

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

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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).

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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 <text> 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.
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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) }
```

```
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```

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:asn" PREFIX "asn"

```

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) asn(1) module(0) target-list-notation(4) }

```

```

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```

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) asn(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:asn1" PREFIX "tln"

END

```

Appendix C. ASN.X for XER Encoding Instruction Notation

This appendix is non-normative.

```

<?xml version="1.0"?>
<asn1:module xmlns:asn1="urn:ietf:params:xml:ns:asn1"
    xmlns:tln="urn:ietf:params:xml:ns:asn1"
    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:asn1"
    targetPrefix="asn1"
    extensibilityImplied="true">

<annotation>
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</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:asn1"/>

<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:asn1"/>

<namedType name="XER-EncodingInstructionAssignmentList">
  <type>
    <sequence>
      <optional>
        <element name="annotation" type="asn1:Annotation"/>
      </optional>
      <group name="instructions"
        type="asn1:XER-TargettedEncodingInstructions"/>
    </sequence>
  </type>
</namedType>

<namedType name="XER-TargettedEncodingInstructions">
  <type>
    <sequenceOf minSize="1">
      <element name="targettedInstruction"
        type="asn1:XER-TargettedEncodingInstruction"/>
    </sequenceOf>
  </type>
</namedType>

<namedType name="XER-TargettedEncodingInstruction">
  <type>
    <sequence>
      <group name="instruction"
        type="asn1:XER-GeneralEncodingInstruction"/>
      <optional>
        <group name="targetList" type="tln:TargetList"/>
      </optional>
    </sequence>
  </type>
</namedType>
```

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

<namedType name="XER-EncodingInstruction">
  <type>
    <constrained type="asn:x: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="asn:x:XER-WildcardInstruction"/>
      <element name="not-anyAttributes"
        type="asn:x:XER-NegatingInstruction"/>
      <element name="anyElement" type="asn:x:XER-WildcardInstruction"/>
      <element name="not-anyElement"
        type="asn:x:XER-NegatingInstruction"/>
      <element name="attribute" type="asn:x:XER-SimpleInstruction"/>
      <element name="not-attribute"
        type="asn:x:XER-NegatingInstruction"/>
      <element name="base64" type="asn:x:XER-SimpleInstruction"/>
      <element name="not-base64" type="asn:x:XER-NegatingInstruction"/>
      <element name="decimal" type="asn:x:XER-SimpleInstruction"/>
      <element name="not-decimal" type="asn:x:XER-NegatingInstruction"/>
      <element name="defaultForEmpty"
        type="asn:x:XER-DefaultForEmptyInstruction"/>
      <element name="not-defaultForEmpty"
        type="asn:x:XER-NegatingInstruction"/>
      <element name="embedValues" type="asn:x:XER-SimpleInstruction"/>
      <element name="not-embedValues"
        type="asn:x:XER-NegatingInstruction"/>
      <element name="globalDefaults"
        type="asn:x:XER-GlobalDefaultsInstruction"/>
      <element name="list" type="asn:x:XER-SimpleInstruction"/>
      <element name="not-list" type="asn:x:XER-NegatingInstruction"/>
      <element name="name" type="asn:x:XER-NameInstruction"/>
      <element name="not-name" type="asn:x:XER-NegatingInstruction"/>
      <element name="namespace" type="asn:x:XER-NamespaceInstruction"/>
      <element name="not-namespace"
        type="asn:x: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>

<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:x:XER-NamespaceSpecification"/>
  </optional>
</sequence>
</type>
</namedType>

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

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

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```
</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>
```

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