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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.

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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)

ORGANIZATION OF X-SERIES RECOMMENDATIONS

Subject area	Recommendation series
PUBLIC DATA NETWORKS	
Services and facilities	X.1-X.19
Interfaces	X.20-X.49
Transmission, signalling and switching	X.50-X.89
Network aspects	X.90-X.149
Maintenance	X.150-X.179
Administrative arrangements	X.180-X.199
OPEN SYSTEMS INTERCONNECTION	
Model and notation	X.200-X.209
Service definitions	X.210-X.219
Connection-mode protocol specifications	X.220-X.229
Connectionless-mode protocol specifications	X.230-X.239
PICS proformas	X.240-X.259
Protocol identification	X.260-X.269
Security protocols	X.270-X.279
Layer managed objects	X.280-X.289
Conformance testing	X.290-X.299
INTERWORKING BETWEEN NETWORKS	
General	X.300-X.349
Mobile data transmission systems	X.350-X.369
Management	X.370-X.399
MESSAGE HANDLING SYSTEMS	X.400-X.499
DIRECTORY	X.500-X.599
OSI NETWORKING AND SYSTEM ASPECTS	
Networking	X.600-X.649
Naming, addressing and registration	X.650-X.679
Abstract Syntax Notation One (ASN.1)	X.680-X.699
OSI MANAGEMENT	X.700-X.799
SECURITY	X.800-X.849
OSI APPLICATIONS	
Commitment, concurrency and recovery	X.850-X.859
Transaction processing	X.860-X.879
Remote operations	X.880-X.899
OPEN DISTRIBUTED PROCESSING	X.900-X.999

Superseded by a more recent version

Contents

Superseded by a more recent version

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.

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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*.

   – 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-organiationalUnit }
```

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.

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

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-organiationalUnit }
```

```
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-organiationalUnit              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-dSANameForm	**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.
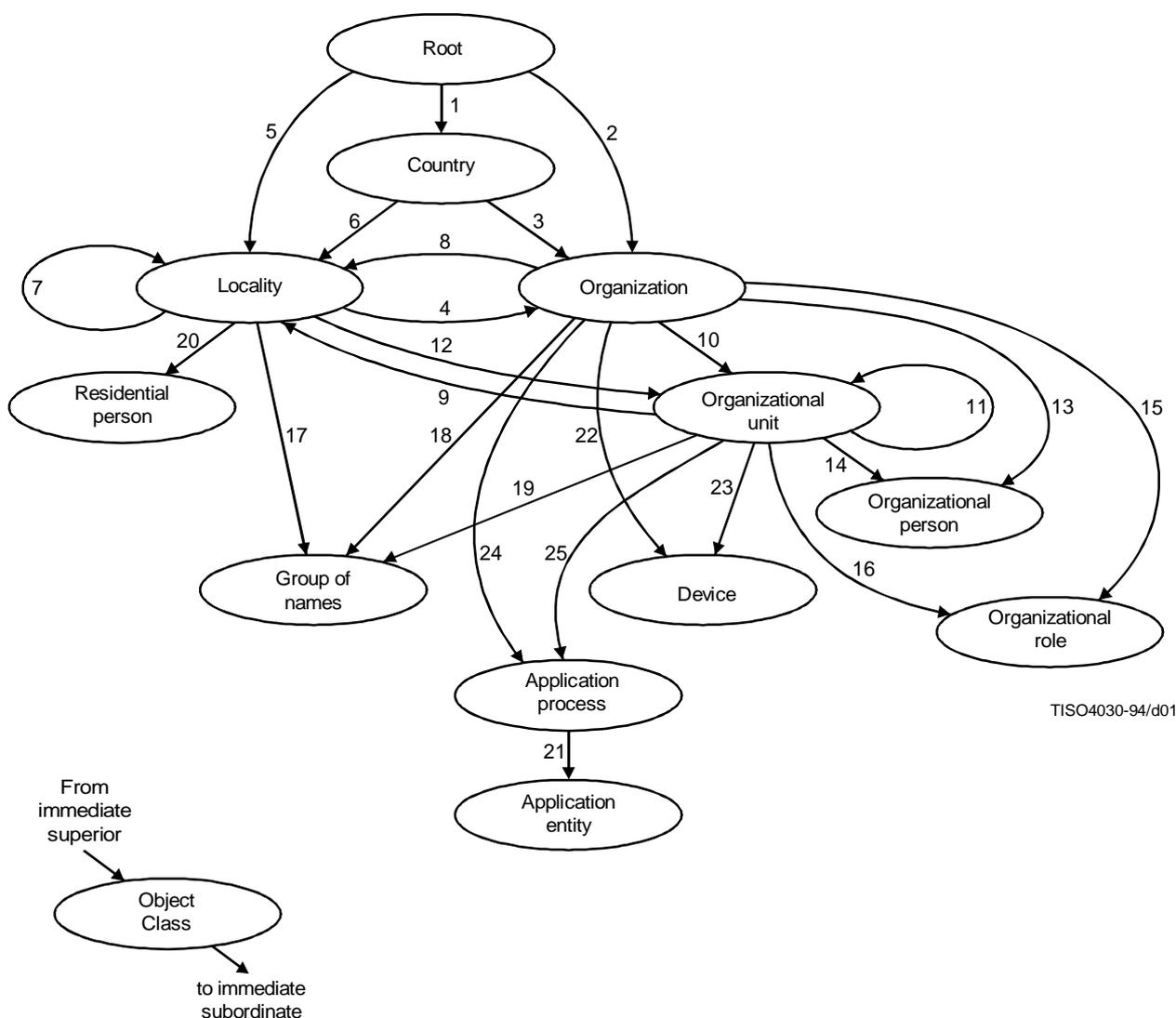

Figure B.1 – Suggested DIT structure

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 }
```

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).