Network Working Group
Request for Comments: 1838
Category: Experimental

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August 1995

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

Status of this Memo

This memo defines an Experimental Protocol for the Internet community. This memo does not specify an Internet standard of any kind. Discussion and suggestions for improvement are requested. Distribution of this memo is unlimited.

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].

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

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.

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.

```
-------------------------------------------------------------------------
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 {                                                    10
        associatedDomain}
    ID oc-x400-to-rfc822-mapping}


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

                                                                     20
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}                                         30
```

Figure 1: ObjectClasses for RFC 1327 mappings

```
-------------------------------------------------------------------------
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

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] Kille, S. "X.500 and Domains", RFC 1279, Department of Computer Science, University College London, November 1991.

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

[3] Kille, S., "MHS Use of the X.500 Directory to Support MHS Routing", RFC 1801, ISODE Consortium, June 1995.

[4] Kille, S., "Representing Tables and Subtrees in the X.500 Directory", RFC 1837, ISODE Consortium, August 1995.

[5] Kille, S., "Representing the O/R Address Hierarchy in the X.500 Directory Information Tree", RFC 1836, ISODE Consortium, August 1995.

6. Security Considerations

Security issues are not discussed in this memo.

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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}              10
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