Simple Mail Transfer Protocol (SMTP) Binding Profile

1. Introduction

The term labelling is the process of determining the appropriate metadata for a given data object, creating the metadata label and binding the metadata label to the data object. A binding is a relationship between a data object and a metadata label. A binding is realized by applying a binding mechanism. If a metadata label must be bound to a data object, both the metadata label and the data object are input to the binding mechanism. The output of the binding mechanism is the binding of a data object and metadata label (see Figure 1) which says that the data object and the metadata label belong together. The binding can be recorded as a structured data object, known as a Binding Data Object (BDO).
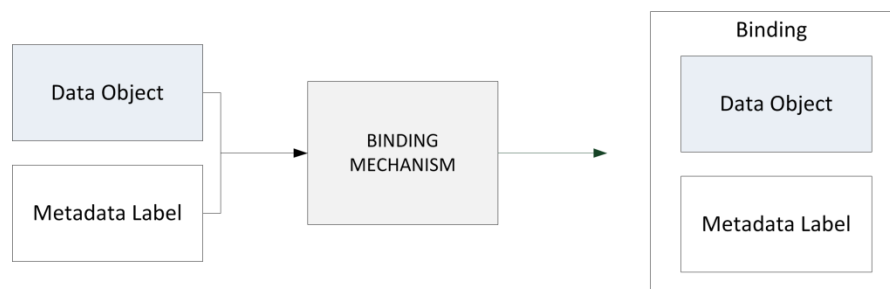

Figure 1 Creation of a binding

STANAG 4778 (Reference [2]) standardizes the binding of a data object and metadata label by specifying a common binding mechanism and a syntax for representing the BDO. However, to support information management and information sharing requirements it is necessary to further profile the application of STANAG 4778 to facilitate locating a BDO and embedding a BDO in data objects.

2. SMTP Introduction

This profile specifies the mechanism for binding metadata to Internet Email (Reference [3]) (both formal and informal) including MIME entities. A MIME entity can be a sub-part, sub-parts of a message or the message with all its sub-parts. A MIME entity that is the message includes only the MIME message headers and MIME body, and does not include the Internet Email headers. For the purposes of this profile, a message is an Internet Email conformant with Reference [3] that can optionally include MIME entities.

This profile does not support the capability for referencing Internet Email headers (or subsets thereof).

3. Identification

The profile for SMTP is uniquely identified by the Canonical Identifier shown in Table 1.

Table 1: Profile Identifiers

Type	Identifier
Canonical Identifier	urn:nato:stanag:4778:profile:smtp
Version Identifier	urn:nato:stanag:4778:profile:smtp:1:0

It is recognized that this profile may evolve during its review cycle. For example, a review might identify:

- changes to the base SMTP standards
- improvements to the existing profiles based upon operational feedback

Therefore this version of the profile is uniquely identified by the Version Identifier shown in Table 1.

Subsequent versions of this profile will maintain the same Canonical Identifier, but define a new Version Identifier.

4. Standards

[1] STANAG 4774, Confidentiality Metadata Label Syntax, Brussels, Belgium

[2] STANAG 4778, Metadata Binding Mechanism, Brussels, Belgium

[3] IETF RFC 5322, "Internet Message Format", at http://tools.ietf.org/html/rfc5322, October 2008.

[4] IETF RFC 7444, "Security Labels in Internet Email", K. Zeilenga and A. Melnikov, at http://tools.ietf.org/html/rfc7444, February 2015.

[5] IETF RFC 2392, "Content-ID and Message-ID Uniform Resource Locators", at http://tools.ietf.org/html/rfc2392, August 1998.

[6] IETF RFC 2045, "Multipurpose Internet Mail Extensions(MIME) Part One: Format of Internet Message Bodies", at http://tools.ietf.org/html/rfc2045, November 1996

[7] IETF RFC 2231, "MIME Parameter Value and Encoded Word Extensions: Character Sets, Languages, and Continuations", at http://tools.ietf.org/html/rfc2231, November 1997.

5. Notational Conventions

- The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [IETF RFC 2119, 1997].
- Words in *italics* indicate terms derived from Reference [2].
- `Courier font` indicates syntax derived from SIO[1]-Label (Reference [4]), Message-ID ((Reference [5])) and Content-ID (Reference [5]) URI schemes and MIME Entities (Reference [6]).

6. Internet Email Structure

The BDO is an embedded BDO that MUST contain at least one *MetadataBinding* that contains a *DataReference URI* attribute value conformant with the Message-ID Uniform Resource Locator, `mid`, scheme according to (Reference [5]). By conforming to Reference [5] to syntactically and semantically interpret the *DataReference URI* attribute allows for the metadata to be bound to the entire message.

The *DataReference xmime:contentType* attribute value is REQUIRED when the *URI* attribute value is the `mid` URI scheme.

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[1] SIO stands for Security Information Object, as defined in X.841

The *DataReference xmime:contentType* attribute value SHALL be *message/rfc822* when the *URI* attribute value is the `mid` URI scheme.

This profile requires that the SIO-Label header field as specified in (Reference [4]) SHALL be used to embed the BDO within the Informal Email.

The BDO MUST be included in the SIO-Label header `label` parameter.

The SIO-Label `label` parameter value MUST be the `base64` encoding of the BDO.

The SIO-Label `type` parameter MUST be present with the value *urn:nato:stanag:4778:bindinginformation:1:0*.

It must be noted that the `label` parameter SHALL conform to Reference [7] (as specified in Reference [4]) specifically in relation to parameter value continuation.

Depending upon the line length limit (recommended to be 78 characters or less and not more than 998 characters – see Reference [3]) the `label` parameter SHALL be split into multiple `label` parameters, as illustrated below.

label*0="PFNlY0xhYmVsIHhtbG5zPSJodHRwOi8vZXhhbX";

label*1="BsZS5jb20vc2VjLWxhYmVsLzAiPjxQb2xpY3lJ";

label*2="ZGVudGlmaWVyIFVSST0idXJuOm9pZDoxLjEiLz";

label*3="48Q2xhc3NpZmljYXRpb24+MzwvQ2xhc3NpZmlj";

label*4="YXRpb24+PC9TZWNNYWJlbD4=";

An example of an Embedded BDO contained in the SIO-Label header field of an Informal Email that illustrates the binding of Confidentiality Metadata Labels (Reference [1]) as example metadata to the message is provided in **Figure 2**.

```
From: alan.ross@smhs.co.uk
To: alan.ross@reach.nato.int
SIO-Label: type="urn:nato:stanag:4778:bindinginformation:1:0"; label=<base64 BIO>
Message-Id: <unique-msg-id@smhs.co.uk>

This is a simple informal message




  <mb:BindingInformation
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:mb="urn:nato:stanag:4778:bindinginformation:1:0"
    xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
    xmlns:xmime="http://www.w3.org/2005/05/xmlmime">
    <mb:MetadataBindingContainer>
     <mb:MetadataBinding>
      <mb:Metadata>
       <slab:originatorConfidentialityLabel
         xmlns:slab="urn:nato:stanag:4774:confidentialitymetadatalabel:1:0">
        <slab:ConfidentialityInformation>
         <slab:PolicyIdentifier>ACME</slab:PolicyIdentifier>
         <slab:Classification>UNCLASSIFIED</slab:Classification>
        </slab:ConfidentialityInformation>
        <slab:CreationDateTime>
         2015-09-30T12:30:00Z
        </slab:CreationDateTime>
       </slab:originatorConfidentialityLabel>
      </mb:Metadata>
      <mb:DataReference
       URI="mid://unique-msg-id@smhs.co.uk"
       xmime:contentType="message/rfc822"/>
     </mb:MetadataBinding>
    </mb:MetadataBindingContainer>
  </mb:BindingInformation>
```

Figure 2: Example of Binding Confidentiality Metadata Label to Email

In the case where metadata is to be bound to individual MIME bodyparts, the *URI* attribute of the *DataReference* element MUST use the Content-ID Uniform Resource Locator, `cid`, scheme according to (Reference [5]).

The MIME `Content-Type` header field value, that indicates the internet media type of the MIME bodypart, SHALL be used as the *DataReference xmime:contentType* attribute value.

The example provided in **Figure 3** illustrates an Embedded BDO contained in the SIO-Label header field of an informal email where Confidentiality Metadata Labels (Reference [1]) as example metadata are bound to:
1) a message; and
2) a MIME bodypart included in the message.

```
From: alan.ross@smhs.co.uk
To: alan.ross@reach.nato.int
SIO-Label: type="urn:nato:stanag:4778:bindinginformation:1:0"; label=<base64 BIO>
Message-Id: <unique-msg-id@smhs.co.uk>
Content-Type: multipart/mixed;
      boundary="boundary-001";

--boundary-001

Content-ID: <unique-content-id-001@smhs.co.uk>
Content-Type: application/pdf;

..etc..

--boundary-001—-
   <mb:BindingInformation
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xmlns:xsd="http://www.w3.org/2001/XMLSchema"
     xmlns:mb="urn:nato:stanag:4778:bindinginformation:1:0"
     xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
     xmlns:xmime="http://www.w3.org/2005/05/xmlmime">
     <mb:MetadataBindingContainer>
      <mb:MetadataBinding>
       <mb:Metadata>
        <slab:originatorConfidentialityLabel
          xmlns:slab="urn:nato:stanag:4774:confidentialitymetadatalabel:1:0">
         <slab:ConfidentialityInformation>
          <slab:PolicyIdentifier>ACME</slab:PolicyIdentifier>
          <slab:Classification>UNCLASSIFIED</slab:Classification>
         </slab:ConfidentialityInformation>
         <slab:CreationDateTime>
          2015-09-30T12:30:00Z
         </slab:CreationDateTime>
        </slab:originatorConfidentialityLabel>
       </mb:Metadata>
       <mb:DataReference
        URI="mid://unique-msg-id@smhs.co.uk"
        xmime:contentType="message/rfc822"/>
      </mb:MetadataBinding>
      <mb:Metadata>
        <slab:originatorConfidentialityLabel
          xmlns:slab="urn:nato:stanag:4774:confidentialitymetadatalabel:1:0">
         <slab:ConfidentialityInformation>
          <slab:PolicyIdentifier>ACME</slab:PolicyIdentifier>
          <slab:Classification>RESTRICTED</slab:Classification>
         </slab:ConfidentialityInformation>
         <slab:CreationDateTime>
          2015-09-30T12:30:00Z
         </slab:CreationDateTime>
        </slab:originatorConfidentialityLabel>
       </mb:Metadata>
       <mb:DataReference
        URI="cid://unique-content-id-001@smhs.co.uk"
        xmime:contentType="application/pdf"/>
      </mb:MetadataBinding>
     </mb:MetadataBindingContainer>
    </mb:BindingInformation>
```

Figure 3: Example Binding of Confidentiality Metadata Labels to Email Message and Attachment