::= {attributeType 29}

PresentationAddress     ::=     SEQUENCE {
        pSelector               [0]     OCTET STRING OPTIONAL,
        sSelector               [1]     OCTET STRING OPTIONAL,
        tSelector               [2]     OCTET STRING OPTIONAL,
        nAddresses              [3]     SET SIZE(1..MAX) OF OCTET STRING}

supportedApplicationContext ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            objectIdentifierSyntax
            ::=  {attributeType 30}

member ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            distinguishedNameSyntax
        ::=  {attributeType 31}

owner ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            distinguishedNameSyntax
        ::=  {attributeType 32}

roleOccupant ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            distinguishedNameSyntax
        ::= {attributeType 33}

seeAlso ATTRIBUTE
        WITH ATTRIBUTE-SYNTAX
            distinguishedNameSyntax
        ::= {attributeType 34}

userPassword UserPassword
        ::= {attributeType 35}

userCertificate UserCertificate
        ::= {attributeType 36}

cACertificate CACertificate
        ::= {attributeType 37}

authorityRevocationList AuthorityRevocationList
        ::= {attributeType 38}

certificateRevocationList CertificateRevocationList
        ::= {attributeType 39}

CrossCertificatePair CrossCertificatePair
        ::= {attributeType 40}

-- attribute syntaxes --

undefined ATTRIBUTE-SYNTAX
        ANY
        ::= {attributeSyntax 0}

distinguishedNameSyntax DistinguishedNameSyntax
        ::= {attributeSyntax 1}

objectIdentifierSyntax ObjectIdentifierSyntax
        ::= {attributeSyntax 2}
```

```
caseExactStringSyntax ATTRIBUTE-SYNTAX
        CHOICE {T61String, PrintableString}
        MATCHES FOR EQUALITY SUBSTRINGS
        ::= {attributeSyntax 3}

caseIgnoreSyntax ATTRIBUTE-SYNTAX
        CHOICE {T61String, PrintableString}
        MATCHES FOR EQUALITY SUBSTRINGS

::= {atrributeSyntax 4}
printableStringSyntax ATTRIBUTE-SYNTAX
        PrintableString
        MATCHES FOR EQUALITY SUBSTRINGS
        ::= {attributeSyntax 5}

numericStringSyntax ATTRIBUTE-SYNTAX
        NumericString
        MATCHES FOR EQUALITY SUBSTRINGS
        ::= {attributeSyntax 6}

caseIgnoreListSyntax ATTRIBUTE-SYNTAX
        SEQUENCE OF
        CHOICE {T61String, PrintableString}
        MATCHES FOR EQUALITY SUBSTRINGS
        ::= {attributeSyntax 7}

booleanSyntax ATTIBUTE-SYNTAX
        BOOLEAN
        MATCHES FOR EQUALITY
        ::= {attributeSyntax 8}

integerSyntax ATTRIBUTE-SYNTAX
        INTEGER
        MATCHES FOR EQUALITY ORDERING
        ::= {attributeSyntax 9}

octetStringSyntax ATTRIBUTE-SYNTAX
        OCTET STRING
        MATCHES FOR EQUALITY SUBSTRINGS ORDERING
        ::= {attributeSyntax 10}

uTCTimeSyntax ATTRIBUTE-SYNTAX
        UTCTime
        MATCHES FOR EQUALITY ORDERING
        ::= {attributeSyntax 11}

telephoneNumberSyntax ATTRIBUTE-SYNTAX
        PrintableString
                (SIZE(1..ub-telephone-number))
        MATCHES FOR EQUALITY SUBSTRINGS
        ::= {attributeSyntax 12}
```

ANNEX B

(to Recommendation X.520)

Index of Attribute Types and Syntaxes

ATTRIBUTE TYPES

A	Aliased Object Name *	5.1.2
	Authority Revocation List	5.11.4
B	Business Category	5.5.3
C	CA Certificate	5.11.3
	Certificate Revocation List	5.11.5
	Common Name	5.2.1
	Country Name	5.3.1
	Cross Certificate Pair	5.11.6
D	Description	5.5.1
	Destination Indicator	5.7.8
F	Facsimile Telephone Number	5.7.4
I	International ISDN Number	5.7.6
K	Knowledge Information	5.1.3
L	Locality Name	5.3.2
M	Member	5.10.1
O	Object Class *	5.1.1
	Organization Name 5.4.1	
	Organizational Unit Name	5.4.2
	Owner	5.10.2

ATTRIBUTE TYPES

P	Physical Delivery Office Name	5.6.4
	Post Office Box	5.6.3
	Postal Address	5.6.1
	Postal Code	5.6.2
	Preferred Delivery Method	5.8.1
	Presentation Address	5.9.1
R	Registered Address	5.7.7
	Role Occupant	5.10.3
S	Search Guide	5.5.2
	See Also	5.10.4
	Serial Number	5.2.3
	State or Province Name	5.3.2
	Street Address	5.3.4
	Supported Application Context	5.9.2
	Surname	5.2.2
T	Telephone Number	5.7.1
	Teletex Terminal Identifier	5.7.3
	Telex Number	5.7.2
	Title	5.4.3

ATTRIBUTE SYNTAXES

B	Boolean	6.3.1
C	Case Exact String	6.2.1
	Case Ignore List	6.2.5
	Case Ignore String	6.2.3
D	Distinguished Name*	6.1.2
I	Integer	6.3.2
N	Numeric String	6.2.4
O	Object Identifier *	6.1.3
	Object String	6.3.2
P	Printable String	6.3.2
T	Telephone Number	6.3.5
U	UTC Time	
	Undefined	6.1.1

* Know to and used by Directory itself.

U	User Certificate	5.11.2
	User Password	5.11.1
X	X.121 Address	5.7.5

ANNEX C

(to Recommendation X.520)

Upper Bounds

This Annex is part of the Recommendation.

```
UpperBounds {joint-ISO-CCITT ds(5) modules(1)
        upperBounds(10)}
DEFINITIONS ::=
BEGIN

-- Exports everything --

    ub-answerback                   INTEGER ::= 8
    ub-common-name                  INTEGER ::= 64
    ub-surname                      INTEGER ::= 64
    ub-serial-number                INTEGER ::= 64
    ub-locality-name                INTEGER ::= 128
    ub-state-name                   INTEGER ::= 128
    ub-street-address               INTEGER ::= 128
    ub-organization-name            INTEGER ::= 64
    ub-organizational-unit-name     INTEGER ::= 64
    ub-title                        INTEGER ::= 64
    ub-description                  INTEGER ::= 1024
    ub-business-category            INTEGER ::= 128
    ub-postal-line                  INTEGER ::= 6
    ub-postal-string                INTEGER ::= 30
    ub-postal-code                  INTEGER ::= 40
    ub-post-office-box              INTEGER ::= 40
    ub-physical-office-name         INTEGER ::= 128
    ub-telex-number                 INTEGER ::= 14
    ub-country-code                 INTEGER ::= 4
    ub-teletex-terminal-id          INTEGER ::= 24
    ub-telephone-number             INTEGER ::= 32
    ub-x121-address                 INTEGER ::= 15
    ub-international-isdn-number    INTEGER ::= 16
    ub-destination-indicator        INTEGER ::= 128
    ub-user-password                INTEGER ::= 128
END
```