STANDARDS RELATED DOCUMENT

ADatP-5636.1

NATO CORE METADATA SPECIFICATION (NCMS) - IMPLEMENTATION GUIDANCE

Edition A Version 1

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

22 November 2002

1.   The enclosed Standard-related Document ADatP-5636.1, Edition A, Version 1 NATO CORE METADATA SPECIFICATION (NCMS) - IMPLEMENTATION GUIDANCE, which has been approved in conjunction with ADatP-5636 by the nations in the Consultation, Command and Control Board (C3B), is promulgated herewith.

2.   ADatP-5636.1 Edition A, Version 1 is effective upon receipt.

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4.   This publication shall be handled in accordance with C-M(2002)60.

Dimitrios SIGOULAKIS
Major General, GRC (A)
Director, NATO Standardization Office

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TABLE OF CONTENTS

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CHAPTER 1   INTRODUCTION

1.1. BACKGROUND

The Primary Directive on Information Management (PDIM) prescribes the application of metadata and markings in accordance with NATO policies and directives to facilitate sharing and control of NATO information.

The PDIM defines metadata as structured information that describes, explains, locates, and otherwise makes it easier to retrieve and use a data object. The structure consists of 'elements', each of which will contain 'values'. The values relate to the resource itself, there may be controls over what the actual values can be.

Metadata is a key enabler for the effective and efficient management of information. Modern automated information systems require data objects to be labelled with metadata.

The Dublin Core Metadata Initiative defined a small set of 15 metadata elements (standardized as ISO 15836:2009). ADatP-5636 The NATO Core Metadata Specification (NCMS) customized the Dublin Core metadata elements to meet NATO requirements.

1.2. OBJECTIVE

The NCMS defines a set of core metadata elements to support information management in the Alliance.

This document recognizes the existence of communities of interest's specific metadata standards and aims at steering their evolution in the mid to long term and at providing a single mediation standard in the short term to achieve sharing of information among different communities of interest.

1.3. SCOPE

NCMS applies to all NATO information and to any data object handled or processed by NATO's communications and information systems. NCMS describes data object and supports its consistent and appropriate handling.

All NATO civil and military bodies are mandated to use NCMS.

Allies and Partners must also use NCMS when handling NATO information.

1.4. NATO METADATA REGULATORY STANDARDS

NATO has the following regulatory metadata standards:

- **ADatP-5636** NATO Core Metadata Specification defines the core set of metadata elements that must be used to support interoperable information exchange
- **ADatP-4774** Confidentiality Metadata Label Syntax provides support for the Security Layer metadata elements
- **ADatP-4778** Metadata Binding Mechanism describes how to consistently bind metadata (of any sort) to a finite data object

Standard-related Documents (SRDs) are complementing those three standards by providing implementation and other guidance.
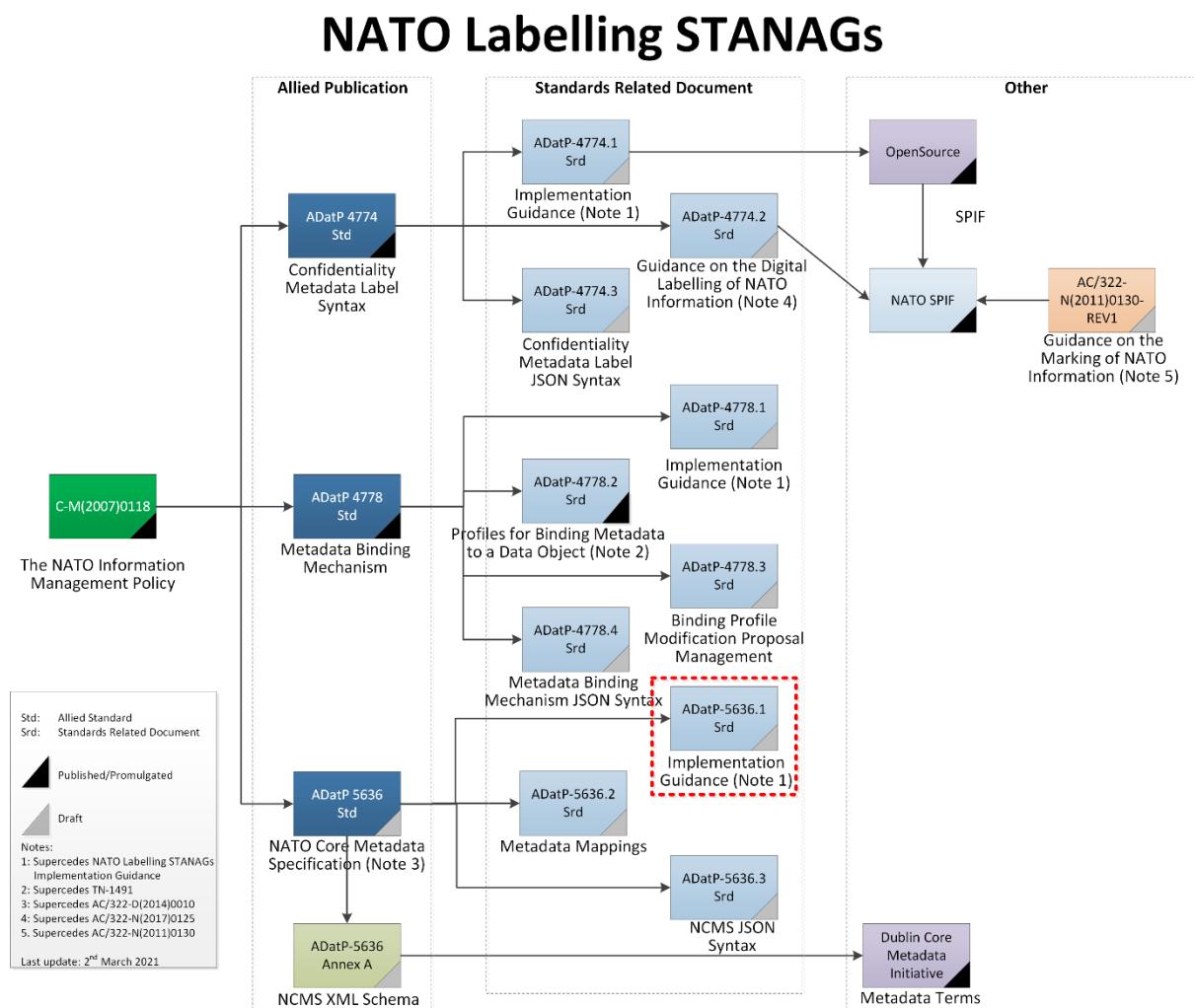

Figure 1 NATO Labelling STANAGs and related documents

This Standard Related Document (SRD) is the Implementation Guidance for the NATO Core Metadata Specification (highlighted in a red, dashed box in Figure 1).

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CHAPTER 2   OVERVIEW

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2.1.   INTRODUCTION

This Implementation Guidance describes a number of components that may be used to support the implementation of NATO Core Metadata Specification within a given service/solution.

This Implementation Guidance is optional and implementers of NCMS are free to follow the guidance that they feel is most appropriate to their particular requirements.

The Implementation Guidance will be periodically updated with new guidance on how to support the implementation of the NCMS based upon implementation experience.

2.2.   DATA CENTRIC SECURITY

The vision of Data Centric Security (DCS) is to deliver shareable Alliance information, protected at source, controlled for life.

DCS allows for variation in how protection requirements are determined, in what way the enforcement of the protection policy is executed, and in the choice of the underlying access control model. The variation is driven by evolution in the following directions:

1. The level of detail for describing information with metadata;
   a. *Sensitivity metadata.*
   b. *Common core metadata.*
2. The granularity of access control;
   a. *Clearance based.*
   b. *Attribute based.*
3. The level of object protection;
   a. *Deny or Grant Access Control.*
   b. *Cryptographic Access Control.*

The DCS Vision and Strategy (Reference [10]) defines three Maturity Levels (listed below) that have been determined by the variation in the different directions of evolution:

I.   Basic Labelling – the majority of new data objects are labelled
   a. *Labelling and binding compliant with STANAG 4774 and STANAG 4778*
   b. Guard capability to mediate release based on confidentiality labels
   c. Use and management of metadata with the NATO Enterprise
II. Enhanced Labelling – the majority of shared data objects are labelled and domain boundary release controlled
   a. Integration with the NATO Enterprise Identify and Access Management
   b. Granular labelling of all shareable data objects, including legacy data
   c. *Rich metadata compliant with STANAG 5636*

    d. Alliance-wide attribute-based access control
    e. Agile response to changing security environment
    f. Metadata labels applied to non-finite data streams e.g. voice and video, with appropriate guard technology
III. Cryptographic protection – data objects controlled post-release
    a. Cryptographic protection for data objects in transit and at rest
    b. Controlled sharing of released data objects (federated digital rights management)
    c. Converged cloud platforms for multi-level data separation
    d. Increasing automation of information sharing and redaction.

Each of the Maturity Levels builds upon the foundations of the previous Maturity Level, and so all three Maturity Levels are dependent upon STANAG 4774 and 4778, and Maturity Levels 2, and 3, are dependent on STANAG 5636.

Implementation of STANAGs 4774, 4778 and 5636 across the NATO Alliance facilitates evolution of DCS in the direction of increasing the level of detail for describing information with metadata. Evolution of DCS in the directions of granularity of access control and level of object protection will require the implementation of additional standards and specifications.

This STANAG 5636 Implementation Guidance SRD thus provides guidance on the confidentiality labelling of data objects for DCS Maturity Levels 2 and 3.

2.3. METADATA BINDING MECHANISM

NCMS metadata elements must be bound to data objects in accordance with STANAG 4778 "Metadata Binding Mechanism" (Reference [5]).

Chapter 3 provides details and examples of how a metadata binding can be generated that contains NCMS metadata elements.

2.4. CODE LISTS

Many of the NCMS metadata elements have a code representation, where their value is drawn from a known, identified code list.

Chapter 4 describes the Genericode code list specification, identifies the specific code lists that should be used with the corresponding NCMS elements and describes how the values can be validate against the code list.

```
    <s4778:MetadataBinding>
      <s4778:Metadata>
        <s4774:originatorConfidentialityLabel>
          <s4774:ConfidentialityInformation>
            <s4774:PolicyIdentifier>ACME</s4774:PolicyIdentifier>
            <s4774:Classification>RESTRICTED</s4774:Classification>
          </s4774:ConfidentialityInformation>
          <s4774:CreationDateTime>2015-09-30T12:30:00Z
          </s4774:CreationDateTime>
        </s4774:originatorConfidentialityLabel>
      </s4778:Metadata>
      <s4778:DataReference URI="http://www.example.com/images/image.png"
        xmime:contentType="image/png" />
    </s4778:MetadataBinding>
  </s4778:MetadataBindingContainer>
</s4778:BindingInformation>
```

3.2.2. NCMS Mandatory Metadata

The following example shows a Detached metadata binding contained of the mandatory metadata from the ADatP-5636 This shows the use of metadata elements defined in ADatP-4774 and ADatP-5636.

```
<s4778:BindingInformation
  xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
  xmlns:s4774="urn:nato:stanag:4774:confidentialitymetadatalabel:1:0
  xmlns:s4778="urn:nato:stanag:4778:bindinginformation:1:0"
  xmlns:s5636="urn:nato:stanag:5636:A:1:elements"
  xmlns:xmime=http://www.w3.org/2005/05/xmlmime>
  <s4778:MetadataBindingContainer>
    <s4778:MetadataBinding>
      <s4778:Metadata>
        <s4774:originatorConfidentialityLabel>
          <s4774:ConfidentialityInformation>
            <s4774:PolicyIdentifier>ACME</s4774:PolicyIdentifier>
            <s4774:Classification>RESTRICTED</s4774:Classification>
          </s4774:ConfidentialityInformation>
          <s4774:CreationDateTime>2008-05-08T12:30:00Z
          </s4774:CreationDateTime>
        </s4774:originatorConfidentialityLabel>
      </s4778:Metadata>
      <s4778:Metadata>
        <s5636:Creator type="organization">IM Workshop</s5636:Creator>
      </s4778:Metadata>
      <s4778:Metadata>
       <s5636:DateCreated>2008-05-08</s5636:DateCreated>
      </s4778:Metadata>
      <s4778:Metadata>
        <s5636:Identifier>AC/322-D(2008)0024</s5636:Identifier>
      </s4778:Metadata>
      <s4778:Metadata>
        <s5636:Publisher type="organization">
          NATO Consultation, Command and Control Board, Brussels, Belgium
        </s5636:Publisher>
      </s4778:Metadata>
      <s4778:Metadata>
```

```
            <s5636:Title>The Primary Directive on Information Management
            </s5636::Title>
        </s4778:Metadata
        <s4778:DataReference xmime:contentType="application/pdf"
            URI="https://reccen.nr.ncia/Registry/NCIARECCEN-4-82252.PDF" />
    </s4778:MetadataBinding>
  </s4778:MetadataBindingContainer>
</s4778:BindingInformation>
```

Note that the Layer and Group structure of the metadata elements are not reflected within the binding, the binding is just a flat collection of metadata elements.

3.3.   METADATA CARD

The ADatP-4778 Metadata Binding (the `s4778:BindingInformation` element) can be considered the *metadata card* for the data object to which it refers (the `s4778:DataReference` or `s4778:Data` elements), as it captures the association between the metadata and the data object.
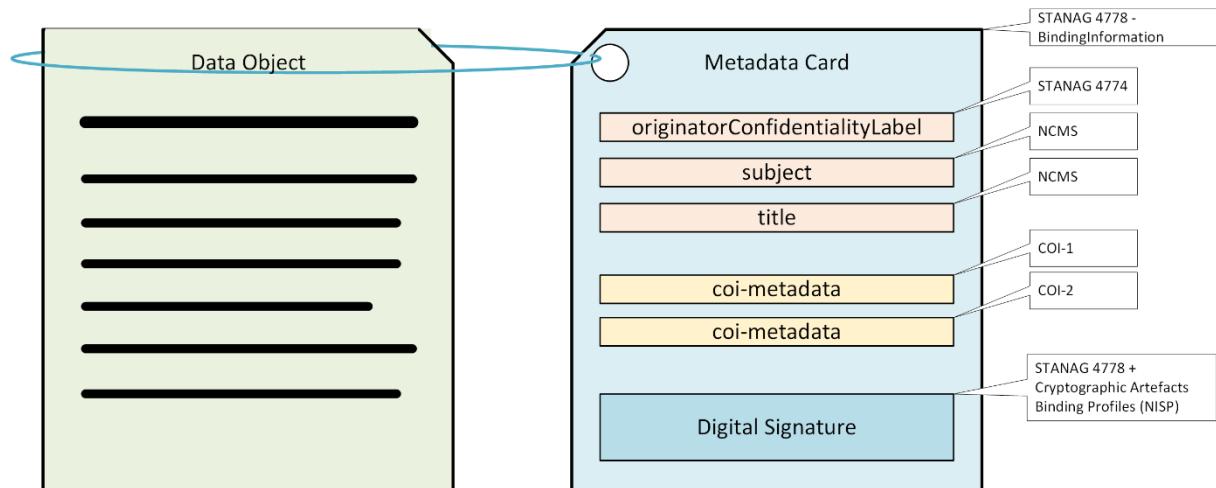
Figure 2 Metadata Card

The metadata card can be protected to provide integrity and non-repudiation of the metadata, data objects and the binding between them, using the ADatP-4778 Metadata Binding Mechanism and associated binding profiles.

3.4.   XML DATA OBJECTS

3.4.1. Existing Metadata

XML data objects may already contain COI-specific fields that either represent NCMS metadata terms, or can be used to derive NCMS metadata terms.

Whilst an ADatP-4778 Metadata Binding can reference metadata terms outside of the MetadataBinding, the process of referencing the metadata term is not always simple or straight-forward. Indeed the use of a Metadata Reference can have an impact on:

- the processing time of the Metadata Binding: each client that processes the Metadata Binding must compute/follow the reference each time the metadata is access/required. This can be particularly significant for a large data object when a XPath transform (which considers every node in the data object) is used.
- the size of the Metadata Binding: the specification of the Metadata Reference may be as big, if not larger, than the actual Metadata value that is referenced. For example, the Metadata Reference to extract a creation date from an XML

It is therefore recommended that any metadata information that can be derived from the data object is copied into the Metadata Binding, rather than referenced from the Metadata Binding.

3.5. EXTENSIBLE STYLESHEET LANGUAGE

An eXtensible Stylesheet Language Transformation (XSLT) (Reference [8]) provides a simple mechanism to add the NCMS metadata to an XML data object in accordance with the appropriate ADatP-4778 Bind Profile.

Figure 3 shows an example XML stylesheet that can add the mandatory NCMS metadata required for the NATO Enterprise to an XML Schema document, in accordance with the appropriate Binding Profile for XML (see section 12.6 of the ADatP-4778 "Profiles for Binding Metadata to a Data Object".)

```
<xsl:stylesheet version="2.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
xmlns:gen-xsl="http://www.w3.org/1999/XSL/Transform/Generated"
xmlns:s4774="urn:nato:stanag:4774:confidentialitymetadatalabel:1:0"
xmlns:s4778="urn:nato:stanag:4778:bindinginformation:1:0"
xmlns:s4778-ext="urn:nato:stanag:4778:bindinginformation:extensions:1:0"
xmlns:s5636="urn:nato:stanag:5636:A:1:elements"
xmlns:cli="urn:nato:ncdf:specification:1:0code-lists-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:gc="http://docs.oasis-open.org/codelist/ns/genericode/1.0/"
    <!-- Anything in the namespace gen will be a xsl element in the generated
stylesheet -->
    <!-- Needed for the Stylesheet Binding Profile -->
    <xsl:namespace-alias stylesheet-prefix="gen-xsl" result-prefix="xsl"/>
    <xsl:param name="dataReference"/>
    <xsl:param name="labelMarking">ACME UNCLASSIFIED</xsl:param>
    <!-- The labelMarking is looked up in the labelCatalog to determine the
corresponding confidentiality Label  -->
    <xsl:param name="labelCatalog">label-catalog.gc</xsl:param>
    <xsl:param name="title">title</xsl:param>
    <xsl:param name="identifier">identifier</xsl:param>
    <xsl:param name="creator">NATO C&amp;I Agency</xsl:param>
    <xsl:param name="publisher">NATO C&amp;I Agency</xsl:param>
```

```
    <xsl:param name="dateCreated">
        <xsl:value-of select="current-dateTime()"/>
    </xsl:param>
    <xsl:param name="dateDisposition">
        <xsl:value-of select="current-dateTime() +
xsd:yearMonthDuration('P5Y')"/>
    </xsl:param>
    <xsl:output method="xml" indent="yes"/>
    <xsl:template match="/">
        <xsl:result-document href="labelled.xml">
            <xsl:apply-templates/>
        </xsl:result-document>
    </xsl:template>
    <!-- Main engine that copies the input to the output, unless we have
defined a specific template -->
    <xsl:template match="@* | node()">
        <xsl:copy>
            <xsl:apply-templates select="@* | node()"/>
        </xsl:copy>
    </xsl:template>
    <!-- The BindingInformation we create -->
    <xsl:template name="BindingInformation">
        <xsl:param name="profile"/>
        <s4778:BindingInformation>
            <xsl:if test="$profile">
                <xsl:attribute name="profile"
namespace="urn:nato:stanag:4778:bindinginformation:extensions:1:0"><xsl:value-of
select="$profile"/></xsl:attribute>
            </xsl:if>
            <s4778:MetadataBindingContainer Id="dbf9de07-86fb-45e7-b5f2-
e4fee95706e2">
                <s4778:MetadataBinding>
                 <xsl:call-template
name="ncmsOriginatorConfidentialityLabel"/>
                    <xsl:call-template name="ncmsTitle"/>
                    <xsl:call-template name="ncmsCreator"/>
                    <xsl:call-template name="ncmsPublisher"/>
                    <xsl:call-template name="ncmsIdentifier"/>
                    <xsl:call-template name="ncmsDateCreated"/>
                    <xsl:call-template name="ncmsDateDisposition"/>
                    <s4778:DataReference URI="{$dataReference}"/>
                </s4778:MetadataBinding>
            </s4778:MetadataBindingContainer>
        </s4778:BindingInformation>
    </xsl:template>
    <xsl:template name="ncmsOriginatorConfidentialityLabel">
        <xsl:variable name="catalogLabel">
            <xsl:copy-of
select="document($labelCatalog)/gc:CodeList/SimpleCodeList/Row[Value[@ColumnRef=
'marking']/SimpleValue/text() =
$labelMarking]/Value[@ColumnRef='confidentialityLabel']/ComplexValue/*"/>
        </xsl:variable>
        <xsl:variable name="defaultLabel">
            <xsl:copy-of
select="document($labelCatalog)/gc:CodeList/SimpleCodeList/Row[Value[@ColumnRef=
```

```
'marking']/SimpleValue/text() =
'default']/Value[@ColumnRef='confidentialityLabel']/ComplexValue/*"/>
        </xsl:variable>
        <xsl:choose>
            <xsl:when test="not($catalogLabel = '')">
                <s4778:Metadata>
                  <xsl:copy-of select="$catalogLabel"/>
                </s4778:Metadata>
            </xsl:when>
            <xsl:when test="not($defaultLabel = '')">
                <s4778:Metadata>
                  <xsl:comment>
                        <xsl:text>Default label - marking '</xsl:text>
                        <xsl:value-of select="$labelMarking"/>
                        <xsl:text>' could not be found.</xsl:text>
                  </xsl:comment>
                  <xsl:copy-of select="$defaultLabel"/>
                </s4778:Metadata>
            </xsl:when>
            <xsl:otherwise>
                <xsl:comment>
                  <xsl:text>Marking '</xsl:text>
                  <xsl:value-of select="$labelMarking"/>
                  <xsl:text>' could not be found, and no default
defined.</xsl:text>
                </xsl:comment>
            </xsl:otherwise>
        </xsl:choose>
    </xsl:template>
    <xsl:template name="ncmsTitle">
        <xsl:if test="$title">
            <s4778:Metadata><s5636:Title>
                <xsl:value-of select="$title"/>
            </s5636:Title></s4778:Metadata>
        </xsl:if>
    </xsl:template>
    <xsl:template name="ncmsIdentifier">
        <xsl:if test="$identifier">
            <s4778:Metadata><s5636:Identifier>
                <xsl:value-of select="$identifier"/>
            </s5636:Identifier></s4778:Metadata>
        </xsl:if>
    </xsl:template>
    <xsl:template name="ncmsCreator">
        <xsl:if test="$creator">
            <s4778:Metadata><s5636:Creator type="organization">
                <xsl:value-of select="$creator"/>
            </s5636:Creator></s4778:Metadata>
        </xsl:if>
    </xsl:template>
    <xsl:template name="ncmsPublisher">
        <xsl:if test="$publisher">
            <s4778:Metadata><s5636:Publisher type="organization">
                <xsl:value-of select="$publisher"/>
            </s5636:Publisher></s4778:Metadata>
```

```
            </xsl:if>
        </xsl:template>
        <xsl:template name="ncmsDateCreated">
            <xsl:if test="$dateCreated">
                <s4778:Metadata><s5636:DateCreated>
                    <xsl:value-of select="$dateCreated"/>
                </s5636:DateCreated></s4778:Metadata>
            </xsl:if>
        </xsl:template>
        <xsl:template name="ncmsDateDisposition">
            <xsl:if test="$dateDisposition">
                <s4778:Metadata><s5636:DateDisposition>
                    <xsl:value-of select="$dateDisposition"/>
                </s5636:DateDisposition></s4778:Metadata>
            </xsl:if>
        </xsl:template>
        <!-- Information Lifecycle Support Layer -->
        <!-- Templates for XSD Binding Profile -->
        <xsl:template
match="/xsd:schema[not(xsd:annotation/xsd:appinfo/s4778:BindingInformation)]">
            <xsd:schema>
                <xsl:apply-templates select="@*"/>
                <xsd:annotation>
                    <xsd:documentation>STANAG 4778 Binding
Information</xsd:documentation>
                    <xsd:appinfo>
                      <xsl:call-template name="BindingInformation">
                            <xsl:with-param
name="profile">urn:nato:stanag:4778:profile:xml:schema:1:0</xsl:with-param>
                       </xsl:call-template>
                    </xsd:appinfo>
                </xsd:annotation>
                <xsl:apply-templates select="*"/>
            </xsd:schema>
        </xsl:template>
</xsl:stylesheet>
```

Figure 3: An Example Stylesheet to Add NCMS Mandatory Metadata

The stylesheet applies the mandatory NCMS metadata terms for the NATO Enterprise to a XML Schema (that does not already contain a Metadata Binding). Each of the metadata terms has a default value (specified in the XML stylesheet) which can be overridden using command line arguments. In addition, the originatorConfidentialityLabel is determined by looking up the value from a Genericode code list (see STANAG 4774 Implementation Guidance, Reference [4]), rather than specifying the whole value.

The XML stylesheet can also generate metadata terms from the contents of the data object to which the metadata is being bound by using an appropriate XPath expression.

By processing the data object in a streamed fashion, the XML stylesheet approach can also be used in XML pipelines of transformations and validations, such as those defined by the XProc XML transformation language.

The principle of this XML stylesheet, of calling the "BindingInformation" template at the appropriate point) can be applied to any XML document, including Schematrons, Genericode lists and SPIFs, as well as COI-specific XML instance documents, in accordance with the appropriate metadata binding profile (Reference [7]).

Note that the creation of a cryptographic binding, if required, would need to be performed by a separate step/process.

3.6.   NATO METADATA BINDING SERVICE

The NATO Metadata Binding Service (NMBS) provides a common service that can be used by wide variety implementations. It provides a much more powerful and comprehensive approach that supports, amongst other things the generation of cryptographic bindings and bindings to non-XML data objects.

Further details of the NATO Metadata Binding Service can be found in the ADatP-4778 Implementation Guidance Standard-related Document (Reference [6]).

CHAPTER 4   CODE LISTS

4.1.   INTRODUCTION

Some of the Core Metadata Terms have a Code syntax encoding that allow values to be drawn from a given value domain. The Code syntax encoding adopts the NATO Code Data Framework (NCDF) Code Lists Specification to identify the code list from which a value has been selected the NCDF Code Lists Specification defines how a code list should be represented using a standard representation, so that it can be consistently referenced.

It is recommended that NCMS metadata terms with a Code syntax encoding reference a code lists that is represented using the OASIS Code List Representation (Genericode) (Reference [1]) format.

The following sections provide an overview of the Genericode format, and also describe how they can be used to validate metadata terms with a Code syntax encoding, as well as provide a code list for metadata terms with other syntax encodings.

4.2.   GENERICODE

The Genericode provides a single model and XML format that can encode a broad list of code list information, from simple string literals to complex XML elements.

Figure 4 illustrates a Genericode code list containing country code that could be used for the countryCode metadata terms.
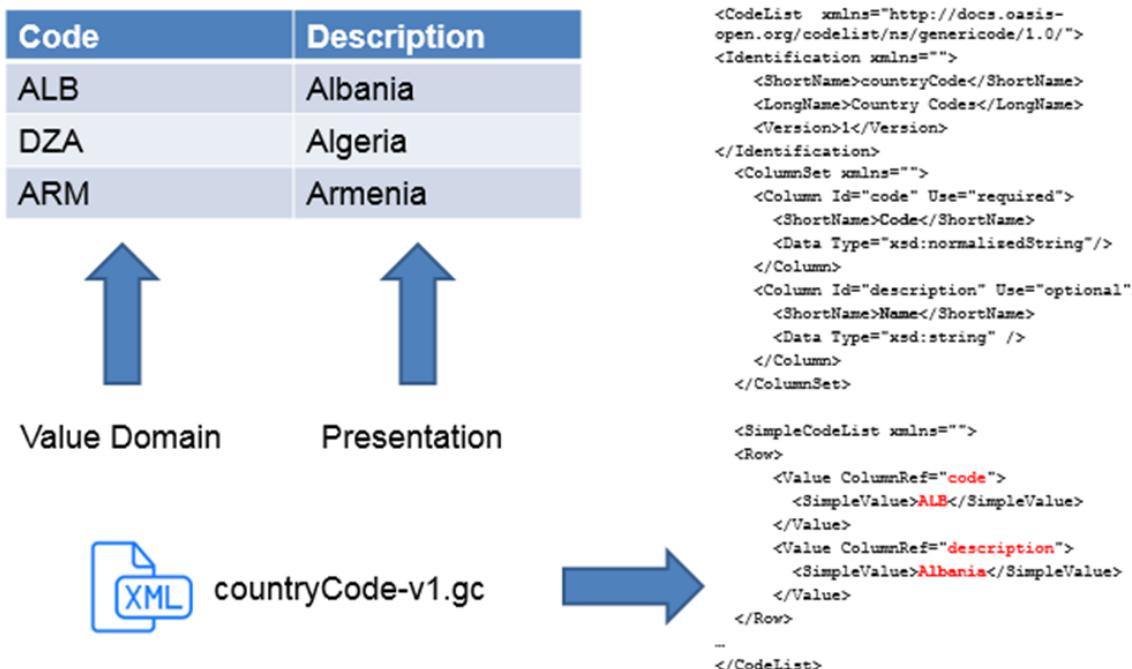
Figure 4: Code List Example

The example shows a code list with two columns:
 i. code – which contains the value that should be encoded into the Metadata term
 ii. definition – a human-readable description that may be used to support the selection of the value on origination and display of the value on reception.

This example code list could be used to specify the NCMS CountryCode metadata term as shown below:[3]

```
<s5636:CountryCode cli:codeListColumnName="code"
cli:codeListURI="urn:nato:stanag:5636:a:1:codelists:countryCode">
ALB</s5636:CountryCode>
```

It is recommended that all code lists use a "code" column (with a column identifier of urn:nato:ncdf:specification:code-lists:1:0:column:code) to represent the values and a "Definition" column (with column identifier urn:nato:ncdf:specification:code-lists:1:0:column:definition) to provide a more detailed description of the value.

Other columns may be added to the code list to support further processing of the value domains, for example, providing descriptions in different languages (e.g. French) or providing the corresponding value in a different value domain.

Genericode code list files support the use of an arbitrary string to specify the version of the code list.

---

[3] The codeListColumnName could be omitted as the default value for codeListColumnName would match a column with the name "code".

It is recommended that the version identifier of a code list contains a period delimited number (e.g. 1.0). The version number should also be contained within the URI of the code list when it is published.

For code lists that are derived from an external authoritative source, it is recommended that the version of the code list is identical to the version specified by the authoritative source at the given time.

For example, if the Internet Assigned Numbers Authority (IANA) is used as the authoritative source for media formats then the version should include a properly formatted date stamp, such as "2018-05-09".

The code lists to use with the NATO Core Metadata Specification within the NATO Enterprise are identified in Table 1.

Code List Identifier[4]	NCMS Elements	Value Domain
countryCode	countryCode	In accordance with the "Interim Measure regarding Geographical Entities for C3 Standards" (Reference [11]), this SRD does not identify a value domain.
entity	custodian, publisher, rightsHolder	"Definition of the NATO Enterprise for the Delivery of C3 Capabilities and Information and Communications Technology Services", AC/322-N(2013)0134
extentQualifier	extentQualifier	Semantic specifications for unit of measure, quantity kind, dimensions and data types. http://qudt.org/1.1/vocab/unit
keyword	keyword	No official value domain has been identified.
language	language	"Codes for the representation of names of languages -- Part 3: Alpha-3 code for comprehensive coverage of languages" , ISO 639-3
mediaType	mediaFormat	Media Type Specifications and Registration Procedures, RFC 6838, http://www.iana.org/assignments/media-types/
medium	medium	No official value domain has been identified.
placeName	placeName	In accordance with the "Interim Measure regarding Geographical Entities for C3 Standards" (Reference [11]), this SRD does not identify a value domain.
recordsDisposition	recordsDisposition	"Policy on the Retention and Disposition of NATO Information", C-M(2009)0021
region	region	In accordance with the "Interim Measure regarding Geographical Entities for C3 Standards" (Reference [11]), this SRD does not identify a value domain.
status	status	"NATO Records Policy", C-M(2011)0043
subjectCategory	subjectCategory	"NATO Subject Indicator Systems (NASIS)", ACP 117 NATO SUPP-2(B)
type	type	"DCMI Type Vocabulary", http://dublincore.org/documents/dcmi-type-vocabulary/#H7

[4] All code list identifiers use the prefix "urn:nato:stanag:5636:A:1:codelists:". Version information may be appended to the identifier.

Code List Identifier[4]	NCMS Elements	Value Domain
updatingFrequency	updatingFrequency	"Geographic information -- Metadata -- Part 1: Fundamentals" ISO19115-1:2014

Table 1: NCMS Code Lists for Use within the NATO Enterprise

4.3.   CONTEXT/VALUE ASSOCIATION

The NCMS Code syntax encoding allows a value to be drawn from an arbitrary, externally maintained, code list, as opposed to embedding the allowed values within the XML schema itself. As a result validating the NCMS metadata against the XML schema will not validate the value chosen for a metadata terms with a Code syntax encoding.

The OASIS Context/Value Association (CVA) (Reference [2]) file provides a standard mechanism to identify contexts (e.g. metadata terms) and associate code lists, which contain the allowable values for that context. A given context may be allow values from more than one code list, with the CVA can use information associated with the context (for example, the codeListURI attribute) to determine which code list the value should be validated against, as illustrated in Figure 5.
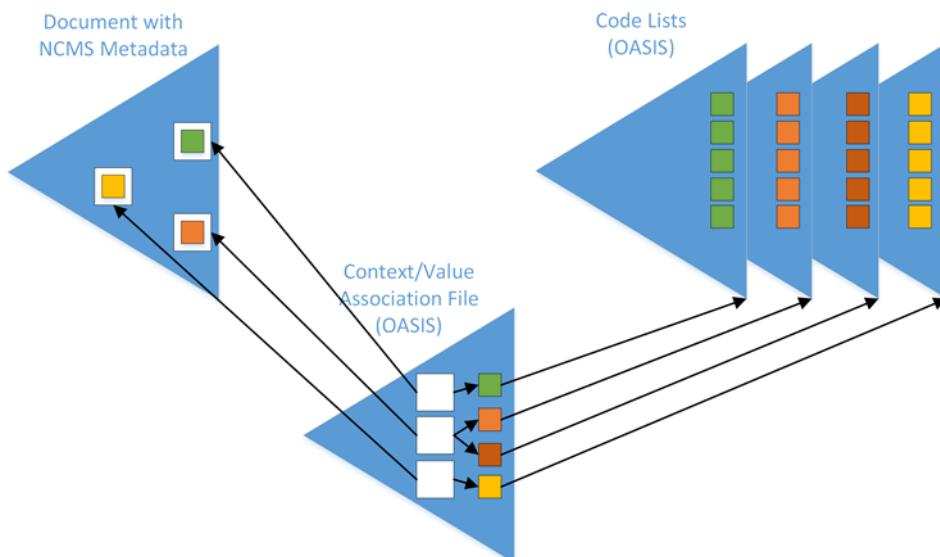

Figure 5: Using Context Value Associations to associate Metadata terms with their supporting Value Domains

Figure 6 shows an example CVA file that demonstrates how multiple code lists can be associated with a specific metadata term, in this case a COI may use additional, or different, country codes that are not include in the core set of country codes.

```
<cva:ContextValueAssociation
 xmlns:cva="http://docs.oasis-open.org/codelist/ns/ContextValueAssociation/1.0/"
  name="ncms-1.0" version="1.0">
  <Title>
    This is the main context/value association file for NCMS 1.0..
  </Title>
  <ValueLists>
    <Annotation>
      <Description>
        NCMS versioned code lists.
      </Description>
    </Annotation>
    <ValueList xml:id="countryCodes-v1" uri="CodeLists/countryCode-v1.gc"/>
    <ValueList xml:id="countryCodes-coi" uri="CodeLists/countryCode-coi.gc"/>
  </ValueLists>
  <InstanceMetadataSets>
    <InstanceMetadataSet xml:id="version">
      <InstanceMetadata address=""codeListURI" identification="Version">
        <Annotation>
          <Description>NCMS uses the NCDF codeListURI attribute within the
           codeType to indicate the codeList the value was drawn from.
          </Description>
        </Annotation>
      </InstanceMetadata>
    </InstanceMetadataSet>
  </InstanceMetadataSets>
  <Contexts>
    <Context address="s5636:CountryCode "
      values="countryCodes-v1 countryCodes-coi" metadata="version"/>
  </Contexts>
</cva:ContextValueAssociation>
```

Figure 6: Multiple Code List associations to a Single Metadata Term

A complete context/value association for the NCMS profile, based upon the code lists identified in Table 1, is shown in Figure 7.

```
<?xml version="1.0" encoding="UTF-8"?>
<cva:ContextValueAssociation
 xmlns:cva="http://docs.oasis-open.org/codelist/ns/ContextValueAssociation/1.0/"
  xmlns:s5636="urn:nato:ikm:ncms:1:0"
  xmlns:cli="urn:nato:ncdf:specification:1:0code-lists-instance"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  queryBinding="xslt" id="urn:nato:ikm:ncms:1:0:cva" name="ncms-1.0"
  version="1.0">
  <Annotation>
    <Description>A context/value association (CVA) file for the use of
      controlled vocabularies with NCMS metadata elements.</Description>
  </Annotation>
  <Title>This is the main context/value association file for NCMS for the
   NATO Enterprise 1.0.</Title>
  <ValueLists>
    <Annotation>
      <Description>NCMS versioned code lists.</Description>
    </Annotation>
```

```
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:countryCode"
        uri="CodeLists/countryCode-v1.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:extentQualifier"
        uri="CodeLists/extentQualifier-v1.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelist:keyword"
        uri="CodeLists/keyword-v1.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:mediaType"
        uri="CodeLists/mediaTypes-v2018-05-09.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:medium"
        uri="CodeLists/medium-v1.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:placeName"
        uri="CodeLists/placeName-v1.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:recordsDisposition"
        uri="CodeLists/recordsDisposition-v1.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:region"
        uri="CodeLists/region-v1.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:status"
        uri="CodeLists/status-v1.gc"/>
      <ValueList xml:id=" urn:nato:stanag:5636:a:1:codelists:subjectCategory"
        uri="CodeLists/subjectCategory-v1.gc"/>
      <ValueList xml:id="urn:nato:stanag:5636:a:1:codelists:type"
        uri="CodeLists/type-v1.gc"/>
      <ValueList xml:id="urn:nato:stanag:5636:a:1:codelists:updatingFrequency"
        uri="CodeLists/updatingFrequency-v1.gc"/>
  </ValueLists>
  <InstanceMetadataSets>
    <InstanceMetadataSet xml:id="version">
      <InstanceMetadata address="@cli:codeListURI" identification="Version">
        <Annotation>
          <Description>NCMS uses the NCDF codeListURI attribute within the
           code encoding to indicate the version of the code list the value was
drawn from.
          </Description>
        </Annotation>
      </InstanceMetadata>
    </InstanceMetadataSet>
  </InstanceMetadataSets>
  <Contexts>
    <Context address="s5636:countryCode" values="countryCodes-v1"
metadata="version"/>
<!—Check the name of organizational POCTypes against a list of entities  -->
    <Context address="*[@type='organization']"
            values="entity-v1" metadata="version"/>
    <Context address="s5636:Extent/@s5636:qualifier" values="extentQualifier-v1"
            metadata="version"/>
    <Context address="s5636:Keyword" values="keyword-v1" metadata="version"/>
    <Context address="s5636:Format" values="mediaType-v2018-05-09"
            metadata="version"/>
    <Context address="s5636:Medium" values="medium-v1" metadata="version"/>
    <Context address="s5636:PlaceName" values="placeName-v1"metadata="version"/>
    <Context address="s5636:RecordsDisposition" values="recordsDisposition-v1"
            metadata="version"/>
    <Context address="s5636:Region" values="region-v1" metadata="version"/>
    <Context address="s5636:Status" values="status-v1"  metadata="version"/>
    <Context address="s5636:subjectCategory" values="subjectCategory-v1"
```

```
        metadata="version"/>
    <Context address="s5636:Type" values="type-v1" metadata="version"/>
    <Context address="s5636:UpdatingFrequency" values="updatingFrequency-v1"
      metadata="version"/>
  </Contexts>
</cva:ContextValueAssociation>
```
Figure 7: Example NCMS CVA File

An XML representation of the Core Metadata Terms Profile, defined in STANAG 5636, maybe transformed into a context value association through the use of an appropriate stylesheet, which is published to the NMRR.

The resulting Context/Value Association may in turn be converted into a set of Schematron assertions that validate the values in a set of metadata terms.

4.4. OTHER CODE LISTS

Genericode code lists can be used to specify the value domains for NCMS metadata terms that have the Code syntax encoding. In addition, Genericode code lists can also be used to specify values that can be have different syntax encodings.

Chapter 7 of ADatP-4774.1 (Reference [4]) describes the use of Genericode code lists as confidentiality label catalogs that can be used to select a complete confidentiality label.

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CHAPTER 5   REFERENCE MATERIALS

5.1.   REFERENCES

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[3] ADatP-4774 "Confidentiality Metadata Label Syntax", Edition A, Version 1, December 2017.

[4] ADatP-4774.1, "Implementation Guidance", Standard-related Document (SRD), Edition A, Version 1 (draft).

[5] ADatP-4778 "Metadata Binding Mechanism", Edition A, Version 1, October 2018.

[6] ADatP-4778.1, "Implementation Guidance", Standard-related Document (SRD), Edition A, Version 1

[7] ADatP-4778.2, "Profiles for Binding Metadata to a Data Object", Standard-related Document (SRD), Edition A, Version 1.

[8] ISO/IEC-19757-3 Information Technology – Document Schema Definition Languages (DSDL) – Part 3: Rule-based validation: Schematron", January 2016.

[9] W3C "XML Stylesheet Language Transformation (XSLT), Version 2.0", https://www.w3.org/TR/xslt/all/, April 2009

[10]   IMSM-1049-2019 (INV) "Data Centric Security Vision and Strategy for the Alliance Federation, including the NATO Enterprise" 17th May 2019.

[11]   AC/322-D(2017)0043 "Interim Measure regarding Geographical Entities for C3 Standards", 20th October 2017.

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