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Information technology — Abstract Syntax Notation One (ASN.1): Parameterization of ASN.1 specifications

*Technologies de l'information — Notation de syntaxe abstraite numéro 1
(ASN.1): Spécifications pour paramétrisation ASN.1*



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CONTENTS

	<i>Page</i>
1 Scope	1
2 Normative references	1
2.1 Identical Recommendations International Standards	1
3 Definitions	1
3.1 Specification of basic notation	1
3.2 Information object specification	1
3.3 Constraint specification	1
3.4 Additional definitions	1
4 Abbreviations	2
5 Convention	2
6 Notation	2
6.1 Assignments	2
6.2 Parameterized definitions	2
6.3 Symbols	3
7 ASN.1 items	3
8 Parameterized assignments	3
9 Referencing parameterized definitions	5
10 Abstract syntax parameters	7
Annex A – Examples	9
A.1 Example of the use of a parameterized type definition	9
A.2 Example of use of parameterized definitions together with an information object class	9
A.3 Example of parameterized type definition that is finite	10
A.4 Example of a parameterized value definition	11
A.5 Example of a parameterized value set definition	11
A.6 Example of a parameterized class definition	11
A.7 Example of a parameterized object set definition	12
A.8 Example of a parameterized object set definition	12
Annex B – Summary of the notation	13

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 8824-4 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.683.

This is a revision of ISO/IEC 8824:1990.

ISO/IEC 8824:1995 consists of the following parts, under the general title *Information technology — Abstract Syntax Notation One (ASN.1)*:

- *Part 1: Specification of basic notation*
- *Part 2: Information object specification*
- *Part 3: Constraint specification*
- *Part 4: Parameterization of ASN.1 specifications*

Annexes A and B of this part of ISO/IEC 8824:1995 are for information only.

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 implementor to complete, and would then be specified as part of the Protocol Implementation Conformance Statement.

While the provisions of ITU-T Rec. X.681 | ISO/IEC 8824-2 and ITU-T Rec. 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 is sometimes required 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 once, with parts left to be defined later, then reference 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.

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 editions of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunications Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.680 (1994) | ISO/IEC 8824-1:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation.*
- ITU-T Recommendation X.681 (1994) | ISO/IEC 8824-2:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Information object specification.*
- ITU-T Recommendation X.682 (1994) | ISO/IEC 8824-3:1995, *Information technology – Abstract Syntax Notation One (ASN.1): Constraint specification.*

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 ITU-T Rec. X.680 | ISO/IEC 8824-1.

3.2 Information object specification

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

3.3 Constraint specification

This Recommendation | International Standard uses the terms defined in ITU-T Rec. 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.

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

ASN.1 Abstract Syntax Notation One

5 Convention

This Recommendation | International Standard employs the notational convention defined in ITU-T Rec. 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 ITU-T Rec. X.680 | ISO/IEC 8824-1, clause 10) 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 ITU-T Rec. X.680 | ISO/IEC 8824-1, subclause 11.1) 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 ITU-T Rec. X.680 | ISO/IEC 8824-1, subclause 11.1) 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 ITU-T Rec. X.680 | ISO/IEC 8824-1, subclause 11.1) 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 ITU-T Rec. X.681 | ISO/IEC 8824-2, subclause 9.2) is defined in this Recommendation | International Standard:

- ParameterizedObjectClass (see 9.2).