INTERNATIONAL STANDARD

ISO/IEC 11179-3

First edition
1994-12-15

Information technology — Specification and standardization of data elements —

Part 3:
Basic attributes of data elements

Technologies de l'information — Spécifications et normalisation des éléments de données

Partie 3: Attributs de base des éléments de données

INTERNATIONAL

Reference number
ISO/IEC 11179-3:1994(E)

Contents

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 11179-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, SC 14, *Data element principles*.

ISO/IEC 11179 consists of the following parts, under the general title *Information technology - Specification and standardization of data elements*:

- *Part 1: Framework for the generation and standardization of data elements*
- *Part 2: Classification of concepts for the identification of domains*
- *Part 3: Basic attributes of data elements*
- *Part 4: Rules and guidelines for the formulation of data definitions*
- *Part 5: Naming and identification principles for data elements*
- *Part 6: Registration of data elements*

Annexes A, B, C and D of this part of ISO/IEC 11179 are for information only.

Introduction

This part of ISO/IEC 11179 defines basic attributes for specifying data elements.

Data processing and electronic data interchange heavily relies on accurate, reliable, controllable and verifiable data recorded in databases.

One of the prerequisites for a correct and proper use and interpretation of data is that both users and owners of data have a common understanding of the meaning and representation of the data elements. To facilitate a shared view of data elements, a number of attributes have to be defined.

Information technology — Specification and standardization of data elements —

Part 3: Basic attributes of data elements

1 Scope

This part of ISO/IEC 11179 specifies attributes of data elements. It is limited to a set of basic attributes independently of their usage in application systems, databases, data interchange messages, etc.

This part of ISO/IEC 11179 applies to activities including:

a) the definition, specification and contents of data element dictionaries;
b) the design and specification of application-oriented data models, databases and message types for data interchange;
c) the actual use of data in communications and information processing systems;
d) interchanging or referencing among various collections of data elements.

This set of basic attributes will have to be extended with additional attributes to enable the performance of a comprehensive data management function. No logical or physical structure of the data is implied in this part of ISO/IEC 11179.

A comprehensive data management function also requires a set of rules and procedures for classifying, defining, identifying, naming and registering data elements. These rules and procedures are outside the scope of this part and are covered in the other parts of ISO/IEC 11179.

Techniques for implementing a data element dictionary using this part of ISO/IEC 11179 are outside the scope of this part of ISO/IEC 11179.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions for this part of ISO/IEC 11179. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 11179 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 646:1991, *Information technology - ISO 7-bit coded character set for information interchange.*

ISO 3166:1993, *Codes for the representation of names of countries.*

ISO 6093:1985, *Information processing - Representation of numerical values in character strings for information interchange.*

3 Definitions

For the purpose of this part of ISO/IEC 11179 the following definitions apply.

3.1 attribute: A characteristic of an object or entity.

3.2 attribute value: A representation of an instance of an *attribute.*

3.3 data element: A unit of data for which the definition, identification, representation and permissible values are specified by means of a set of *attributes.*

3.4 data element concept: A concept which can be represented in the form of a data element, described independently of any particular representation.

3.5 data element dictionary: An information resource that specifies, defines, and lists all relevant *data elements.*

NOTE: Data element dictionaries may exist at various levels, e.g. ISO/IEC Committees, international associations, industry sectors, companies, application systems.

3.6 data element value: A value out of a set of permissible values pertaining to a data element.

4 Descriptors of a data element attribute

4.1 General descriptors

Data element attributes shall be registered and controlled in a standard way in order to achieve consistency in the exchange of information on data elements among data element dictionaries and to enable the comparison of data elements used in different data management environments.
Table 1 gives the set of general descriptors for describing a data element attribute. The column 'obligation' indicates whether a descriptor is 'mandatory' or 'conditional' or 'optional' when a data element attribute is described.

Table 1 — General descriptors

Descriptor of attribute	Obligation	For definition see
- name	M	4.3
- definition	M	4.4
- obligation	M	4.5
- condition	C	4.6
- maximum occurrence	O	4.7
- datatype	M	4.8
- maximum size	O	4.9
- character set	C	Note 1
- language	C	Note 2
- comment	O	4.10

NOTES

1 In general, a data element attribute is registered in a data element dictionary using one character set. The character set used, is described as the descriptor 'character set' of a data element attribute. The descriptor is valid at the data element dictionary level and shall be explicitly stated in case of interchange among dictionaries. If one (or more) of the data element attributes uses a character set that differs from the set generally used for the complete data element dictionary, then the descriptor 'character set' shall be specified.

2 In general, a data element attribute is registered in a data element dictionary using one language. The language used, is described as the descriptor 'language' of a data element attribute. The descriptor is valid at the data element dictionary level and shall be explicitly stated in case of interchange among data element dictionaries. If one (or more) of the data element attributes uses a language that differs from the set generally used for the complete data element dictionary, then the descriptor 'language' shall be specified. For recommendations of use see Annex D.

4.2 Mandatory descriptors

The following descriptors of data element attributes are mandatory:

- name, see 4.3
- definition, see 4.4
- obligation, see 4.5
- datatype, see 4.8

4.3 Name

Label assigned to a data element attribute. The name shall be unique and shall be presented as an alphanumeric character string.

NOTE: The names of the basic attributes of data elements are listed in table 2.

4.4 Definition

Description of a data element attribute that clearly distinguishes it from other data element attributes. The definition is represented as an alphanumeric character string.

4.5 Obligation

A descriptor indicating whether a data element attribute shall always be present or sometimes be present (i.e. contain value). This descriptor may have the following values:

- mandatory: the data element attribute shall be present.

- conditional: the data element attribute shall be present if condition(s) specified under 4.6 occur.

- optional: the data element attribute may be present or not be present.

4.6 Condition

Circumstances under which a data element attribute shall be present.

4.7 Maximum occurrence

A descriptor specifying the maximum number of instances the data element attribute may have in the specification of one data element.

NOTE: The descriptor 'maximum occurrence' may be implemented by repeating the attribute or by presenting the attribute once with multiple values (multi-valued attribute). The implementation of the latter case requires a syntax convention for distinguishing the attribute values from each other.

Example 1 of implementation:
A data management function has decided that the attribute: 'Synonymous name' may occur 3 times in a data element specification. The three 'Synonymous names' of the data element, named: 'product code' may be presented as follows:

Name:	product code
Synonymous name 1:	article number
Synonymous name 2:	material code
Synonymous name 3:	product reference number

Example 2 of implementation:
A data management function has decided that the attribute: 'Classification scheme' may occur only once but may have 2 values in a data element specification. The two 'classification schemes' of the data element: 'Length of body of component' may be presented as follows:
(The semicolon (;) is used as separator of the two classes.)

Name:	body length
Classification scheme:	IEC Component Class: Component; IEC Data element type class: Quantity of space (T03).

4.8 Datatype

A descriptor specifying a set of distinct values for representing the attribute value. Examples of datatypes for attribute values are: 'character', 'ordinal number', 'integer', 'character string'.

4.9 Maximum size

A specification of the maximum number of storage units to represent the distinct values of the datatype specified in 4.8.
Example: When the instance of 'datatype' is specified as: 'integers' and the instance of the descriptor 'maximum size' is: '3' it means that the attribute value may contain maximum 3 integers.

NOTE: For recommendations for use see Annex D.

4.10 Comment

Remark concerning the application of the attributes.

5 Basic attributes of data elements

5.1 Use of basic attributes

A specification of a data element consists of a set of attributes. This part of ISO/IEC 11179 specifies a set of *basic* attributes. *Basic* means that they are frequently needed to specify a data element. *Basic* attributes may be useful for a variety of functions such as:

- design of information processing systems;
- design of EDI-messages for data interchange;
- maintenance of data element dictionaries;
- data management;
- data administration;
- data element dictionary design;
- data element dictionary control;
- use of information processing systems.

The attributes specified in this part of ISO/IEC 11179 are also considered *basic* in the sense that additional attributes are required to support each of the functions enumerated above.

Basic also implies that the attributes are independent of:

- any application environment;
- any function of a data element (e.g. qualifier, indicator);
- any level of abstraction of the meaning (e.g. a representation of a generic concept like 'name of a person' or a representation of a specific concept like 'name of the driver of a truck');

- any grouping of data elements;
- any method for designing information processing systems or data interchange messages;
- any data element dictionary system.

Basic does not imply that all standardized attributes presented in this part of ISO/IEC 11179 are required in all cases. Distinction is made between those basic attributes that are:

- mandatory: always required;
- conditional: required to be present under certain specified conditions;
- optional: allowed but not required.

5.2 Categories of basic attributes

5.2.1 Identifying

Attributes that are applicable for the identification of a data element.

5.2.2 Definitional

Attributes that describe the semantic aspects of a data element.

NOTE: These attributes may be derived by inheritance from characteristics of data element concepts, objects or entities.

5.2.2 Relational

Attributes that describe associations among data elements and/or associations between data elements and classification schemes, data element concepts, objects, entities.

5.2.3 Representational

Attributes that describe representational aspects of a data element.

5.2.4 Administrative

Attributes that describe management and control aspects of a data element.

5.3 Table of basic attributes

Table 2 lists the basic attributes grouped according to the categories of 5.2.

For a precise definition of these attributes see Clause 6.
The column 'obligation' indicates whether an attribute in a data element dictionary is 'Mandatory' (M), 'Conditional' (C) or 'Optional' (O).

Table 2 – Data element attributes

Attribute category	Name of data element attribute	Obligation	See definition
Identifying	- Name	M	6.1.1
	- Identifier	C	6.1.2
	- Version	C	6.1.3
	- Registration Authority	C	6.1.4
	- Synonymous name	O	6.1.5
	- Context	C	6.1.6
Definitional	- Definition	M	6.2.1
Relational	- Classification scheme	O	6.3.1
	- Keyword(s)	O	6.3.2
	- Related data reference	O	6.3.3
	- Type of relationship	C	6.3.4
Representational	- Representation category	M	6.4.1
	- Form of representation	M	6.4.2
	- Datatype of data element values	M	6.4.3
	- Maximum size of data element values	M	6.4.4
	- Minimum size of data element values	M	6.4.5
	- Layout of representation	C	6.4.6
	- Permissible data element values	M	6.4.7
Administrative	- Responsible organization	O	6.5.1
	- Registration status	C	6.5.2
	- Submitting organization	O	6.5.3
	- Comments	O	6.5.4

5.4 Model of basic attributes

The model depicted in Figure 1 groups the attributes of a data element using two criteria: Similar cardinality and logical interdependency between attributes being clustered together.

- Cardinality type
  Each data element specification may contain zero or one (0:1), one and only one (1:1), zero or more (0:n) or one or more (1:n) occurrences of the attributes listed in Table 2.
  For example, a data element specification may contain zero or one attributes 'Responsible organisation', but requires one and only one attribute 'Definition'; may contain zero or more pair of attributes 'Related data reference' and 'Type of relationship' but requires one or more attributes 'Permissible data element values'.

- Logical interdependency
  In addition to having a similar cardinality type, attributes may depend on one another, i.e., one attribute may not be specified without other attribute(s) being specified.
  For example, both the attribute 'Synonymous name' and 'Context' shall be specified if either one is specified. Similarly, both the attributes 'Related data reference' and 'Type of relationship' shall exist if either one exists. On the other hand, even though both attributes 'Related data reference' and 'synonymous name' have the same cardinality type (0:n), they do not depend on each other to exist, thus are not grouped together.

5.5 Mandatory attributes

The following attributes of data elements are mandatory:

- Name, see 6.1.1
- Definition, see 6.2.1
- Representation category, see 6.4.1
- Form of representation, see 6.4.2
- Datatype of data element values, see 6.4.3
- Maximum size of data element values, see 6.4.4
- Minimum size of data element values, see 6.4.5
- Permissible data element values, see 6.4.7

NOTE: A data management environment may decide that basic attributes having 'obligation': conditional or optional as specified in this part of ISO/IEC 11179, may have a higher 'obligation' in a local environment.

5.6 Additional attributes

Additional, non-basic attributes of data elements can be required, e.g. for internal representation in databases or for structural relations with system and message elements.
See Annex A for examples.

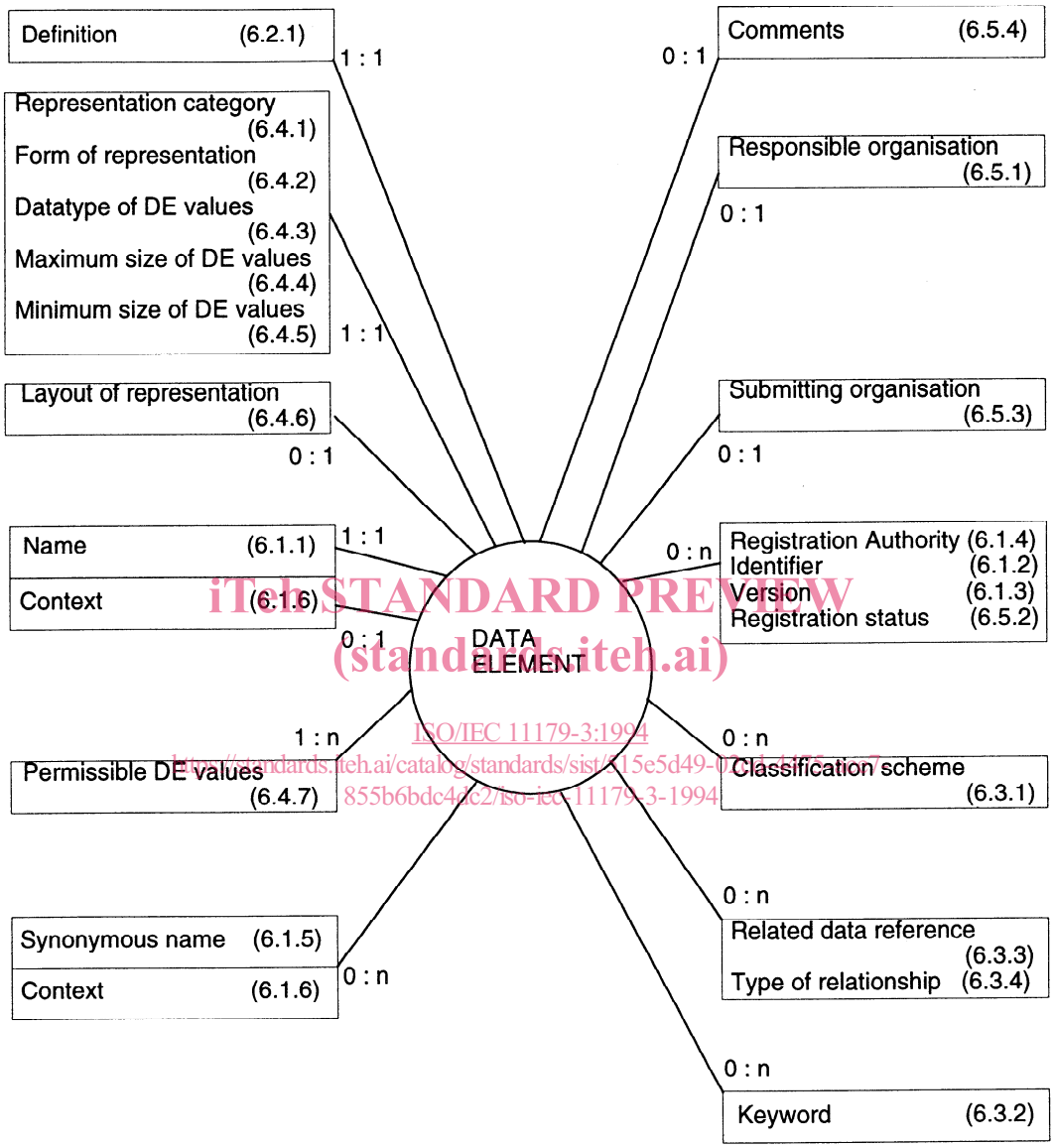

Figure 1 — Model of basic attributes