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Information technology — Learning, education and training — Collaborative technology — Collaborative workplace —

Part 1: Collaborative workplace data model

Technologies de l'information — Apprentissage, éducation et formation — Technologies collaboratives — Lieu de travail collaboratif —

Partie 1: Modèle de données du lieu de travail collaboratif

Reference number
ISO/IEC 19778-1:2015(E)

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 36, *Information technology for learning, education and training*.

This second edition cancels and replaces the first edition (ISO/IEC 19978–1:2008), of which it constitutes a minor revision.

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*

— *Part 2: Collaborative environment data model*

— *Part 3: Collaborative group data model*

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Introduction

Many activities in the field of learning, education and training are collaborative in nature, involving turn-taking, statement-and-response or multi-thread discussions which, in turn, take place among *participants* over periods of time ranging from seconds to entire human generations. For example, a question posed via text messaging or email might receive a response in a matter of seconds, minutes or hours; commentary on a historically-significant text might take place months, years or even generations after it has been written. A typical collaborative event is initiated by one *participant*, is usually received by several other *participants*, refers to a previous collaborative event, and provides a response to it. *Collaborative activities* can be established in the widest imaginable range of circumstances, involving many different communicative forms and contents.

The International Standards on collaborative technology for learning, education and training focus on a particular subset of these *collaborative activities*. All terms specifically defined in these International Standards are italicized throughout all parts of ISO/IEC 19778. This subset of activities is characterized by:

— information exchange in small or medium-sized *collaborative groups* of *participants* (typically above two and below a few dozen) who collaborate over relatively short periods of time (typically several days to several months);

— information exchange taking place through the use of communication technology, using either a single, well-defined *collaborative tool* supporting *collaborative functions*, or a set of *collaborative tools*, organized in a *collaborative environment*;

— short intervals in establishing feedback on messages or expressions (generally seconds to hours);

— the exchange of relatively small information chunks (ranging between a single word and a small number of paragraphs);

— a relatively high level of responsiveness among active *collaborative group* members;

— information exchanged among *participants* (due to a number of the factors listed above) tends to be highly context-dependent or -sensitive;

— important contextual information presented by the relationship between these *collaborative group* members and the *collaborative environment* (and its subcomponents), which all together form a *collaborative workplace*.

ISO/IEC 19778 consists of three parts:

— *Part 1: Collaborative workplace data model* provides a representation format for *Data Model* specification, and specifies the *Data Model* structure and the *Data Model Elements* for the *collaborative workplace* in general.

— *Part 2: Collaborative environment data model* specifies the *Data Model* structure and the *Data Model Elements* for the technical infrastructure of a *collaborative workplace*.

— *Part 3: Collaborative group data model* specifies the *Data Model* structure and the *Data Model Elements* specifying and providing information for the membership of a *collaborative workplace*.

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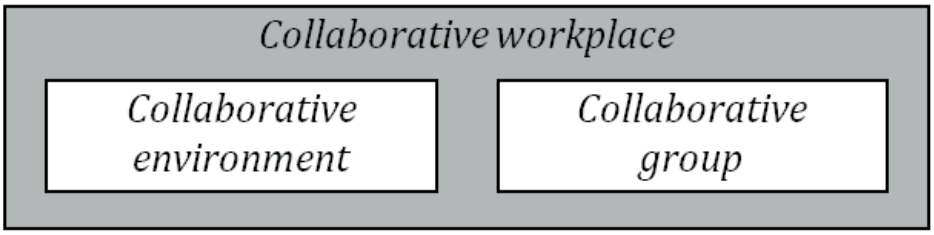


Figure 1 — Entities defined in ISO/IEC 19778

Figure 1 illustrates the relationships among the three physical entities involved. Any *collaborative workplace* represents the combination of a particular *collaborative environment* and a particular *collaborative group*. While the physical entity *collaborative workplace* contains its *collaborative environment* and its *collaborative group*, the *Data Model* instantiations for these physical entities (and the *Data Models* from which these instantiations are derived) are separate data entities.

The *Data Models* specified by ISO/IEC 19778 provide the structure and the concepts for information which

— supports the understanding of the application intentions of *collaborative workplaces* and their components,

— is qualified for supporting the set-up and managing of *collaborative workplaces*,

— enables the specification of relationships among *Data Model instantiations* derived from ISO/IEC 19778 or among their *Data Model Element instantiations*, and

— enables the specification of relationships among anticipated, further *Data Models* or their *Data Model Elements* (or their instantiations), and the *Data Models* or their *Data Model Elements* of ISO/IEC 19778 (or their instantiations).

The interrelationship among a *collaborative workplace* and its *collaborative environment* and *collaborative group*, their associated *Data Model* instantiations, and the corresponding *Data Models* specified in ISO/IEC 19778 is illustrated in Figure 2.

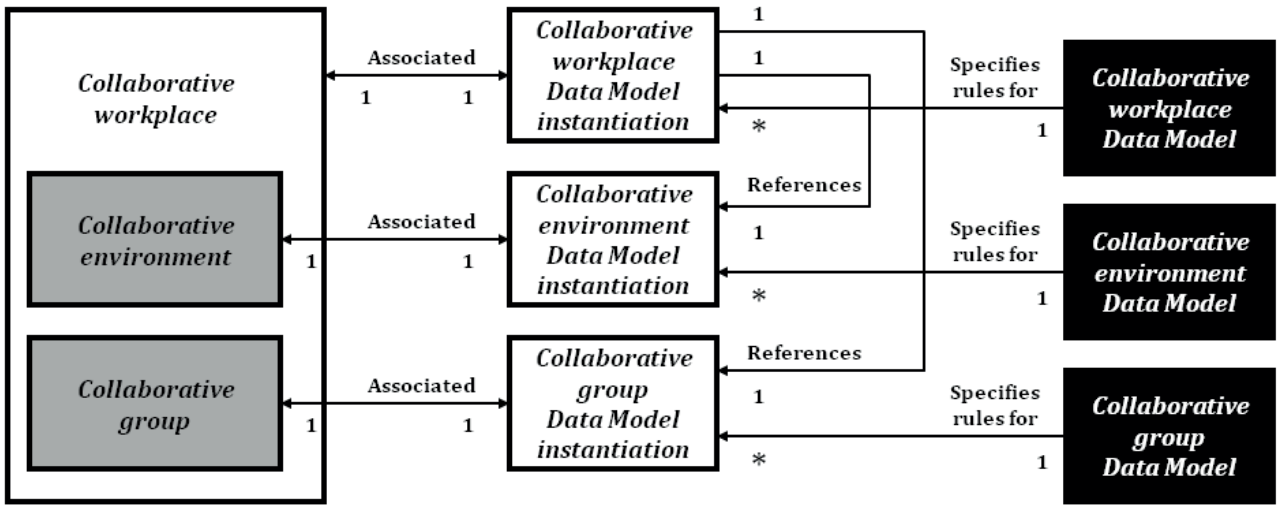


Figure 2 — The interrelationship among a *collaborative workplace* and its *collaborative environment* and *collaborative group*, their associated *Data Model* instantiations, and the *Data Models* specified in ISO/IEC 19778

This part of ISO/IEC 19778 specifies a *Data Model* that provides general information on a *collaborative workplace* (in Figure 2, the outer frame to the left). A *collaborative workplace* comprises a technical

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infrastructure (ISO/IEC 19778–2, *Collaborative environment*) and means of defining its membership (ISO/IEC 19778–3, *Collaborative group*).

As illustrated in Figure 2, it is important to distinguish among (from left to right)

— the physical entities of a *collaborative workplace*, comprising its technical infrastructure and its members;

— the *Data Model instantiations* that are associated with these physical entities, and that are derived from their respective *Data Models* using any conforming binding;

— the *Data Models* provided by ISO/IEC 19778 and specifying the (binding-independent) rules for creating *Data Model instantiations*.

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Information technology — Learning, education and training — Collaborative technology — Collaborative workplace —

Part 1: Collaborative workplace data model

1 Scope

1.1 Statement of scope

1.1.1 ISO/IEC 19778

ISO/IEC 19778 is applicable to collaborative technologies used to support communication among learners, instructors and other *participants*. The implementation and communicative use of these technologies entails the creation of information related to *participant* groups, and to the *collaborative environments*, functions and tools that are set up for, and used by, these groups. This part of ISO/IEC 19778:—, together with its subsequent parts, defines *Data Models* that enable the portability and reuse of this data in integrated form, and allow *Data Model instantiations* to be interchanged, stored, retrieved, reused or analysed by a variety of systems.

NOTE 1 A typical case of reusing a particular *collaborative workplace Data Model instantiation* (and its interlinked *collaborative environment and collaborative group Data Model instantiations*) is the automated set-up of new *collaborative workplaces* by using the specifications in the *Data Model instantiations* as templates.

NOTE 2 The reason for providing the specification for a *collaborative workplace* using several *Data Models* and their instantiations is to provide flexibility in the further development of these standards in future editions. By providing optional references to potential further specifications or standards, this approach goes far beyond the parts of ISO/IEC 19778 and the limited number of information elements provided by them.

1.1.2 This part of ISO/IEC 19778

This part of ISO/IEC 19778 specifies a table-based approach for defining *Data Models.* This *Data Model* specification is used for specifying the *collaborative workplace Data Model*. The same *Data Model* specification is also used in ISO/IEC 19778-2 and ISO/IEC 19778-3 to define the related components of the *collaborative environment* (ISO/IEC 19778-2) and the *collaborative group* (ISO/IEC 19778-3) in separate *Data Models*.

NOTE 1 This *Data Model* specification is also used in ISO/IEC 19780.

The *collaborative workplace Data Model* specifies the *Data Model Elements* and their interrelationships that enable the creation of *collaborative workplace Data Model instantiations*.

Any conforming *collaborative workplace Data Model instantiation* describes or specifies a particular *collaborative workplace* with which it is associated.

NOTE 2 How the association of a particular *collaborative workplace Data Model instantiation* and a particular *collaborative workplace* is implemented is outside the scope of this part of ISO/IEC 19778 (i.e. is dependent on the implementation of the used collaboration system).

Any conforming collaborative workplace Data Model instantiation

— references *Data Model instantiations* for both a particular *collaborative environment* and a particular *collaborative group*;

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— provides its particular identifier that allows this *Data Model instantiation* to be referenced from other *Data Model instantiations*;

NOTE 3 The ISO/IEC 19778 *Data Models* and *Data Model* or *Data Model Element instantiations* are referenced by ISO/IEC 19780, which provides storage formats for captured communicative contributions, along with contextual data (relationship to other contributions, time sent, authorship, etc.).

— provides the life-span dates-and-times for the associated *collaborative workplace*;

— may provide a name and a textual description for its associated *collaborative workplace*, particularly for the purpose of full-text search for *collaborative workplace Data Model instantiations*.

1.2 Subjects and aspects not currently addressed in ISO/IEC 19778

Further parts or future new editions of the existing parts of ISO/IEC 19778 are anticipated. They include the following.

— Internationalization (e.g. national alternatives for the values of textual, descriptive *Data Elements*).

— Bindings for the *Data Models* of ISO/IEC 19778–1, –2, and –3 will be provided by additional parts.

— Best practice guides for the use of Parts 1, 2, and 3 will be provided by additional parts.

— Enabling the concurrent use of several international languages in ISO/IEC 19778–1, –2, and –3 will be reflected by future editions.

— Any lessons learnt from practicing ISO/IEC 19778–1, –2, and –3 will be reflected by future editions of these parts.

1.3 Excluded subjects and aspects in ISO/IEC 19778

Beyond the scope of ISO/IEC 19778, communities of practice or standardization bodies may provide further specifications or standards which are not yet identified. These anticipated specifications or standards may either make use of ISO/IEC 19778, or may — where this is prepared for — specify value domains for *Data Elements* of the *Data Models* of ISO/IEC 19778, or may represent extensions of ISO/IEC 19778 by providing and referencing *Data Models* with supplementing information.

Subjects and aspects not provided by ISO/IEC 19778, but anticipated to be provided by further specifications or standards, include:

— the specification of *roles* that *collaborative group* members may play, including the obligations and permissions associated with these *roles*;

— the specification of *collaborative tools* and their *collaborative functions*, including their technical capabilities and constraints;

— the specification of models for collaborative applications, including the modelling of tasks, activities and objectives of such activities.

1.4 Subjects and aspects addressed in related standards

ISO/IEC 19778 is closely related to ISO/IEC 19780-1. This related International Standard enables the recording, portability and reuse of the communicative contents, the messages or expressions generated in the course of *collaborative activity*. The way this communicative data are recorded and captured makes use of *collaborative workplace*, *collaborative group* and *collaborative environment Data Model Elements*.

2 Normative references

There are no normative references cited in this document.

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE 1 The terms defined here are closely interrelated. Terms defined in this Clause are italicized elsewhere in this part of ISO/IEC 19778 when used as defined. Where these terms are not italicized in this International Standard, they are used with their self-explanatory or common meanings. One exception to this rule is presented by the use of these defined terms in clause and subclause titles, headings, or term listings, where italicization is dropped for purposes of formatting consistency.

NOTE 2 An alphabetical list of all of the terms defined in 3.1 and 3.2 is provided in Annex A.

3.1 Terms and definitions used to specify a representation of a Data Model

NOTE This subclause defines terms used to specify the way the *Data Model* (3.1.7) is represented in ISO/IEC 19778.

3.1.1
Aggregating Element
AE
DME (3.1.8) which is neither a *Root Element* (3.1.19) nor a leaf element in a *Data Model* (3.1.7) tree structure, represented as a unit of data for which an *identifier* (3.1.12), *designation* (3.1.11), *definition* (3.1.10), *obligation status* (3.1.15), and a *multiplicity value* (3.1.14) are all specified as *DME attributes* (3.1.9)

Note 1 to entry: *AE*s provide an important means of structuring the *Data Model*, and also provide important semantic information.

3.1.2
Collaborative Technology standards
CT standards
International Standards family in the domain of "Information technology — Learning, education and training — Collaborative technology"

Note 1 to entry: Many of the standards in this domain are closely interrelated, implying the need for particular cross-standard harmonization.

3.1.3
conditionally mandatory
required under certain specified conditions

Note 1 to entry: This is one of four permissible *DME obligation status* (3.1.15) values. See also *conditionally optional* (3.1.4), *mandatory* (3.1.17) and *optional* (3.1.18).

Note 2 to entry: Where this *DME obligation status* value is assigned, the specification of the "conditions" under which the *DME's* provision is *mandatory* is required.

3.1.4
conditionally optional
permitted under certain specified conditions only, but not required

Note 1 to entry: This is one of four permissible *DME obligation status* (3.1.15) values. See also *conditionally mandatory* (3.1.3), *mandatory* (3.1.17) and *optional* (3.1.18).

Note 2 to entry: Where this *DME obligation status* value is assigned, the specification of the "conditions" under which the *DME's* provision is *optional* is required.

[SOURCE: ISO/IEC 11179-3:2003, 3.2.9, modified]

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3.1.5
Data Element
DE
DME (3.1.8) which is a leaf element in a *Data Model* (3.1.7) tree structure, represented as a unit of data for which an *identifier* (3.1.12), *designation* (3.1.11), *definition* (3.1.10), *obligation status* (3.1.15), a *DME multiplicity* (3.1.14), the representation and permissible values of the *Data Element* (3.1.5), and optionally value examples for the *Data Element* are all specified as *DME attributes* (3.1.9)

Note 1 to entry: In *Data Model instantiations* (3.1.16) in any appropriate binding, the representation of a *Data Element* instantiation requires (at least) the provision of its *DME identifier* and its value. The format used to achieve this is binding-specific.

Note 2 to entry: In *CT standards* (3.1.2), both the representation and permissible values of a *Data Element* are indicated through the *DE datatype* (3.1.6). Additional constraints for the set of permissible values may be imposed by a referenced external specification or standard.

[SOURCE: ISO/IEC 11179-3:2003, 3.3.36, modified]

3.1.6
Data Element datatype
DE datatype
specification of a set of distinct values for a *DE* (3.1.5), characterized by properties of those values and by possible operations on those values

Note 1 to entry: The set of distinct values specified by the value of a *DME datatype* may be restricted to a subset, based on a specification or standard which is external to the *Data Model* (3.1.7). The reference to this external specification or standard is provided as the value of an appropriate *Data Element* in the *Data Model*. Which *Data Element* provides the reference to this external specification or standard is indicated at the same place where the respective *DE datatype* is specified.

[SOURCE: ISO/IEC 11404:2007, 3.12, modified]

3.1.7
Data Model
DM
graphical and/or lexical representation of data, specifying their properties, structures and interrelationships

[SOURCE: ISO/IEC 11179-3:2003, 3.2.11, modified]

3.1.8
Data Model Element
DME
Aggregating Element (3.1.1) or *Data Element* (3.1.5)

3.1.9
Data Model Element attribute
DME attribute
particular characteristic of a *DME* (3.1.8)

[SOURCE: ISO/IEC 11179-3:2003, 3.1.3, modified]

3.1.10
Data Model Element definition
DME definition
representation of the concept of a *DME* (3.1.8) through a descriptive statement which serves to differentiate it from related concepts

[SOURCE: ISO 1087-1:2000, 3.3.1, modified]

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3.1.11
Data Model Element designation
DME designation
label for a *DME* (3.1.8), designating it in a manner which is unambiguous in the context of the *Data Model* (3.1.7)

Note 1 to entry: *DME designations* (3.1.11) are used in the wording of *CT standards* (3.1.2) in order to refer to particular *DME*s, as opposed to the linguistically neutral *DME identifiers* (3.1.12), which serve a mnemonic function.

[SOURCE: ISO 1087-1:2000, 3.4.1, modified]

3.1.12
Data Model Element identifier
DME identifier
sequence of numerical branch indices, which specify the path from the general *Root Element* (3.1.19) of the *Data Model* (3.1.7) to the specific *DME* (3.1.8), and thus identify it uniquely within the context of the *Data Model*

[SOURCE: ISO/IEC 11179-3:2003, 3.1.8, modified]

3.1.13
Data Model Element instantiation
DME instantiation
data object in a *Data Model instantiation* (3.1.16), representing a *Data Model Element* (3.1.8)

3.1.14
Data Model Element multiplicity
DME multiplicity
specification of the interval between the required minimum and the permitted maximum of *DME instantiation* (3.1.13) occurrences in a conforming *Data Model instantiation* (3.1.16)

Note 1 to entry: Where a *DME* (3.1.8) is not provided at all in a *Data Model instantiation* [as permitted by the value of the *DME obligation status* (3.1.15)], its *DME multiplicity* (3.1.14) value does not apply.

Note 2 to entry: In cases where the two values (required minimum and permitted maximum occurrence) coincide, only a single value is specified.

3.1.15
Data Model Element obligation status
DME obligation status
specification of whether, or under which condition(s), a *DME* (3.1.8) is permitted or required in a conforming *Data Model instantiation* (3.1.16)

Note 1 to entry: The possible values for this attribute are *mandatory* (3.1.17), *optional* (3.1.18), *conditionally mandatory* (3.1.3) and *conditionally optional* (3.1.4).

[SOURCE: ISO/IEC 11179-3:2003, 3.2.9, 3.2.17, and 3.2.28, modified]

3.1.16
Data Model instantiation
DM instantiation
data object derived from a *Data Model* (3.1.7), providing values for its *Data Elements* (3.1.5), and generally making use of a particular binding specification (RDF, XML, etc.)

Note 1 to entry: The precise forms of the *DM instantiations* (3.1.16) are dependent on the specific binding used.

3.1.17
mandatory
always required

Note 1 to entry: One of four permissible *DME obligation status* (3.1.15) values. See also *conditionally optional* (3.1.4), *conditionally mandatory* (3.1.3), and *optional* (3.1.18).

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[SOURCE: ISO/IEC 11179-3:2003, 3.2.17]

3.1.18
optional
permitted but not required

Note 1 to entry: One of four permissible *DME obligation status* values. See also *conditionally optional* (3.1.4), *conditionally mandatory* (3.1.3), and *mandatory* (3.1.17).

[SOURCE: ISO/IEC 11179-3:2003, 3.2.28]

3.1.19
Root Element
RE
root or top-most element in the tree structure of a *Data Model* (3.1.7)

Note 1 to entry: The *Root Element* represents the entire *Data Model* and is neither quoted in the table representation of the *Data Model* nor included in the concept *Data Model Element* (3.1.8).

3.2 Terms and definitions for the Data Model Elements of this and related standards

NOTE This subclause defines terms used to specify the *Data Model Elements* (3.18) of the *Data Model* (3.1.7) in ISO/IEC 19778.

3.2.1
collaborative activity
pursuit of intended results through the efforts of several or all members of a *collaborative group* (3.2.5) in a *collaborative workplace* (3.2.8)

3.2.2
collaborative effect
particular intended result, supportive or constitutive of learning, that can be achieved through the use of a *collaborative service* (3.2.6)

3.2.3
collaborative environment
single or combination of *collaborative service(s)* (3.2.6) provided within a *collaborative workplace* (3.2.8) for the purposes of supporting the *collaborative activities* (3.2.1) of a *collaborative group* (3.2.5)

3.2.4
collaborative function
elementary functionality or capability provided for *collaborative group* (3.2.5) members and enabling particular *collaborative effects* (3.2.2) and *collaborative activities* (3.2.1) that cannot be further decomposed without loss of this functionality

Note 1 to entry: A single *collaborative tool* (3.2.7) frequently provides multiple *collaborative functions* (3.2.4), e.g. the combination of an application broadcasting function and a text-based chat function, which could also be provided individually through separate *collaborative tools*.

3.2.5
collaborative group
two or more *participants*, in their capacity as members of the same *collaborative workplace* (3.2.8) and through their involvement in the same *collaborative environment* (3.2.3)

Note 1 to entry: Accommodating on-the-fly changes in membership or in participation status (e.g. online vs. off-line) of *participants* (3.2.9) or *role* (3.2.10) holders is considered outside of the scope of ISO/IEC 19778. For example, whisper (a subset of a larger group being temporarily created for the purposes of confidential communication) is a function not directly accommodated by ISO/IEC 19778.

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3.2.6
collaborative service
service providing *collaborative tools* (3.2.7) and *collaborative functions* (3.2.4) to *collaborative environments* (3.2.3)

Note 1 to entry: *Collaborative service* itself is not defined in ISO/IEC 19778, because a CE *DM instantiation* (3.1.16) may choose some or all of *collaborative tools* from a *collaborative service* or it may combine different *collaborative tools* or *collaborative functions* from multiple *collaborative services* into a CE. For this reason, only *collaborative tools* and *collaborative functions* appear in CE specifications. The definition of *collaborative service*, e.g. how it may define *collaborative tools* and *collaborative functions* within it, is outside of scope of ISO/IEC 19778.

3.2.7
collaborative tool
hardware and related software and data providing one or multiple *collaborative functions* (3.2.4) for several or all *collaborative group* (3.2.5) members

Note 1 to entry: Several *collaborative tools* may be integrated in a *collaborative service*.

3.2.8
collaborative workplace
instantiation of an entity, comprising the *collaborative activities* (3.2.1) of a *collaborative group* (3.2.5) defined in relation to a *collaborative environment* (3.2.3)

Note 1 to entry: 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* (3.2.2).

3.2.9
participant
interactive entity such as a human being, artefact such as an interactive computer process (enabled by appropriate software, data and interfaces), or set of such entities and/or artefacts acting and reacting as a single entity

3.2.10
role
profile or listing of rights and responsibilities specified for a potential or actual member of a *collaborative group* (3.2.5)

Note 1 to entry: 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*.

4 Abbreviated terms and acronyms

NOTE Some of the abbreviations or acronyms in this clause represent terms defined in Clause 3.

AE Aggregating Element (3.1.1)

CE Collaborative Environment (3.2.3)

CG Collaborative Group (3.2.5)

CT Collaborative Technology (3.1.2)

CW Collaborative Workplace (3.2.8)

DE Data Element (3.1.5)

DM Data Model (3.1.7)

DME Data Model Element (3.1.8)

ID Identifier

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