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Part 4: Parameterization of ASN.1 specifications

Technologies de l'information — Notation de syntaxe abstraite numéro un (ASN.1) —

Partie 4: Paramétrage des spécifications de la notation de syntaxe abstraite numéro un

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This sixth edition cancels and replaces the fifth edition (ISO/IEC 8824-4:2015), which has been technically revised. It also incorporates ISO/IEC 8824-4:2015/Cor 1:2018.

A list of all parts in the ISO/IEC 8824 series can be found on the ISO and IEC websites.

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Introduction

Application designers need to write specifications in which certain aspects are left undefined. Those aspects will later be defined by one or more other groups (each in its own way), to produce a fully defined specification for use in the definition of an abstract syntax (one for each group).

In some cases, aspects of the specification (for example, bounds) may be left undefined even at the time of abstract syntax definition, being completed by the specification of International Standardized Profiles or functional profiles from some other body.

NOTE 1 – It is a requirement imposed by this Recommendation | International Standard that any aspect that is not solely concerned with the application of constraints has to be completed prior to the definition of an abstract syntax.

In the extreme case, some aspects of the specification may be left for the implementer to complete, and would then be specified as part of the Protocol Implementation Conformance Statement.

While the provisions of Rec. ITU-T X.681 | ISO/IEC 8824-2 and Rec. ITU-T X.682 | ISO/IEC 8824-3 provide a framework for the later completion of parts of a specification, they do not of themselves solve the above requirements.

Additionally, a single designer sometimes requires to define many types, or many information object classes, or many information object sets, or many information objects, or many values, which have the same outer level structure, but differ in the types, or information object classes, or information object sets, or information objects, or values, that are used at an inner level. Instead of writing out the outer level structure for every such occurrence, it is useful to be able to write it out once, with parts left to be defined later, then to refer to it and provide the additional information.

All these requirements are met by the provision for parameterized reference names and parameterized assignments by this Recommendation | International Standard.

The syntactic form of a parameterized reference name is the same as that of the corresponding normal reference name, but the following additional considerations apply:

– When it is assigned in a parameterized assignment statement, it is followed by a list of dummy reference names in braces, each possibly accompanied by a governor; these reference names have a scope which is the right-hand side of the assignment statement, and the parameter list itself.

  NOTE 2 – This is what causes it to be recognized as a parameterized reference name.

– When it is exported or imported, it is followed by a pair of empty braces to distinguish it as a parameterized reference name.

– When it is used in any construct, it is followed by a list of syntactic constructions, one for each dummy reference name, that provide an assignment to the dummy reference name for the purposes of that use only.

Dummy reference names have the same syntactic form as the corresponding normal reference name, and can be used anywhere on the right-hand side of the assignment statement that the corresponding normal reference name could be used. All such usages are required to be consistent.

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INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information Technology – Abstract Syntax Notation ONE (ASN.1): Parameterization of ASN.1 specifications

1 Scope

This Recommendation | International Standard is part of Abstract Syntax Notation One (ASN.1) and defines notation for parameterization of ASN.1 specifications.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- Recommendation ITU-T X.680 (2021) | ISO/IEC 8824-1:2021, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*
- Recommendation ITU-T X.681 (2021) | ISO/IEC 8824-2:2021, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- Recommendation ITU-T X.682 (2021) | ISO/IEC 8824-3:2021, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*

NOTE – The references above shall be interpreted as references to the identified Recommendations | International Standards together with all their published amendments and technical corrigenda.

3 Definitions

For the purposes of this Recommendation | International Standard, the following definitions apply.

3.1 Specification of basic notation

This Recommendation | International Standard uses the terms defined in Rec. ITU-T X.680 | ISO/IEC 8824-1.

3.2 Information object specification

This Recommendation | International Standard uses the terms defined in Rec. ITU-T X.681 | ISO/IEC 8824-2.

3.3 Constraint specification

This Recommendation | International Standard uses the terms defined in Rec. ITU-T X.682 | ISO/IEC 8824-3.

3.4 Additional definitions

3.4.1 **normal reference name**: A reference name defined, without parameters, by means of an "Assignment" other than a "ParameterizedAssignment". Such a name references a complete definition and is not supplied with actual parameters when used.

3.4.2 **parameterized reference name**: A reference name defined using a parameterized assignment, which references an incomplete definition and which, therefore, must be supplied with actual parameters when used.

3.4.3 **parameterized type**: A type defined using a parameterized type assignment and thus whose components are incomplete definitions which must be supplied with actual parameters when the type is used.

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3.4.4 **parameterized value**: A value defined using a parameterized value assignment and thus whose value is incompletely specified and must be supplied with actual parameters when used.

3.4.5 **parameterized value set**: A value set defined using a parameterized value set assignment and thus whose values are incompletely specified and must be supplied with actual parameters when used.

3.4.6 **parameterized object class**: An information object class defined using a parameterized object class assignment and thus whose field specifications are incompletely specified and must be supplied with actual parameters when used.

3.4.7 **parameterized object**: An information object defined using a parameterized object assignment and thus whose components are incompletely specified and must be supplied with actual parameters when used.

3.4.8 **parameterized object set**: An information object set defined using a parameterized object set assignment and thus whose objects are incompletely specified and must be supplied with actual parameters when used.

3.4.9 **variable constraint**: A constraint employed in specifying a parameterized abstract syntax, and which depends on some parameter of the abstract syntax.

4 Abbreviations

For the purposes of this Recommendation | International Standard, the following abbreviation applies:

ASN.1 Abstract Syntax Notation One

5 Convention

This Recommendation | International Standard employs the notational convention defined in Rec. ITU-T X.680 | ISO/IEC 8824-1, clause 5.

6 Notation

This clause summarizes the notation defined in this Recommendation | International Standard.

6.1 Assignments

The following notation which can be used as an alternative for "Assignment" (see Rec. ITU-T X.680 | ISO/IEC 8824-1, clause 13) is defined in this Recommendation | International Standard:

– ParameterizedAssignment (see 8.1).

6.2 Parameterized definitions

6.2.1 The following notation which can be used as an alternative for "DefinedType" (see Rec. ITU-T X.680 | ISO/IEC 8824-1, 14.1) is defined in this Recommendation | International Standard:

– ParameterizedType (see 9.2).

6.2.2 The following notation which can be used as an alternative for "DefinedValue" (see Rec. ITU-T X.680 | ISO/IEC 8824-1, 14.1) is defined in this Recommendation | International Standard:

– ParameterizedValue (see 9.2).

6.2.3 The following notation which can be used as an alternative for "DefinedType" (see Rec. ITU-T X.680 | ISO/IEC 8824-1, 14.1) is defined in this Recommendation | International Standard:

– ParameterizedValueSetType (see 9.2).

6.2.4 The following notation which can be used as an alternative for "ObjectClass" (see Rec. ITU-T X.681 | ISO/IEC 8824-2, 9.2) is defined in this Recommendation | International Standard:

– ParameterizedObjectClass (see 9.2).

6.2.5 The following notation which can be used as an alternative for "Object" (see Rec. ITU-T X.681 | ISO/IEC 8824-2, 11.3) is defined in this Recommendation | International Standard:

– ParameterizedObject (see 9.2).

6.2.6 The following notation which can be used as an alternative for "ObjectSet" (see Rec. ITU-T X.681 | ISO/IEC 8824-2, 12.3) is defined in this Recommendation | International Standard:

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