Network Working Group
INTERNET-DRAFT

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Representing the O/R Address hierarchy in the Directory Information Tree

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Abstract

This document defines a representation of the O/R Address hierarchy in the Directory Information Tree [6, 1]. This is useful for a range of purposes, including:

- Support for MHS Routing [4].
- Support for X.400/RFC 822 address mappings [2, 5].

This draft document will be submitted to the RFC editor as a protocol standard. Distribution of this memo is unlimited. Please send comments to the author or to the discussion group <mhs-ds@mercury.udev.cdc.com>.

Object Class	Mandatory
mHSCountry	M
aDMD	M
pRMD	O
mHSX121	O
mHSNumericUserIdentifier	O
mHSOrganization	O
mHSOrganizationalUnit	O
mHSPerson	O
mHSNamedObject	O
mHSTerminalID	O
mHSDomainDefinedAttribute	O

Table 1: Order of O/R Address Directory Components

1 The O/R Address Hierarchy

An O/R Address hierarchy is represented in the X.500 directory by associating directory name components with O/R Address components. An example of this is given in Figure 1. The object classes and attributes required to support this representation are defined in Figure 2. The schema, which defines the hierarchy in which these objects are represented in the directory information tree is specified in Table 1. A given object class defined in the table will always be higher in the DIT than an object class defined lower down the table. Valid combinations of O/R Address components are defined in X.400.

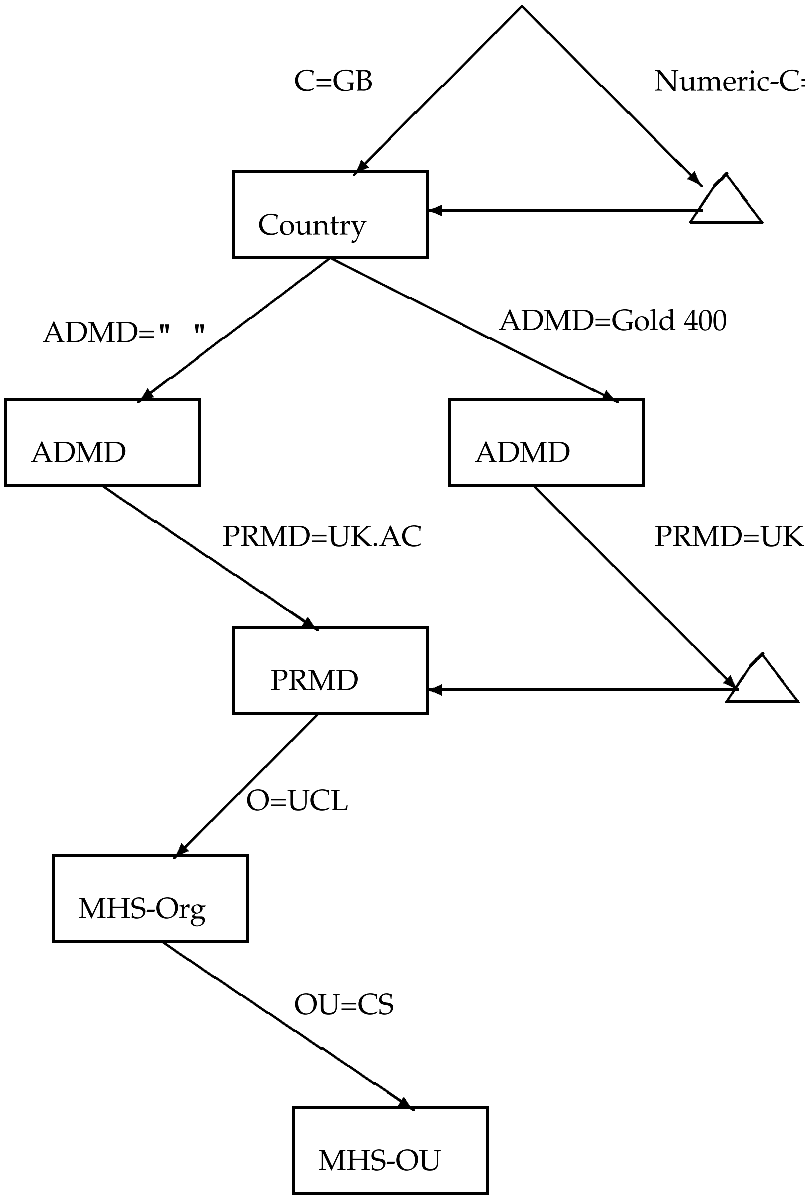

Figure 1: Example O/R Address Tree

```
IMPORTS
 ub-domain-name-length, ub-domain-name-length, ub-organization-name-length,
 ub-organizational-unit-name-length, ub-common-name-length,
 ub-x121-address-length, ub-domain-defined-attribute-type-length,
 ub-domain-defined-attribute-value-length, ub-terminal-id-length,
 ub-numeric-user-id-length, ub-country-name-numeric-length,
 ub-surname-length, ub-given-name-length,  ub-initials-length
 ub-generational-qualifier-length

  FROM MTSUpperBounds {joint-iso-ccitt mhs-motis(6) mts(3)
    modules(0) upper-bounds(3) };

mHSCountry OBJECT-CLASS
  SUBCLASS OF  country
  MAY CONTAIN {
          mHSNumericCountryName }
  ::= oc-mhs-country

mHSNumericCountryName ATTRIBUTE
  WITH ATTRIBUTE-SYNTAX
          NumericString (SIZE (ub-numeric-country-name-numeric-lenght))
  SINGLE VALUE
  ::= at-mhs-numeric-country-name

aDMD OBJECT-CLASS
  SUBCLASS OF top
  MUST CONTAIN {aDMDName }
  ::= oc-admd

aDMDName ATTRIBUTE
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-domain-name-length))
  ::= at-admd-name

pRMD OBJECT-CLASS
  SUBCLASS OF top
  MUST CONTAIN {pRMDName }
  ::= oc-prmd

pRMDName ATTRIBUTE
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-domain-name-length))
  ::= at-prmd-name

mHSOrganization OBJECT-CLASS
  SUBCLASS OF top
  MUST CONTAIN {mHSOrganizationName }
  ::= oc-mhs-organization

mHSOrganizationName ATTRIBUTE
  SUBTYPE OF organizationName
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-organization-name-length))
  ::= at-mhs-organization-name
```

```
mHSOrganizationalUnit OBJECT-CLASS
  SUBCLASS OF top
  MUST CONTAIN {mHSOrganizationalUnitName }
  ::= oc-mhs-organizational-unit

mHSOrganizationalUnitName ATTRIBUTE
  SUBTYPE OF organizationalUnitName
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-organizational-unit-name-length))
  ::= at-mhs-organizational-unit-name

mHSPerson OBJECT-CLASS
  SUBCLASS OF top
  MUST CONTAIN {mHSSurname}
  MAY CONTAIN {mHSGivenName, mHSInitials, mHSGenerationalQualifier}
  ::= oc-mhs-person

mHSSurname ATTRIBUTE
  SUBTYPE OF surname
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-surname-lenght))
  ::= at-mhs-surname

mHSGivenName ATTRIBUTE
  SUBTYPE OF givenName
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-given-name-length))
  ::= at-mhs-given-name

mHSInitials ATTRIBUTE
  SUBTYPE OF initials
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-initials-length))
  ::= at-mhs-initials

mHSGenerationalQualifier ATTRIBUTE
  SUBTYPE OF generationQualifier
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-generational-qualifier-length))
  ::= at-mhs-generational-qualifier

mHSNamedObject OBJECT-CLASS
  SUBCLASS OF top
  MUST CONTAIN {mHSCommonName}
  ::= oc-mhs-named-object

mHSCommonName ATTRIBUTE
  SUBTYPE OF commonName
  WITH ATTRIBUTE-SYNTAX
          caseIgnoreStringSyntax (SIZE (1..ub-common-name-length))
  ::= at-mhs-common-name

mHSX121 OBJECT-CLASS
  SUBCLASS OF top
  MUST CONTAIN {mHSX121Address}
  ::= oc-mhs-x121
```

```
mHSX121Address ATTRIBUTE
   WITH ATTRIBUTE-SYNTAX
              caseIgnoreStringSyntax (SIZE (1..ub-x121-address-length))
   ::= at-x121-address

mHSDomainDefinedAttribute OBJECT-CLASS
   SUBCLASS OF top
   MUST CONTAIN {
              mHSDomainDefineAttributeType,
              mHSDomainDefineAttributeValue}
   ::= oc-mhs-domain-defined-attribute

mHSDomainDefinedAttributeType ATTRIBUTE
   WITH ATTRIBUTE-SYNTAX
              caseIgnoreStringSyntax
 (SIZE (1..ub-domain-defined-attribute-type-length))
   SINGLE VALUE
   ::= at-mhs-domain-defined-attribute-type

mHSDomainDefinedAttributeValue ATTRIBUTE
   WITH ATTRIBUTE-SYNTAX
              caseIgnoreStringSyntax
 (SIZE (1..ub-domain-defined-attribute-value-length))
   SINGLE VALUE
   ::= at-mhs-domain-defined-attribute-value


mHSTerminalID OBJECT-CLASS
   SUBCLASS OF top
   MUST CONTAIN {mHSTerminalIDName}
   ::= oc-mhs-terminal-id

mHSTerminalIDName ATTRIBUTE
   WITH ATTRIBUTE-SYNTAX
              caseIgnoreStringSyntax (SIZE (1..ub-terminal-id-length))
   ::= at-mhs-terminal-id-name


mHSNumericUserIdentifier OBJECT-CLASS
   SUBCLASS OF top
   MUST CONTAIN {mHSNumericUserIdentifierName}
   ::= oc-mhs-numeric-user-id

mHSNumericeUserIdentifierName ATTRIBUTE
   WITH ATTRIBUTE-SYNTAX
              caseIgnoreStringSyntax (SIZE (1..ub-numeric-user-id-length))
   ::= at-mhs-numeric-user-id-name
```

Figure 2: O/R Address Hierarchy

Some choices of interest that are made in this hierarchy:

- The representation is defined so that it is straightforward to make a mechanical transformation in either direction. This requires that each node is named by an attribute whose type can determine the mapping.
- Where there are multiple domain defined attributes, the first in the sequence is the most significant.
- Physical Delivery (postal) addresses are not represented in this hierarchy. This is primarily because physical delivery can be handled by the Access Unit routing mechanisms defined in [4], and there is no need for this representation.
- Terminal and network forms of address are not handled, except for X.121 form, which is useful for addressing faxes.
- MHSCountry is defined as a subclass of Country, and so the same entry will be used for MHS Routing as for the rest of the DIT.
- The numeric country code will be an alias.
- ADMD will always be present in the hierarchy. This is true in the case of " " and of "0". This facilitates an easy mechanical transformation between the two forms of address.
- Each node is named by the relevant part of the O/R Address.
- Aliases may be used in other parts of the tree, in order to normalise alternate values. Where an alias is used, the value of the alias should be present as an alternate value in the node aliased to. Aliases may not be used for domain defined attributes.
- Domain Defined Attributes are named by a multi-valued RDN (Relative Distinguished Name), consisting of the type and value. This is done so that standard attribute syntaxes can be used.
- Where an O/R Address has a valid Printable String and T.61 form, both must be present, with one as an alias for the other. When both are present in the O/R Address, either may be used to construct the distinguished name.
- Personal name is handled by use of the `mHSPerson` object class. Each of the components of the personal name will be present in the relative distinguished name, which will usually be multi-valued.

The relationship between X.400 O/R Addresses and the X.400 Entries (Attribute Type and Object Class) are given in Table 2. Where there are multiple Organizational Units or Domain Defined Attributes, each component is mapped onto a single X.500 entry.

O/R Address	Object Class	Naming Attribute
C	mHSCountry	countryName or mHSNumericCountryName
ADMD	aDMD	aDMDName
PRMD	pRMD	pRMDName
O	mHSOrganization	mHSOrganizationName
OU	mHSOrganizationalUnit	mHSOrganizationalUnitName
PN	mHSPerson	personName
CN	mHSNamedObject	mHSCommonName
X121	mHSX121	mHSX121Address
T-ID	mHSTerminalID	mHSTerminalIDName
UA-ID	mHSNumericUserIdentifier	mHSNumericUserIdentifierName
DDA	mHSDomainDefinedAttribute	mHSDomainDefinedAttributeType and mHSDomainDefinedAttributeValue

Table 2: O/R Address relationship to Directory Name

Note: When an X.121 address is used for addressing fax transmission, this may only be done relative to the PRMD. This is in line with the current X.400 standards position. This means that it is not possible to use this form of addressing for an organisational or departmental fax gateway service.

2 Notation

O/R Addresses are written in the RARE WG1 syntax ***REF.

Distinguished Names used the string representation of distinguished names defined in [3]. The keywords used for the attributes defined in this specification are given in Table 3.

3 Example Representation

The O/R Address:

```
I=S; S=Kille; OU=CS; O=UCL,
PRMD=UK.AC; ADMD=Gold 400; C=GB;
```

would be represented in the directory as:

```
MHS-I=S + MHS-S=Kille, MHS-OU=CS, MHS-O=UCL,
PRMD=UK.AC, ADMD=Gold 400, C=GB
```

Attribute	Keyword
mHSNumericCountryName	MHS-Numeric-Country
aDMDName	ADMD
pRMDName	PRMD
mHSOrganizationName	MHS-O
mHSOrganizationalUnitName	MHS-OU
mHSSurname	MHS-S
mHSGivenName	MHS-G
mHSInitials	MHS-I
mHSGenerationalQualifier	MHS-GQ
mHSCommonName	MHS-CN
mHSX121Address	MHS-X121
mHSDomainDefinedAttributeType	MHS-DDA-Type
mHSDomainDefinedAttributeValue	MHS-DDA-Value
mHSTerminalIDName	MHS-T-ID
mHSNumericeUserIdentifierName	MHS-UA-ID

Table 3: Keywords for String DN Representation

4 Mapping from O/R Address to Directory Name

The primary application of this mapping is to take an X.400 encoded O/R Address and to generate an equivalent directory name. This mapping is only used for selected types of O/R Address:

- Mnemonic form
- Numeric form
- Terminal form, where country is present and X121 addressing is used

Other forms of O/R address are handled by Access Unit mechanisms.

The O/R Address is treated as an ordered list, with the order as defined in Table 1. For each O/R Address attribute, generate the equivalent directory naming attribute. In most cases, the mapping is mechanical. Printable String or Teletex encodings are chosen as appropriate. Where both forms are present in the O/R Address, the Teletex form only should be used to generate the distinguished name. There are two special cases:

1. A DDA generates a multi-valued RDN
2. The Personal Name is mapped to the attribute according to RFC 1327

In many cases, an O/R Address will be provided, and only the higher components of the address will be represented in the DIT. In this case, the "longest possible match" should be returned.

5 Mapping from Directory Name to O/R Address

The reverse mapping is also needed in some cases. All of the naming attributes are unique, so the mapping is mechanically reversible.

References

[1] The Directory — overview of concepts, models and services, December 1988. CCITT X.500 Series Recommendations.

[2] S.E. Kille. Mapping between X.400(1988) / ISO 10021 and RFC 822. Request for Comments 1327, Department of Computer Science, University College London, May 1992.

[3] S.E. Kille. A string representation of distinguished name. Request for Comments in preparation, Department of Computer Science, University College London, January 1992.

[4] S.E. Kille. MHS use of the directory to support MHS routing, July 1993. Internet Draft.

[5] S.E. Kille. Use of the directory to support mapping between X.400 and RFC 822 addresses, July 1993. Internet Draft.

[6] CCITT recommendations X.400 / ISO 10021, April 1988. CCITT SG 5/VII / ISO/IEC JTC1, Message Handling: System and Service Overview.

6 Security Considerations

Security considerations are not discussed in this INTERNET–DRAFT .

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A Object Identifier Assignment

```
mhs-ds OBJECT-IDENTIFIER ::= {iso(1) org(3) dod(6) internet(1) private(4)
        enterprises(1) isode-consortium (453) mhs-ds (7)}


tree OBJECT IDENTIFIER ::= {mhs-ds 2}

oc OBJECT IDENTIFIER ::= {tree 1}
at OBJECT IDENTIFIER ::= {tree 2}

oc-admd OBJECT IDENTIFER ::= {oc 1}
oc-mhs-country OBJECT IDENTIFER ::= {oc 2}
oc-mhs-domain-defined-attribute OBJECT IDENTIFER ::= {oc 3}
oc-mhs-named-object OBJECT IDENTIFER ::= {oc 4}
oc-mhs-organization OBJECT IDENTIFER ::= {oc 5}
oc-mhs-organizational-unit OBJECT IDENTIFER ::= {oc 6}
oc-mhs-person OBJECT IDENTIFER ::= {oc 7}
oc-mhs-x121 OBJECT IDENTIFER ::= {oc 8}
oc-prmd OBJECT IDENTIFER ::= {oc 9}
oc-mhs-terminal-id OBJECT IDENTIFER ::= {oc 10}
oc-mhs-numeric-user-id OBJECT IDENTIFER ::= {oc 11}

at-admd-name OBJECT IDENTIFER ::= {at 1}
at-mhs-common-name OBJECT IDENTIFER ::= {at 2}
at-mhs-domain-defined-attribute-type OBJECT IDENTIFER ::= {at 3}
at-mhs-domain-defined-attribute-value OBJECT IDENTIFER ::= {at 4}
at-mhs-numeric-country-name OBJECT IDENTIFER ::= {at 5}
at-mhs-organization-name OBJECT IDENTIFER ::= {at 6}
at-mhs-organizational-unit-name OBJECT IDENTIFER ::= {at 7}
at-prmd-name OBJECT IDENTIFER ::= {at 10}
at-x121-address OBJECT IDENTIFER ::= {at 12}
at-mhs-terminal-id-name OBJECT IDENTIFER ::= {at 13}
at-mhs-numeric-user-id-name  OBJECT IDENTIFER ::= {at 14}
at-mhs-surname OBJECT IDENTIFIER ::= {at 15}
at-mhs-given-name OBJECT IDENTIFIER ::= {at 16}
at-mhs-initials OBJECT IDENTIFIER ::= {at 17}
at-mhs-generational-qualifier OBJECT IDENTIFIER ::= {at 18}
```

Figure 3: Object Identifier Assignment