

Network Working Group
Request for Comments: 4914
Category: Experimental

S. Legg
eB2Bcom
July 2007

Abstract Syntax Notation X (ASN.X) Representation
of Encoding Instructions for
the XML Encoding Rules (XER)

Status of This Memo

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

Copyright Notice

Copyright (C) The IETF Trust (2007).

Abstract

Abstract Syntax Notation X (ASN.X) is an Extensible Markup Language (XML) representation for Abstract Syntax Notation One (ASN.1) specifications. This document specifies the ASN.X representation of encoding instructions for the XML Encoding Rules (XER).

Table of Contents

1. Introduction	3
2. Conventions	3
3. Preprocessing of ImportedTypesIdentification	4
4. EncodingInstructionAssignmentList Translation	4
5. EncodingInstruction Translation	5
5.1. AnyAttributesInstruction Translation	6
5.1.1. NamespaceRestriction Translation	7
5.2. AnyElementInstruction Translation	7
5.3. AttributeInstruction Translation	7
5.4. Base64Instruction Translation	8
5.5. DecimalInstruction Translation	8
5.6. DefaultForEmptyInstruction Translation	8
5.7. ElementInstruction Translation	8
5.8. EmbedValuesInstruction Translation	8
5.9. GlobalDefaultsInstruction Translation	8
5.10. ListInstruction Translation	9
5.11. NameInstruction Translation	9
5.12. NamespaceInstruction Translation	10
5.13. PIOrCommentInstruction Translation	10
5.14. TextInstruction Translation	11
5.15. UntaggedInstruction Translation	11
5.16. UseNilInstruction Translation	12
5.17. UseNumberInstruction Translation	12
5.18. UseOrderInstruction Translation	12
5.19. UseQNameInstruction Translation	12
5.20. UseTypeInstruction Translation	12
5.21. UseUnionInstruction Translation	12
5.22. WhiteSpaceInstruction Translation	12
6. TargetList Translation	13
6.1. TypeIdentification Translation	13
6.2. BuiltInTypeIdentification Translation	15
6.3. IdentifiersInContext Translation	17
7. Security Considerations	18
8. References	18
8.1. Normative References	18
8.2. Informative References	19
Appendix A. ASN.1 for XER Encoding Instruction Notation	20
Appendix B. ASN.1 for Target List Notation	24
Appendix C. ASN.X for XER Encoding Instruction Notation	26
Appendix D. ASN.X for Target List Notation	33

1. Introduction

Abstract Syntax Notation X (ASN.X) [ASN.X] is an Extensible Markup Language (XML) [XML10] [XML11] representation for Abstract Syntax Notation One (ASN.1) [X.680] specifications. The ASN.X representation for the ASN.1 basic notation [X.680] [X.680-1] is described elsewhere [ASN.X].

The grammar of ASN.1 permits the application of encoding instructions [X.680-1], through type prefixes and encoding control sections, that modify how abstract values are encoded by nominated encoding rules.

The generic notation for type prefixes and encoding control sections is defined by the ASN.1 basic notation; however, the notation for specific encoding instructions, i.e., the EncodingInstruction and EncodingInstructionAssignmentList productions of the notation, are defined separately for each set of encoding rules using encoding instructions. This document specifies the ASN.X representation for EncodingInstructionAssignmentList and EncodingInstruction as they are defined for the XML Encoding Rules (XER) [X.693][X.693-1].

ASN.X is defined in terms of rules for translating from an ASN.1 specification. This does not preclude an ASN.X module being written directly without a pre-existing ASN.1 module; however, such an ASN.X module is considered valid if and only if there exists, in principle, an ASN.1 module that when translated would yield the ASN.X module.

By design, an ASN.X module is also the Robust XML Encoding Rules (RXER) [RXER] encoding of an ASN.1 value. The ASN.1 type definitions for such values, insofar as they pertain to the ASN.1 basic notation, are provided elsewhere [ASN.X]; however, this document provides the ASN.1 type definitions for representing XER encoding instructions as abstract values. These definitions appear in Appendix A.

The ASN.X translation of the ASN.1 module in Appendix A is presented in Appendix B.

The General Considerations of the specification for ASN.X [ASN.X] also apply here.

2. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", and "MAY" in this document are to be interpreted as described in BCP 14, RFC 2119 [BCP14]. The key word "OPTIONAL" is exclusively used with its ASN.1 meaning.

A reference to an ASN.1 production [X.680] (e.g., Type, NamedType) is a reference to the text in an ASN.1 specification corresponding to that production.

The description of the translation of XER encoding instructions into ASN.X makes use of definitions from the XML Information Set (Infoset) [INFOSET]. In particular, information item property names follow the Infoset convention of being shown in square brackets, e.g., [local name]. Literal values of Infoset properties are enclosed in double quotes; however, the double quotes are not part of the property values. In the sections that follow, "information item" will be abbreviated to "item", e.g., "element information item" is abbreviated to "element item". Element items will be referred to by their [local name] in angle brackets, e.g., "the <name> element item" means the element item with the [local name] "name". Attribute items will be referred to by their [local name], e.g., "the name attribute item" means the attribute item with the [local name] "name".

Code points for characters [UNICODE] are expressed using the Unicode convention U+n, where n is four to six hexadecimal digits, e.g., the space character is U+0020.

3. Preprocessing of ImportedTypesIdentification

Interpretation of an ImportedTypesIdentification depends on a SymbolList in the Imports of a module, but a SymbolList does not have a direct translation into ASN.X. A module containing at least one ImportedTypesIdentification must be preprocessed so that each ImportedTypesIdentification has the intended effect.

If an EncodingInstruction in an XER EncodingInstructionAssignmentList has a Targets instance that is an ImportedTypesIdentification, then each Type affected by the ImportedTypesIdentification MUST be replaced by an EncodingPrefixedType where the Type in the EncodingPrefixedType is the original Type and the EncodingPrefix contains the EncodingInstruction minus the TargetList. The ImportedTypesIdentification SHALL be removed. If the EncodingInstruction in the EncodingInstructionAssignmentList has no other Targets instances, then it MUST be removed from the EncodingInstructionAssignmentList.

4. EncodingInstructionAssignmentList Translation

As described in the specification for ASN.X [ASN.X], the translation of an EncodingControlSection for XER is an element item with the [local name] "XER". The translation of the EncodingInstructionAssignmentList in such an EncodingControlSection determines the content of the <XER> element item.

An element item with the [local name] "annotation" MAY be added to the [children] of the <XER> element item.

The translation of each EncodingInstruction nested in the EncodingInstructionAssignmentList SHALL be appended to the [children] of the <XER> element item.

5. EncodingInstruction Translation

The translation of an EncodingInstruction for XER can appear in the translation of an EncodingInstructionAssignmentList (see the previous section) or an EncodingPrefix. The translation for an EncodingPrefix is described by the specification for ASN.X [ASN.X].

The translation of an EncodingInstruction in an EncodingInstructionAssignmentList for XER is an element item with the [local name] "targettedInstruction". The translation of the PositiveInstruction or NegatingInstruction in the EncodingInstruction SHALL be added to the [children] of the <targettedInstruction> element item. The translation of the TargetList nested in the encoding instruction SHALL be appended to the [children] of the <targettedInstruction> element item.

Aside: The TargetList appears within an EncodingInstruction in an EncodingInstructionAssignmentList, but its ASN.X translation appears immediately after the translation of the EncodingInstruction, rather than within it.

Example

```
ENCODING-CONTROL XER
  GLOBAL-DEFAULTS MODIFIED-ENCODINGS
  ATTRIBUTE MyType
```

```
<encodingControls>
  <XER>
    <targettedInstruction>
      <globalDefaults>
        <modifiedEncodings/>
      </globalDefaults>
    </targettedInstruction>
    <targettedInstruction>
      <attribute/>
      <target type="MyType"/>
    </targettedInstruction>
  </XER>
</encodingControls>
```

The translation of an EncodingInstruction for XER in an EncodingPrefix is the translation of the PositiveInstruction or NegatingInstruction in the EncodingInstruction.

Aside: The TargetList within an EncodingInstruction in an EncodingPrefix is required to be empty and has no ASN.X translation in this context.

The translation of a PositiveInstruction is the translation of the AnyAttributeInstruction, AnyElementInstruction, AttributeInstruction, Base64Instruction, DecimalInstruction, DefaultForEmptyInstruction, EmbedValuesInstruction, GlobalDefaultsInstruction, ListInstruction, NameInstruction, NamespaceInstruction, PIOrCommentInstruction, TextInstruction, UntaggedInstruction, UseNilInstruction, UseNumberInstruction, UseOrderInstruction, UseQNameInstruction, UseTypeInstruction, UseUnionInstruction or WhitespaceInstruction in the PositiveInstruction.

The translation of a NegatingInstruction that is an ElementInstruction is the translation of that ElementInstruction.

The translation of a NegatingInstruction that is not an ElementInstruction is an element item where the [local name] is the concatenation of "not-" and the [local name] that would be used by the translation of the PositiveInstruction in the NegatingInstruction. No items are added to the [attributes] or [children] of the element item resulting from the translation of a NegatingInstruction.

Example

```
[XER:NOT ATTRIBUTE] MyType
<type>
  <prefixed>
    <XER><not-attribute/></XER>
    <type ref="MyType"/>
  </prefixed>
</type>
```

5.1. AnyAttributesInstruction Translation

The translation of an AnyAttributesInstruction is an element item with the [local name] "anyAttributes". If a NamespaceRestriction is present in the AnyAttributesInstruction, then the translation of the NamespaceRestriction SHALL be added to the [children] of the <anyAttributes> element item.

Example

```
ANY-ATTRIBUTES FROM "http://example.com" ABSENT

<anyAttributes>
  <namespace>http://example.com</namespace>
  <local/>
</anyAttributes>
```

5.1.1. NamespaceRestriction Translation

The NamespaceRestriction production is common to the AnyAttributesInstruction production and the AnyElementInstruction production.

The translation of a NamespaceRestriction of the "FROM URIList" form is an element item with the [local name] "from". The translation of each QuotedURIorAbsent nested in the URIList SHALL be appended to the [children] of the <from> element item.

The translation of a NamespaceRestriction of the "EXCEPT URIList" form is an element item with the [local name] "except". The translation of each QuotedURIorAbsent nested in the URIList SHALL be appended to the [children] of the <except> element item.

The translation of a QuotedURIorAbsent that is a QuotedURI is an element item with the [local name] "namespace". The sequence of character items for the URI in the QuotedURI is added to the [children] of the <namespace> element item.

The translation of a QuotedURIorAbsent of the "ABSENT" form is an element item with the [local name] "local".

5.2. AnyElementInstruction Translation

The translation of an AnyElementInstruction is an element item with the [local name] "anyElement". If a NamespaceRestriction is present in the AnyElementInstruction, then the translation of the NamespaceRestriction SHALL be added to the [children] of the <anyElement> element item.

5.3. AttributeInstruction Translation

The translation of an AttributeInstruction is an element item with the [local name] "attribute".

Example

```
ATTRIBUTE
<attribute/>
```

5.4. Base64Instruction Translation

The translation of a Base64Instruction is an element item with the [local name] "base64".

5.5. DecimalInstruction Translation

The translation of a DecimalInstruction is an element item with the [local name] "decimal".

5.6. DefaultForEmptyInstruction Translation

The translation of a DefaultForEmptyInstruction is an element item with the [local name] "defaultForEmpty". The translation of the Value in the DefaultForEmptyInstruction SHALL be added to the [children] or [attributes] of the <defaultForEmpty> element item.

Example

```
DEFAULT-FOR-EMPTY AS "unspecified"
<defaultForEmpty literalValue="unspecified"/>
```

5.7. ElementInstruction Translation

The translation of an ElementInstruction is an element item with the [local name] "element".

5.8. EmbedValuesInstruction Translation

The translation of an EmbedValuesInstruction is an element item with the [local name] "embedValues".

5.9. GlobalDefaultsInstruction Translation

The translation of a GlobalDefaultsInstruction is an element item with the [local name] "globalDefaults".

If the DefaultSetting in the GlobalDefaultsInstruction is "MODIFIED-ENCODINGS", then an element item with the [local name] "modifiedEncodings" SHALL be added to the [children] of the <globalDefaults> element item.

If the `DefaultSetting` in the `GlobalDefaultsInstruction` is a `ControlNamespace`, then the translation of the `ControlNamespace` SHALL be added to the `[children]` of the `<globalDefaults>` element item.

The translation of a `ControlNamespace` is an element item with the `[local name]` "controlNamespace". An attribute item with the `[local name]` "name" SHALL be added to the `[attributes]` of the `<controlNamespace>` element item. The `[normalized value]` of this attribute item is the Uniform Resource Identifier (URI) `[URI]` in the `QuotedURI` in the `ControlNamespace`. If the `ControlNamespace` has a `Prefix`, then an attribute item with the `[local name]` "prefix" SHALL be added to the `[attributes]` of the `<controlNamespace>` element item. The `[normalized value]` of this attribute item is the `NCName` in the `QuotedNCName` in the `Prefix`.

Example

```
GLOBAL-DEFAULTS
  CONTROL-NAMESPACE "http://example.com" PREFIX "ex"

<globalDefaults>
  <controlNamespace name="http://example.com" prefix="ex"/>
</globalDefaults>
```

5.10. ListInstruction Translation

The translation of a `ListInstruction` is an element item with the `[local name]` "list".

5.11. NameInstruction Translation

The translation of a `NameInstruction` is an element item with the `[local name]` "name".

If the `NewNameOrKeyword` in the `NameInstruction` is a `NewName`, then an attribute item with the `[local name]` "newName" SHALL be added to the `[attributes]` of the `<name>` element item. The `[normalized value]` of this attribute item is the character string value of the `RestrictedCharacterStringValue` in the `NewName`.

If the `NewNameOrKeyword` in the `NameInstruction` is a `Keyword`, then an attribute item with the `[local name]` "conversion" SHALL be added to the `[attributes]` of the `<name>` element item. The `[normalized value]` of this attribute item is the word in the `Keyword` with all letters downcased, i.e., "capitalized", "uncapitalized", "uppercased", or "lowercased".

Example

```

NAME AS UNCAPITALIZED

<name conversion="uncapitalized"/>

NAME AS "category"

<name newName="category"/>

```

5.12. NamespaceInstruction Translation

The translation of a NamespaceInstruction is an element item with the [local name] "namespace".

If a NamespaceSpecification is present in the NamespaceInstruction, then an attribute item with the [local name] "name" SHALL be added to the [attributes] of the <namespace> element item. The [normalized value] of this attribute item is the URI in the QuotedURI in the NamespaceSpecification.

If a Prefix is present in the NamespaceSpecification, then an attribute item with the [local name] "prefix" SHALL be added to the [attributes] of the <namespace> element item. The [normalized value] of this attribute item is the NCName in the QuotedNCName in the Prefix.

Example

```

NAMESPACE AS "http://example.com" PREFIX "ex"

<namespace name="http://example.com" prefix="ex"/>

```

5.13. PIOrCommentInstruction Translation

The translation of a PIOrCommentInstruction is an element item with the [local name] "piOrComment".

An attribute item with the [local name] "text" SHALL be added to the [attributes] of the <piOrComment> element item. The [normalized value] of this attribute item is the character string value of the RestrictedCharacterStringValue in the PIOrCommentInstruction.

An attribute item with the [local name] "position" SHALL be added to the [attributes] of the <piOrComment> element item. The [normalized value] of this attribute item is "beforeTag" if the keyword in the Position in the PIOrCommentInstruction is BEFORE-TAG,

"beforeValue" if the keyword in the Position is BEFORE-VALUE,
 "afterValue" if the keyword in the Position is AFTER-VALUE, or
 "afterTag" if the keyword in the Position is AFTER-TAG.

Example

```
PI-OR-COMMENT AS "<!-- This is a comment. -->" BEFORE-TAG

<piOrComment text="&lt;!-- This is a comment. --&gt;"
  position="beforeTag"/>
```

5.14. TextInstruction Translation

The translation of a TextInstruction is an element item with the [local name] "text".

If a TextToBeUsed is present in the TextInstruction and the NewNameOrKeyword in the TextToBeUsed is a NewName, then an attribute item with the [local name] "newName" SHALL be added to the [attributes] of the <text> element item. The [normalized value] of this attribute item is the character string value of the RestrictedCharacterStringValue in the NewName.

If a TextToBeUsed is present in the TextInstruction and the NewNameOrKeyword in the TextToBeUsed is a Keyword, then an attribute item with the [local name] "conversion" SHALL be added to the [attributes] of the <name> element item. The [normalized value] of this attribute item is the word in the Keyword with all letters downcased, i.e., "capitalized", "uncapitalized", "uppercased", or "lowercased".

Examples

```
TEXT AS UPPERCASED

<text conversion="uppercased"/>

TEXT AS "A4"

<text newName="A4"/>
```

5.15. UntaggedInstruction Translation

The translation of an UntaggedInstruction is an element item with the [local name] "untagged".

5.16. UseNilInstruction Translation

The translation of a UseNilInstruction is an element item with the [local name] "useNil".

5.17. UseNumberInstruction Translation

The translation of a UseNumberInstruction is an element item with the [local name] "useNumber".

5.18. UseOrderInstruction Translation

The translation of a UseOrderInstruction is an element item with the [local name] "useOrder".

5.19. UseQNameInstruction Translation

The translation of a UseQNameInstruction is an element item with the [local name] "useQName".

5.20. UseTypeInstruction Translation

The translation of a UseTypeInstruction is an element item with the [local name] "useType".

5.21. UseUnionInstruction Translation

The translation of a UseUnionInstruction is an element item with the [local name] "useUnion".

5.22. WhiteSpaceInstruction Translation

The translation of a WhiteSpaceInstruction is an element item with the [local name] "whiteSpace".

An attribute item with the [local name] "action" SHALL be added to the [attributes] of the <whiteSpace> element item. The [normalized value] of this attribute item is the word in the WhiteSpaceAction in the WhiteSpaceInstruction with all letters downcased, i.e., "replace" or "collapse".

Example

```
WHITESPACE COLLAPSE  
  
<whiteSpace action="collapse"/>
```

6. TargetList Translation

The TargetList production is common to all the encoding instructions.

The translation of a TargetList is the concatenation of the translations of each Targets instance in the TargetList.

The translation of a Targets instance is an element item with the [local name] "target". The translation of the TypeIdentification, BuiltInTypeIdentification or IdentifiersInContext in the Targets instance SHALL be added to the [children] and/or [attributes] of the <target> element item.

Aside: A Targets instance that is an ImportedTypesIdentification will have been removed by the preprocessing described in Section 3.

6.1. TypeIdentification Translation

The translation of a TypeIdentification of the "ALL" form is an element item with the [local name] "allTypes"; otherwise, the translation of a TypeIdentification is the translation of its ModuleAndTypeReference followed by the translation of its ComponentReference, if present, followed by the translation of its QualifyingInformationPart, if present.

The translation of a ModuleAndTypeReference is an attribute item with the [local name] "type". The [normalized value] of this attribute item is a qualified name [XMLNS10] for the expanded name corresponding to the typereference in the ModuleAndTypeReference (see Section 5.1 of the specification for ASN.X [ASN.X]).

The translation of a ComponentReference is an element item with the [local name] "component". The [children] property of the <component> element item is set to the sequence of character items for a solidus ('/', U+002F) separated list of the translations of the ComponentId instances in the ComponentIdList in the ComponentReference, excluding "ALL" if present. Leading and/or trailing white space character items [ASN.X] MAY be added to the [children] of the <component> element item. White space character items MAY be added immediately before and/or after any character item for the solidus character ('/', U+002F). If the final ComponentId in the ComponentIdList in the ComponentReference is "ALL", then an element item with the [local name] "allTextuallyPresent" SHALL follow the <component> element item.

If a ComponentId identifies the Type in a NamedType, then the translation of the ComponentId is a qualified name for the expanded name [XMLNS10] of the NamedType [RXEREI]. If the NamedType is subject to an RXER ATTRIBUTE or ATTRIBUTE-REF encoding instruction [RXEREI], or subject to an RXER COMPONENT-REF encoding instruction that references a top-level NamedType that is subject to an RXER ATTRIBUTE encoding instruction, then the qualified name is prefixed with the commercial at character ('@', U+0040).

If a ComponentId identifies a Type that is not in a NamedType (i.e., the component type for a SEQUENCE OF Type or SET OF Type), then the translation of the ComponentId is the character string "item".

If a ComponentId does not identify a Type and the ComponentId is an identifier, then the translation of the ComponentId is the identifier.

If a ComponentId does not identify a Type and the ComponentId is "*", then the translation of the ComponentId is the character string "item".

The <component> element item is required to be self-contained [RXER].

Aside: An element item is self-contained if all namespace prefixes used by the element item and its contents are declared within the element item.

The translation of a QualifyingInformationPart is the translation of the QualifyingInformation instance in the QualifyingInformationPart.

The translation of a QualifyingInformation instance of the "identifier" form is an element item with the [local name] "identifier". An attribute item with the [local name] "name" SHALL be added to the [attributes] of the <identifier> element item. If the ModuleTypeAndReference and ComponentReference (if present) in the TypeIdentification identify a BIT STRING, ENUMERATED, or INTEGER type where the associated BitStringType, EnumeratedType, or IntegerType (respectively) is subject to an RXER VALUES encoding instruction, then the [normalized value] of the attribute item is the replacement name [RXEREI] for the identifier; otherwise, the [normalized value] is the identifier.

The translation of a QualifyingInformation instance of the "ALL" form is an element item with the [local name] "allIdentifiers".

Examples

Assume this type assignment:

```
MyType ::= SEQUENCE {
  a SEQUENCE OF CHOICE {
    b ENUMERATED { red, green, blue },
    c INTEGER
  }
}
```

MyType.a.*.ALL

```
<target type="MyType">
  <component> a / item </component>
  <allTextuallyPresent/>
</target>
```

MyType.a.*.b:ALL

```
<target type="MyType">
  <component> a / item / b </component>
  <allIdentifiers/>
</target>
```

6.2. BuiltInTypeIdentification Translation

The translation of a BuiltInTypeIdentification is the translation of its BuiltInTypeName followed by the translation of its BuiltInTypeQualifyingInformationPart, if present.

If the BuiltInTypeName is "BIT STRING", "BOOLEAN", "CHARACTER STRING", "EMBEDDED PDV", "EXTERNAL", "GeneralizedTime", "INTEGER", "NULL", "ObjectDescriptor", "OBJECT IDENTIFIER", "OCTET STRING", "REAL", "RELATIVE-OID", or "UTCTime", then the translation of the BuiltInTypeName is an attribute item with the [local name] "type". The [normalized value] of this attribute item is a qualified name with the namespace name being "urn:ietf:params:xml:ns:asn1" and the local part being the BuiltInTypeName with any white space separators replaced by a single hyphen character ('-', U+002D), e.g., BIT STRING becomes BIT-STRING.

If the BuiltInTypeName is a RestrictedCharacterStringType, then the translation of the BuiltInTypeName is an attribute item with the [local name] "type". The [normalized value] of this attribute item is a qualified name with the namespace name being "urn:ietf:params:xml:ns:asn1" and the local part being the RestrictedCharacterStringType, i.e., BMPString, GeneralString,

GraphicString, IA5String, ISO646String, NumericString, PrintableString, TeletexString, T61String, UniversalString, UTF8String, VideotexString, or VisibleString.

If the BuiltInTypeName is "CHOICE", then the translation of the BuiltInTypeName is an element item with the [local name] "choice".

If the BuiltInTypeName is "ENUMERATED", then the translation of the BuiltInTypeName is an element item with the [local name] "enumerated".

If the BuiltInTypeName is "INSTANCE OF", then the translation of the BuiltInTypeName is an element item with the [local name] "instanceOf".

If the BuiltInTypeName is "SEQUENCE", then the translation of the BuiltInTypeName is an element item with the [local name] "sequence".

If the BuiltInTypeName is "SEQUENCE OF", then the translation of the BuiltInTypeName is an element item with the [local name] "sequenceOf".

If the BuiltInTypeName is "SET", then the translation of the BuiltInTypeName is an element item with the [local name] "set".

If the BuiltInTypeName is "SET OF", then the translation of the BuiltInTypeName is an element item with the [local name] "setOf".

The translation of a BuiltInTypeQualifyingInformationPart is the translation of the BuiltInTypeQualifyingInformation instance in the BuiltInTypeQualifyingInformationPart.

The translation of a BuiltInTypeQualifyingInformation instance of the "identifier" form is an element item with the [local name] "identifier". An attribute item with the [local name] "name" SHALL be added to the [attributes] of the <identifier> element item. The [normalized value] of this attribute item is the identifier in the BuiltInTypeQualifyingInformation instance.

The translation of a BuiltInTypeQualifyingInformation instance of the "ALL" form is an element item with the [local name] "allIdentifiers".

Examples

```
BOOLEAN:true
```

```
<target xmlns:asn="urn:ietf:params:xml:ns:asn"
        type="asn:BOOLEAN">
  <identifier name="true"/>
</target>
```

```
ENUMERATED:ALL
```

```
<target>
  <enumerated/>
  <allIdentifiers/>
</target>
```

6.3. IdentifiersInContext Translation

The translation of an IdentifiersInContext instance is an element item with the [local name] "components".

If the IdentifierList in the IdentifiersInContext instance is not of the "ALL" or "COMPONENTS" form, then for each identifier in the IdentifierList, an element item with the same [local name] (i.e., "attribute", "element", "component", "group", "item", "member", or "simpleContent") as the translation of the NamedType corresponding to the identifier SHALL be appended to the [children] of the <components> element item. An attribute item with the [local name] "name" SHALL be added to the [attributes] of each <attribute>, <element>, <component>, <group>, <item>, <member>, or <simpleContent> element item. The [normalized value] of each of these attribute items is a qualified name for the expanded name [XMLNS10] of the NamedType [RXEREI] corresponding to the identifier.

If the IdentifierList in the IdentifiersInContext instance is of the "ALL" form, then an element item with the [local name] "allTextuallyPresent" SHALL be appended to the [children] of the <components> element item.

If the IdentifierList in the IdentifiersInContext instance is of the "COMPONENTS" form, then an element item with the [local name] "allFirstLevel" SHALL be appended to the [children] of the <components> element item.

An element item with the [local name] "in" SHALL be appended to the [children] of the <components> element item. The translation of the TypeIdentification in the IdentifiersInContext instance SHALL be added to the [children] and/or [attributes] of the <in> element item.

Example

Assume this type assignment:

```
MyType ::= SEQUENCE {
    field      INTEGER,
    fieldAtt  [RXER:NAME AS "field"][RXER:ATTRIBUTE] BOOLEAN
}
```

field, fieldAtt IN MyType

```
<target>
  <components>
    <element name="field"/>
    <attribute name="field"/>
    <in type="MyType"/>
  </components>
</target>
```

7. Security Considerations

The ASN.X translation of an XER encoding instruction is semantically equivalent to the original XER encoding instruction. The security considerations that apply to an application built from an original ASN.1 specification with XER encoding instructions apply equally to an application built from the ASN.X translation of the ASN.1 specification.

See the main specification for ASN.X [ASN.X] for security considerations related to ASN.X modules.

8. References

8.1. Normative References

- [BCP14] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [URI] Berners-Lee, T., Fielding, R. and L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax", STD 66, RFC 3986, January 2005.
- [RXER] Legg, S. and D. Prager, "Robust XML Encoding Rules (RXER) for Abstract Syntax Notation One (ASN.1)", RFC 4910, July 2007.
- [RXEREI] Legg, S., "Encoding Instructions for the Robust XML Encoding Rules (RXER)", RFC 4911, July 2007.

- [ASN.X] Legg, S., "Abstract Syntax Notation X (ASN.X)", RFC 4912, July 2007.
- [X.680] ITU-T Recommendation X.680 (07/02) | ISO/IEC 8824-1, Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation.
- [X.680-1] ITU-T Recommendation X.680 (2002) Amendment 1 (10/03) | ISO/IEC 8824-1:2002/Amd 1:2004, Support for EXTENDED-XER.
- [X.693-1] Amendment 1: (to ITU-T Rec. X.693 | ISO/IEC 8825-4) XER encoding instructions and EXTENDED-XER.
- [XML10] Bray, T., Paoli, J., Sperberg-McQueen, C., Maler, E. and F. Yergeau, "Extensible Markup Language (XML) 1.0 (Fourth Edition)", W3C Recommendation, <http://www.w3.org/TR/2006/REC-xml-20060816>, August 2006.
- [XML11] Bray, T., Paoli, J., Sperberg-McQueen, C., Maler, E., Yergeau, F., and J. Cowan, "Extensible Markup Language (XML) 1.1 (Second Edition)", W3C Recommendation, <http://www.w3.org/TR/2006/REC-xml11-20060816>, August 2006.
- [XMLNS10] Bray, T., Hollander, D., Layman, A., and R. Tobin, "Namespaces in XML 1.0 (Second Edition)", W3C Recommendation, <http://www.w3.org/TR/2006/REC-xml-names-20060816>, August 2006.
- [INFOSET] Cowan, J. and R. Tobin, "XML Information Set (Second Edition)", W3C Recommendation, <http://www.w3.org/TR/2004/REC-xml-infoset-20040204>, February 2004.
- [UNICODE] The Unicode Consortium, "The Unicode Standard, Version 4.0", Boston, MA, Addison-Wesley Developers Press, 2003. ISBN 0-321-18578-1.

8.2. Informative References

- [X.693] ITU-T Recommendation X.693 (12/01) | ISO/IEC 8825-4:2002, Information technology - ASN.1 encoding rules: XML encoding rules (XER).

Appendix A. ASN.1 for XER Encoding Instruction Notation

This appendix is normative.

XER-EncodingInstructionNotation

```
{ iso(1) identified-organization(3) dod(6)
  internet(1) private(4) enterprise(1)
  xmled(21472) asnx(1) module(0) xer-ei-notation(3) }
```

```
-- Copyright (C) The IETF Trust (2007). This version of
-- this ASN.1 module is part of RFC 4914; see the RFC itself
-- for full legal notices.
```

```
--
```

```
-- Regarding this ASN.1 module or any portion of it, the author
-- makes no guarantees and is not responsible for any damage
-- resulting from its use. The author grants irrevocable permission
-- to anyone to use, modify, and distribute it in any way that does
-- not diminish the rights of anyone else to use, modify, and
-- distribute it, provided that redistributed derivative works do
-- not contain misleading author or version information.
-- Derivative works need not be licensed under similar terms.
```

DEFINITIONS

RXER INSTRUCTIONS

AUTOMATIC TAGS

EXTENSIBILITY IMPLIED ::= BEGIN

IMPORTS

```
AnyURI,
NCName
```

```
FROM AdditionalBasicDefinitions
```

```
{ iso(1) identified-organization(3) dod(6)
  internet(1) private(4) enterprise(1)
  xmled(21472) asnx(1) module(0) basic(0) }
```

```
Annotation,
Value
```

```
FROM AbstractSyntaxNotation-X
```

```
{ iso(1) identified-organization(3) dod(6)
  internet(1) private(4) enterprise(1)
  xmled(21472) asnx(1) module(0) notation(1) }
```

```
TargetList
```

```
FROM TargetListNotation
```

```
{ iso(1) identified-organization(3) dod(6)
  internet(1) private(4) enterprise(1)
  xmled(21472) asnx(1) module(0)
  target-list-notation(4) }
```

```
;
```

```

XER-EncodingInstructionAssignmentList ::= SEQUENCE {
    annotation      Annotation OPTIONAL,
    instructions    [GROUP] XER-TargettedEncodingInstructions
}

XER-TargettedEncodingInstructions ::= SEQUENCE SIZE (1..MAX) OF
    targettedInstruction XER-TargettedEncodingInstruction

XER-TargettedEncodingInstruction ::= SEQUENCE {
    instruction     [GROUP] XER-GeneralEncodingInstruction,
    targetList     [GROUP] TargetList OPTIONAL
}

XER-EncodingInstruction ::= XER-GeneralEncodingInstruction
    (WITH COMPONENTS { ..., globalDefaults ABSENT })

XER-GeneralEncodingInstruction ::= [SINGULAR-INSERTIONS] CHOICE {
    anyAttributes      XER-WildcardInstruction,
    not-anyAttributes XER-NegatingInstruction,
    anyElement        XER-WildcardInstruction,
    not-anyElement    XER-NegatingInstruction,
    attribute         XER-SimpleInstruction,
    not-attribute     XER-NegatingInstruction,
    base64            XER-SimpleInstruction,
    not-base64       XER-NegatingInstruction,
    decimal           XER-SimpleInstruction,
    not-decimal      XER-NegatingInstruction,
    defaultForEmpty  XER-DefaultForEmptyInstruction,
    not-defaultForEmpty XER-NegatingInstruction,
    embedValues      XER-SimpleInstruction,
    not-embedValues  XER-NegatingInstruction,
    globalDefaults   XER-GlobalDefaultsInstruction,
    list             XER-SimpleInstruction,
    not-list         XER-NegatingInstruction,
    name             XER-NameInstruction,
    not-name         XER-NegatingInstruction,
    namespace        XER-NamespaceInstruction,
    not-namespace    XER-NegatingInstruction,
    piOrComment      XER-PIOrCommentInstruction,
    not-piOrComment  XER-NegatingInstruction,
    text             XER-TextInstruction,
    not-text         XER-NegatingInstruction,
    untagged         XER-SimpleInstruction,
    not-untagged     XER-NegatingInstruction,
    element          XER-NegatingInstruction,
    useNil           XER-SimpleInstruction,
    not-useNil       XER-NegatingInstruction,
    useNumber        XER-SimpleInstruction,

```

```

    not-useNumber      XER-NegatingInstruction,
    useOrder           XER-SimpleInstruction,
    not-useOrder       XER-NegatingInstruction,
    useQName           XER-SimpleInstruction,
    not-useQName       XER-NegatingInstruction,
    useType            XER-SimpleInstruction,
    not-useType        XER-NegatingInstruction,
    useUnion           XER-SimpleInstruction,
    not-useUnion       XER-NegatingInstruction,
    whiteSpace         XER-WhiteSpaceInstruction,
    not-whiteSpace     XER-NegatingInstruction
}

XER-SimpleInstruction ::= SEQUENCE { }

XER-NegatingInstruction ::= XER-SimpleInstruction

XER-WildcardInstruction ::= SEQUENCE {
    namespaceRestriction [GROUP] XER-NamespaceRestriction OPTIONAL
}

XER-NamespaceRestriction ::= [NO-INSERTIONS] CHOICE {
    from XER-URIList,
    except XER-URIList
}

XER-URIList ::= SEQUENCE SIZE(1..MAX) OF
    uriOrAbsent [GROUP] XER-QuotedURIorAbsent

XER-QuotedURIorAbsent ::= [SINGULAR-INSERTIONS] CHOICE {
    namespace AnyURI,
    local NULL
}

XER-DefaultForEmptyInstruction ::= SEQUENCE {
    value [GROUP] Value
}

XER-GlobalDefaultsInstruction ::= SEQUENCE {
    defaultSetting [GROUP] [SINGULAR-INSERTIONS] CHOICE {
        modifiedEncodings NULL,
        controlNamespace XER-ControlNamespace
    }
}

XER-ControlNamespace ::= SEQUENCE {
    name [ATTRIBUTE] AnyURI,
    prefix [ATTRIBUTE] NCName OPTIONAL
}

```

```
}  
  
XER-NameInstruction ::= SEQUENCE {  
    newNameOrKeyword [GROUP] XER-NewNameOrKeyword  
}  
  
XER-NewNameOrKeyword ::= [NO-INSERTIONS] CHOICE {  
    newName [ATTRIBUTE] UTF8String,  
    conversion [ATTRIBUTE] XER-Conversion  
}  
  
XER-Conversion ::= ENUMERATED {  
    capitalized (0),  
    uncapitalized (1),  
    uppercased (2),  
    lowercased (3)  
}  
  
XER-NamespaceInstruction ::= SEQUENCE {  
    namespace [GROUP] XER-NamespaceSpecification OPTIONAL  
}  
  
XER-NamespaceSpecification ::= [HOLLOW-INSERTIONS] SEQUENCE {  
    name [ATTRIBUTE] AnyURI,  
    prefix [ATTRIBUTE] NCName OPTIONAL  
}  
  
XER-PIOrCommentInstruction ::= SEQUENCE {  
    text [ATTRIBUTE] UTF8String,  
    position [ATTRIBUTE] XER-Position  
}  
  
XER-Position ::= ENUMERATED {  
    beforeTag (0),  
    beforeValue (1),  
    afterValue (2),  
    afterTag (3)  
}  
  
XER-TextInstruction ::= SEQUENCE {  
    newNameOrKeyword [GROUP] XER-NewNameOrKeyword OPTIONAL  
}  
  
XER-WhiteSpaceInstruction ::= SEQUENCE {  
    action [ATTRIBUTE] XER-WhiteSpaceAction  
}  
  
XER-WhiteSpaceAction ::= ENUMERATED {
```

```

    replace (0),
    collapse (1)
}

```

ENCODING-CONTROL RXER

```

SCHEMA-IDENTITY "urn:oid:1.3.6.1.4.1.21472.1.0.3"
TARGET-NAMESPACE "urn:ietf:params:xml:ns:asnx" PREFIX "asnx"

```

END

Appendix B. ASN.1 for Target List Notation

This appendix is normative.

TargetListNotation

```

{ iso(1) identified-organization(3) dod(6)
  internet(1) private(4) enterprise(1)
  xmled(21472) asnx(1) module(0) target-list-notation(4) }

```

```

-- Copyright (C) The IETF Trust (2007).  This version of
-- this ASN.1 module is part of RFC 4914; see the RFC itself
-- for full legal notices.

```

```

--
-- Regarding this ASN.1 module or any portion of it, the author
-- makes no guarantees and is not responsible for any damage
-- resulting from its use.  The author grants irrevocable permission
-- to anyone to use, modify, and distribute it in any way that does
-- not diminish the rights of anyone else to use, modify, and
-- distribute it, provided that redistributed derivative works do
-- not contain misleading author or version information.
-- Derivative works need not be licensed under similar terms.

```

DEFINITIONS

RXER INSTRUCTIONS

AUTOMATIC TAGS

EXTENSIBILITY IMPLIED ::= BEGIN

IMPORTS

```

Markup,
NCName,
QName
FROM AdditionalBasicDefinitions
{ iso(1) identified-organization(3) dod(6)
  internet(1) private(4) enterprise(1)
  xmled(21472) asnx(1) module(0) basic(0) }

```

;

TargetList ::= SEQUENCE SIZE (1..MAX) OF target Targets

```
Targets ::= [NO-INSERTIONS] CHOICE {
  allTypes          NULL,
  identifiedTypes   [GROUP] QualifiedTypeIdentification,
  components        IdentifiersInContext,
  allImportsFrom    SEQUENCE { }
  -- allImportsFrom is not used in this version
}
```

```
-- TypeIdentification and BuiltInTypeIdentification
QualifiedTypeIdentification ::= [HOLLOW-INSERTIONS] SEQUENCE {
  types             [GROUP] [SINGULAR-INSERTIONS] CHOICE {
    specificType    [GROUP] SpecificTypeIdentification,
    choice          NULL,
    enumerated      NULL,
    instanceOf     NULL,
    sequence        NULL,
    sequenceOf     NULL,
    set            NULL,
    setOf          NULL
  },
  qualification     [GROUP] QualifyingInformationPart OPTIONAL
}
```

```
SpecificTypeIdentification ::= [HOLLOW-INSERTIONS] SEQUENCE {
  type              [ATTRIBUTE] QName,
  component         Markup OPTIONAL,
  allTextuallyPresent NULL OPTIONAL
}
```

```
QualifyingInformationPart ::= [NO-INSERTIONS] CHOICE {
  allIdentifiers   NULL,
  identifier        SEQUENCE {
    name            [ATTRIBUTE] NCName
  }
}
```

```
IdentifiersInContext ::= SEQUENCE {
  identifiers       [GROUP] IdentifierList,
  in               CHOICE {
    allTypes        NULL,
    specificType    [GROUP] SpecificTypeIdentification
  }
}
```

```
IdentifierList ::= [NO-INSERTIONS] CHOICE {
  list              [GROUP] IdentifiedComponents,
```

```

    allTextuallyPresent  NULL,
    allFirstLevel        NULL
}

```

```

IdentifiedComponents ::= SEQUENCE SIZE (1..MAX) OF
    identifiedComponent [GROUP] IdentifiedComponent

```

```

IdentifiedComponent ::= [SINGULAR-INSERTIONS] CHOICE {
    component      GenericIdentifiedComponent,
    element        GenericIdentifiedComponent,
    attribute      GenericIdentifiedComponent,
    group          GenericIdentifiedComponent,
    member         GenericIdentifiedComponent,
    item           GenericIdentifiedComponent,
    simpleContent  GenericIdentifiedComponent
}

```

```

GenericIdentifiedComponent ::= SEQUENCE {
    name [ATTRIBUTE] QName
}

```

```

ENCODING-CONTROL RXER

```

```

    SCHEMA-IDENTITY "urn:oid:1.3.6.1.4.1.21472.1.0.4"
    TARGET-NAMESPACE "urn:ietf:params:xml:ns:asnx" PREFIX "tln"

```

```

END

```

Appendix C. ASN.X for XER Encoding Instruction Notation

This appendix is non-normative.

```

<?xml version="1.0"?>
<asnx:module xmlns:asnx="urn:ietf:params:xml:ns:asnx"
    xmlns:tln="urn:ietf:params:xml:ns:asnx"
    name="XER-EncodingInstructionNotation"
    identifier="1.3.6.1.4.1.21472.1.0.3"
    schemaIdentity="urn:oid:1.3.6.1.4.1.21472.1.0.3"
    targetNamespace="urn:ietf:params:xml:ns:asnx"
    targetPrefix="asnx"
    extensibilityImplied="true">

```

```

<annotation>

```

Copyright (C) The IETF Trust (2007). This version of this ASN.X module is part of RFC 4914; see the RFC itself for full legal notices.

Regarding this ASN.X module or any portion of it, the author

makes no guarantees and is not responsible for any damage resulting from its use. The author grants irrevocable permission to anyone to use, modify, and distribute it in any way that does not diminish the rights of anyone else to use, modify, and distribute it, provided that redistributed derivative works do not contain misleading author or version information. Derivative works need not be licensed under similar terms.

```

</annotation>

<import name="AbstractSyntaxNotation-X"
  identifier="1.3.6.1.4.1.21472.1.0.1"
  schemaIdentity="urn:oid:1.3.6.1.4.1.21472.1.0.1"
  namespace="urn:ietf:params:xml:ns:asnx"/>

<import name="TargetListNotation"
  identifier="1.3.6.1.4.1.21472.1.0.4"
  schemaIdentity="urn:oid:1.3.6.1.4.1.21472.1.0.4"
  namespace="urn:ietf:params:xml:ns:asnx"/>

<namedType name="XER-EncodingInstructionAssignmentList">
  <type>
    <sequence>
      <optional>
        <element name="annotation" type="asnx:Annotation"/>
      </optional>
      <group name="instructions"
        type="asnx:XER-TargettedEncodingInstructions"/>
    </sequence>
  </type>
</namedType>

<namedType name="XER-TargettedEncodingInstructions">
  <type>
    <sequenceOf minSize="1">
      <element name="targettedInstruction"
        type="asnx:XER-TargettedEncodingInstruction"/>
    </sequenceOf>
  </type>
</namedType>

<namedType name="XER-TargettedEncodingInstruction">
  <type>
    <sequence>
      <group name="instruction"
        type="asnx:XER-GeneralEncodingInstruction"/>
      <optional>
        <group name="targetList" type="tln:TargetList"/>
      </optional>
    </sequence>
  </type>
</namedType>

```

```

    </sequence>
  </type>
</namedType>

<namedType name="XER-EncodingInstruction">
  <type>
    <constrained type="asnX:XER-GeneralEncodingInstruction">
      <withComponents partial="true">
        <element name="globalDefaults" use="absent"/>
      </withComponents>
    </constrained>
  </type>
</namedType>

<namedType name="XER-GeneralEncodingInstruction">
  <type>
    <choice insertions="singular">
      <element name="anyAttributes"
        type="asnX:XER-WildcardInstruction"/>
      <element name="not-anyAttributes"
        type="asnX:XER-NegatingInstruction"/>
      <element name="anyElement" type="asnX:XER-WildcardInstruction"/>
      <element name="not-anyElement"
        type="asnX:XER-NegatingInstruction"/>
      <element name="attribute" type="asnX:XER-SimpleInstruction"/>
      <element name="not-attribute"
        type="asnX:XER-NegatingInstruction"/>
      <element name="base64" type="asnX:XER-SimpleInstruction"/>
      <element name="not-base64" type="asnX:XER-NegatingInstruction"/>
      <element name="decimal" type="asnX:XER-SimpleInstruction"/>
      <element name="not-decimal" type="asnX:XER-NegatingInstruction"/>
      <element name="defaultForEmpty"
        type="asnX:XER-DefaultForEmptyInstruction"/>
      <element name="not-defaultForEmpty"
        type="asnX:XER-NegatingInstruction"/>
      <element name="embedValues" type="asnX:XER-SimpleInstruction"/>
      <element name="not-embedValues"
        type="asnX:XER-NegatingInstruction"/>
      <element name="globalDefaults"
        type="asnX:XER-GlobalDefaultsInstruction"/>
      <element name="list" type="asnX:XER-SimpleInstruction"/>
      <element name="not-list" type="asnX:XER-NegatingInstruction"/>
      <element name="name" type="asnX:XER-NameInstruction"/>
      <element name="not-name" type="asnX:XER-NegatingInstruction"/>
      <element name="namespace" type="asnX:XER-NamespaceInstruction"/>
      <element name="not-namespace"
        type="asnX:XER-NegatingInstruction"/>
      <element name="piOrComment"

```

```

        type="asn:x:XER-PIOrCommentInstruction"/>
    <element name="not-piOrComment"
        type="asn:x:XER-NegatingInstruction"/>
    <element name="text" type="asn:x:XER-TextInstruction"/>
    <element name="not-text" type="asn:x:XER-NegatingInstruction"/>
    <element name="untagged" type="asn:x:XER-SimpleInstruction"/>
    <element name="not-untagged"
        type="asn:x:XER-NegatingInstruction"/>
    <element name="element" type="asn:x:XER-NegatingInstruction"/>
    <element name="useNil" type="asn:x:XER-SimpleInstruction"/>
    <element name="not-useNil" type="asn:x:XER-NegatingInstruction"/>
    <element name="useNumber" type="asn:x:XER-SimpleInstruction"/>
    <element name="not-useNumber"
        type="asn:x:XER-NegatingInstruction"/>
    <element name="useOrder" type="asn:x:XER-SimpleInstruction"/>
    <element name="not-useOrder"
        type="asn:x:XER-NegatingInstruction"/>
    <element name="useQName" type="asn:x:XER-SimpleInstruction"/>
    <element name="not-useQName"
        type="asn:x:XER-NegatingInstruction"/>
    <element name="useType" type="asn:x:XER-SimpleInstruction"/>
    <element name="not-useType" type="asn:x:XER-NegatingInstruction"/>
    <element name="useUnion" type="asn:x:XER-SimpleInstruction"/>
    <element name="not-useUnion"
        type="asn:x:XER-NegatingInstruction"/>
    <element name="whiteSpace"
        type="asn:x:XER-WhiteSpaceInstruction"/>
    <element name="not-whiteSpace"
        type="asn:x:XER-NegatingInstruction"/>
</choice>
</type>
</namedType>

<namedType name="XER-SimpleInstruction">
    <type>
        <sequence/>
    </type>
</namedType>

<namedType name="XER-NegatingInstruction"
    type="asn:x:XER-SimpleInstruction"/>

<namedType name="XER-WildcardInstruction">
    <type>
        <sequence>
            <optional>
                <group name="namespaceRestriction"
                    type="asn:x:XER-NamespaceRestriction"/>
            </optional>
        </sequence>
    </type>
</namedType>

```

```
    </optional>
  </sequence>
</type>
</namedType>

<namedType name="XER-NamespaceRestriction">
  <type>
    <choice insertions="none">
      <element name="from" type="asn:x:XER-URIList"/>
      <element name="except" type="asn:x:XER-URIList"/>
    </choice>
  </type>
</namedType>

<namedType name="XER-URIList">
  <type>
    <sequenceOf minSize="1">
      <group name="uriOrAbsent" type="asn:x:XER-QuotedURIorAbsent"/>
    </sequenceOf>
  </type>
</namedType>

<namedType name="XER-QuotedURIorAbsent">
  <type>
    <choice insertions="singular">
      <element name="namespace" type="asn:x:AnyURI"/>
      <element name="local" type="asn:x:NULL"/>
    </choice>
  </type>
</namedType>

<namedType name="XER-DefaultForEmptyInstruction">
  <type>
    <sequence>
      <group name="value" type="asn:x:Value"/>
    </sequence>
  </type>
</namedType>

<namedType name="XER-GlobalDefaultsInstruction">
  <type>
    <sequence>
      <group name="defaultSetting">
        <type>
          <choice insertions="singular">
            <element name="modifiedEncodings" type="asn:x:NULL"/>
            <element name="controlNamespace"
              type="asn:x:XER-ControlNamespace"/>
          </choice>
        </type>
      </group>
    </sequence>
  </type>
</namedType>
```

```
        </choice>
      </type>
    </group>
  </sequence>
</type>
</namedType>

<namedType name="XER-ControlNamespace">
  <type>
    <sequence>
      <attribute name="name" type="asn:AnyURI"/>
      <optional>
        <attribute name="prefix" type="asn:NCName"/>
      </optional>
    </sequence>
  </type>
</namedType>

<namedType name="XER-NameInstruction">
  <type>
    <sequence>
      <group name="newNameOrKeyword" type="asn:XER-NewNameOrKeyword"/>
    </sequence>
  </type>
</namedType>

<namedType name="XER-NewNameOrKeyword">
  <type>
    <choice insertions="none">
      <attribute name="newName" type="asn:UTF8String"/>
      <attribute name="conversion" type="asn:XER-Conversion"/>
    </choice>
  </type>
</namedType>

<namedType name="XER-Conversion">
  <type>
    <enumerated>
      <enumeration name="capitalized" number="0"/>
      <enumeration name="uncapitalized" number="1"/>
      <enumeration name="uppercased" number="2"/>
      <enumeration name="lowercased" number="3"/>
    </enumerated>
  </type>
</namedType>

<namedType name="XER-NamespaceInstruction">
  <type>
```

```
<sequence>
  <optional>
    <group name="namespace" type="asn:XER-NamespaceSpecification"/>
  </optional>
</sequence>
</type>
</namedType>

<namedType name="XER-NamespaceSpecification">
  <type>
    <sequence insertions="hollow">
      <attribute name="name" type="asn:AnyURI"/>
      <optional>
        <attribute name="prefix" type="asn:NCName"/>
      </optional>
    </sequence>
  </type>
</namedType>

<namedType name="XER-PIOrCommentInstruction">
  <type>
    <sequence>
      <attribute name="text" type="asn:UTF8String"/>
      <attribute name="position" type="asn:XER-Position"/>
    </sequence>
  </type>
</namedType>

<namedType name="XER-Position">
  <type>
    <enumerated>
      <enumeration name="beforeTag" number="0"/>
      <enumeration name="beforeValue" number="1"/>
      <enumeration name="afterValue" number="2"/>
      <enumeration name="afterTag" number="3"/>
    </enumerated>
  </type>
</namedType>

<namedType name="XER-TextInstruction">
  <type>
    <sequence>
      <optional>
        <group name="newNameOrKeyword"
          type="asn:XER-NewNameOrKeyword"/>
      </optional>
    </sequence>
  </type>
</namedType>
```



```

</namedType>

<namedType name="XER-WhiteSpaceInstruction">
  <type>
    <sequence>
      <attribute name="action" type="asn:x:XER-WhiteSpaceAction"/>
    </sequence>
  </type>
</namedType>

<namedType name="XER-WhiteSpaceAction">
  <type>
    <enumerated>
      <enumeration name="replace" number="0"/>
      <enumeration name="collapse" number="1"/>
    </enumerated>
  </type>
</namedType>

</asn:x:module>

```

Appendix D. ASN.X for Target List Notation

This appendix is non-normative.

```

<?xml version="1.0"?>
<asn:x:module xmlns:asn:x="urn:ietf:params:xml:ns:asn:x"
  xmlns:tln="urn:ietf:params:xml:ns:asn:x"
  name="TargetListNotation"
  identifier="1.3.6.1.4.1.21472.1.0.4"
  schemaIdentity="urn:oid:1.3.6.1.4.1.21472.1.0.4"
  targetNamespace="urn:ietf:params:xml:ns:asn:x"
  targetPrefix="tln"
  extensibilityImplied="true">

<annotation>
  Copyright (C) The IETF Trust (2007). This version of
  this ASN.X module is part of RFC 4914; see the RFC itself
  for full legal notices.

```

Regarding this ASN.X module or any portion of it, the author makes no guarantees and is not responsible for any damage resulting from its use. The author grants irrevocable permission to anyone to use, modify, and distribute it in any way that does not diminish the rights of anyone else to use, modify, and distribute it, provided that redistributed derivative works do not contain misleading author or version information. Derivative works need not be licensed under similar terms.

```
</annotation>

<namedType name="TargetList">
  <type>
    <sequenceOf minSize="1">
      <element name="target" type="tln:Targets"/>
    </sequenceOf>
  </type>
</namedType>

<namedType name="Targets">
  <type>
    <choice insertions="none">
      <element name="allTypes" type="asn:NULL"/>
      <group name="identifiedTypes"
        type="tln:QualifiedTypeIdentification"/>
      <element name="components" type="tln:IdentifiersInContext"/>
      <element name="allImportsFrom">
        <annotation>
          allImportsFrom is not used in this version
        </annotation>
        <type>
          <sequence/>
        </type>
      </element>
    </choice>
  </type>
</namedType>

<namedType name="QualifiedTypeIdentification">
  <annotation>
    TypeIdentification and BuiltInTypeIdentification
  </annotation>
  <type>
    <sequence insertions="hollow">
      <group name="types">
        <type>
          <choice insertions="singular">
            <group name="specificType"
              type="tln:SpecificTypeIdentification"/>
            <element name="choice" type="asn:NULL"/>
            <element name="enumerated" type="asn:NULL"/>
            <element name="instanceOf" type="asn:NULL"/>
            <element name="sequence" type="asn:NULL"/>
            <element name="sequenceOf" type="asn:NULL"/>
            <element name="set" type="asn:NULL"/>
            <element name="setOf" type="asn:NULL"/>
          </choice>
        </type>
      </group>
    </sequence>
  </type>
</namedType>
```

```

    </type>
  </group>
  <optional>
    <group name="qualification"
      type="tln:QualifyingInformationPart"/>
  </optional>
</sequence>
</type>
</namedType>

<namedType name="SpecificTypeIdentification">
  <type>
    <sequence insertions="hollow">
      <attribute name="type" type="asn:QName"/>
      <optional>
        <element name="component" type="asn:Markup"/>
      </optional>
      <optional>
        <element name="allTextuallyPresent" type="asn:NULL"/>
      </optional>
    </sequence>
  </type>
</namedType>

<namedType name="QualifyingInformationPart">
  <type>
    <choice insertions="none">
      <element name="allIdentifiers" type="asn:NULL"/>
      <element name="identifier">
        <type>
          <sequence>
            <attribute name="name" type="asn:NCName"/>
          </sequence>
        </type>
      </element>
    </choice>
  </type>
</namedType>

<namedType name="IdentifiersInContext">
  <type>
    <sequence>
      <group name="identifiers" type="tln:IdentifierList"/>
      <element name="in">
        <type>
          <choice>
            <element name="allTypes" type="asn:NULL"/>
            <group name="specificType"

```

```

        type="tln:SpecificTypeIdentification"/>
    </choice>
</type>
</element>
</sequence>
</type>
</namedType>

<namedType name="IdentifierList">
  <type>
    <choice insertions="none">
      <group name="list" type="tln:IdentifiedComponents"/>
      <element name="allTextuallyPresent" type="asn:NULL"/>
      <element name="allFirstLevel" type="asn:NULL"/>
    </choice>
  </type>
</namedType>

<namedType name="IdentifiedComponents">
  <type>
    <sequenceOf minSize="1">
      <group name="identifiedComponent"
        type="tln:IdentifiedComponent"/>
    </sequenceOf>
  </type>
</namedType>

<namedType name="IdentifiedComponent">
  <type>
    <choice insertions="singular">
      <element name="component" type="tln:GenericIdentifiedComponent"/>
      <element name="element" type="tln:GenericIdentifiedComponent"/>
      <element name="attribute" type="tln:GenericIdentifiedComponent"/>
      <element name="group" type="tln:GenericIdentifiedComponent"/>
      <element name="member" type="tln:GenericIdentifiedComponent"/>
      <element name="item" type="tln:GenericIdentifiedComponent"/>
      <element name="simpleContent"
        type="tln:GenericIdentifiedComponent"/>
    </choice>
  </type>
</namedType>

<namedType name="GenericIdentifiedComponent">
  <type>
    <sequence>
      <attribute name="name" type="asn:QName"/>
    </sequence>
  </type>
</namedType>

```

</namedType>

</asn:module>

Author's Address

Dr. Steven Legg
eB2Bcom
Suite 3, Woodhouse Corporate Centre
935 Station Street
Box Hill North, Victoria 3129
AUSTRALIA

Phone: +61 3 9896 7830
Fax: +61 3 9896 7801
EMail: steven.legg@eb2bcom.com

Full Copyright Statement

Copyright (C) The IETF Trust (2007).

This document is subject to the rights, licenses and restrictions contained in BCP 78, and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY, THE IETF TRUST AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in BCP 78 and BCP 79.

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at <http://www.ietf.org/ipr>.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at ietf-ipr@ietf.org.

Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

