Network Working Group
INTERNET-DRAFT

S.E. Kille
ISODE Consortium

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Use of the X.500 Directory to support mapping between X.400 and RFC 822 Addresses

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Abstract

This document defines how to use directory to support the mapping between X.400 O/R Addresses and mailboxes defined in RFC 1327 [2].

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>.

1 X.400/RFC 822 Mappings

RFC 1327 defines an algorithm for maintaining a global mapping between X.400 and RFC 822 addresses directory [2]. RFC 1327 also defines a table based mechanism for maintaining this mapping. There is substantial benefit to maintaining this mapping within the directory. In particular, this will lead to an approach for managing the mapping which is both distributed and scalable.

Mechanisms for representing O/R Address and Domain hierarchies within the DIT are defined in [1, 5]. These techniques are used to define two independent subtrees in the DIT, which contain the mapping information. The benefits of this approach are:

1. The mapping information is kept in a clearly defined area which can be widely replicated in an efficient manner. The tree is constrained to hold only information needed to support the mapping. This is important as gateways need good access to the entire mapping.
2. It facilitates migration from the currently deployed table-based approach.
3. It handles the issues of "missing components" in a natural manner.

   An alternative approach which is not taken is to locate the information in the routing subtrees. The benefits of this would be:

   - *It is the "natural" location, and will also help to ensure correct administrative authority for a mapping definition.*
   - *The tree will usually be accessed for routing, and so it will be efficient for addresses which are being routed.*

   This is not done, as the benefits of the approach proposed are greater.

There are three mappings, which are represented by two subtrees located under:

```
OU=X.400/RFC 822 Mapping,  O=Internet
```

These subtree roots are of object class `subtree`, and use the mechanism for representing subtrees defined in [4].

X.400 to RFC 822 This table gives the equivalence mapping from X.400 to RFC 822. There is an O/R Address tree under this. An example entry is:

```
PRMD=UK.AC, ADMD=Gold 400, C=GB, CN=X.400 to RFC 822,
OU=X.400/RFC 822 Mapping,  O=Internet
```

```
rFC822ToX400Mapping OBJECT−CLASS ::= {
  SUBCLASS OF {domain−component}
  MAY CONTAIN {
        associatedORAddress|
        associatedX400Gateway}
  ID oc−rfc822−to−x400−mapping}

x400ToRFC822Mapping OBJECT−CLASS ::= {
  SUBCLASS OF {top}
  MAY CONTAIN {
        associatedDomain}
  ID oc−x400−to−rfc822−mapping}


associatedORAddress ATTRIBUTE ::= {
  SUBTYPE OF distinguishedName
  SINGLE VALUE
  ID at−associated−or−address}


associatedX400Gateway ATTRIBUTE ::= {
  SUBTYPE OF mhs−or−addresses
  MULTI VALUE
  ID at−associated−x400−gateway}

associatedDomain ATTRIBUTE ::= {
  SUBTYPE OF name
  WITH SYNTAX caseIgnoreIA5String
  SINGLE VALUE
  ID at−associated−domain}
```

Figure 1: Object Classes for RFC 1327 mappings

RFC 822 to X.400 There is a domain tree under this. This table holds the equivalence mapping from RFC 822 to X.400, and the gateway mapping defined in RFC 1327. An example entry is:

```
DomainComponent=ISODE, DomainComponent=COM,
CN=RFC 822 to X.400,
OU=X.400/RFC 822 Mapping,  O=Internet
```

The values of the table mapping are defined by use of two new object classes, as specified in Figure 1. The objects give pointers to the mapped components.

```
omittedORAddressComponent OBJECT−CLASS ::=
        SUBCLASS OF {top}
        MUST Contain {
                oRAddressComponentType
        }
        ID oc−omitted−or−address−component}


oRAddressComponentType ATTRIBUTE ::= {
        SUBTYPE OF  objectIdentifier                                    10
        SINGLE VALUE
        ID at−or−address−component−type}
```

Figure 2: Omitted O/R Address Component

2 Omitted Components

In RFC 1327, it is possible to have omitted components in O/R Addresses on either side of the mapping. A mechanism to represent such omitted components is defined in Figure 2.

The attribute `at-or-address-component-type` is set to the X.500 attribute type associated with the omitted component (e.g., `at-prmd-name`). This mechanism is for use only within the `X.400 to RFC 822` subtree and for the `at-associated-or-address` attribute.

3 Mapping from X.400 to RFC 822

As an example, consider the mapping from the O/R Address:

```
P=UK.AC; A=Gold 400; C=GB
```

This would be keyed by the directory entry:

```
PRMD=UK.AC, ADMD=Gold 400, C=GB, CN=X.400 to RFC 822,
OU=X.400/RFC 822 Mapping,  O=Internet
```

and return the mapping from the `associatedDomain` attribute, which gives the domain which this O/R address maps to. This attribute is used to define authoritative mappings, which are placed in the open community tree. The manager of an RFC 1327 mapping shall make the appropriate entry.

Functionally, mapping takes place exactly according to RFC 1327. The longest match is found by the following algorithm.

1. Take the O/R Address, and derive a directory name. This will be the O/R Address as far as the lowest OU.
2. Look up the entire name derived from the RFC 1327 key in the in the `X.400 to RFC 822` subtree. This lookup will either succeed, or it will fail and indicate the longest possible match, which can then be looked up.
3. Check for an `associatedDomain` attribute in the matched entry.

The mapping can always be achieved with two lookups.

Because of the availability of aliases, some of the table mappings may be simplified. In addition, the directory can support mapping from addresses using the numeric country codes.

4 Mapping from RFC 822 to X.400

There is an analogous structure for mappings in the reverse direction. The domain hierarchy is represented in the DIT according to RFC 1279. The domain:

```
AC.UK
```

Is represented in the DIT as:

```
DomainComponent=AC, DomainComponent=UK,  CN=RFC 822 to X.400,
OU=X.400/RFC 822 Mapping,  O=Internet
```

This has associated with it the attribute `associatedORAddress` encoded as a distinguished name with a value:

```
PRMD=UK.AC, ADMD=Gold 400, C=GB
```

The "table 3" mapping defined in RFC 1327[2] is provided by the `associatedX400Gateway` attribute. This value may identify multiple possible associated gateways. This information is looked up at the same time as mapped O/R addresses. In effect, this provides a fallback mapping, which is found if there is no equivalence mapping. Because of the nature of the mapping a domain will map to either a gateway or a domain, but not both. Thus, there shall never be both an `associatedX400Gateway` and `associatedORAddress` attribute present in the same entry. Functionally, mapping takes place exactly according to RFC 1327. The longest match is found by the following algorithm.

1. Derive a directory name from the domain part of the RFC 822 address.

2. Look up this name in the `RFC 822 to X.400` subtree to find the mapped value (either `associatedORAddress` or `associatedX400Gateway`.). If the lookup fails, the error will indicate the longest match, which can then be looked up.

If `associatedORAddress` is found, this will define the mapped O/R Address. The mapping can always be achieved with two lookups. If an `associatedX400Gateway` is present, the address in question will be encoded as a domain defined attribute, relative to the O/R Address defined by this attribute. If multiple `associatedX400Gateway` attributes are found, the MTA may select the one it chooses to use.

Because of the availability of aliases, some of the table mappings may be simplified. In addition, the directory can support mapping from addresses using the numeric country codes.

5 Acknowledgements

Acknowledgements for work on this document are given in [3].

References

[1] S.E. Kille. X.500 and domains. Request for Comments RFC 1279, Department of Computer Science, University College London, November 1991.

[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. MHS use of the X.500 directory to support MHS routing, June 1994. Internet Draft.

[4] S.E. Kille. Representing tables and subtrees in the X.500 directory, June 1994. Internet Draft.

[5] S.E. Kille. Representing the O/R Address hierarchy in the X.500 directory information tree, June 1994. Internet Draft.

6 Security Considerations

Security considerations are not discussed in this INTERNET–DRAFT.

7 Author's Address

Steve Kille
ISODE Consortium
The Dome
The Square
Richmond
TW9 1DT
England

Phone: +44-81-332-9091

Internet EMail: S.Kille@ISODE.COM

X.400: I=S; S=Kille; O=ISODE Consortium; P=ISODE;
A=Mailnet; C=FI;

UFN: S. Kille, ISODE Consortium, GB

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)}

mapping OBJECT IDENTIFIER ::= {mhs−ds 4}

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


oc−rfc822−to−x400−mapping OBJECT IDENTIFIER ::= {oc 1}
oc−x400−to−rfc822−mapping OBJECT IDENTIFIER ::= {oc 2}
oc−omitted−or−address−component OBJECT IDENTIFIER ::= {oc 3}

at−associated−or−address OBJECT IDENTIFIER ::= {at 6}
at−associated−x400−gateway OBJECT IDENTIFIER ::= {at 3}
at−associated−domain OBJECT IDENTIFIER ::= {at 4}
at−or−address−component−type OBJECT IDENTIFIER ::= {at 7}
```

Figure 3: Object Identifier Assignment