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

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1   MIXER X.400/RFC 822 Mappings

MIXER (RFC 2156) defines an algorithm for use of a set of global
mapping between X.400 and RFC 822 addresses [4]. 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 [5, 2]. 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:

         o It is the "natural" location, and will also help to
            ensure correct administrative authority for a mapping
            definition.

         o 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 [1].

   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[4] 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[4] 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 [3].

References

   [1] Kille, S., "Representing tables and subtrees in the X.500
       directory", RFC 1837, August 1995.

   [2] Kille, S., "Representing the O/R Address hierarchy in the X.500
       directory information tree," RFC 1836, August 1995.

   [3] Kille, S., " X.400-MHS use of the X.500 directory to support
       X.400-MHS routing," RFC 1801, June 1995.

   [4] Kille, S., "MIXER (Mime Internet X.400 Enhanced Relay):
       Mapping between X.400 and RFC 822/MIME," RFC 2156, January 1998.

   [5] Kille, S., Wahl, M., Grimsatd, A., Huber, R., and S. Sataluri,
       "Using Domains in LDAP/X.500 Distinguished Names", RFC 2247,
       January 1998.

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

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