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Use of an X.500/LDAP directory to support MIXER address mapping

Abstract

This document defines how to use an X.500 or LDAP directory to support the mapping between X.400 OR Addresses and mailboxes defined in MIXER (RFC 1327bis) [5].
This draft document will be submitted to the RFC editor as a protocol standard. Distribution of this memo is unlimited.

1 MIXER X.400/RFC 822 Mappings

MIXER (RFC 1327bis) defines an algorithm for use of a set of global mapping between X.400 and RFC 822 addresses [5]. This specification defines how to represent and maintain these mappings (MIXER Conformant Global Address Mappings of MCGAMs) in an X.500 or LDAP directory.

Mechanisms for representing OR Address and Domain hierarchies within the DIT are defined in [1, 3]. 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 a 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.

MCGAMs are global. A MIXER gateway may use any set of MCGAMs. A key use of the directory is to enable MIXER gateways to share MCGAMs and to share the effort of maintaining and publishing MCGAMs. This specification and MIXER also recognise that there is not a single unique location for publication of all MCGAMs. This specification

allows for multiple sets of MCGAMs to be published. Each set of MCGAMs is published under a single part of the directory.
There are four mappings, which are represented by two subtrees located under any part of the DIT. For the examples the location defined below is used:

OU=MIXER MCGAMs, O=Zydeco Plc, C=GB

These subtree roots are of object class subtree, and use the mechanism for representing subtrees defined in [2].

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

PRMD=Isode, ADMD=Mailnet, C=FI, CN=X.400 to RFC 822,
OU=MIXER MCGAMs, O=Zydeco Plc, C=GB

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=MIXER MCGAMs, O=Zydeco Plc, C=GB

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 MIXER, it is possible to have omitted components in OR 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.,

---

```
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|
        associatedInternetGateway}
    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

associatedInternetGateway ATTRIBUTE ::= {
    SUBTYPE OF name
    WITH SYNTAX caseIgnoreIA5String
    MULTI VALUE
    ID at-associated-internet-gateway}
```

Figure_1:__Object_Classes_for_MIXER_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_OR_Address_Component_____

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 OR Address:

P=Isode; A=Mailnet; C=FI

This would be keyed by the directory entry:

PRMD=Isode, ADMD=Mailnet, C=FI, CN=X.400 to RFC 822,
OU=MIXER MCGAMs, O=Zydeco Plc, C=GB

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

The Internet gateway mapping defined in MIXER[5] is provided by the associatedInternetGateway attribute. This value may identify multiple possible associated gateways. This information is looked up at the same time as mapped OR addresses. In effect, this provides a fallback

mapping, which is found if there is no equivalence mapping. Because of the nature of the mapping an OR Address will map to either a gateway or a domain, but not both. Thus, there shall never be both an associatedDomain and associatedInternetGateway attribute present in

the same entry. Functionally, mapping takes place exactly according to MIXER. The longest match is found by the following algorithm.

1. **Take the OR Address, and derive a directory name.** This will be the OR Address as far as the lowest OU.

2. **Look up the entire name derived from the MIXER 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 or associatedInternetGateway 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:

ISODE.COM

Is represented in the DIT as:

DomainComponent=ISODE, DomainComponent=COM, CN=RFC 822 to X.400, OU=MIXER MCGAMs, O=Zydeco Plc, C=GB

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

PRMD=Isode, ADMD=Mailnet, C=FI

The X.400 gateway mapping defined in MIXER[5] 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 OR 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 MIXER. 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 OR 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 OR 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 Gateway Selection of MCGAMs

The directory information to support identification of MCGAMs is given in Figure 3. A MIXER gateway simply identifies the an ordered lists of MCGAM collections that it will use for lookup. These are referenced by name.
A gateway is not required to use any MCGAMs. Where MCGAMs are accessed from multiple sources, it is recommended that all of the sources be accessed in order to determine the MCGAM which gives the


```
mixerGateway OBJECT-CLASS ::=
        KIND auxiliary
        SUBCLASS OF {mhs-message-transfer-agent}
```

```
        MUST Contain {
                mcgamTables
        }
        ID oc-mixer-gateway}


mcgamTables ATTRIBUTE ::= {                                          10
        WITH SYNTAX SEQUENCE OF DistinguishedName
        SINGLE VALUE
        ID at-mcgam-tables}
```

Figure 3: Object Classes for MCGAM selection

best match.

6 Acknowledgements

Acknowledgements for work on this document are given in [4].

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. Representing tables and subtrees in the X.500 directory. Request for Comments RFC 1837, Isode Ltd., August 1995.

[3] S.E. Kille. Representing the O/R Address hierarchy in the X.500 directory information tree. Request for Comments RFC 1836, Isode Ltd., August 1995.

[4] S.E. Kille. X.400-MHS use of the X.500 directory to support X.400-MHS routing. Request for Comments RFC 1801, Isode Ltd., June 1995.

[5] S.E. Kille. MIXER (Mime Internet X.400 Enhanced Relay): Mapping between X.400 and RFC 822/MIME. Request for Comments RFC 1327bis, Isode Ltd., February 1997.

7 Security Considerations

This document specifies a means by which the X.500/LDAP directory service can direct the translation between X.400 and Internet mail addresses. This can indirectly affect the routing of messages across a gateway between X.400 and Internet Mail. A succesful attack on this service could cause incorrect translation of an originator address (thus "forging" the originator address), or incorrect translation of a recipient address (thus directing the mail to an unauthorized recipient, or making it appear to an authorized recipient, that the message was intended for recipients other than those chosen by the originator).
When cryptographic authentication is available for directory responses, clients shall employ those mechanisms to verify the authenticity and integrity of those responses.

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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)}

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}
oc-mixer-gateway ::= {oc 4}

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}
at-associated-internet-gateway OBJECT IDENTIFIER ::= {at 8}
at-mcgam-tables ::= {at 9}                                          20
```

Figure 4: Object Identifier Assignment