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**Information technology — Learning, education and training —
Collaborative technology — Collaborative workplace — Part 3:
Collaborative group data model**

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Foreword

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This second/third/... edition cancels and replaces the first/second/... edition (), [clause(s) / subclause(s) / table(s) / figure(s) / annex(es)] of which [has / have] been technically revised.

ISO/IEC 19778 consists of the following parts, under the general title *Information technology — Learning, education and training — Collaborative technology — Collaborative workplace*:

- *Part 1: Collaborative workplace data model*
- *Part2: Collaborative environment data model*
- *Part3: Collaborative group data model*

Introduction

This Part 3 of the multipart standard ISO/IEC 19778 Information technology - Learning, education and training - Collaborative Technology - Collaborative Workplace specifies the member (or group) aspects of the *collaborative workplace*.

The concept of a *collaborative workplace* is described in ISO/IEC 19778 Part 1, while the service aspects of the *collaborative workplace* are specified in ISO/IEC 19778 Part 2.

While many activities in the field of learning, education, and training are performed by groups of *participants* in general, the *collaborative groups* addressed here are characterized by:

- Well-defined membership (in the context of administration)
- Well-defined *role* specifications for all members
- A limited life-span

The distinguishment of the *collaborative workplace* as an entity and its two main components is reflected in the first three parts of the multipart standard ISO/IEC 19778 Information technology - Learning, education and training - Collaborative technology - Collaborative workplace:

Part 1: **Collaborative workplace data model**: specifying and providing information regarding the *collaborative workplace* generally - being provided as a separate Part.

Part 2: **Collaborative environment data model**: specifying and providing information regarding the *collaborative services* of a *collaborative workplace* - being provided as a separate Part.

Part 3: **Collaborative group data model**: specifying and providing information regarding the members of a *collaborative workplace* - this document.

Information technology — Learning, education and training — Collaborative technology — Collaborative workplace — Part 3: Collaborative group data model

1 Scope

This Part 3 - **Collaborative group data model** - of the multipart standard ISO/IEC 19778 specifies the data model for a *collaborative group*.

The purpose of this Standard is:

- to provide a standardized way of specifying the human or other participation and membership in a *collaborative workplace* (by associating the member *participants* with a *collaborative group* identifier of sufficient degree of uniqueness); and
- to provide appropriate information regarding the members of a *collaborative workplace* for the purpose of permissions set-up and control and the management of activities of the *collaborative group*.

NOTE There is a risk of improper access and misuse of personal and private data facilitated by use of the *collaborative group* data model. It is the responsibility of the implementer to ensure proper use of any involved personal information.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- ISO/IEC 11404 Information technology -- Programming languages, their environments and system software interfaces -- Language-independent datatypes.
- ISO/IEC 10646:2003 Information technology -- Universal Multiple-Octet Coded Character Set (UCS).
- ISO 8601:2004 Data elements and interchange formats – Information interchange – Representation of dates and times.
- ISO/IEC 24703:2004 Information technology -- Participant Identifiers
- RFC 3986 - Uniform Resource Identifiers (URI): Generic Syntax (see <http://www.ietf.org/rfc/rfc3986.txt>)

3 Terms and Definitions

NOTE The terms defined here are closely interrelated. When a term is utilized anywhere in this document as defined in this list, that term is *italicized*.

3.1 Collaborative effect

A particular intended result supportive or constitutive of learning that can be achieved through the use of a *collaborative service* or a *collaborative tool*.

3.2 Collaborative environment

One or more *collaborative service(s)* provided within a *collaborative workplace*, for the purposes of supporting the *collaborative activities* of a *collaborative group*.

3.3 Collaborative function

An elementary functionality or capability provided for members of a *collaborative workplace* and enabling particular *collaborative effects* and collaborative activities that cannot be further decomposed without loss of this functionality.

NOTE A single *collaborative tool* frequently provides multiple *collaborative functions* (e.g. the combination of a voice communication function and a text-based chat function) which could also be provided individually, through separate *collaborative tools*.

3.4 Collaborative group

Two or more *participants*, in their capacity as members of the same *collaborative workplace* and through their involvement in the same *collaborative environment*.

3.5 Collaborative service

One or several *collaborative tools* provided in a *collaborative environment* and administered as a single, compound set.

NOTE *Collaborative services* are based on *collaborative tools* and additionally provide communicative functionalities for employing these tools in a *collaborative workplace*.

3.6 Collaborative tool

Hardware, and related software and data providing one or multiple *collaborative functions* for several or all members of a *collaborative workplace*.

3.7 Collaborative workplace

That which is instantiated as an independent entity, comprising the *collaborative activities* of a *collaborative group* defined in relationship to a *collaborative environment*.

NOTE A *collaborative workplace* is usually established with the intention of facilitating collaborative activities among the members of the *collaborative group* to achieve one or more *collaborative effects*.

3.8 Participant

An interactive entity such as a human being, an artifact such as an interactive computer process (enabled by appropriate software, data and interfaces), or a set of such entities and/or artifacts acting and reacting as a single entity.

3.9 Role

A profile or listing of rights and responsibilities specified for a potential or actual member of a *collaborative group*. By assigning a single *role* or several *roles* to a *collaborative group* member, the aggregate rights and responsibilities associated with the *role(s)* are transferred to this *participant*.

3.10 Smallest Permitted Maximum (SPM)

A declaration regarding the upper limit of the size of a data element value, which has a variable size.

Typical data elements whose specifications define SPMs are character strings, records, arrays, bags, sets, and the kind.

Generally, this term designates different concepts depending on the application of the data element, such as:

- For data elements in data model instances, the SPM specifies the upper size limit for a permissible value (i.e. data element values conforming to the standard shall not exceed this size limit); or
- For applications using the value of a data element, the SPM specifies the lowest permissible size limit regarding the capability of the application (i.e. applications conforming to the standard shall be able to handle data element values up to this size limit, or larger).

In the context of this Standard, SPM values are solely used for data elements in data model instances.

4 Conformance

These conformance specifications are concerned solely with the conformance of data model instances themselves (in contrast to, e.g., conformance specifications regarding applications which may use such data model instances).

A conforming *collaborative group* data instance shall be an instance of the data model as defined in section 5.

5 Data Model

5.1 Notation

The following tabular notation is used in the data model.

Table 1 — The Tabular notation for the data model

No.	Name	Explanation	Presence Type	Multi	Datatype	Example

For each data element that has a value domain (i.e. that is not simply an aggregate or container for other, subordinate elements), the following information is provided:

No.: An alpha-numerical value associated with the data element. An element may be composed of sub-elements, and this numbering scheme reflects these relationships.

Name: A title for the element.

Explanation: A definition of the element. An asterisk (*) indicates that the explanation has been adapted from Dublin Core (ISO 15836) data element definitions.

Presence Type: Indicates, for conformance purposes, the conditions under which an element is to be provided:

- M = Mandatory Element. Must be provided in a conformant data instance or record.
- CM = Conditional Mandatory. Elements which must be provided only under certain conditions (e.g. a parent element must be provided when a sub-element is populated).
- O = Optional Element. Elements which can be included in an instance, but are not mandatory.

Multi: Multiplicity of the element:

- Number = the number of times the data element can occur (i.e. its “cardinality”).
- [Number1 .. Number2] = specifies a range for the cardinality of the data element (i.e. from Number1 up to Number2). Note that “*” is used in the context of this notation to indicate “unbounded.”

e.g.,

- [1..10] one to 10 instances of the element are acceptable
- [0..10] 0 to 10 instances of the element are acceptable
- [0..*] 0 to an unlimited number of instances of the element are acceptable

Multiplicity of an element implies that all sub-elements repeat with the parent element.

Datatype: A property of distinct values, indicating common features of those values. Where possible, these datatypes are taken from ISO/IEC 11404:

- Char - characterstring(ISO/IEC 10646:2003) (ISO/IEC 11404)
- PID - Participant Identifier (ISO/IEC 24703:2004 Information technology -- Participant Identifiers)
- T/D - Time Interval (ISO 8601:2004)

NOTE “Agg” designates an aggregate data element, having no value, value space or datatype, but having one or more leaf elements subsumed hierarchically underneath it.

Example: Possible value for the given element.

5.2 Collaborative group data model

5.2.1 Relational description

Figure 1 (below), shows the *collaborative group* data model (bounded by a dashed line) as specified in this Standard. This diagram also indicates specifications or standards which are as of yet unidentified and out of scope for this standard, but which may play a significant role in its implementation.

The following graphical conventions are used in this diagram:

- boxes with a solid outline are data elements as defined in this Standard
- boxes with a dashed outline are standards or specifications

Lines or arrows (and the notation appearing next to them) describe the relationships among elements, and between elements and specifications or standards:

- An arrow joining two boxes indicates that they are related hierarchically, as parent (super-ordinate) and child (sub-ordinate) entities:
 - The box at the arrow's origin is the parent (super-ordinate) data element, standard or specification.
 - The box to which the arrow points is the child (sub-ordinate) data element, standard or specification.
- The notation appearing next to the origin or end of the arrow indicates the multiplicity of the adjacent data element, standard or specification:
 - "1" next to the origin of the arrow indicates that any of possibly multiple relations applies to a single instance of (possibly multiple) parent (super-ordinate) data elements. The notation next the end of the arrow applies to any of such (possibly multiple) relations.
 - "1" next to the end of the arrow indicates that exactly one instance of the corresponding element, standard or specification is related to any parent (super-ordinate) data element.
 - "0..1" is used only in conjunction with data elements, indicating that the data element is optional, and that if it is used, only a single instance shall exist.
 - "1..*" is also used only in conjunction with data elements, and indicates that the data element is mandatory, and that one or more instance(s) of that element may exist.

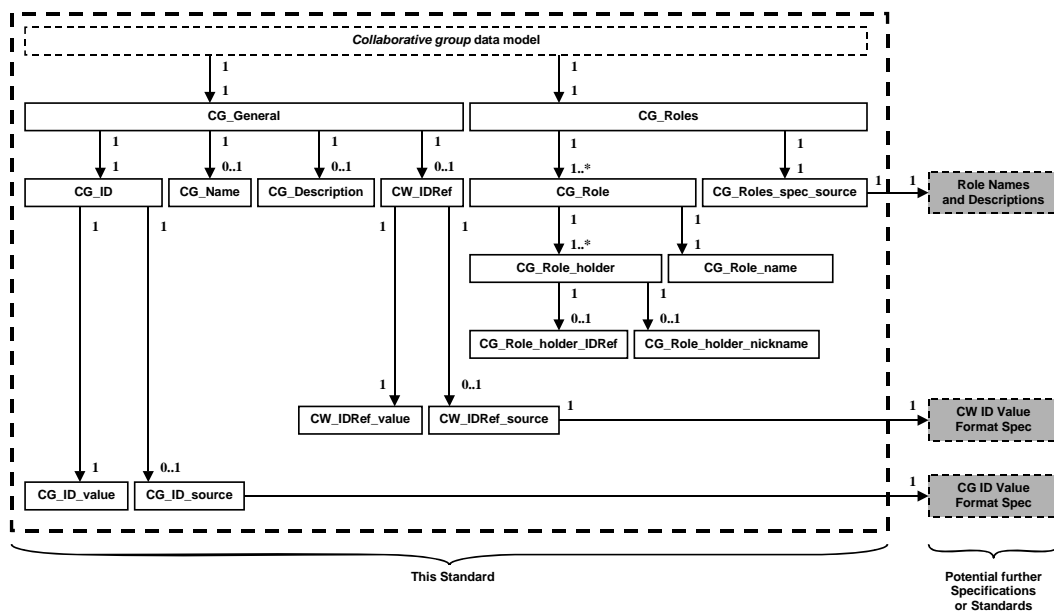


Figure 1 — Collaborative group data model and external specifications

As indicated above, all of the data elements and interrelationships that comprise the collaborative group data model are indicated within the framed area on the left of Figure 1. At the highest level, the collaborative group data model is divided into two sub-structures:

- The sub-structure specifying the collaborative group as a whole (sub-structure CG_General); and
- the sub-structure specifying the components of the collaborative group: the roles and the role holders (sub-structure CG_Roles).

The "potential" specifications and standards provided on the far right of the diagram are those which have either not yet been fully developed, or which are not yet widely recognized in the use of Information and Communication Technologies (ICTs) in learning, education and training. Their development is seen as dependent on experience and practices that are only gradually emerging through the widespread use of ICTs in collaborative and other forms of learning. These potential specifications or standards could serve as sources or namespaces that provide values for specific *collaborative group* data model elements. Should these kinds of specifications or standards eventually be developed or identified, the degree to which data model instances conforming to the this Standard could be reused would be substantially increased.

In the case of ISO/IEC 19778 Part 3, these "potential specifications or standards" are seen as addressing two issue in this data model (a further issue of this kind, regarding **collaborative functions** and **collaborative tools**, is addressed in the Part 2 of this multipart standard ISO/IEC 19778):

- The value domains (designations and particularly definitions) for *role* names (see CE_Role_name), including the specification of the associated *roles*.

Achieving international agreement on a harmonized list or taxonomy of kinds of *roles* in ICT-supported LET is likely to be difficult, and cannot be undertaken without drawing from a broad range of experience and practice – extending well beyond the scope of collaborative learning. One of the goals of this Standard is to facilitate the acquisition of such experience in the context of structured and standardized systems. This, in turn, should allow for further systematization and harmonization of typologies, functionalities and their effects.

- Identifiers and identifier references.

Globally unique identifiers are already in use in many fields of technical application. The standardized creation and management of such identifiers for ICT-supported learning, education, and training (LET) has been gradually emerging. However, this use has yet to become a matter of formalized consensus.

5.2.2 Tabular description

Table 2 — Collaborative group data model

No.	Name	Explanation	Presence Type	Multi	Datatype	Example
G1	General	This sub-structure groups the general information that describes this <i>collaborative group</i> as a whole.	M	1	Agg	-/-
G1.1	CG_Name	<i>Collaborative group</i> name	O	1	Char SPM: 100	Group 3
G1.2	CG_Description	<i>Collaborative group</i> description	O	1	Char SPM: 4000	Group for collaborative work on Computer Graphics exercises
G1.3	CG_ID	<i>Collaborative group</i> identifier	M	1	Agg	-/-

G1.3.1	CG_ID_source	The name or URI of the identification scheme used to generate the value of the <i>collaborative group</i> identifier. A namespace scheme.	O	1	Identifier_type	http://www.gris.informatik.tu-darmstadt.de/idformats/group-identifiers.pdf
G1.3.2	CG_ID_value	Value of the <i>collaborative group</i> identifier	M	1	Identifier_type	de_tu-darmstadt_informatik_gris_20060711_15061154
G1.4	CW_IDRef	<i>Collaborative workplace</i> identifier reference	O	1	Agg	-/-
G1.4.1	CW_IDRef_source	The name or URI of the identification scheme used to generate the value of the <i>collaborative workplace</i> identifier reference. A namespace scheme.	O	1	Identifier_type	http://www.gris.informatik.tu-darmstadt.de/idformats/identifier_type.pdf
G1.4.2	CW_IDRef_value	Value of the <i>collaborative workplace</i> identifier reference	CM	1	Identifier_type	de_tu-darmstadt_informatik_gris_20060910_10141733
G2	CG_Roles	Designation and optional holder assignment for the <i>roles</i> of this <i>collaborative group</i>	M	1	Agg	-/-
G2.1	CG_Roles_spec_source	URI of the specification of the names (name value domain) and the corresponding definitions for <i>roles</i> used in this data model instance. A namespace scheme.	M	1	Identifier_type	http://www.gris.informatik.tu-darmstadt.de/value-domains/role-names.pdf
G2.2	CG_Role	Declaration of a particular <i>role</i>	M	[1...]	Agg	-/-

G2.2.1	CG_Role_name	Name of this particular <i>role</i>	M	1	Char SPM: 100	moderator
G2.2.2	CG_Role_holder	Assignment of a <i>participant</i> to a particular <i>role</i>	M	[1...] NOTE At least two holders shall be allocated to a group in total	Agg	-/-
G2.2.2.1	CG_Role_holder_IDRef	Identifier of this <i>role</i> holder	O	1	PID	de_tu-darmstadt_informatik_g ris_meier-3
G2.2.2.2	CG_Role_holder_nickname	Name by which the <i>role</i> holder is known within the <i>collaborative group</i>	O	1	Char SPM: 100	Nick

5.2.3 Textual description

5.2.3.1 Data element General

This sub-structure groups the general information that describes this *collaborative group* as a whole.

5.2.3.2 Data element CG_Name

Name given to the *collaborative group*.

NOTE This name is solely intended for human use.

5.2.3.3 Data element CG_Description

Description of the *collaborative group*.

NOTE This description is solely intended for human reading and understanding.

5.2.3.4 Data element CG_ID

The *collaborative group* identifier serves as a label for a *collaborative group* data instance (for allowing the reference from the associated *collaborative workplace* data model instance, or from external objects).

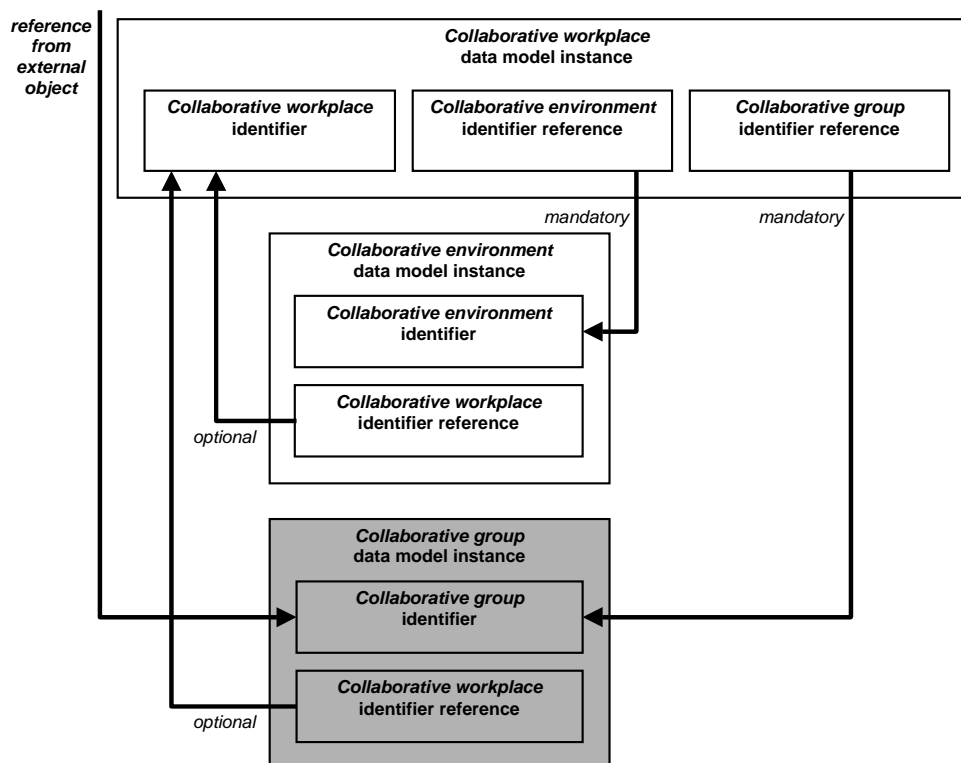


Figure 2 — Linkages between the *collaborative group*, the associated *collaborative workplace*, and the associated *collaborative environment*

In order to support more than a single identifier format, a "source-value" approach has been applied in this data element structure. Accordingly, the value of the sub-element "source" specifies a Uniform Resource Identifier (URI), that can be used for establishing the range of uniqueness for the *collaborative group* identifier value; it could also represent a URI that procures access to a data object that specifies the identifier format. The sub-element "value" serves as a label for the associated *collaborative group*.

5.2.3.5 Data element CG_ID_source

The value of this data element specifies the URI of the source where the regulations are provided that are associated with the used *collaborative group* ID value. The purpose of this value is manifold:

- The URI (in its capacity of being a globally unique identifier) unambiguously identifies a particular community that is responsible for the uniqueness of the used *collaborative group* ID values within this community
- The URI provides access to the regulations regarding the format of the admissible *collaborative group* ID values. These regulations generally specify, how such identifiers are constructed (within the limits of their datatype). Typically, such a specification may restrict the permitted character set, may specify particular characters with special meaning (e.g. separators between distinct fields of the character string), may (for data model instances only) restrict the SPM value for the number of characters of the character string, etc.

NOTE The format of such regulations is not specified in this Standard. Particularly, it is left open whether such regulations are appropriate for automated use or just for human reading, understanding, and observance.

NOTE This data element is optional (and not mandatory) in order to allow simple applications of this data model, where the practicing community takes care that the *collaborative group* identifier values are unambiguous.

5.2.3.6 Data element CG_ID_value

This data element represents both:

- The identifier of this *collaborative group* instance
- The identifier-based reference to the *collaborative workplace* which is associated with this *collaborative group* instance

This identifier shall be unique at least within the application range of this data model instance.

5.2.3.7 Data element CW_IDRef

A reference to the data model instance of the *collaborative workplace* the *collaborative group* is associated with. This reference is specified by providing the identifier of the data model instance of the *collaborative workplace*. This data element directly links the *collaborative group* with its associated *collaborative workplace*, and indirectly (via the *collaborative workplace* link) links the *collaborative group* with its associated *collaborative environment* (see Figure 2).

This identifier reference is optional, as in diverse use cases, this reference might not be required.

5.2.3.8 Data element CW_IDRef_source

The value of this data element specifies the URI of the source where the regulations are provided that are associated with the used *collaborative workplace* ID value. The purpose of this value is manifold:

- The URI (in its capacity of being a globally unique identifier) unambiguously identifies a particular community that is responsible for the unambiguosness of the used *collaborative workplace* ID values within this community
- The URI provides access to the regulations regarding the format of the admissible *collaborative workplace* ID values. These regulations generally specify, how such identifiers are constructed (within the limits of their datatype). Typically, such a specification may restrict the permitted character set, may specify particular characters with special meaning (e.g. separators between distinct fields of the character string), may (for data model instances only) restrict the SPM value for the number of characters of the character string, etc.

NOTE The format of such regulations is not specified in this Standard. Particularly, it is left open whether such regulations are appropriate for automated use or just for human reading, understanding, and observance.

NOTE This data element is optional (and not mandatory) in order to allow simple applications of this data model, where the practicing community takes care that within the range of their visibility the *collaborative workplace* identifier values are unambiguous.

5.2.3.9 Data element CW_IDRef_value

This data element represents the identifier of the associated *collaborative workplace* data model instance. This identifier shall be unique at least within the application range of this data model instance.

5.2.3.10 Data element CG_Roles

This sub-structure specifies the composition of the *collaborative group* regarding its members. It does this by primarily specifying the *roles* of these members and only secondarily assigning *participants* to these *roles*.

NOTE This "roles-first" approach is taken in order to reflect the intention of deriving *collaborative group* templates from *collaborative group* instances for the purpose of setting up new groups with corresponding properties. Such templates would lack values for the *role* holder IDRefs and nicknames in order to fill those in in case of instantiation.

5.2.3.11 Data element CG_Roles_spec_source

The value of this data element specifies the URI of the source where the regulations are provided for the admissible *role* names and where also the specification of these *roles* is provided. The purpose of this value is manifold:

- The URI (in its capacity of being a globally unique identifier) unambiguously identifies a particular community that is responsible for the uniqueness of the used *role* names, and also for the specification of the associated *roles* within this community;
- The URI provides access to the value domain of the admissible *role* names and the specification of the *roles* associated with these names.

NOTE The format of such value domain and specification is not specified in this Standard. Particularly, it is left open whether such regulations are appropriate for automated use or just for human reading, understanding, and observance.

5.2.3.12 Data element CG_Role

The declaration of a particular *role*.

5.2.3.13 Data element CG_Role_name

The designation of a particular *role*.

NOTE 1 The definition of the *role* which is associated with this *collaborative group role* name is provided at the *collaborative group roles* source URI.

NOTE 2 Any desirable standardization of *role* names and definitions requires the evaluation of a sufficient amount of experiencing in practice.

5.2.3.14 Data element CG_Role_holder

The assignment of a *participant* to a particular *role*. The assignment is performed by associating a *role* holder with a *participant* through referencing its *participant* identifier.

NOTE Don't mix up *role* holders with *participants*. A *participant* may be the holder of more than a single *role*, while several *participants* may be holders of the same *role*.

5.2.3.15 Data element CG_Role_holder_IDRef

The (or a) identifier of the *participant* who is associated with this *role* holder.

NOTE Any *participant* may have more than a single *participant* identifier. If a *participant* has several identifiers, it is advisable for the handling of *collaborative groups* to commit oneself to a single of those.

5.2.3.16 Data element CG_Role_holder_nickname

The (or a) nickname of the *participant* who is associated with this *role* holder.

NOTE Any *participant* may have more than a single nickname. If a *participant* has several nicknames, it is advisable for the handling of *collaborative groups* to commit oneself to a single of those.

6 Auxiliary data types

6.1 Identifier_type

Values of datatype identifier_type are based on datatype characterstring(iso-10646-1) with an SPM of 250 characters.

This data type is provided for identifiers that identify a single object and possibly one or more exact equivalents. These identifiers shall be unique within the context in which such objects are utilized. The character string shall conform to the syntax for Uniform Resource Identifiers (URIs) as defined by RFC 3986.