INTERNATIONAL STANDARD

ISO/IEC 9594-6

Second edition
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Information technology — Open Systems Interconnection — The Directory: Selected attribute types

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — L'Annuaire: Types d'attributs sélectionnés

Reference number
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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 9594-6 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing,* in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.520.

Implementors should note that a defect resolution process exists and that corrections may be applied to this part of ISO/IEC 9594 in the form of technical corrigenda. A list of approved technical corrigenda for this part of ISO/IEC 9594 can be obtained from the subcommittee secretariat. Published technical corrigenda are available from your national standards organization.

This second edition technically revises and enhances ISO/IEC 9594-6:1990. Implementations may still claim conformance to the first edition of this part of ISO/IEC 9594. However, at some point, the first edition will no longer be supported (i.e. reported defects will no longer be resolved). It is recommended that implementations conform to this second edition as soon as possible.

ISO/IEC 9594 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — The Directory*:

— *Part 1: Overview of concepts, models and services*

— *Part 2: Models*

— *Part 3: Abstract service definition*

— *Part 4: Procedures for distributed operation*

— *Part 5: Protocol specifications*

— *Part 6: Selected attribute types*

— *Part 7: Selected object classes*

— *Part 8: Authentication framework*

— *Part 9: Replication*

Annex A forms an integral part of this part of ISO/IEC 9594. Annexes B to E are for information only.

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 types which may be found useful across a range of applications of the Directory, as well as a number of standard attribute syntaxes and matching rules. One particular use for many of the attributes defined herein is in the formation of names, particularly for the classes of object defined in ITU-T Rec. X.521 | ISO/IEC 9594-7.

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 (1995) specifies version 1 of the Directory service and protocols. The first edition (1990) 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 the second edition of X.519 | ISO/IEC 9594-5.

Annex A, which is an integral part of this Recommendation | International Standard, provides the ASN.1 notation for the complete module which defines the attributes, attribute syntaxes, and matching rules.

Annex B, which is not an integral part of this Recommendation | International Standard, provides a table of attribute types, for easy reference.

Annex C, which is not an integral part of this Recommendation | International Standard, provides suggested upper bounds value constraints used in these Directory Specifications.

Annex D, which is not an integral part of this Recommendation | International Standard, lists alphabetically the attributes and matching rules defined in this Directory Specification.

Annex E, 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

CCITT RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – THE DIRECTORY: SELECTED ATTRIBUTE TYPES

SECTION 1 – GENERAL

1 Scope

This Recommendation | International Standard defines a number of attribute types and matching rules which may be found useful across a range of applications of the Directory.

Attribute types and matching rules fall into three categories, as described below.

Some attribute types and matching rules are used by a wide variety of applications or are understood and/or used by the Directory itself.

NOTE – It is recommended that an attribute type or matching rule defined in this document be used, in preference to the generation of a new one, whenever it is appropriate for the application.

Some attribute types and matching rules are internationally standardized, but are application-specific. These are defined in the standards associated with the application concerned.

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

2 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 9594-1:1995, *Information technology – Open Systems Interconnection – The Directory: Overview of concepts, models and services.*
- ITU-T Recommendation X.501 (1993) | ISO/IEC 9594-2:1995, *Information technology – Open Systems Interconnection – The Directory: Models.*
- ITU-T Recommendation X.511 (1993) | ISO/IEC 9594-3:1995, *Information technology – Open Systems Interconnection – The Directory: Abstract service definition.*
- ITU-T Recommendation X.518 (1993) | ISO/IEC 9594-4:1995, *Information technology – Open Systems Interconnection – The Directory: Procedures for distributed operation.*
- ITU-T Recommendation X.519 (1993) | ISO/IEC 9594-5:1995, *Information technology – Open Systems Interconnection – The Directory: Protocol specifications.*
- ITU-T Recommendation X.521 (1993) | ISO/IEC 9594-7:1995, *Information technology – Open Systems Interconnection – The Directory: Selected object classes.*

- ITU-T Recommendation X.509 (1993) | ISO/IEC 9594-8:1995, *Information technology – Open Systems Interconnection – The Directory: Authentication framework.*
- ITU-T Recommendation X.525 (1993) | ISO/IEC 9594-9:1995, *Information technology – The Directory: Replication.*
- ITU-T Recommendation X.680 (1994) | ISO/IEC 8824-1:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*
- ITU-T Recommendation X.681 (1994) | ISO/IEC 8824-2:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- ITU-T Recommendation X.682 (1994) | ISO/IEC 8824-3:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*
- ITU-T Recommendation X.683 (1994) | ISO/IEC 8824-4:1995, *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, *Information processing systems — Open Systems Interconnection — Basic Reference Model.*

2.3 Other references

- CCITT Recommendation E.123 (1988), *Notation for National and International Telephone numbers.*
- CCITT Recommendation E.164 (1991), *Numbering plan for the ISDN era.*
- CCITT Recommendation F.1 (1992), *Operational provisions for the international public telegram service.*
- CCITT Recommendation F.200 (1992), *Teletex service.*
- CCITT Recommendation F.401 (1992), *Message handling services: Naming and addressing for public message handling services.*
- CCITT Recommendation T.30 (1993), *Procedures for document facsimile transmission in the general switched telephone network.*
- CCITT Recommendation T.61 (1993), *Character repertoire and coded character sets for the international teletex service.*
- CCITT Recommendation T.62 (1993), *Control procedures for teletex and Group 4 facsimile services.*
- CCITT Recommendation X.121 (1992), *International numbering plan for public data networks.*
- ISO 3166:1993, *Codes for the representation of names of countries.*

3 Definitions

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

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

a) *attribute type;*

b) *object class;*

c) *matching 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 ITU-T Rec. X.520 | ISO/IEC 9594-6. 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 CCITT X.500-Series Recommendations and the ISO/IEC 9594:1990 edition. Systems conforming to the current Directory Specifications are referred to as "1993 edition systems".

Attribute types and matching rules are defined in this Recommendation | International Standard by use of the **ATTRIBUTE** and **MATCHING-RULE** information object classes defined in ITU-T Rec. X.501 | ISO/IEC 9594-2.

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

SECTION 2 – SELECTED ATTRIBUTE TYPES

5 Definition of selected attribute types

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

Many of the attributes defined in this Specification are based on a common ASN.1 syntax:

```
DirectoryString { INTEGER : maxSize } ::= CHOICE {
    teletexString           TeletexString (SIZE (1..maxSize)),
    printableString         PrintableString (SIZE (1..maxSize)),
    universalString         UniversalString (SIZE (1..maxSize)) }
```


Some implementations of the Directory do not support the last of these choices, and will not be able to generate, match, or display attributes having such a syntax.

5.1 System attribute types

5.1.1 Knowledge Information

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

NOTE – This attribute is now obsolete.

```
knowledgeInformation ATTRIBUTE          ::=     {
    WITH SYNTAX                         DirectoryString {ub-knowledge-information}
    EQUALITY MATCHING RULE               caseIgnoreMatch
    ID                                  id-at-knowledgeInformation }
```

5.2 Labeling attribute types

These attributes type are concerned with information about objects which has been explicitly associated with the objects by a labeling process.

5.2.1 Name

The *Name* attribute type is the attribute supertype from which string attribute types typically used for naming may be formed.

```
name ATTRIBUTE                  ::=     {
    WITH SYNTAX                         DirectoryString {ub-name}
    EQUALITY MATCHING RULE               caseIgnoreMatch
    SUBSTRINGS MATCHING RULE            caseIgnoreSubstringsMatch
    ID                                  id-at-name }
```

5.2.2 Common Name

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

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

Examples:

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

CN = "Divisional Coordination Committee";

CN = "High Speed Modem".

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

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

```
commonName ATTRIBUTE        ::=     {
    SUBTYPE OF                      name
    WITH SYNTAX                     DirectoryString {ub-common-name}
    ID                              id-at-commonName }
```

5.2.3 Surname

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

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

```
surname ATTRIBUTE           ::=     {
    SUBTYPE OF                      name
    WITH SYNTAX                     DirectoryString {ub-name}
    ID                              id-at-surname }
```


5.2.4 Given Name

The *Given Name* attribute type specifies the linguistic construct which is normally given to an individual by the individual's parent, or is chosen by the individual, or by which the individual is commonly known.

An attribute value for Given Name is a string, e.g. "David", or "Jean Paul".

```
givenName ATTRIBUTE         ::=     {
    SUBTYPE OF                      name
    WITH SYNTAX                     DirectoryString {ub-name}
    ID                              id-at-givenName }
```

5.2.5 Initials

The *Initials* attribute type contains the initials of some or all of an individual's names, but not the surname(s).

An attribute value for Initials is a string, e.g. "D" or "D." or "J.P.".

```
initials ATTRIBUTE          ::=     {
    SUBTYPE OF                      name
    WITH SYNTAX                     DirectoryString {ub-name}
    ID                              id-at-initials }
```

5.2.6 Generation Qualifier

The *Generation Qualifier* attribute type contains a string which is used to provide generation information to qualify an individual's name.

An attribute value for Generation Qualifier is a string, e.g. "Jr." or "II".

```
generationQualifier ATTRIBUTE   ::=     {
    SUBTYPE OF                      name
    WITH SYNTAX                     DirectoryString {ub-name}
    ID                              id-at-generationQualifier }
```

5.2.7 Unique Identifier

The *Unique Identifier* attribute type specifies an identifier which may be used to distinguish between object references when a distinguished name has been reused. It may be, for example, an encoded object identifier, certificate, date, timestamp, or some other form of certification on the validity of the distinguished name.

An attribute value for Unique Identifier is a bit string.

```
uniqueIdentifier ATTRIBUTE      ::=     {
    WITH SYNTAX                         UniqueIdentifier
    EQUALITY MATCHING RULE               bitStringMatch
    ID                                  id-at-uniqueIdentifier }
UniqueIdentifier                ::=     BIT STRING
```

5.2.8 DN Qualifier

The *DN Qualifier* attribute type specifies disambiguating information to add to the relative distinguished name of an entry. It is intended to be used for entries held in multiple DSAs which would otherwise have the same name, and that its value be the same in a given DSA for all entries to which this information has been added.

```
dnQualifier ATTRIBUTE           ::=     {
    WITH SYNTAX                         PrintableString
    EQUALITY MATCHING RULE               caseIgnoreMatch
    ORDERING MATCHING RULE               caseIgnoreOrderingMatch
    SUBSTRINGS MATCHING RULE            caseIgnoreSubstringsMatch
    ID                                  id-at-dnQualifier }
```

5.2.9 Serial Number

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

An attribute value for Serial Number is a printable string.

```
serialNumber ATTRIBUTE          ::=     {
    WITH SYNTAX                         PrintableString (SIZE (1..ub-serialNumber))
    EQUALITY MATCHING RULE              caseIgnoreMatch
    SUBSTRINGS MATCHING RULE            caseIgnoreSubstringsMatch
    ID                                  id-at-serial-number }
```


5.3 Geographical Attribute Types

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

5.3.1 Country Name

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

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

```
countryName ATTRIBUTE           ::=     {
    SUBTYPE OF                          name
    WITH SYNTAX                         PrintableString (SIZE (2)) -- IS 3166 codes only
    SINGLE VALUE                        TRUE
    ID                                  id-at-countryName }
```

5.3.2 Locality Name

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

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

```
localityName ATTRIBUTE          ::=     {
    SUBTYPE OF                          name
    WITH SYNTAX                         DirectoryString {ub-locality-name}
    ID                                  id-at-localityName }
```

The *Collective Locality Name* attribute type specifies a locality name for a collection of entries.

```
collectiveLocalityName ATTRIBUTE        ::=     {
    SUBTYPE OF                                  localityName
    COLLECTIVE                                  TRUE
    ID                                          id-at-collectiveLocalityName }
```

5.3.3 State or Province Name

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

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

```
stateOrProvinceName ATTRIBUTE::=        {
    SUBTYPE OF                          name
    WITH SYNTAX                         DirectoryString {ub-state-name}
    ID                                  id-at-stateOrProvinceName }
```

The *Collective State or Province Name* attribute type specifies a state or province name for a collection of entries.

```
collectiveStateOrProvinceName ATTRIBUTE  ::=     {
    SUBTYPE OF                             stateOrProvinceName
    COLLECTIVE                             TRUE
    ID                                     id-at-collectiveStateOrProvinceName }
```

5.3.4 Street Address

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

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


```
streetAddress ATTRIBUTE         ::=     {
    WITH SYNTAX                         DirectoryString {ub-street-address}
    EQUALITY MATCHING RULE               caseIgnoreMatch
    SUBSTRINGS MATCHING RULE            caseIgnoreSubstringsMatch
    ID                                  id-at-streetAddress }
```

The *Collective Street Address* attribute type specifies a street address for a collection of entries.

```
collectiveStreetAddress ATTRIBUTE       ::=     {
    SUBTYPE OF                          streetAddress
    COLLECTIVE                          TRUE
    ID                                  id-at-collectiveStreetAddress }
```

5.3.5 House Identifier

The *House Identifier* attribute type specifies a linguistic construct used to identify a particular building, for example a house number or house name relative to a street, avenue, town or city, etc.

An attribute value for House Identifier is a string, e.g. "14".

```
houseIdentifier ATTRIBUTE       ::=     {
    WITH SYNTAX                         DirectoryString {ub-name}
    EQUALITY MATCHING RULE               caseIgnoreMatch
    SUBSTRINGS MATCHING RULE             caseIgnoreSubstringsMatch
    ID                                  id-at-houseIdentifier }
```

5.4 Organizational attribute types

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

5.4.1 OrganizationName

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

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

```
organizationName ATTRIBUTE      ::=     {
    SUBTYPE OF                          name
    WITH SYNTAX                         DirectoryString {ub-organization-name}
    ID                                  id-at-organizationName }
```

The *Collective Organization Name* attribute type specifies an organization name for a collection of entries.

```
collectiveOrganizationName ATTRIBUTE      ::=     {
    SUBTYPE OF                            organizationName
    COLLECTIVE                            TRUE
    ID                                    id-at-collectiveOrganizationName }
```

5.4.2 Organizational Unit Name

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

The designated organizational unit is understood to be part of an organization designated by an OrganizationName attribute. It follows that if an Organizational Unit Name attribute is used in a directory name, it must be associated with an OrganizationName attribute.

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

Example:

O = "Scottel", OU = "TD"


```
organizationalUnitName ATTRIBUTE      ::=     {
    SUBTYPE OF                                name
    WITH SYNTAX                               DirectoryString {ub-organizational-unit-name}
    ID                                        id-at-organizationalUnitName }
```

The *Collective Organizational Unit Name* attribute type specifies an organizational unit name for a collection of entries.

```
collectiveOrganizationalUnitName ATTRIBUTE      ::=     {
    SUBTYPE OF                                    organizationalUnitName
    COLLECTIVE                                    TRUE
    ID                                            id-at-collectiveOrganizationalUnitName }
```

5.4.3 Title

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

An attribute value for Title is a string.

Example:

T = "Manager, Distributed Applications"

```
title ATTRIBUTE      ::=     {
    SUBTYPE OF               name
    WITH SYNTAX              DirectoryString {ub-title}
    ID                       id-at-title }
```

5.5 Explanatory attribute types

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

5.5.1 Description

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

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

An attribute value for Description is a string.

```
description ATTRIBUTE                ::=    {
    WITH SYNTAX                             DirectoryString {ub-description}
    EQUALITY MATCHING RULE                   caseIgnoreMatch
    SUBSTRINGS MATCHING RULE                caseIgnoreSubstringsMatch
    ID                                      id-at-description }
```

5.5.2 Search Guide

The *Search Guide* attribute type specifies information of suggested search criteria which may be included in some entries expected to be a convenient base-object for the search operation, e.g. country or organization.

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

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

```
searchGuide ATTRIBUTE                ::=    {
    WITH SYNTAX                             Guide
    ID                                      id-at-searchGuide }

Guide                                ::=    SET {
    objectClass                [0]          OBJECT-CLASS.&id OPTIONAL,
    criteria                   [1]          Criteria }

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

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


Example:

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

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

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

Step (1) produces the intermediate Filter value

```
intermediate-filter Filter                ::=
    and : {
        item : substrings  {
            type  commonName.&id,
            strings { any : teletexString : "Dubois" }},
        item : substrings  {
            type  streetAddress.&id,
            strings { any : teletexString  "Hugo" }}}
```

Step (2) produces a filter for matching Residential Person entries in the subtree:

```
residential-person-filter Filter ::=
    and : {
        item : equality : {
            type objectClass.&id,
            assertion residentialPerson.&id },
        intermediateFilter }
```

5.5.3 Enhanced Search Guide

The *Enhanced Search Guide* attribute provides an enhancement of the **searchGuide** attribute, adding information about the recommended search depth for searches among subordinate objects of a given object class.

```
enhancedSearchGuide ATTRIBUTE           ::=     {
    WITH SYNTAX                                 EnhancedGuide
    ID                                          id-at-enhancedSearchGuide }

EnhancedGuide                   ::=             SEQUENCE {
    objectClass                 [0]             OBJECT-CLASS.&id,
    criteria                    [1]             Criteria,
    subset                      [2]             INTEGER
        { baseObject (0), oneLevel (1), wholeSubtree (2) } DEFAULT oneLevel }
```

5.5.4 Business Category

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


```
businessCategory ATTRIBUTE      ::=     {
    WITH SYNTAX                         DirectoryString {ub-business-category}
    EQUALITY MATCHING RULE              caseIgnoreMatch
    SUBSTRINGS MATCHING RULE            caseIgnoreSubstringsMatch
    ID                                  id-at-businessCategory }
```


5.6 Postal Addressing attribute types

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

5.6.1 Postal Address

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

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

```
postalAddress ATTRIBUTE         ::=     {
    WITH SYNTAX                         PostalAddress
    EQUALITY MATCHING RULE              caseIgnoreListMatch
    SUBSTRINGS MATCHING RULE            caseIgnoreListSubstringsMatch
    ID                                  id-at-postalAddress }

PostalAddress       ::=     SEQUENCE SIZE(1..ub-postal-line) OF DirectoryString {ub-postal-string}
```

The *Collective Postal Address* attribute type specifies a postal address for a collection of entries.

```
collectivePostalAddress ATTRIBUTE       ::=     {
    SUBTYPE OF                                  postalAddress
    COLLECTIVE                                  TRUE
    ID                                          id-at-collectivePostalAddress }
```