UN/CEFACT
Core Components Business Document Assembly
Technical Specification

Version 1.0

27 June 2012
Abstract

This document describes how to construct syntax independent Business Documents based on UN/CEFACT Core Components and defines the basic structure of Business Documents in a syntax and technology neutral way.

This document offers guidance to experts involved in the development and standardization of UN/CEFACT standard Business Document Types. A Business Document Type is a container of artifacts that describe the information exchanged in a Business Interaction. The CCBDA specification can be employed wherever business information is being shared or exchanged amongst and between enterprises, governmental agencies and/or other organizations in an open environment. This environment can be of a worldwide scope or restricted to a specific Business Context (such as an industry or region).

The CCBDA specification is developed to identify how to construct Business Documents from Core Component constructs (BIEs) in accordance with a Business Requirements Specification (BRS) and a Requirements Specification Mapping (RSM). CCBDA supports assembling CCTS based data models into syntax independent business information exchange models that may subsequently be rendered as syntax specific business information exchanges.

CCBDA forms the basis for standards development work of business analysts, business users and information technology specialists supplying the content of and implementing applications that will employ the UN/CEFACT Core Component Document Library (CCDL).
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1 Status of this document

This Technical Specification has been developed in accordance with the UN/CEFACT/TRADE/22 Open Development Process for Technical Specifications and approved for publication by the UN/CEFACT Bureau.
2 Project Team Participants

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2.1 Legal Disclaimer

The views and specification expressed in this document are those of the authors and are not necessarily those of their employers. The authors and their employers specifically disclaim responsibility for any problems arising from correct or incorrect implementation or use of this technical specification.

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3 Introduction

3.1 Scope and Focus

This Core Components Business Document Assembly Technical Specification (CCBDA) can be employed wherever business information is being shared or exchanged amongst and between enterprises, governmental agencies and/or other organizations in an open environment. This environment can be of a worldwide scope or restricted to a specific Business Context (such as an industry or region). Interoperability supported by this specification covers both interactive and batch exchanges of business data between applications. These applications may use Internet and Web based information exchanges as well as traditional Electronic Data Interchange (EDI) systems. CCBDA compliant models may serve as the computer readable part of an EDI Document Implementation Guideline. The exchanges may be service oriented as in Web Services or be Peer-to-peer.

This specification builds on the UN/CEFACT Modeling Methodology (UMM). UMM describes how inter organizational business information systems are designed by means of various views (see Annex A). The CCBDA specification is an elaboration of the UMM Business Information View, and defines how information is structured. CCBDA forms the basis for standards development work of business analysts, business users and information technology specialists supplying the content of and implementing applications that will employ the UN/CEFACT Core Component Message Library (CCML).

This specification does not specify a transmission protocol or any mechanisms to circumvent communication failure. Signalling (acknowledgements of receipt or acceptance) is outside the scope of this specification as are application processing considerations.

The way the information on envelopes, headers and information entities is represented in some syntax, such as XML or UN/EDIFACT, is outside the scope of this specification.

3.2 Audience

The audience of this technical specification includes but not limited to developers and implementers of e-business systems.

3.3 Structure of this document

Section 4 provides an overview of Business Document Assembly.

Section 5 provides rules for how a Message Assembly is named, defined and structured.
Section 6 describes how Message Assemblies and the Business Information Entities they are associated with are defined in a specific Business Context.

Section 7 explains the use of Constraints.

Section 8 provides a list of terms and their definitions.

Sections 3, 5, 6, 7 and 8 are normative. All other sections are informative.

Implementations of this technical specification will be considered to be in full compliance with this technical specification if they comply with the content of the normative sections.

### 3.4 Notation

*Italics* – All words appearing in italics, when not titles or used for emphasis, are special terms defined in Section 8.

*Courier* – All words appearing in bolded courier font are rules.

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in Internet Engineering Task Force (IETF) Request For Comments (RFC) 2119.1.

### 3.5 Related Documents

- UN/CEFACT Modelling Methodology Base Module Version 2.0;
- UN/CEFACT Modelling Methodology Foundation Module Version 2.0;
- UN/CEFACT Business Document Header Technical Specification;
- UN/CEFACT Business Requirements Specification (BRS) Documentation Template, Version 2.1 (out for public review);
- Requirements Specification Mapping (RSM) Documentation Template and Conformity Rules Version 2.1 (out for public review);
- Key words for use in RFCs to Indicate Requirement Levels - Internet Engineering Task Force, Request For Comments 2119, March 1997 http://www.ietf.org/rfc/rfc2119.txt?number=2119
4 Overview

This specification provides a specific methodology for assembling higher level semantic Business Documents from Business Information Entities. Business Document Types may be reusable and stored in Core Component Message Libraries.

This technical specification will focus on the business information in a Business Document, and will not include the specification of any protocol envelope needed to transmit this information. The methodology makes use of Business Information Entities as specified in the UN/CEFACT Core Component Technical Specification v2.01 (CCTS) and ISO/TS 15000-5 (ebCCTS).

This technical specification defines the structure of Business Documents in an abstract, syntax neutral way, as a data model (a UML Class Diagram) that can be realised in various concrete syntaxes, such as XML (Extensible Markup Language, a W3C Recommendation) and UN/EDIFACT (ISO 9735).

Figure 4-1. Business Message Structure

Fig 4.1 describes the components of a CCBDA document assembly and how they combine with a business document header to form a complete business message.
A Business Message is a container of artifacts that describe the information exchanged in a Business Interaction. A Business Message consists of a Business Document Header (BDH), and one or more Message Assemblies (MAs). The BDH includes the identification of the sender and receiver, document type etc. An MA is a collection of business data to be exchanged.

![Diagram of Business Message and Message Assembly](image)

Figure 4-2. Message Assembly Conceptual Overview

An MA is the logical root of a message structure. An MA consists of one or more ASMAs each of which is an association to an MBIE.

MBIEs may have associations to other MBIEs through Message Association Business Information Entities (ASMBIEs). MBIEs inherit their name, structure and definition from Aggregate Business Information Entities (ABIEs). All MBIE properties (ASMBIEs and MBBIEs) inherit their (meta) properties such as Names, Definitions and Property Terms from their corresponding property (ASBIEs and BBIEs) in the inherited ABIE. The cardinality and values of the ABIE properties (BBIEs and ASBIEs) that the MBIE inherits from the ABIE may be restricted.
Syntax-neutral Business Messages are implemented in concrete syntaxes and technical protocols.

MAs and ASMAs are not CCTS Aggregate Business Information Entities (ABIE) and do not require corresponding Aggregate Core Components (ACC). ASMAs are the properties of an MA. MAs may be based on more generic MAs, much like Aggregate Business Information Entities may be based on more generic Aggregate Business Information Entities.

A Business Message is exchanged in the course of a Business Process. The Business Context in which a Business Message is valid must be specified. The Business Context may be a (specific step in a) Business Process plus a business sector and/or a geographical area (amongst others).

This section defines the characteristics of an assembled Business Document as:

- **Atomic:**
  This means that no constituent element (part), of a Business Document, has any business meaning on its own, and cannot, in isolation, change the state of any Business Entity. In other words before taking any action whatsoever, the entire Business Document must be processed as it is only then that it will be known exactly what actions are required.

- **Consistent:**
  A Business Document in its entirety has business meaning that can change the state of Business Entities. In other words a Business...
Document, that affects the state of a Business Entity, uniquely identifies the end state of that Business Entity.

- **Isolated:**
  Each Business Document has an individual business meaning. A Business Document changes the state of Business Entities independent of other Business Documents. In other words, a Business Document must not have a dependency on any other Business Document.

- **Durable:**
  Once a Business Document has been completely processed, the states of all of the Business Entities that have been changed, will remain changed until further changes are introduced by a later Business Document. In other words they can only be changed again (or even reverted) by means of a new Business Document.

- **Idempotent:**
  Processing multiple copies of the same Business Document or processing a Business Document more than once has the same effect on Business Entity states as processing just one copy. For example, if a Business Document asks to "increment stock of product A with 1 unit" then processing 10 copies of this same Business Document will still only result in one increment of one unit of product A. It is important that a copy be recognized as a copy, and not as another original Business Document.

A collection of business information to be exchanged between Business Partners can form a single business document assembly, multiple business document assemblies or be part of another business document assembly.

The characteristics described above may be used to determine whether a collection of information, to be communicated with a Business Partner, is 1) a complete Message Assembly, or 2) needs to be divided into (distinct / separate) Message Assemblies, or 3) needs to be combined with other collections to form a (single) Message Assembly as follows:

1) Whenever a collection has all of the characteristics listed, then this collection constitutes a complete Message Assembly.

2) Whenever a part of such a collection has all of the characteristics listed, then this part of the collection constitutes a separate Message Assembly.

3) Whenever a collection only has these characteristics in combination with one or more other collections, then the collections should be combined to form one Message Assembly.
5 Business Document Structure

5.1 Message Business Information Entities (MBIEs)

An MA is the logical root of a message structure. An MA consists of one or more ASMas each of which is an association to an MBIE.

[R01] Each MA must have one or more ASMas each of which associates to an MBIE.

An MA may be a subset of another defined MA as long as the context of the subset MA is restricted compared to the parent MA.

[R02] If an MA is defined as a subset of another MA then the context values of the subset MA must include at least one restricted context value compared to the context values of the parent MA.

[R03] When MAs are restricted no additional MBIEs may be added.

An MBIE defines which properties of an ABIE are to be included. The content model of an MBIE may be the same as, or may be a subset of, the content model of an ABIE.

An MBIE inherits its name, structure and definition from the ABIE on which it is based.

MBIEs are defined within the scope of an MA and do not exist outside that scope. Identical MBIEs may exist in other MAs but they are not reuses as such.

The structure of an MBIE (e.g. the repetition of its properties i.e. its MBBIEs and ASMBIEs) may be restricted with regard to the underlying ABIE (Constraints may also apply; see section 7: Constraints). The following rules apply:

[R04] If an MBIE is a restricted form of an ABIE then the restrictions must be specified.

[R05] An MBIE inherits its structure from the ABIE on which it is based. The set of properties of an MBIE may be a subset of the set of properties of the ABIE on which it is based.

[R06] An MBIE must contain all mandatory properties (BBIEs and/or ASBIEs) of the ABIE on which it is based. These become MBBIEs and/or ASMBIEs.
MBIEs have properties which are either basic properties (MBBIEs) or association properties (ASMBIEs).

[R07] An MBIE must be identified by means of a unique Identifier.

[R08] An MBIE may have zero or more associations with other MBIEs through ASMBIEs.

[R09] An MBIE may have zero or more MBBIEs derived from the ABIE on which it is based.

[R10] Each property of an MBIE must be derived from the ABIE on which it is based and an MBIE must contain at least one property

[R11] An MBIE property may be a restriction of its inherited ABIE property in any or all of the followings ways:

   a. A used optional property may be made mandatory
   b. An optional property may be not used
   c. A used optional or mandatory property may specify a lower number of maximum occurrences but not lower than the minimum occurrences.

[R12] The maximum repetition of an MBIE property must not exceed the maximum repetition that is defined for the ABIE.

MBBIEs have Message Data Types (MDTs) that may be a restriction of the underlying qDT.

[R13] Restrictions may not be applied to uDTs.

[R14] If an MDT is a restricted form of a qDT then all restrictions must be specified.

[R15] An MDT must not add supplementary components to a Data Type that do not already exist.

[R16] An MDT may reduce the maximum cardinality of a supplementary component from 1 to 0. The minimum number of supplementary components is 0.

[R17] An MDT may restrict the value domain of a supplementary component or the content component to be more restrictive than the base qDT.

An example of a restriction of a value domain would be a restricted set of codes for a code list.
An MDT may restrict the values of the facets of a supplementary component or the content component to be more restrictive than the base qDT.

Figure 5-1. CCBDA Metamodel

MAs, MBIEs, ASMBIEs, MBIEs, and MDTs within a Business Message that are stored in libraries and registries possess a cohesive set of metadata as defined in CCTS.

MBIEs have the same set of metadata that ABIEs have.

ASMBIEs have the same set of metadata as ASBIEs.

An ASMA is an association, without any metadata.

Note: The action code can define how information defined by the MBIE is to be acted upon (e.g. Create / Refer / Update / Delete).
5.2 Names and Definitions

[R19] The Dictionary Entry Name of an MA shall consist of a meaningful Object Class Term and optionally preceded by an additional Qualifier Term(s) (ref rules B26 and B27 in CCTS 2.01) to represent its specific Business Context, followed by a dot, a space character, and the term Message. The Object Class Term may consist of more than one word. In all other respects the naming of the MA should follow the ABIE naming rules.

[R20] An MBIE inherits its name and definition from the ABIE on which it is based.

[R21] The Dictionary Entry Name of an MBIE, ASMBIE, MBBIE, or MDT shall be unique within its Business Message.

[R22] The Dictionary Entry Name of an ASMA follows all the naming rules for an ASBIE except that the Property Term is optional.

[R23] The definition for an ASMA follows the same rules as for an ASBIE.

5.3 Sequencing

ASMA{s} and the properties of MBIE{s} may be assigned an optional Sequence Number that may be used in syntax renderings (or in model representations) to present them in some order in the MA. However, sequencing does not change the semantics.

[R24] Each MBIE may be assigned a Sequence Number that is used for presentation of the MA structure or for representation in a specific syntax.

5.4 Business Document Header

6 Context

A Business Document is exchanged in a certain Context. CCTS defines eight context categories or context dimensions: Business Process, Product Classification, Industry Classification, Geopolitical, Official Constraints, Business Process Role, Supporting Role and System Capabilities.

The structure of a Business Document is dependent on the specific step in the Business Process or Business Process Activity where the Business Document is used. That step further narrows the context.

[R25] The context of the MA must apply to all of the objects within the MA structure.

7 Constraints

Each Message Business Information Entity or Document Assembly may have Constraints associated with it.

Constraints are used to restrict the content model or business process to satisfy specific business requirements where the constraint is the formal expression of the requirements.

Constraints may affect repetition and cardinality, element values, or a mix (e.g. "if the Delivery Term="FOB", a Delivery Term Location must be present").

A constraint can be structured or unstructured. An unstructured constraint will be expressed as free form text. A structured constraint is a constraint that is expressed in a formal constraint language such as the UML Object Constraint Language (OCL) or Object Management Group (OMG) Semantics of Business Vocabulary and Usage Rules (SBVR).

Constraint condition types may also be specified such as invariant, pre-condition or post-condition. The constraint condition type value is taken from a constraint type code list.

[R26] If an MBIE contains any constraints then each constraint must contain one or more of the following:

- the text of the constraint
- a reference identifier to a constraint defined in an external list of constraints if applicable
- a code defining the type of the constraint condition
- in the case of structured constraints, a code indicating the constraint language in which the constraint is expressed
An unstructured constraint shall have or refer to a free form text expression that fully details the business requirements that it is addressing.

A structured constraint shall have or refer to a formal constraint language expression.

8 Definition of Terms

Aggregate Business Information Entity (ABIE) – A collection of related pieces of business information that together convey a distinct business meaning in a specific business context. Expressed in modelling terms, it is the representation of an object class, in a specific business context.

Association Business Information Entity (ASBIE) – A business information entity that represents a complex business characteristic of a specific object class in a specific business context. It has a unique business semantic definition. An Association Business Information Entity represents an Association Business Information Entity property and is therefore associated to an Aggregate Business Information Entity, which describes its structure. An Association Business Information Entity is derived from an Association Core Component.

Aggregate Core Component (ACC) - A collection of related pieces of business information that together convey a distinct business meaning, independent of any specific Business Context. Expressed in modelling terms, it is the representation of an Object Class, independent of any specific Business Context.

Association Core Component (ASCC) – A Core Component which constitutes a complex business characteristic of a specific Aggregate Core Component that represents an Object Class. It has a unique Business Semantic definition. An Association Core Component represents an Association Core Component Property and is associated to an Aggregate Core Component, which describes its structure.

Association Message Business Information Entity – An association between two Message Business Information Entities. An Association Message Business Information Entity is based on an Association Business Information Entity.

Attribute – A named value or relationship that exists for some or all instances of some entity and is directly associated with that instance.

Business Partner - A business partner is an organization type, an organizational unit type or a person type that participates in a business process.

Business Context – The formal description of a specific business circumstance as identified by the values of a set of context categories, allowing different business circumstances to be uniquely distinguished.

Business Information Entity (BIE) – A piece of business data or a group of pieces of business data with a unique business semantic definition. A business information entity can be a Basic Business Information Entity (BBIE), an Association Business Information Entity (ASBIE), or an Aggregate Business Information Entity (ABIE).
Business Interaction – Exchange of Business Messages between Business Partners in a Business Context. Business interaction involves communication by one Business Partner to another of a change to at least one BIE of a Business Document.

Business Document – A collection of information that is exchanged in a step of a Business Process. A Business Document updates information on Business Entities, such as Products, Contracts, Locations, etc. Exchanging a Business Document synchronizes the knowledge on the states of those Business Entities among the Business Partners involved.

Business Message – A business message (also known as an information envelope) has exactly one business document header (BDH) which serves for identification purposes of technical sender and receiver, document type etc. A business document header is defined in the Business Document Header specification of UN/CEFACT. The body of a business message consists of exactly one element, which is of type message assembly (MA). This single message assembly serves as the root element of a business document definition and is connected to the information envelope using a standard UML aggregation. Message assemblies are used to aggregate different aggregate business information entities (ABIE) to a specific business document. Association message assemblies (ASMA) are used to connect different message assemblies to each other and to connect aggregate business information entities to message assemblies. ABIEs, MAs, and ASMAs are part of the UML Profile for Core Components.

Business Process – The business process as described using the UN/CEFACT Catalogue of Common business processes.

Business Semantic(s) – A precise meaning of a concept from a business perspective.

Classification Scheme – This is an officially supported scheme to describe a given context category.

Constraint – a constraint is one or more conditions expressed as a business rule used to restrict a content model or business process to satisfy a specific business requirement where the constraint is the formal expression of the requirement.

Context – Defines the circumstances in which a business process may be used. This is specified by a set of context categories known as business context.

Context Category – A group of one or more related values used to express a characteristic of a business circumstance.

Core Component Message Library (CCML) – The library of all Message Assemblies and their constituent parts published by an organization, such as the UN/CEFACT CCML.

Definition – The unique semantic meaning of a concept, business document, core component, business information entity, business context or data type.

Dictionary – A collection of Dictionary Entry Names for CCTS conformant artefacts for a specific library.

Document Assembly – (1) The process whereby Business Information Entities are assembled into a usable document for exchanging business information. (2)
A grouping of Message Business Information Entities which does not change the semantics of the MBIEs.

**Information Envelope (also known as Business Message)** - An information envelope has exactly one business document header (BDH) which serves for identification purposes of technical sender and receiver, document type etc. A business document header is defined in the Business Document Header specification of UN/CEFACT. The body of an information envelope consists of exactly one element, which is of type message assembly (MA). This single message assembly serves as the root element of a business document definition and is connected to the information envelope using a standard UML aggregation.

Message assemblies are used to aggregate different aggregate business information entities (ABIE) to a specific business document. Association message assemblies (ASMA) are used to connect different message assemblies to each other and to connect aggregate business information entities to message assemblies. ABIEs, MAs, and ASMAs are part of the UML Profile for Core Component

**Message Business Information Entity** – A part of a Business Document that inherits its definition and structure from an ABIE to represent information to be updated.

**Naming Convention** – The set of rules that together comprise how the dictionary entry name for artefacts is constructed.

**Object Class** – The logical data grouping (in a logical data model) to which a data element belongs.

**Object Class Term** – A component of the name of a core component or business information entity which represents the object class to which it belongs.

**Property Term** – A semantically meaningful name for the characteristic of the Object Class that is represented by the core component property. It shall serve as basis for the DEN of the basic and Association Core Components that represents this core component property.

**Qualifier Term** – A word or group of words that help define and differentiate an item (e.g. a business information entity or a business data type) from its associated items (e.g. from a core component, a core data type, another business information entity or another business data type).

**Registry** – An information system that manages and references artifacts that are stored in a repository. The term registry implies a combination of registry/repository.

**Registry class** – The formal definition of all the common information necessary to be recorded in the registry by a registry artefact – core component, a business information entity, a data type or a business context.

**Representation Term** – The type of valid values for a Basic Core Component or Basic Business Information Entity.

**Sequence Number** – A number identifying the sequence of an item within a collection of related items.

**Unique Identifier** – The identifier that references a registry class instance in a universally unique and unambiguous way.
Usage Rules – Usage rules describe a constraint that describes specific conditions that are applicable to a component in the model.

Version – An indication of the evolution over time of an instance of a core component, data type, business context, or business information entity.

Web Service - Web services describes a standardized way of integrating Web-based applications using the XML, SOAP, WSDL and UDDI open standards over an Internet protocol backbone.

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Annex A : Non-normative - for information only

Relation between CCBDA and UMM

UMM defines how to analyze an inter-organizational business process to design the Process Choreography. One of the views, defined in the UMM, is the Business Information View (BIV). The UN/CEFACT CCBDA Technical Specification, in conjunction with the UN/CEFACT CCTS, may be used to model that BIV.

UMM also defines a Business Entity View (BEV). In the BEV, the Business Entities are identified that are affected by the process. Business Entities are represented in the Core Components Library (CCL) as Aggregate Business Information Entities (ABIEs). In the course of the business process the information on Business Entities changes and is updated by means of business documents, defined as Message Assembles (MA). An MA consists of Message Business Information Entities (MBIEs).

The choreography may define the states and the lifecycles of the Business Entities and the mechanism to synchronize those states between business partners (who fulfill Authorized Roles). Business Entity State synchronization means that some business entities may be instantiated in a business transaction, while others may only be changed or deleted, e.g., in an Order Confirmation document, order lines might be deleted or changed, but not added. This can be defined in the Action code, which is an optional attribute of an MBIE.

Business Context, as defined in the UN/CEFACT Context Methodology (UCM), defines what information needs to be exchanged to synchronize the Business Entity states. Context is applied in two steps. First, context is applied to Core Components to turn these CC’s into Business Information Entities (BIE’s) that reflect a particular business environment (e.g., the ordering of office supplies). The step from CC to BIE is described in UN/CEFACT CCTS.

Second, BIE’s are customized to the specific requirements of a particular information exchange in a particular business process (e.g., office supplies order confirmation). This step is described in the UN/CEFACT CCBDA Technical Specification.

The second step of context application could be realized by adding constraints to the business document root (the MA). These constraints may be stated in a formal constraint language such as the OMG Object Constraint Language. In many cases cardinalities of BIE’s are affected by this second step (e.g., in an order confirmation, order lines may only contain an identifier and no product specification), and it is desirable to present the restricted cardinalities graphically instead of as rule statements. Therefore, instead of using ABIE’s directly, Message Business Information Entities (MBIE’s) are used. MBIE’s are based on...
ABIE’s in the same way ABIE’s are based on *Aggregate Core Components* (ACC’s). The cardinalities of MBIE’s may be restricted with regard to the ABIE they are based on and they may graphically be presented in a UML Class diagram.