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

Part 2: Collaborative environment data model

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

Partie 2: Modèle de données de l'environnement collaboratif

Reference number
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

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.

ISO/IEC 19778-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 36, *Information technology for learning, education and training*.

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

ISO/IEC 19778 provides *Data Models* for specifying *collaborative workplaces* and their components. ISO/IEC 19778-1 provides general information for all parts, and specifies a *Data Model* which, by reference, composes the *Data Model instantiations* of the two main components of a *collaborative workplace*: the *collaborative environment* and the *collaborative group*. This part of ISO/IEC 19778 provides the *Data Model* for the *collaborative environment* and specifies information related to the service aspects of a *collaborative workplace*. ISO/IEC 19778-3 provides the *Data Model* for the *collaborative group* and specifies information related to the *roles* and the membership of a *collaborative workplace*.

The main accomplishment of this part of ISO/IEC 19778 is to specify the composition of the *collaborative tools* which are integrated in the *collaborative service(s)* of a *collaborative workplace*. As *collaborative tools* frequently provide several *collaborative functions*, these *collaborative functions* are also identified in the *collaborative environment Data Model*.

The purpose of this part of ISO/IEC 19778 is:

— to provide a standardized way of defining and instantiating, as an independent entity, the service(s) and associated entities of a *collaborative workplace* (this is done by associating these services and entities with a *collaborative environment* identifier unique within a particular domain or application context); and

— to specify the technical and infrastructural requirements of a *collaborative workplace* for the purpose of set-up, employment, management, administration, and evaluation of its *collaborative environment.*

The detailed specification of the *collaborative tools* and their *collaborative functions* is not provided in this part of ISO/IEC 19778; however, it may be linked to the *collaborative environment Data Model instantiations* by referring to "potential further specifications or standards" that are not identified and possibly do not yet even exist. (One of the intentions of this part of ISO/IEC 19778 is to encourage adopters to develop and harmonize such specifications.)

Linkages to "potential further specifications or standards" are constituted by employing a "source/value" approach, where the value (e.g. the name of a *collaborative tool* or *collaborative function*) is taken from a "source", a specification or standard, which declares the names and specifies the details of *collaborative tools* or *collaborative functions*. The "source" itself is specified by reference, using a URL. The intention of this "source/value" approach is to provide a simple method for linking developing specifications or standards to the *Data Model* of this part of ISO/IEC 19778 without needing to identify them beforehand. This highly flexible method reflects the fact that ISO/IEC 19778-2 is a part of a multipart standard that represents prospective technology. Figure 1 illustrates how this is achieved.

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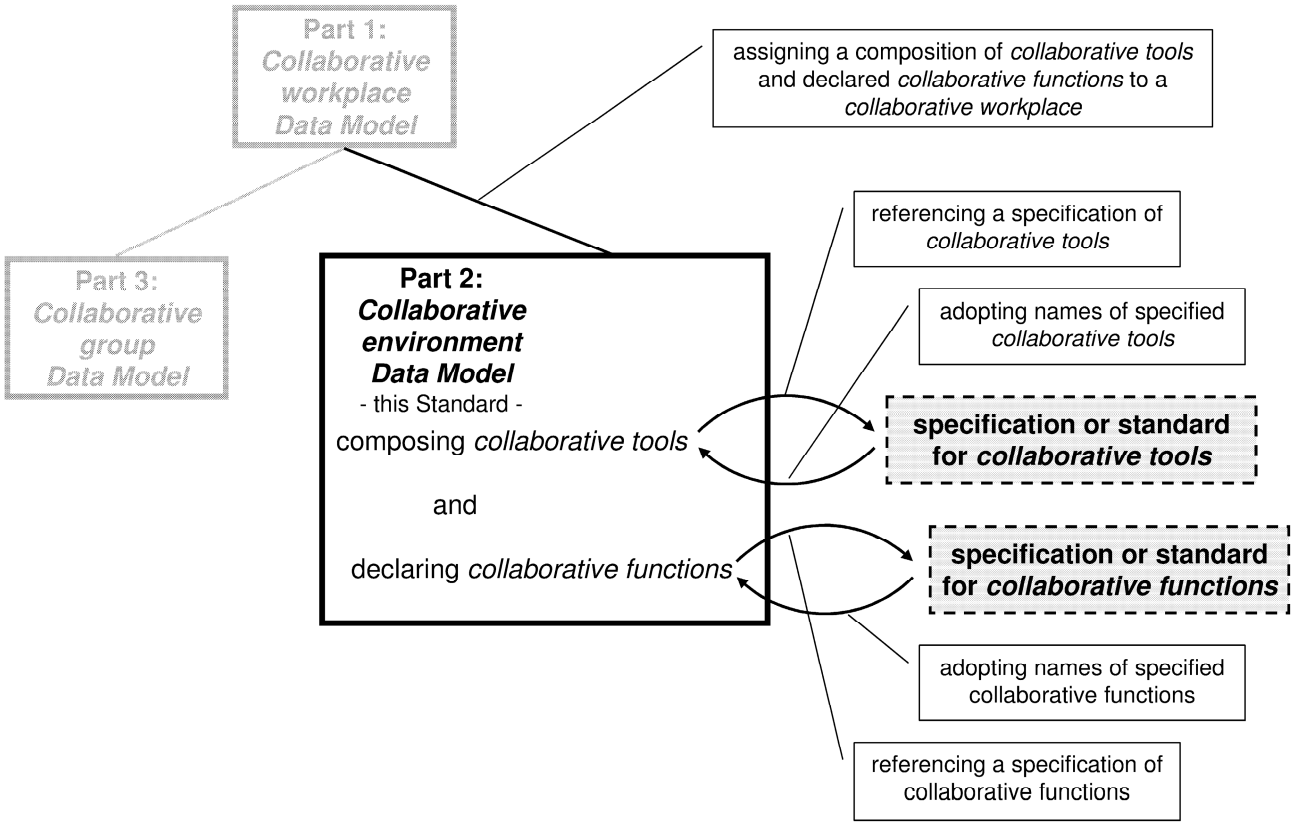

Figure 1 — Composing *collaborative tools* and declaring *collaborative functions* in this part of ISO/IEC 19778

In this part of ISO/IEC 19778, "composing *collaborative tools*" and "declaring their *collaborative functions*" are generally performed by specifying names of *collaborative tools* and *collaborative functions*. Further information on these *collaborative tools* and *collaborative functions* may be specified in "potential further specifications or standards" which are not included in this part of ISO/IEC 19778. The adopters of this part of ISO/IEC 19778 may decide whether or not to use such "potential further specifications or standards". If no "potential further specifications or standards" are used, the names and properties of *collaborative tools* and *collaborative functions* need to be consistently known in the user community. This, however, also means that the interoperability of *Data Model instantiations* of this kind is limited to this "harmonized" user community.

Where the need for broader interoperability exists, external "specifications or standards" are required. They would at least define a set of *collaborative tools* or *collaborative functions*, provide names for them, and describe their properties. Of course, such "specifications or standards" could be very simple and general. However, they could be highly sophisticated and detailed as well. Where a *collaborative environment Data Model instantiation* makes use of such an external "specification or standard", it references it and adopts the names for *collaborative tools* or *collaborative functions* as shown in Figure 1.

Using this first edition of this part of ISO/IEC 19778 provides utmost flexibility at the risk of a low level of interoperability. It allows adopters to experiment with diverse specifications for *collaborative tools* or *collaborative functions*. It is intended as a step towards broader harmonization of *collaborative tools* or *collaborative functions* with respect to their specification and naming. This expected progress in harmonization will be reflected by future editions of this part of ISO/IEC 19778, while today's users can employ this first edition instantly.

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

Part 2: Collaborative environment data model

1 Scope

1.1 Statement of scope

This part of ISO/IEC 19778 specifies the *Data Model* for a *collaborative environment*.

The *collaborative environment Data Model* composes *collaborative tools* and declares their *collaborative functions* by specifying their names. These names may be used as references to *collaborative tools* and *collaborative functions* specified in detail by further specifications or standards. Where no such specifications or standards are available or identified, the provision of descriptions for human interpretation may support harmonized use of these names.

1.2 Subjects and aspects not currently addressed

In future editions of this part of ISO/IEC 19778, extended support for adapting *collaborative environments* to preferences and needs of *participants* may be provided. Such support may be gained by prioritizing the *collaborative effects* (defining which *collaborative effects* are intended to be supported) in contrast to the *collaborative tools* and *collaborative functions* (defining by which technical provisions the intended *collaborative effects* are supported).

1.3 Excluded subjects and aspects

Subjects and aspects not provided by this part of ISO/IEC 19778, but which it is anticipated will be provided by further specifications or standards include:

— the detailed specification of *collaborative tools* or *collaborative functions* (such specification is left to further specifications or standards and means service component harmonization which is excluded from this part of ISO/IEC 19778);

— the detailed specification of *collaborative effects* (such specification is left to further specifications or standards and addresses application modelling which is excluded from this part of ISO/IEC 19778);

— the specification of methods for integrating *collaborative tools* or *collaborative functions* into services (as this affects service modelling which is excluded from this part of ISO/IEC 19778).

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.

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ISO/IEC 10646:2003, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)*

ISO/IEC 11404:2007, *Information technology — General-Purpose Datatypes (GPD)*

ISO/IEC 19778-1:2008, *Information technology — Learning, education and training — Collaborative technology — Collaborative workplace — Part 1: Collaborative workplace data model*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19778-1:2008 apply.

4 Abbreviations and acronyms

NOTE Some of the abbreviations or acronyms in this clause represent terms defined in Clause 3 of ISO/IEC 19778-1:2008. The term numbers are provided in brackets.

AE Aggregating Element (see 3.1.1)

CE Collaborative Environment (see 3.2.3)

CW Collaborative Workplace (see 3.2.8)

DE Data Element (see 3.1.5)

DM Data Model (see 3.1.7)

DME Data Model Element (see 3.1.8)

ID Identifier

Ref Reference

URI Uniform Resource Identifier

URL Uniform Resource Locator (world wide web address)

XML eXtensible Markup Language

XSD XML Schema Definition

5 Collaborative environment Data Model

5.1 Data Model representation

The table-based *Data Model* representation used here corresponds to the specification provided in ISO/IEC 19778-1:2008, 5.1.

5.2 Collaborative environment Data Model diagram

Figure 2 provides a relational overview for the *collaborative environment Data Model* as specified in this part of ISO/IEC 19778. This diagram also indicates specifications or standards which are as of yet unidentified and out of scope for this part of ISO/IEC 19778, but which may play a significant role in its implementation.

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The *Data Model* is outlined inside the large dashed box. The *Root Element* on top represents the basis for this *Data Model* and is not represented in the table representation. The indices of the branches are denoted.

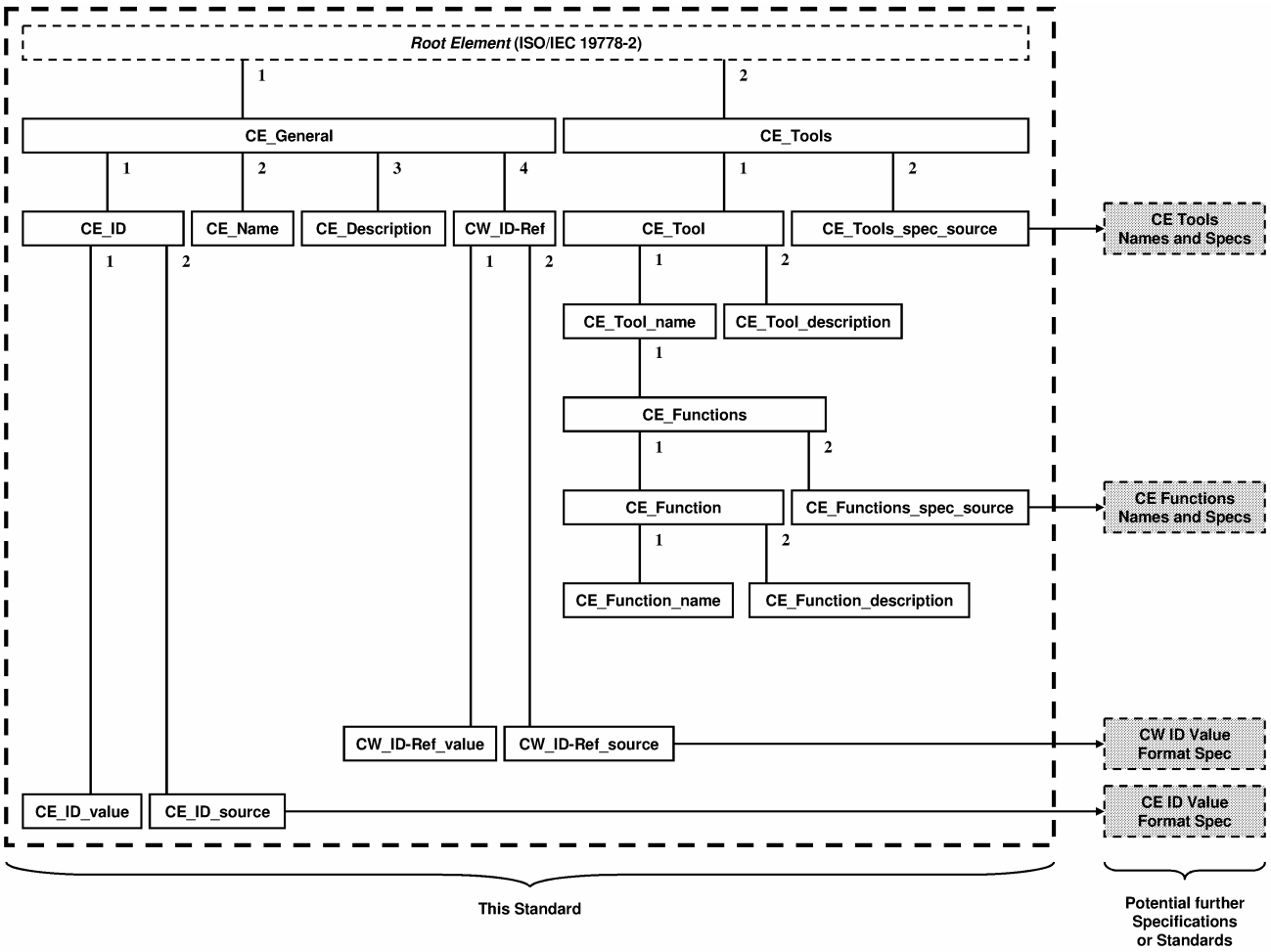

Figure 2 — *Collaborative environment Data Model* and external specifications or standards

Four potential further specifications or standards are denoted as grey boxes outside the large dashed box to the right. The arrows from the *DMEs* to these boxes represent references from this *Data Model* to such specifications or standards. Where such specifications or standards are referenced, they impose regulations on "value" or "name" *DMEs* as specified in the Datatype column of the *Data Model* table in 5.3.

5.3 Collaborative environment Data Model specification

The following specification of the *Data Model* uses the tabular representation specified in ISO/IEC 19778-1:2008, 5.1.

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Table 1 — *Collaborative Environment Data Model*

Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
1	CE_General	Information describing the *collaborative environment* as a whole	*mandatory*	1		
1.1	CE_Name	A title or name by which the *collaborative environment* is generally known	*optional*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 100 characters	Computer Graphics Exercises
1.2	CE_Description	An account of the *collaborative environment*	*optional*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 4000 characters	Environment for collaborative work on Computer Graphics exercises
1.3	CE_ID	An identifier for the *collaborative environment*	*mandatory*	1		
1.3.1	CE_ID_source	The name or URI of the identification scheme used to generate the value of the *collaborative environment* identifier. A namespace scheme.	*optional*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	http://www.gris.informatik.tu-darmstadt.de/idformats/identifier_type.pdf

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Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
1.3.2	CE_ID_value	Value of the *collaborative environment* identifier	*mandatory*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters Permissible values shall comply with any specification or standard identified by the reference value in *DE* 1.3.1 (if provided).	de_tu-darmstadt_informatik_gris_20060707_13582578
1.4	CW_ID-Ref	*Collaborative workplace* identifier reference	*optional*	1		
1.4.1	CW_ID-Ref_source	The name or URI of the identification scheme used to generate the value of the *collaborative workplace* identifier reference. A namespace scheme.	*optional*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	http://www.gris.informatik.tu-darmstadt.de/idformats/identifier_type.pdf
1.4.2	CW_ID-Ref_value	Value of the *collaborative workplace* identifier reference; the corresponding *collaborative workplace* identifier is specified in *Data Element* "ISO/IEC 19778-1:2008, 1.3.2".	*mandatory*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters Permissible values shall comply with any specification or standard identified by the reference value in *DE* 1.4.1 (if provided).	de_tu-darmstadt_informatik_gris_20060910_10141733
2	CE_Tools	Specification of the *collaborative tools* of the *collaborative environment*	*mandatory*	1		

Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
2.1	CE_Tools_spec_source	URI of the specification of permissible *collaborative tools*' names and specifications. A namespace scheme.	*optional*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	http://www.gris.informatik.tu-darmstadt.de/tools.pdf
2.2	CE_Tool	*Collaborative tool* specification	*mandatory*	1..20		
2.2.1	CE_Tool_name	Name of the *collaborative tool*	*mandatory*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 100 characters Permissible values shall comply with any specification or standard identified by the reference value in *DE* 2.1 (if provided).	Chat
2.2.2	CE_Tool_description	Description of the *collaborative tool*	*optional*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 4000 characters	Proprietory tool
2.2.3	CE_Functions	Specification of the *collaborative function(s)* of the *collaborative tool*	*optional*	1		
2.2.3.1	CE_Functions_spec_ source	URI of the specification of permissible *collaborative functions*' names and specifications. A namespace scheme.	*optional*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 250 characters	http://www.gris.informatik.tu-darmstadt.de/functions.pdf

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Identifier	Designation	Definition	Obligation	Multiplicity	Datatype	Examples
2.2.3.2	CE_Function	*Collaborative function* specification	*mandatory*	1..20		
2.2.3.2.1	CE_Function_name	Name of the *collaborative function*	*mandatory*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 100 characters Permissible values shall comply with any specification or standard identified by the reference value in *DE* 2.2.3.1 (if provided).	Upload
2.2.3.2.2	CE_Function_description	Description of the *collaborative function*	*optional*	1	ISO/IEC 11404:2007, 10.1.5 "Character string (ISO/IEC 10646:2003)" Supported Length = 4000 characters	File upload function

5.4 Supplementing information for DMEs of the CE DM

5.4.1 AE CE_General

This *Aggregating Element* groups the general information that describes this *collaborative environment* as a whole.

5.4.2 DE CE_Name

Name given to the *collaborative environment.*

NOTE This name is solely intended for human use.

5.4.3 DE CE_Description

Description of the *collaborative environment.*

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

5.4.4 AE CE_ID

This *Aggregating Element* groups the source and value of the *collaborative environment* identifier that serves as a label for a *collaborative environment Data Model instantiation* (for allowing to reference it from the associated *collaborative workplace Data Model instantiation*, or from external objects).

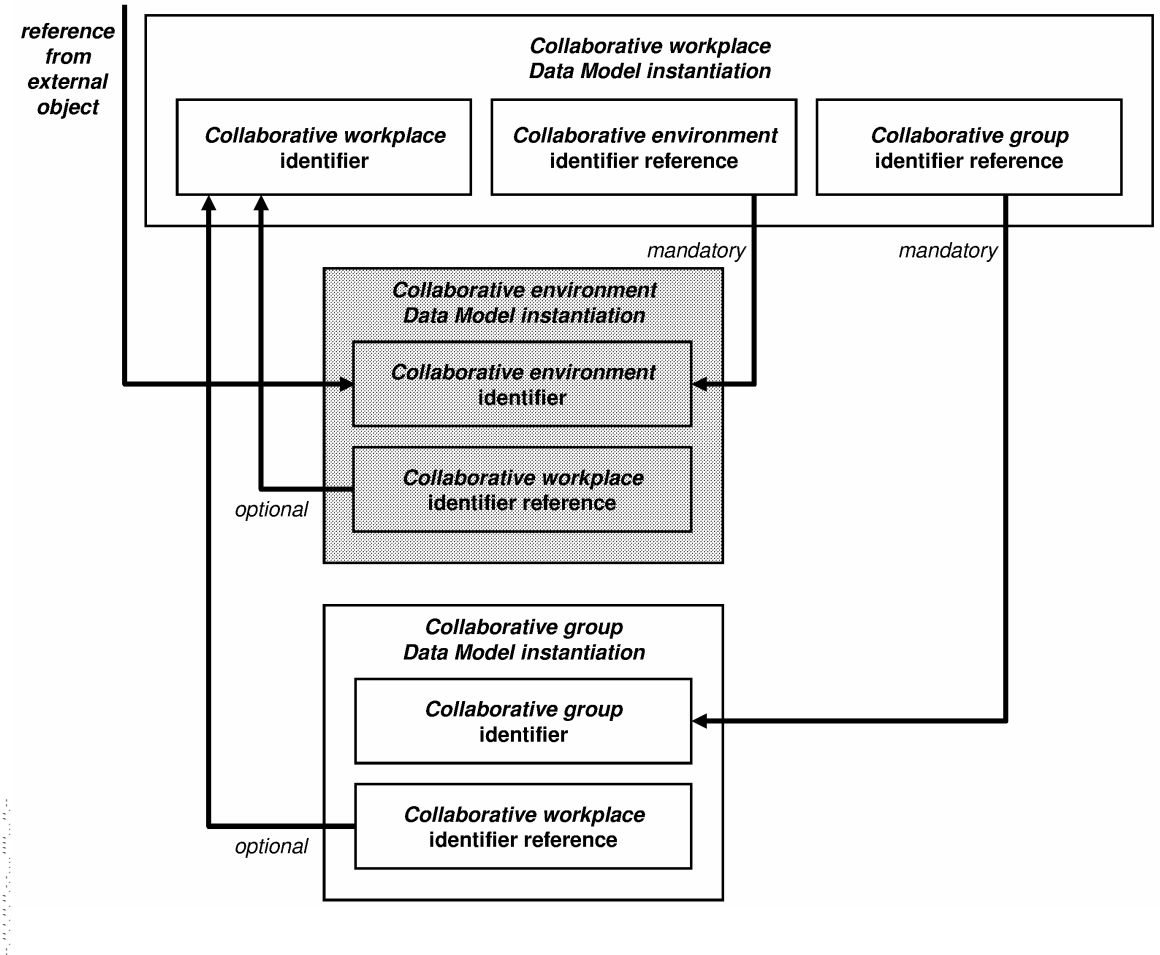

Figure 3 — Linkages between the *collaborative environment*, the associated *collaborative workplace*, and the associated *collaborative group*

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In order to support more than a single identifier format, a "source-value" approach has been applied in this *Aggregating Element*. 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 environment* 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 environment*.

5.4.5 DE CE_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 environment* 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 environment* ID values within this community.

— The URI provides access to the regulations regarding the format of the admissible *collaborative environment* 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 instantiations* only) restrict the supported number of characters of the character string, etc.

NOTE 1 The format of such regulations is not specified in this part of ISO/IEC 19778. Particularly, it is left open whether such regulations are appropriate for automated use or just for human reading, understanding, and observance.

NOTE 2 This *Data Element* is *optional* in order to allow simple applications of this *Data Model*, where the practicing community takes care that the *collaborative group* identifier values are unambiguous.

NOTE 3 At the time of the publication of this part of ISO/IEC 19778, direct or indirect reference to RFC 3986 - Uniform Resource Identifiers (URI): Generic Syntax {http://www.ietf.org/rfc/rfc3986.txt} was recommended.

5.4.6 DE CE_ID_value

This *Data Element* represents both:

— the identifier of this *collaborative environment Data Model instantiation*; and

— the identifier-based reference to the *collaborative workplace* which is associated with this *collaborative environment Data Model instantiation*.

This identifier shall be unique at least within the application range of this *Data Model instantiation*.

5.4.7 AE CW_ID-Ref

This *Aggregating Element* groups the source and value of the reference to the *Data Model instantiation* of the *collaborative workplace* the *collaborative environment* is associated with. This reference is specified by providing the identifier of the *Data Model instantiation* of the *collaborative workplace*. This *Data Element* directly links the *collaborative environment* with its associated *collaborative workplace*, and indirectly (via the *collaborative workplace* link) links the *collaborative environment* with its associated *collaborative group* (see Figure 3).

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

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5.4.8 DE CW_ID-Ref_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 unambiguousness 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 instantiations* only) restrict the supported number of characters of the character string, etc.

NOTE 1 The format of such regulations is not specified in this part of ISO/IEC 19778. Particularly, it is left open whether such regulations are appropriate for automated use or just for human reading, understanding, and observance.

NOTE 2 This *Data Element* is *optional* in order to allow simple applications of this *Data Model*, where the practicing community takes care that the *collaborative group* identifier values are unambiguous.

NOTE 3 At the time of the publication of this part of ISO/IEC 19778, direct or indirect reference to RFC 3986 - Uniform Resource Identifiers (URI): Generic Syntax {http://www.ietf.org/rfc/rfc3986.txt} was recommended.

5.4.9 DE CW_ID-Ref_value

This *Data Element* represents the identifier of the associated *collaborative workplace Data Model instantiation*. This identifier shall be unique at least within the application range of this *Data Model instantiation*.

5.4.10 AE CE_Tools

This *Aggregating Element* groups the *Data Model Elements* for the *collaborative environment* regarding its *collaborative tools* and their provided *collaborative functions*. It does this by firstly specifying the *tools* and secondary describing the *functions* provided by those.

NOTE This "tools-first" approach is taken in order to make it easy to use this part of ISO/IEC 19778 without much further community harmonization activities. In a given system, the available tools are usually well known and named, while the achievement of a harmonized set of non-overlapping functions requires quite a lot of experience and time.

5.4.11 DE CE_Tools_spec_source

The value of this *Data Element* specifies the URI of the source where the specification of *collaborative tool* names and specifications 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 *collaborative tool* names within this community.

— The URI provides access to the value domain of the admissible *collaborative tool* names and the specification of the *collaborative tools* associated with these names.

NOTE The format of such value domain and specification is not specified in this part of ISO/IEC 19778. Particularly, it is left open whether such regulations are appropriate for automated use or just for human reading, understanding, and observance.

5.4.12 AE CE_Tool

This *Aggregating Element* groups the designation and the description of a particular *collaborative tool*.

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5.4.13 DE CE_Tool_name

The designation of a particular *collaborative tool*.

NOTE 1 The specification of the *collaborative tool* which is associated with this name is provided at the *collaborative tools* specification source URI.

NOTE 2 Any desirable standardization of *collaborative tool* names and specifications requires the evaluation of a sufficient amount of experiencing in practice.

5.4.14 DE CE_Tool_description

The description of the *collaborative tool*.

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

5.4.15 AE CE_Functions

This *Aggregating Element* groups the *Data Model Elements* which specify the equipment of a particular *collaborative tool* regarding its provided *collaborative functions*.

5.4.16 DE CE_Functions_spec_source

The value of this *Data Element* specifies the URI of the source where the specification of *collaborative function* names and specifications 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 *collaborative function* names within this community.

— The URI provides access to the value domain of the admissible *collaborative function* names and the specification of the *collaborative functions* associated with these names.

NOTE The format of such value domain and specification is not specified in this part of ISO/IEC 19778. Particularly, it is left open whether such regulations are appropriate for automated use or just for human reading, understanding, and observance.

5.4.17 AE CE_Function

This *Aggregating Element* groups the designation and the description of a particular *collaborative function*. Annex B provides a list of examples for what such functions could look like. Though being well-considered, it also shows, that the value space for *collaborative functions* is not at all a trivial issue.

5.4.18 DE CE_Function_name

The designation of a particular *collaborative function*.

NOTE 1 The specification of the *collaborative function* which is associated with this name is provided at the *collaborative functions* specification source URI.

NOTE 2 Any desirable standardization of *collaborative function* names and specifications requires the evaluation of a sufficient amount of experiencing in practice.

5.4.19 DE CE_Function_description

The description of the *collaborative function.*

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6 Conformance

The conformance specifications regard solely the conformance of *Data Model instantiations* (in contrast to, e.g. conformance specifications regarding applications which may use such *Data Model instantiations*). They correspond to the specification provided in ISO/IEC 19778-1:2008, Clause 6.

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Annex A
(informative)

Alphabetical list of terms

The following terms defined in Clause 3 of ISO/IEC 19778-1:2008 are used in this part of ISO/IEC 19778. The respective term numbers are provided in the right column.

Term	Defined in
AE	3.1.1
Aggregating Element	3.1.1
collaborative effect	3.2.2
collaborative environment	3.2.3
collaborative function	3.2.4
collaborative group	3.2.5
collaborative service	3.2.6
collaborative tool	3.2.7
collaborative workplace	3.2.8
Data Element	3.1.5
Data Element datatype	3.1.6
Data Model	3.1.7
Data Model Element	3.1.8
Data Model Element definition	3.1.10
Data Model Element designation	3.1.11
Data Model Element identifier	3.1.12
Data Model Element instantiation	3.1.13
Data Model Element multiplicity	3.1.14
Data Model Element obligation status	3.1.15
Data Model instantiation	3.1.16
DE	3.1.5
DE datatype	3.1.6
DM	3.1.7
DM instantiation	3.1.16
DME	3.1.8
DME definition	3.1.10
DME designation	3.1.11
DME identifier	3.1.12
DME instantiation	3.1.13
DME multiplicity	3.1.14
DME obligation status	3.1.15
mandatory	3.1.17
optional	3.1.18
participant	3.2.9
RE	3.1.19
role	3.2.10
Root Element	3.1.19

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Annex B
(informative)

Examples for collaborative functions[1)]

B.1 Instant messaging

Instant Messaging (IM) is a mechanism to alert users when other users are on line and allows them to communicate with each other in real time through private online chat areas. With IM, a user or facilitator creates a list of users with whom communication is desired. When a user on the list is on line and makes a request, other users are alerted and communication is immediately established with the requesting user. Businesses and learning institutions both are starting to employ IM to increase collaboration efficiency and make expertise more readily available to groups of users. Although primarily considered a synchronous mode of collaboration, IM transactions can be stored for later review by other users, enabling an asynchronous use for IM. When used in an asynchronous mode, IM transactions may serve as a basis for a discussion thread.

B.2 Presence awareness

Presence Awareness is the ability of a user to determine who is on line at a given instant in time. Presence Awareness is inherent part of IM and the various forms of Chat in synchronous modes. Some Collaborative Workplace implementations of Presence Awareness use a list of available on-line participant users known as a “buddy list” to determine who is online at any given moment. Through the use of Presence Awareness, a user can identify other users who are on-line.

B.3 Chat

Chat is an abbreviation for conversational hypertext access technology. It is a form of synchronous interactive online typewritten communication allowing users to engage in text-message conferencing. This implies real-time computer networking over designated communications facilities known as "chat rooms". When using Chat, a user message is instantaneously relayed to all other users logged into the chat room. User replies are also instantaneously relayed to the originator and all other users. Chat is also used for private communications between a subset of participants, for example communications between 2 of 20 participants.

B.3.1 Persistent chat

Persistent Chat is a variation of Chat. Like Chat, Persistent Chat is a form of synchronous interactive online typewritten communication allowing users to engage in text-message conferencing. This implies real-time computer networking over designated communications facilities known as "chat rooms". When using Persistent Chat, a user message is instantaneously relayed to all other users logged into the chat room. User replies are also instantaneously relayed to the originator and all other users. However, Persistent Chat messages posted by collaboration participants remain visible, or at least retrievable, indefinitely. In this context, Persistent Chat is an asynchronous form of Chat. In some Collaborative Workplace implementations, Persistent Chat serves as a basis for threaded discussions.

1) This listing is based on the document SC36 WG2 N0077, “Abstract Collaborative Workplace Conceptual Architecture Contribution,” submitted by a “US Expert,” 2004-08-20. Not all examples in the listing apply to this part of ISO/IEC 19778 directly. The Annex is an evidence for work towards inventories and harmonization of *collaborative tools* and *collaborative functions*.

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B.3.2 Multi-chat

Multi-Chat is a variant of Chat. Like Chat, Multi-Chat is a form of synchronous interactive online typewritten communication that allows users to engage in text-message conferencing. Multi-Chat allows a user to participate in multiple simultaneous Chat sessions using a single interface. It provides a way to monitor and collaborate with many users in multiple Chat rooms. Like Persistent Chat, some Multi-Chat implementations allow for persistence of messages, where messages are displayed or can be retrieved for an indefinite period of time.

B.3.3 Broadcast chat

Broadcast Chat is a variant of chat. Like Chat, it is a form of synchronous interactive online typewritten communication that allows users to engage in sending text-messages. Broadcast Chat is one-way communication intended to send a chat message to multiple chat sessions simultaneously. It is generally used for announcements or alerts that apply to most or all users. In most implementations, a dedicated user or facilitator can send the chat message to all of the chat sessions, but users of those sessions are typically not able to respond.

B.3.4 Ticker

A Ticker is another variant of Chat. This is another special case of Chat similar to Broadcast Chat in that it gives privileged users the ability to post messages that are visible to all logged-in users. It differs from Broadcast Chat in that the messages posted are usually displayed outside of the currently used chat tool itself. Ticker is also a one-way means of communication. There is no way for receiving users to interact with the Ticker application or the sender of the message.

B.4 Polling/surveying

Polling / Surveying is intended to provide the ability for a user to request a vote from other collaboration participants. In some implementations, a collaboration session leader or a key decision maker will post a question to participants in a collaboration session. Participants will be presented with a list of possible reactions (usually ‘yes’ or ‘no’). Upon answering, individual user selections may be visible to all, to a privileged few, or the overall result may be displayed. This can be done in synchronous or asynchronous modes.

B.4.1 Emoticons

Emoticons are considered a special case of Polling or Surveying. Emoticons are intended to enable users in synchronous collaborative sessions to select or type specific icons that depict typical human actions, such as hand raising, applauding, frowning, laughing, etc. that can be displayed to other collaboration users. Typical implementations of emoticons are used to convey sentiment or emotion in a collaborative environment where modes to express body language and voice inflections are not available. It provides users a non-interruptive way to participate and register their reactions to subjects or discussions in real time. Emoticons can be simple keyboard characters such as :>), or special characters or icons created for a specific implementation.

B.5 Whiteboard

Whiteboards are normally a synchronous communications device that displays graphics, as well as text, in a window on all user computer screens in a collaborative environment. It's like sharing a window from a paint program, but far more efficient, as it usually includes specific options customized for interactive communication. Typically, users can type, draw or cut and paste onto the whiteboard, and all of the other participants can see it. In several Collaborative Workplace implementations, whiteboards are a principal component of teleconferencing applications because they enable visual as well as audio communication. Normally, Whiteboards exist synchronously for a real-time collaboration session. A Whiteboard usually has a way to save the contents displayed.

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B.5.1 Persistent whiteboard

Persistent Whiteboard is a special case of Whiteboard. Like a Whiteboard, a Persistent Whiteboard is normally a communications device that displays graphics, as well as text, in a window on all user computer screens in a collaborative environment. However a Persistent Whiteboard remains available for an indefinite period and constantly reflects the latest changes made to it by a user. Some Collaborative Workplace implementations utilize Persistent Whiteboards in an asynchronous manner to allow users to add to or update the contents as need be over time. It allows individual users to participate in specifically designed group activities without the entire group being present. As with Whiteboards, a Persistent Whiteboard normally has a way to save the contents displayed.

B.5.2 Geo-registered whiteboarding

Geo-Registered Whiteboarding is a special case of Whiteboard. Like a Whiteboard, a Geo-Registered Whiteboard is normally a communications device that displays graphics, as well as text, in a window on all user computer screens in a collaborative environment. However, a Geo-Registered Whiteboard also provides the ability to import or paste in graphical data that includes geographical information (e.g. Lat./Long.). In some implementations of Collaborative Workplace, Geo-Registered Whiteboards are used to pinpoint the geo-location of participants. Other implementations use Geo-Registered Whiteboards to pinpoint a geographical area of study.

B.6 Application sharing

Application Sharing allows a host user or facilitator to select one or more of the applications resident on the host user computer and make it available to other participants. All participants may then manipulate or control the shared application as if it were executing on their own computers. The application however, remains running on the host user's computer. It is just the graphical output, and potentially the other participant users input, that is made available to others. Several Collaborative Workplace implementations use Application Sharing to allow multiple users to update a single document interactively. Other Collaborative Workplace implementations use Application Sharing to allow a user having trouble with an application (even their OS) to allow another remote user to have control, normally for troubleshooting application problems, correcting application or OS problems, or just for educating users on an application.

B.6.1 Application following

Application Following is a special case of the Application Sharing. It allows a host user to select one or more of the applications resident on the host user computer and make it available to other user participants in a collaborative space. However Application Following does not allow other the other participants to control the host user's application. Application following is normally used in conjunction with other collaborative elements to provide real-time feedback. Most Collaborative Workplace implementations use Application Following when the host user is presenting information to other user participants, a PowerPoint briefing for example.

B.6.2 Application broadcasting

Application Broadcasting is another special case of Application Sharing. Application broadcasting allows a host user to select one or more of the applications resident on the host user computer and make it available to other user participants in a collaborative space. Like Application Following, Application Broadcasting does not allow other the other participants to control the host user's application. However, Application Broadcasting is one-way. No collaborative elements are used to provide real-time feedback. Most Collaborative Workplace implementations use Application Broadcasting when the host user is presenting information to other collaborative participants on a large scale numbering in the hundreds or thousands.

B.7 Desktop sharing

Desktop sharing is intended to allow remote access to a host computer by all users in a collaborative environment. Although similar to Application Sharing, Desktop Sharing allows access to most if not all of the

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resources found on the host computer. This includes all of the applications, data and processing power of the host computer. All participants have the ability to launch, manipulate and control an application on the host computer; access, use and or store data on the host computer; and use a host computer's processor to run applications from other computers. Desktop Sharing also allows all participants to simultaneously view the interactions involved with Desktop Sharing.

B.8 File sharing

File Sharing is the sharing of computer data or space on a network. File sharing allows multiple users or related collaborative applications to use the same file by being able to read, modify, copy and/or print it. Files to be shared may reside on a server, or a user's computer. Several Collaborative Workplace implementations use collaborative applications that include the ability to upload, download, share files and use these files in applications to share a particular view of the file contents. Other Collaborative Workplace implementations use whiteboard applications that have the ability to open and use files, and save the files used with modifications made.

B.9 Shared storage

Shared Storage provides multiple collaborative users with a common place for the placement, access and management of data objects. This is perhaps one of the most common and basic of all collaboration elements. A common place to upload and download files is a necessity for any Collaborative Workplace. It provides the basis for the exchange of documents, images, video, collaborative logs and the applications necessary to instantiate a Collaborative Workplace e-environment. Most Collaborative Workplace implementations of Shared Storage use network servers as the common place to upload, store and download files accessed by portals, portlets or related collaborative applications.

B.9.1 Distributed product management

Distributed Product Management is similar to shared storage except that users are provided a mechanism that can automatically track changes to and provide versions of documents, code or other collaboratively developed artifacts. Distributed Product Management could also provide the capability for participants or facilitators to split documents into smaller pieces which could be separately tracked and controlled, with the capability to collate into a single product at upon request. Distributed Product Management facilitates the control of large, complex documents, or code.

B.10 File transfer

File Transfer is the process of using communications to send a file from one computer to another. This is another common and basic of all collaboration elements. In Collaborative Workplace e-environments, a protocol, FTP or HTTP for example, must be agreed upon by sending and receiving computers before a file transfer can occur. File Transfer can move files from one storage medium location to another, from a storage medium to a program, or a program to a storage medium. Several Collaborative Workplace implementations use File Transfer to send files from one participant to another participant or set of participants. Several implementations also use File Transfer to retrieve relevant subject matter files from the Internet and share these files with other users.

B.11 Shared calendars

Shared Calendars provides a group of participants a common calendar that all may directly interact with. Shared Calendars usually provides a common schedule that all users can view and possibly manipulate. In Collaborative Workplace implementations, Shared Calendars are used to record the meetings and deadlines of a group of users that relate to the needs and goals of the collaborative efforts. Shared Calendars also make it possible to quickly set meetings according to each participant's availability. Some Collaborative Workplace implementations allow users to query the availability of other users and/or resources at given dates and times.

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B.12 Real-time multipoint audio

Real-Time Multipoint Audio provides users the ability to participate in audio conferences with multiple participants in a duplex mode. Real-Time Multipoint Audio is essentially the same as a Teleconference, except that participants are able to use their computers instead of their telephones. The use of streaming technologies is paramount in the implementations of Real-Time Multipoint Audio. Some Collaborative Workplace implementations use Real-Time Multipoint Audio in the context of Chat, where groups of participants collaborate in virtual “audio” Chat rooms using audio instead of text. Other Collaborative Workplace implementations couple Whiteboard applications with Real-Time Multipoint Audio.

B.13 Real-time multipoint video

Real-Time Multipoint video is similar to Real-Time Multipoint Audio, except it provides users the ability to participate in video conferences with multiple participants. It also allows users to simultaneously utilize the thousands of Web Cameras transmissions freely available on the internet. As with Real-Time Multipoint Audio, the use of streaming technologies is paramount in the implementations of Real-Time Multipoint Video. Some Collaborative Workplace implementations use an individual camera connected to a user’s computer to transmit video imagery. Some Collaborative Workplace implementations also use Real-Time Multipoint Audio in conjunction with Real-Time Multipoint Video.

B.14 Audio broadcast

Audio Broadcast provides a participant user or facilitator the ability to send audio to many or all other participants, but does not allow the other participants responses to be heard by the sending user or facilitator. Although Audio Broadcast messages are delivered in a synchronous collaborative environment, the Audio Broadcast message could be a file to be played at a later time to those users not on-line when the message is played. Audio Broadcast messages could also be a file that is transmitted at certain points or time during a collaboration event. Several Collaborative Workplace implementations use Audio Broadcast for making announcements. Other implementations use Audio Broadcast to conduct informational briefings. Some implementation use Video Broadcast in conjunction with Audio Broadcast.

B.15 Video broadcast

Video Broadcast is similar to Audio Broadcast service but provides for video instead of audio. Video Broadcast may include standard participant video from their computer, but may also include any one of the thousands of available Internet surveillance cameras. Although Video Broadcast streams are delivered in a synchronous collaborative environment, the Video Broadcast could be a file to be played at a later time to those participants not on-line when the broadcast is made. A Video Broadcast could also be a file that is transmitted at certain points or time during a collaboration event. Some Collaborative Workplace implementations use Audio Broadcast in conjunction with Video Broadcast.

B.16 Discussion board

A Discussion Board is a communication tool, which allows users and facilitators to post messages, which can be read and replied to by other users and facilitators. Discussion Boards are designed for asynchronous use, where users and facilitators are not present at the same time. Messages posted to a Discussion Board are commonalty grouped into threads, containing a main posting and all related replies. Typically, messages are logged and organized into threads, that contain a main posting, defined by the Course Instructor, and all related replies.

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B.17 E-mail

e-mail is short for electronic mail. Basically it is the transmission of messages over communications networks. The messages can be notes entered from the keyboard or electronic files stored on disk. Most mainframes, minicomputers, and computer networks have an e-mail system. Some electronic-mail systems are confined to a single network, but others have gateways to other computer systems, enabling users to send electronic mail anywhere in the world.

B.18 Audio to text/text to audio

Audio to Text is considered a translation service translating audio into text in real-time for display. Text to Audio is also considered a translation service translating text into audio in real-time for broadcast. This combination provides users in bandwidth-constrained environments, or users without audio equipment including those with accessibility issues, the ability to “see” audio collaboration and to respond interactively.

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[1] RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax,* January 2005 {http://www.ietf.org/rfc/rfc3986.txt}

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