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**DATA NETWORKS AND OPEN SYSTEM
COMMUNICATIONS
DIRECTORY**

**INFORMATION TECHNOLOGY –
OPEN SYSTEMS INTERCONNECTION –
THE DIRECTORY: SELECTED
OBJECT CLASSES**

ITU-T Recommendation X.521

(Previously "CCITT Recommendation")

Foreword

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. Some 179 member countries, 84 telecom operating entities, 145 scientific and industrial organizations and 38 international organizations participate in ITU-T which is the body which sets world telecommunications standards (Recommendations).

The approval of Recommendations by the Members of ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, 1993). In addition, the World Telecommunication Standardization Conference (WTSC), which meets every four years, approves Recommendations submitted to it and establishes the study programme for the following period.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC. The text of ITU-T Recommendation X.521 was approved on 16th of November 1993. The identical text is also published as ISO/IEC International Standard 9594-7.

NOTE

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

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ITU-T X-SERIES RECOMMENDATIONS
DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS
(February 1994)

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Summary

This Recommendation | International Standard defines a number of selected object classes and name forms which may be found useful across a range of applications of the Directory. An object class definition specifies the attribute types which are relevant to the objects of that class. A name form definition specifies the attributes to be used in forming names for the objects of a given class.

Introduction

This Recommendation | International Standard, together with other Recommendations | International Standards, has been produced to facilitate the interconnection of information processing systems to provide directory services. A set of 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.

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.

This Recommendation | International Standard defines a number of attribute sets and object classes which may be found useful across a range of applications of the Directory.

This second edition technically revises and enhances, but does not replace, the first edition of this Recommendation | International Standard. Implementations may still claim conformance to the first edition.

This second edition specifies version 1 of the Directory service and protocols. The first edition also specifies version 1. Differences between the services and between the protocols defined in the two editions are accommodated using the rules of extensibility defined in this edition of X.519 | ISO/IEC 9594-5.

Annex A, which is an integral part of this Recommendation | International Standard, provides an ASN.1 module containing all of the type and value definitions which appear in this document.

Annex B, which is not an integral part of this Recommendation | International Standard, provides some common naming and structure rules which may or may not be used by administrative authorities.

Annex C, which is not an integral part of this Recommendation | International Standard, lists the amendments and defect reports that have been incorporated to form this edition of this Recommendation | International Standard.

INTERNATIONAL STANDARD**ITU-T RECOMMENDATION****INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION –
THE DIRECTORY: SELECTED OBJECT CLASSES****SECTION 1 – GENERAL****1 Scope**

This Recommendation | International Standard defines a number of object classes and name forms which may be found useful across a range of applications of the Directory. The definition of an object class involves listing a number of attribute types which are relevant to objects of that class. The definition of a name form involves naming the object class to which it applies and listing the attributes to be used in forming names for objects of that class. These definitions are used by the administrative authority which is responsible for the management of the directory information.

Any administrative authority can define its own object classes or subclasses and name forms for any purpose.

NOTES

- 1 Those definitions may or may not use the notation specified in ITU-T Rec. X.501 | ISO/IEC 9594-2.
- 2 It is recommended that an object class defined in this Recommendation | International Standard, or a subclass derived from one, or a name form defined in this Recommendation | International Standard, be used in preference to the generation of a new one, whenever the semantics is appropriate for the application.

Administrative authorities may support some or all the selected object classes and name forms, and may also add additional ones.

All administrative authorities shall support the object classes which the directory uses for its own purpose (the top, alias and DSA object classes).

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard part. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent editions of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.500 (1993) | ISO/IEC 9594-1:1994, *Information technology – Open Systems Interconnection – The Directory: Overview of concepts, models and services.*
- ITU-T Recommendation X.501 (1993) | ISO/IEC 9594-2:1994, *Information technology – Open Systems Interconnection – The Directory: Models.*
- ITU-T Recommendation X.511 (1993) | ISO/IEC 9594-3:1994, *Information technology – Open Systems Interconnection – The Directory: Abstract service definition.*
- ITU-T Recommendation X.518 (1993) | ISO/IEC 9594-4:1994, *Information technology – Open Systems Interconnection – The Directory: Procedures for distributed operation.*
- ITU-T Recommendation X.519 (1993) | ISO/IEC 9594-5:1994, *Information technology – Open Systems Interconnection – The Directory: Protocol specifications.*

ISO/IEC 9594-7 : 1995 (E)

- ITU-T Recommendation X.520 (1993) | ISO/IEC 9594-6:1994, *Information technology – Open Systems Interconnection – The Directory: Selected attribute types.*
- ITU-T Recommendation X.509 (1993) | ISO/IEC 9594-8:1994, *Information technology – Open Systems Interconnection – The Directory: Authentication framework.*
- ITU-T Recommendation X.525 (1993) | ISO/IEC 9594-9:1994, *Information technology – Open Systems Interconnection – The Directory: Replication*
- ITU-T Recommendation X.680 (1994) | ISO/IEC 8824-1:1994, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*
- ITU-T Recommendation X.681 (1994) | ISO/IEC 8824-2:1994, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- ITU-T Recommendation X.682 (1994) | ISO/IEC 8824-3:1994, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- ITU-T Recommendation X.683 (1994) | ISO/IEC 8824-4:1994, *Information technology – Abstract Syntax Notation One (ASN.1): Parametrization of ASN.1 specifications.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.200 (1988), *Reference Model of Open Systems Interconnection for CCITT Applications.*
ISO 7498:1984/Corr.1: 1988, *Information Processing Systems – Open Systems Interconnection – Basic Reference Model.*

3 Definitions

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

3.1 OSI Reference Model definitions

The following terms are defined in CCITT Rec. X.200 | ISO 7498:

- a) *application-entity*;
- b) *application-process*.

3.2 Directory Model definitions

The following terms are defined in ITU-T Rec. X.501 | ISO/IEC 9594-2:

- a) *attribute*;
- b) *attribute type*;
- c) *Directory Information Tree (DIT)*;
- d) *Directory System Agent (DSA)*;
- e) *attribute set*;
- f) *entry*;
- g) *name*;
- h) *object class*;
- i) *subclass*;
- j) *name form*;
- k) *structure rule*.

4 Conventions

With minor exceptions this Directory Specification has been prepared according to the “Presentation of ITU-T | ISO/IEC common text” guidelines in the Guide for ITU-T and ISO/IEC JTC 1 Cooperation, March 1993.

The term “Directory Specification” (as in “this Directory Specification”) shall be taken to mean CCITT Rec. X.521 | ISO/IEC 9594-7. The term “Directory Specifications” shall be taken to mean the X.500-Series Recommendations and all parts of ISO/IEC 9594.

This Directory Specification uses the term “1988 edition systems” to refer to systems conforming to the previous (1988) edition of the Directory Specifications, i.e. the 1988 edition of the series of CCITT X.500 Recommendations and the ISO/IEC 9594:1990 edition. Systems conforming to the current Directory Specifications are referred to as “1993 edition systems”.

Object classes and name forms are defined in this Directory Specification as values of the OBJECT-CLASS and NAME-FORM information object classes defined in ITU-T Rec. X.501 | ISO/IEC 9594-2.

SECTION 2 – SELECTED OBJECT CLASSES

5 Definition of useful attribute sets

5.1 Telecommunication attribute set

This set of attributes is used to define those which are commonly used for business communications.

```
TelecommunicationAttributeSet  ATTRIBUTE ::= {
    facsimileTelephoneNumber |
    internationalISDNNumber |
    telephoneNumber |
    teletexTerminalIdentifier |
    telexNumber |
    preferredDeliveryMethod |
    destinationIndicator |
    registeredAddress |
    x121Address }
```

5.2 Postal attribute set

This set of attributes is used to define those which are directly associated with postal delivery.

```
PostalAttributeSet  ATTRIBUTE ::= {
    physicalDeliveryOfficeName |
    postalAddress |
    postalCode |
    postOfficeBox |
    streetAddress }
```

5.3 Locale attribute set

This set of attributes is used to define those which are commonly used for search purposes to indicate the locale of an object.

```
LocaleAttributeSet  ATTRIBUTE ::= {
    localityName |
    stateOrProvinceName |
    streetAddress }
```

5.4 Organizational attribute set

This set of attributes is used to define the attributes that an organization or organizational unit may typically possess.

```

OrganizationalAttributeSet    ATTRIBUTE ::= {
    description |
    LocaleAttributeSet |
    PostalAttributeSet |
    TelecommunicationAttributeSet |
    businessCategory |
    seeAlso |
    searchGuide |
    userPassword }
    
```

6 Definition of selected object classes

6.1 Country

A *Country* object class is used to define country entries in the DIT.

```

country    OBJECT-CLASS    ::= {
    SUBCLASS OF    { top }
    MUST CONTAIN   { countryName }
    MAY CONTAIN    { description | searchGuide }
    ID             id-oc-country }
    
```

6.2 Locality

The *Locality* object class is used to define locality in the DIT.

```

locality    OBJECT-CLASS    ::= {
    SUBCLASS OF    { top }
    MAY CONTAIN    { description |
                    searchGuide |
                    LocaleAttributeSet |
                    seeAlso }
    ID             id-oc-locality }
    
```

At least one of Locality Name or State or Province Name must be present.

6.3 Organization

The *Organization* object class is used to define organization entries in the DIT.

```

organization OBJECT-CLASS    ::= {
    SUBCLASS OF    { top }
    MUST CONTAIN   { organizationName }
    MAY CONTAIN    { OrganizationalAttributeSet }
    ID             id-oc-organization }
    
```

6.4 Organizational Unit

The *Organizational Unit* object class is used to define entries representing subdivisions of organizations.

```

organizationalUnit    OBJECT-CLASS ::= {
    SUBCLASS OF    { top }
    MUST CONTAIN   { organizationalUnitName }
    MAY CONTAIN    { OrganizationalAttributeSet }
    ID             id-oc-organizationalUnit }
    
```

6.5 Person

The *Person* object class is used to define entries representing people generically.

```

person          OBJECT-CLASS ::= {
  SUBCLASS OF    { top }
  MUST CONTAIN   { commonName | surname }
  MAY CONTAIN    { description |
                 telephoneNumber |
                 userPassword |
                 seeAlso }
  ID             id-oc-person }

```

6.6 Organizational Person

The *Organizational Person* object class is used to define entries representing people employed by, or in some other important way associated with, an organization.

```

organizationalPerson OBJECT-CLASS ::= {
  SUBCLASS OF    { person }
  MAY CONTAIN    { LocaleAttributeSet |
                 PostalAttributeSet |
                 TelecommunicationAttributeSet |
                 organizationalUnitName |
                 title }
  ID             id-oc-organizationalPerson }

```

6.7 Organizational Role

The *Organizational Role* object class is used to define entries representing an organizational role, i.e. a position or role within an organization. An organizational role is normally considered to be filled by a particular organizational person. Over its lifetime, however, an organizational role may be filled by a number of different organizational people in succession. In general, an organizational role may be filled by a person or a non-human entity.

```

organizationalRole   OBJECT-CLASS ::= {
  SUBCLASS OF    { top }
  MUST CONTAIN   { commonName }
  MAY CONTAIN    { description |
                 LocaleAttributeSet |
                 organizationalUnitName |
                 PostalAttributeSet |
                 preferredDeliveryMethod |
                 roleOccupant |
                 seeAlso |
                 TelecommunicationAttributeSet }
  ID             id-oc-organizationalRole }

```

6.8 Group of Names

The *Group Of Names* object class is used to define entries representing an unordered set of names which represent individual objects or other groups of names. The membership of a group is static, i.e. it is explicitly modified by administrative action, rather than dynamically determined each time the group is referred to.

The membership of a group can be reduced to a set of individual object's names by replacing each group with its membership. This process could be carried out recursively until all constituent group names have been eliminated, and only the names of individual objects remain.

```

groupOfNames        OBJECT-CLASS ::= {
  SUBCLASS OF    { top }
  MUST CONTAIN   { commonName | member }
  MAY CONTAIN    { description |
                 organizationName |
                 organizationalUnitName |
                 owner |
                 seeAlso |
                 businessCategory }
  ID             id-oc-groupOfNames }

```

6.9 Group of Unique Names

The *Group Of Unique Names* object class is used to define entries representing an unordered set of names whose integrity can be assured and which represent individual objects or other groups of names. The membership of a group is static, i.e. it is explicitly modified by administrative action, rather than dynamically determined each time the group is referred to.

```
groupOfUniqueNames    OBJECT-CLASS    ::= {
  SUBCLASS OF        { top }
  MUST CONTAIN       { commonName | uniqueMember }
  MAY CONTAIN        { description |
                     organizationName |
                     organizationalUnitName |
                     owner |
                     seeAlso |
                     businessCategory }
  ID                  id-oc-groupOfUniqueNames }
```

6.10 Residential Person

The *Residential Person* object class is used to define entries representing a person in the residential environment.

```
residentialPerson    OBJECT-CLASS    ::= {
  SUBCLASS OF        { person }
  MUST CONTAIN       { localityName }
  MAY CONTAIN        { LocaleAttributeSet |
                     PostalAttributeSet |
                     preferredDeliveryMethod |
                     TelecommunicationAttributeSet |
                     businessCategory }
  ID                  id-oc-residentialPerson }
```

6.11 Application Process

The *Application Process* object class is used to define entries representing application processes. An application process is an element within a real open system which performs the information processing for a particular application (see ISO 7498).

```
applicationProcess   OBJECT-CLASS    ::= {
  SUBCLASS OF        { top }
  MUST CONTAIN       { commonName }
  MAY CONTAIN        { description |
                     localityName |
                     organizationalUnitName |
                     seeAlso }
  ID                  id-oc-applicationProcess }
```

6.12 Application Entity

The *Application Entity* object class is used to define entries representing application entities. An application entity consists of those aspects of an application-process pertinent to OSI.

```
applicationEntity    OBJECT-CLASS    ::= {
  SUBCLASS OF        { top }
  MUST CONTAIN       { commonName | presentationAddress }
  MAY CONTAIN        { description |
                     localityName |
                     organizationName |
                     organizationalUnitName |
                     seeAlso |
                     supportedApplicationContext }
  ID                  id-oc-applicationEntity }
```

NOTE – If an application-entity is represented as a Directory object that is distinct from an application-process, the **commonName** attribute is used to carry the value of the Application Entity Qualifier.

6.13 DSA

The *DSA* object class is used to define entries representing DSAs. A DSA is as defined in ISO/IEC 9594-2.

```

dSA OBJECT-CLASS ::= {
  SUBCLASS OF { applicationEntity }
  MAY CONTAIN { knowledgeInformation }
  ID id-oc-dSA }

```

6.14 Device

The *Device* object class is used to define entries representing devices. A device is a physical unit which can communicate, such as a modem, disk drive, etc.

```

device OBJECT-CLASS ::= {
  SUBCLASS OF { top }
  MUST CONTAIN { commonName }
  MAY CONTAIN { description |
  localityName |
  organizationName |
  organizationalUnitName |
  owner |
  seeAlso |
  serialNumber }
  ID id-oc-device }

```

NOTE – At least one of *localityName*, *serialNumber*, *owner*, should be included. The choice is dependent on device type.

6.15 Strong Authentication User

The *Strong Authentication User* object class is used in defining entries for objects which participate in strong authentication, as defined in ISO/IEC 9594-8.

```

strongAuthenticationUser OBJECT-CLASS ::= {
  SUBCLASS OF { top }
  KIND auxiliary
  MUST CONTAIN { userCertificate }
  ID id-oc-strongAuthenticationUser }

```

6.16 Certification Authority

The *Certification Authority* object class is used in defining entries for objects which act as certification authorities, as defined in ISO/IEC 9594-8.

```

certificationAuthority OBJECT-CLASS ::= {
  SUBCLASS OF { top }
  KIND auxiliary
  MUST CONTAIN { cACertificate |
  certificateRevocationList |
  authorityRevocationList }
  MAY CONTAIN { crossCertificatePair }
  ID id-oc-certificationAuthority }

```

SECTION 3 – SELECTED NAME FORMS

7 Definition of selected name forms

7.1 Country name form

The *Country* name form specifies how entries of object class **country** may be named.

```

countryNameForm NAME-FORM ::= {
  NAMES country
  WITH ATTRIBUTES { countryName }
  ID id-nf-countryNameForm }

```

7.2 Locality name form

The *Locality* name form specifies how entries of object class **locality** may be named.

```
locNameForm NAME-FORM ::= {
    NAMES          locality
    WITH ATTRIBUTES { localityName }
    ID             id-nf-locNameForm }
```

7.3 State or Province name form

The *State or Province* name form specifies how entries of object class **locality** may be named.

```
sOPNameForm NAME-FORM ::= {
    NAMES          locality
    WITH ATTRIBUTES { stateOrProvinceName }
    ID             id-nf-sOPNameForm }
```

7.4 Organization name form

The *Organization* name form specifies how entries of object class **organization** may be named.

```
orgNameForm NAME-FORM ::= {
    NAMES          organization
    WITH ATTRIBUTES { organizationName }
    ID             id-nf-orgNameForm }
```

7.5 Organizational Unit name form

The *Organizational Unit* name form specifies how entries of object class **organizationalUnit** may be named.

```
orgUnitNameForm NAME-FORM ::= {
    NAMES          organizationalUnit
    WITH ATTRIBUTES { organizationalUnitName }
    ID             id-nf-orgUnitNameForm }
```

7.6 Person name form

The *Person* name form specifies how entries of object class **person** may be named.

```
personNameForm NAME-FORM ::= {
    NAMES          person
    WITH ATTRIBUTES { commonName }
    ID             id-nf-personNameForm }
```

7.7 Organizational Person name form

The *Organizational Person* name form specifies how entries of object class **organizationalPerson** may be named.

```
orgPersonNameForm NAME-FORM ::= {
    NAMES          organizationalPerson
    WITH ATTRIBUTES { commonName }
    AND OPTIONALLY { organizationalUnitName }
    ID             id-nf-orgPersonNameForm }
```

7.8 Organizational Role name form

The *Organizational Role* name form specifies how entries of object class **organizationalRole** may be named.

```
orgRoleNameForm NAME-FORM ::= {
    NAMES          organizationalRole
    WITH ATTRIBUTES { commonName }
    ID             id-nf-orgRoleNameForm }
```


7.9 Group of Names name form

The *Group of Names* name form specifies how entries of object class **groupOfNames** may be named.

```
gONNameForm NAME-FORM ::= {
    NAMES          groupOfNames
    WITH ATTRIBUTES { commonName }
    ID             id-nf-gONNameForm }
```

7.10 Residential Person name form

The *Residential Person* name form specifies how entries of object class **residentialPerson** may be named.

```
resPersonNameForm NAME-FORM ::= {
    NAMES          residentialPerson
    WITH ATTRIBUTES { commonName }
    AND OPTIONALLY { streetAddress }
    ID             id-nf-resPersonNameForm }
```

7.11 Application Process name form

The *Application Process* name form specifies how entries of object class **applicationProcess** may be named.

```
applProcessNameForm NAME-FORM ::= {
    NAMES          applicationProcess
    WITH ATTRIBUTES { commonName }
    ID             id-nf-applProcessNameForm }
```

7.12 Application Entity name form

The *Application Entity* name form specifies how entries of object class **applicationEntity** may be named.

```
applEntityNameForm NAME-FORM ::= {
    NAMES          applicationEntity
    WITH ATTRIBUTES { commonName }
    ID             id-nf-applEntityNameForm }
```

7.13 DSA name form

The *DSA* name form specifies how entries of object class **dSA** may be named.

```
dSASNameForm NAME-FORM ::= {
    NAMES          dSA
    WITH ATTRIBUTES { commonName }
    ID             id-nf-dSASNameForm }
```

7.14 Device name form

The *Device* name form specifies how entries of object class **device** may be named.

```
deviceNameForm NAME-FORM ::= {
    NAMES          device
    WITH ATTRIBUTES { commonName }
    ID             id-nf-deviceNameForm }
```

Annex A

Selected object classes and name forms in ASN.1

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

This annex includes all of the ASN.1 type and value definitions contained in this Directory Specification in the form of the ASN.1 module **SelectedObjectClasses**.

SelectedObjectClasses {joint-iso-ccitt ds(5) module(1) selectedObjectClasses(6) 2}

DEFINITIONS ::=

BEGIN

-- EXPORTS All --

-- The types and values defined in this module are exported for use in the other ASN.1 modules contained
 -- within the Directory Specifications, and for the use of other applications which will use them to access
 -- Directory services. Other applications may use them for their own purposes, but this will not constrain
 -- extensions and modifications needed to maintain or improve the Directory service.

IMPORTS

objectClass, informationFramework, authenticationFramework, selectedAttributeTypes,
 id-oc, id-nf
 FROM UsefulDefinitions {joint-iso-ccitt ds(5) module(1) usefulDefinitions(0) 2 }

OBJECT-CLASS, ATTRIBUTE, NAME-FORM, top, alias
 FROM InformationFramework informationFramework

businessCategory, commonName, countryName, description, destinationIndicator,
 facsimileTelephoneNumber, internationalISDNNumber, knowledgeInformation, localityName,
 member, organizationName, organizationalUnitName, owner, physicalDeliveryOfficeName,
 postOfficeBox, postalAddress, postalCode, preferredDeliveryMethod, presentationAddress,
 registeredAddress, roleOccupant, searchGuide, seeAlso, serialNumber, stateOrProvinceName,
 streetAddress, supportedApplicationContext, surname, telephoneNumber, teletexTerminalIdentifier,
 telexNumber, title, uniqueMember, x121Address
 FROM SelectedAttributeTypes selectedAttributeTypes

authorityRevocationList, cACertificate, certificateRevocationList, crossCertificatePair,
 userCertificate, userPassword
 FROM AuthenticationFramework authenticationFramework ;

-- Attribute sets --

TelecommunicationAttributeSet ATTRIBUTE ::= {
 facsimileTelephoneNumber |
 internationalISDNNumber |
 telephoneNumber |
 teletexTerminalIdentifier |
 telexNumber |
 preferredDeliveryMethod |
 destinationIndicator |
 registeredAddress |
 x121Address}

PostalAttributeSet ATTRIBUTE ::= {
 physicalDeliveryOfficeName |
 postalAddress |
 postalCode |
 postOfficeBox |
 streetAddress}

LocaleAttributeSet ATTRIBUTE ::= {
 localityName |
 stateOrProvinceName |
 streetAddress}

```

OrganizationalAttributeSet  ATTRIBUTE ::= {
    description |
    LocaleAttributeSet |
    PostalAttributeSet |
    TelecommunicationAttributeSet |
    businessCategory |
    seeAlso |
    searchGuide |
    userPassword}

```

-- Object classes --

```

country  OBJECT-CLASS ::= {
    SUBCLASS OF      { top }
    MUST CONTAIN     { countryName }
    MAY CONTAIN      { description | searchGuide }
    ID               id-oc-country }

```

```

locality  OBJECT-CLASS ::= {
    SUBCLASS OF      { top }
    MAY CONTAIN      { description |
                    searchGuide |
                    LocaleAttributeSet |
                    seeAlso }
    ID               id-oc-locality }

```

```

organization  OBJECT-CLASS ::= {
    SUBCLASS OF      { top }
    MUST CONTAIN     { organizationName }
    MAY CONTAIN      { OrganizationalAttributeSet }
    ID               id-oc-organization }

```

```

organizationalUnit OBJECT-CLASS ::= {
    SUBCLASS OF      { top }
    MUST CONTAIN     { organizationalUnitName }
    MAY CONTAIN      { OrganizationalAttributeSet }
    ID               id-oc-organizationalUnit }

```

```

person  OBJECT-CLASS ::= {
    SUBCLASS OF      { top }
    MUST CONTAIN     { commonName | surname }
    MAY CONTAIN      { description |
                    telephoneNumber |
                    userPassword |
                    seeAlso }
    ID               id-oc-person }

```

```

organizationalPerson  OBJECT-CLASS ::= {
    SUBCLASS OF      { person }
    MAY CONTAIN      { LocaleAttributeSet |
                    PostalAttributeSet |
                    TelecommunicationAttributeSet |
                    organizationalUnitName |
                    title }
    ID               id-oc-organizationalPerson }

```

```

organizationalRole OBJECT-CLASS ::= {
  SUBCLASS OF      { top }
  MUST CONTAIN     { commonName }
  MAY CONTAIN      { description |
                    LocaleAttributeSet |
                    organizationalUnitName |
                    PostalAttributeSet |
                    preferredDeliveryMethod |
                    roleOccupant |
                    seeAlso |
                    TelecommunicationAttributeSet }
  ID               id-oc-organizationalRole }

```

```

groupOfNames OBJECT-CLASS ::= {
  SUBCLASS OF      { top }
  MUST CONTAIN     { commonName | member }
  MAY CONTAIN      { description |
                    organizationName |
                    organizationalUnitName |
                    owner |
                    seeAlso |
                    businessCategory }
  ID               id-oc-groupOfNames }

```

```

groupOfUniqueNames OBJECT-CLASS ::= {
  SUBCLASS OF      { top }
  MUST CONTAIN     { commonName | uniqueMember }
  MAY CONTAIN      { description |
                    organizationName |
                    organizationalUnitName |
                    owner |
                    seeAlso |
                    businessCategory }
  ID               id-oc-groupOfUniqueNames }

```

```

residentialPerson OBJECT-CLASS ::= {
  SUBCLASS OF      { person }
  MUST CONTAIN     { localityName }
  MAY CONTAIN      { LocaleAttributeSet |
                    PostalAttributeSet |
                    preferredDeliveryMethod |
                    TelecommunicationAttributeSet |
                    businessCategory }
  ID               id-oc-residentialPerson }

```

```

applicationProcess OBJECT-CLASS ::= {
  SUBCLASS OF      { top }
  MUST CONTAIN     { commonName }
  MAY CONTAIN      { description |
                    localityName |
                    organizationalUnitName |
                    seeAlso }
  ID               id-oc-applicationProcess }

```

```

applicationEntity OBJECT-CLASS ::= {
  SUBCLASS OF      { top }
  MUST CONTAIN     { commonName | presentationAddress }
  MAY CONTAIN      { description |
                    localityName |
                    organizationName |
                    organizationalUnitName |
                    seeAlso |
                    supportedApplicationContext }
  ID               id-oc-applicationEntity }

```

```

dSA OBJECT-CLASS ::= {
SUBCLASS OF { applicationEntity }
MAY CONTAIN { knowledgeInformation }
ID id-oc-dSA }

device OBJECT-CLASS ::= {
SUBCLASS OF { top }
MUST CONTAIN { commonName }
MAY CONTAIN { description |
localityName |
organizationName |
organizationalUnitName |
owner |
seeAlso |
serialNumber }
ID id-oc-device }

strongAuthenticationUser OBJECT-CLASS ::= {
SUBCLASS OF { top }
KIND auxiliary
MUST CONTAIN { userCertificate }
ID id-oc-strongAuthenticationUser }

certificationAuthority OBJECT-CLASS ::= {
SUBCLASS OF { top }
KIND auxiliary
MUST CONTAIN { cACertificate |
certificateRevocationList |
authorityRevocationList }
MAY CONTAIN { crossCertificatePair }
ID id-oc-certificationAuthority }

```

-- Name forms --

```

countryNameForm NAME-FORM ::= {
NAMES country
WITH ATTRIBUTES {countryName}
ID id-nf-countryNameForm }

locNameForm NAME-FORM ::= {
NAMES locality
WITH ATTRIBUTES {localityName}
ID id-nf-locNameForm }

sOPNameForm NAME-FORM ::= {
NAMES locality
WITH ATTRIBUTES {stateOrProvinceName}
ID id-nf-sOPNameForm }

orgNameForm NAME-FORM ::= {
NAMES organization
WITH ATTRIBUTES {organizationName}
ID id-nf-orgNameForm }

orgUnitNameForm NAME-FORM ::= {
NAMES organizationalUnit
WITH ATTRIBUTES {organizationalUnitName}
ID id-nf-orgUnitNameForm }

personNameForm NAME-FORM ::= {
NAMES person
WITH ATTRIBUTES {commonName}
ID id-nf-personNameForm }

```

```
orgPersonNameForm NAME-FORM ::= {
    NAMES          organizationalPerson
    WITH ATTRIBUTES {commonName }
    AND OPTIONALLY {organizationalUnitName}
    ID             id-nf-orgPersonNameForm }
```

```
orgRoleNameForm NAME-FORM ::= {
    NAMES          organizationalRole
    WITH ATTRIBUTES {commonName}
    ID             id-nf-orgRoleNameForm }
```

```
gONNameForm NAME-FORM ::= {
    NAMES          groupOfNames
    WITH ATTRIBUTES {commonName}
    ID             id-nf-gONNameForm }
```

```
resPersonNameForm NAME-FORM ::= {
    NAMES          residentialPerson
    WITH ATTRIBUTES {commonName}
    AND OPTIONALLY {streetAddress}
    ID             id-nf-resPersonNameForm }
```

```
applProcessNameForm NAME-FORM ::= {
    NAMES          applicationProcess
    WITH ATTRIBUTES {commonName}
    ID             id-nf-applProcessNameForm }
```

```
applEntityNameForm NAME-FORM ::= {
    NAMES          applicationEntity
    WITH ATTRIBUTES {commonName}
    ID             id-nf-applEntityNameForm }
```

```
dSANameForm NAME-FORM ::= {
    NAMES          dSA
    WITH ATTRIBUTES {commonName}
    ID             id-nf-dSANameForm }
```

```
deviceNameForm NAME-FORM ::= {
    NAMES          device
    WITH ATTRIBUTES {commonName}
    ID             id-nf-deviceNameForm }
```

-- Object identifier assignments --

-- object identifiers assigned in other modules are shown in comments

-- Object classes --

```
-- id-oc-top          OBJECT IDENTIFIER ::= {id-oc 0}
-- id-oc-alias        OBJECT IDENTIFIER ::= {id-oc 0}
id-oc-country         OBJECT IDENTIFIER ::= {id-oc 2}
id-oc-locality        OBJECT IDENTIFIER ::= {id-oc 3}
id-oc-organization    OBJECT IDENTIFIER ::= {id-oc 4}
id-oc-organizationalUnit OBJECT IDENTIFIER ::= {id-oc 5}
id-oc-person          OBJECT IDENTIFIER ::= {id-oc 6}
id-oc-organizationalPerson OBJECT IDENTIFIER ::= {id-oc 7}
id-oc-organizationalRole OBJECT IDENTIFIER ::= {id-oc 8}
id-oc-groupOfNames    OBJECT IDENTIFIER ::= {id-oc 9}
id-oc-residentialPerson OBJECT IDENTIFIER ::= {id-oc 10}
id-oc-applicationProcess OBJECT IDENTIFIER ::= {id-oc 11}
id-oc-applicationEntity OBJECT IDENTIFIER ::= {id-oc 12}
id-oc-dSA             OBJECT IDENTIFIER ::= {id-oc 13}
id-oc-device          OBJECT IDENTIFIER ::= {id-oc 14}
id-oc-strongAuthenticationUser OBJECT IDENTIFIER ::= {id-oc 15}
id-oc-certificationAuthority OBJECT IDENTIFIER ::= {id-oc 16}
id-oc-groupOfUniqueNames OBJECT IDENTIFIER ::= {id-oc 17}
```

-- Name forms --

id-nf-countryNameForm	OBJECT IDENTIFIER ::=	{id-nf 0}
id-nf-locNameForm	OBJECT IDENTIFIER ::=	{id-nf 1}
id-nf-sOPNameForm	OBJECT IDENTIFIER ::=	{id-nf 2}
id-nf-orgNameForm	OBJECT IDENTIFIER ::=	{id-nf 3}
id-nf-orgUnitNameForm	OBJECT IDENTIFIER ::=	{id-nf 4}
id-nf-personNameForm	OBJECT IDENTIFIER ::=	{id-nf 5}
id-nf-orgPersonNameForm	OBJECT IDENTIFIER ::=	{id-nf 6}
id-nf-orgRoleNameForm	OBJECT IDENTIFIER ::=	{id-nf 7}
id-nf-gONNameForm	OBJECT IDENTIFIER ::=	{id-nf 8}
id-nf-resPersonNameForm	OBJECT IDENTIFIER ::=	{id-nf 9}
id-nf-applProcessNameForm	OBJECT IDENTIFIER ::=	{id-nf 10}
id-nf-applEntityNameForm	OBJECT IDENTIFIER ::=	{id-nf 11}
id-nf-dSNameForm	OBJECT IDENTIFIER ::=	{id-nf 12}
id-nf-deviceNameForm	OBJECT IDENTIFIER ::=	{id-nf 13}

END

Annex B

Suggested name forms and DIT structures

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

This annex suggests a DIT structure shown in Figure B.1 and related DIT structure rules using the name forms defined in clause 3. The rules cover an unconstrained DIT structure.

The integer identifiers assigned in this annex and used in Figure B.1 are arbitrary and have no global (or standardized) significance. A particular structure rule identifier only has significance within the scope of the subschema in which it applied. Each DMD is responsible for creating its own DIT structure and structure rules that may differ from this example.

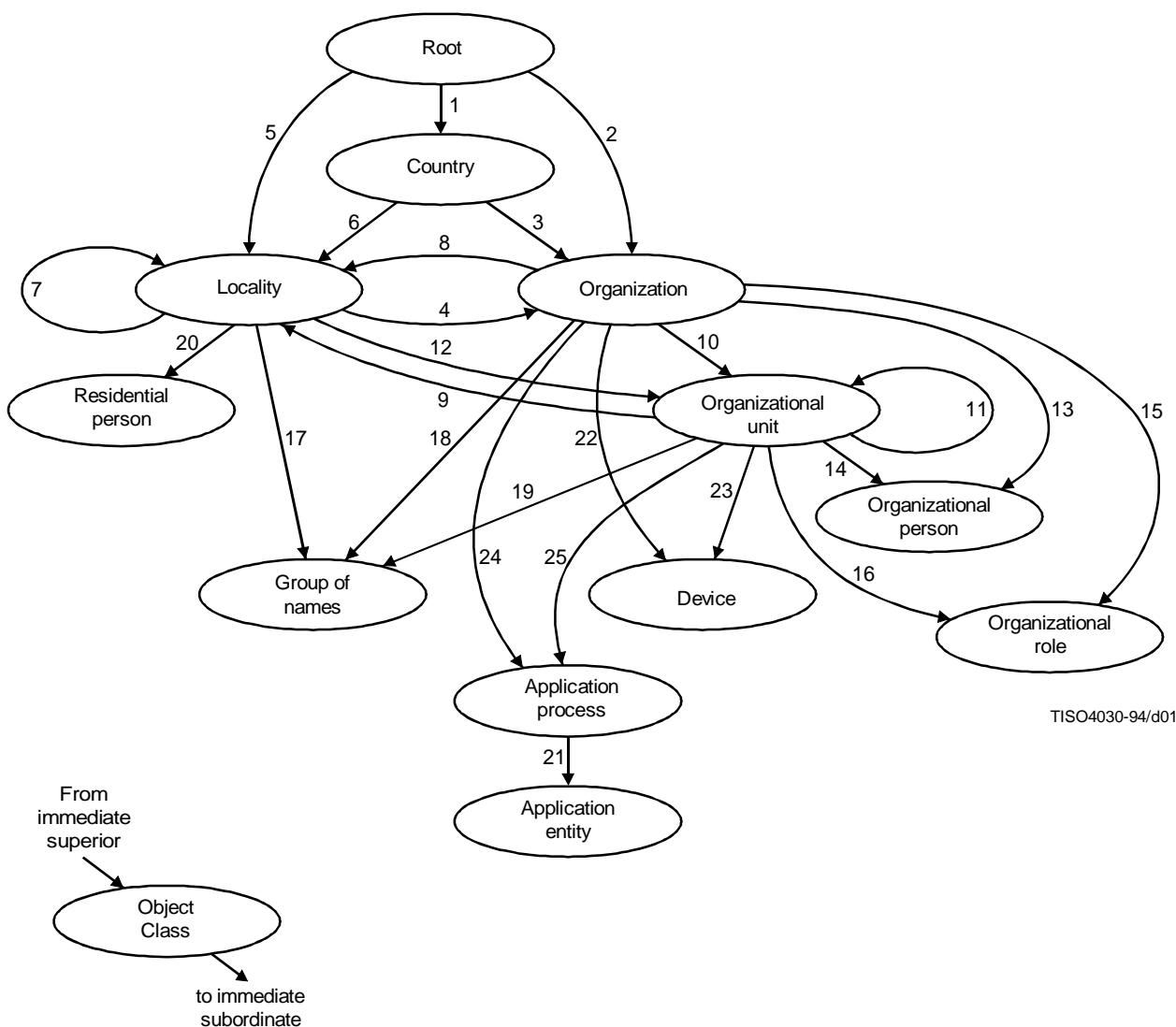


Figure B.1 – Suggested DIT structure

B.1 Country

Attribute **countryName** is used for naming.

The root is the immediate superior to entries of object class **country**.

```
sr1  STRUCTURE-RULE ::= {
      NAME FORM      countryNameForm
      ID              1 }
```

B.2 Organization

Attribute **organizationName** is used for naming.

The root, **country** or **locality** can be the immediate superior of entries of object class **organization**.

NOTE – When the organization is directly under the root, this denotes an international organization. The naming values of the **organizationName** attribute for international organizations must all be distinct.

```
sr2  STRUCTURE-RULE ::= {
      NAME FORM      orgNameForm
      ID              2 }

sr3  STRUCTURE-RULE ::= {
      NAME FORM      orgNameForm
      SUPERIOR RULES { sr1 }
      ID              3 }

sr4  STRUCTURE-RULE ::= {
      NAME FORM      orgNameForm
      SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 }
      ID              4 }
```

B.3 Locality

Attribute **localityName** or **stateOrProvinceName** is used for naming.

NOTE – For naming locality using **stateOrProvinceName**, see B.12.

The root, **country**, **locality**, **organization** or **organizationalUnit** can be the immediate superior of entries of object class **locality**.

```
sr5  STRUCTURE-RULE ::= {
      NAME FORM      locNameForm
      ID              5 }

sr6  STRUCTURE-RULE ::= {
      NAME FORM      locNameForm
      SUPERIOR RULES { sr1 }
      ID              6 }

sr7  STRUCTURE-RULE ::= {
      NAME FORM      locNameForm
      SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 }
      ID              7 }

sr8  STRUCTURE-RULE ::= {
      NAME FORM      locNameForm
      SUPERIOR RULES { sr2 | sr3 | sr4 }
      ID              8 }

sr9  STRUCTURE-RULE ::= {
      NAME FORM      locNameForm
      SUPERIOR RULES { sr10 | sr11 | sr12 }
      ID              9 }
```

B.4 Organizational Unit

Attribute **organizationalUnitName** is used for naming.

organization, **organizationalUnit** or **locality** can be the immediate superior of entries of object class **organizational Unit**.

```

sr10 STRUCTURE-RULE ::= {
    NAME FORM      orgUnitNameForm
    SUPERIOR RULES { sr2 | sr3 | sr4 }
    ID             10 }

sr11 STRUCTURE-RULE ::= {
    NAME FORM      orgUnitNameForm
    SUPERIOR RULES { sr10 | sr11 | sr12 }
    ID             11 }

sr12 STRUCTURE-RULE ::= {
    NAME FORM      orgUnitNameForm
    SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 }
    ID             12 }

```

B.5 Organizational Person

Attribute `commonName` and optionally `organizational UnitName` is used for naming.

`organization` or `organizationalUnit` can be the immediate superior of entries of object class `organizational Person`.

```

sr13 STRUCTURE-RULE ::= {
    NAME FORM      orgPersonNameForm
    SUPERIOR RULES { sr2 | sr3 | sr4 }
    ID             13 }

sr14 STRUCTURE-RULE ::= {
    NAME FORM      orgPersonNameForm
    SUPERIOR RULES { sr10 | sr11 | sr12 }
    ID             14 }

```

B.6 Organizational Role

Attribute `CommonName` is used for naming.

`organization` or `organizationalUnit` can be the immediate superior of entries of object class `organizationalRole`.

```

sr15 STRUCTURE-RULE ::= {
    NAME FORM      orgRoleNameForm
    SUPERIOR RULES { sr2 | sr3 | sr4 }
    ID             15 }

sr16 STRUCTURE-RULE ::= {
    NAME FORM      orgRoleNameForm
    SUPERIOR RULES { sr10 | sr11 | sr12 }
    ID             16 }

```

B.7 Group of Names

Attribute `commonName` is used for naming.

`locality`, `organization` or `organizationalUnit` can be the immediate superior of entries of object class `groupOf Names`.

```

sr17 STRUCTURE-RULE ::= {
    NAME FORM      gonNameForm
    SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 }
    ID             17 }

sr18 STRUCTURE-RULE ::= {
    NAME FORM      gonNameForm
    SUPERIOR RULES { sr2 | sr3 | sr4 }
    ID             18 }

sr19 STRUCTURE-RULE ::= {
    NAME FORM      gonNameForm
    SUPERIOR RULES { sr10 | sr11 | sr12 }
    ID             19 }

```

B.8 Residential Person

Attribute **commonName** and optionally **streetAddress** is used for naming.

locality is the immediate superior of entries of object class **residentialPerson**.

```
sr20 STRUCTURE-RULE ::= {
  NAME FORM      resPersonNameForm
  SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 }
  ID             20 }
```

B.9 Application Entity

Attribute **commonName** is used for naming.

applicationProcess is the immediate superior of entries of object class **applicationEntity**.

```
sr21 STRUCTURE-RULE ::= {
  NAME FORM      applEntityNameForm
  SUPERIOR RULES { sr24 | sr25 }
  ID             21 }
```

B.10 Device

Attribute **commonName** is used for naming.

organization or **organizationalUnit** can be the immediate superior of entries of object class **device**.

```
sr22 STRUCTURE-RULE ::= {
  NAME FORM      deviceNameForm
  SUPERIOR RULES { sr2 | sr3 | sr4 }
  ID             22 }
```

```
sr23 STRUCTURE-RULE ::= {
  NAME FORM      deviceNameForm
  SUPERIOR RULES { sr10 | sr11 | sr12 }
  ID             23 }
```

B.11 Application Process

Attribute **commonName** is used for naming.

organization or **organizationalUnit** can be the immediate superior of entries of object class **applicationProcess**.

```
sr24 STRUCTURE-RULE ::= {
  NAME FORM      applProcessNameForm
  SUPERIOR RULES { sr2 | sr3 | sr4 }
  ID             24 }
```

```
sr25 STRUCTURE-RULE ::= {
  NAME FORM      applProcessNameForm
  SUPERIOR RULES { sr10 | sr11 | sr12 }
  ID             25 }
```

B.12 Alternative Structure Rule for Locality

If the **stateOrProvinceName** attribute is used for naming locality and locality constrained to existing only as an immediate subordinate of country, then one additional structure rule is required to define this.

```
sr26 STRUCTURE-RULE ::= {
  NAME FORM      sOPNameForm
  SUPERIOR RULES { sr1 }
  ID             26 }
```

In addition the structure rules **sr4**, **sr7**, **sr12**, **sr17**, and **sr20** must be modified to include **sr26** within their respective list of superior structure rule as follows.

```
sr4  STRUCTURE-RULE ::= {
  NAME FORM      orgNameForm
  SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 | sr26 }
  ID             4 }
```

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sr7 STRUCTURE-RULE ::= {
NAME FORM locNameForm
SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 | sr26 }
ID 7 }

sr12 STRUCTURE-RULE ::= {
NAME FORM orgUnitNameForm
SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 | sr26 }
ID 12 }

sr17 STRUCTURE-RULE ::= {
NAME FORM gonNameForm
SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 | sr26 }
ID 17 }

sr20 STRUCTURE-RULE ::= {
NAME FORM resPersonNameForm
SUPERIOR RULES { sr5 | sr6 | sr7 | sr8 | sr9 | sr26 }
ID 20 }

Annex C

Amendments and corrigenda

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

This edition of this Directory Specification includes the following amendments:

- Amendment 1: Schema

This edition of this Directory Specification includes the following technical corrigenda correcting the defects reported in the following defect reports (some parts of some of the following Technical Corrigenda may have been subsumed by the amendments that formed this edition of this Directory Specification):

- Technical Corrigendum 1 (covering Defect Report 005).
- Technical Corrigendum 2 (covering Defect Report 055).