

Framework for energy market communications —

Part 501: General guidelines for use of ebXML

ICS 33.200

National foreword

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Cross-references

The British Standards which implement international publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

Summary of pages

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Framework for energy market communications – Part 501: General guidelines for use of ebXML



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INTRODUCTION

With the transition of monopoly energy supply structures to deregulated energy markets, the function of the markets depends heavily on seamless e-business communication between market participants. Compared with global e-business, e-business in the energy market is only a small niche. Today EDIFACT or X12 messages, or proprietary HTML and XML solutions based on Internet technologies are being used.

The 'electronic business Extensible Markup Language' (ebXML) specification and architecture stems from UN/CEFACT and OASIS (see www.ebXML.org). The technical parts regarding the technical e-business infrastructure have now become the multipart ISO 15000 series "Electronic business eXtensible Markup Language (ebXML)" being complemented in future to cover all technical aspects of ebXML. ebXML is a complete set of specifications and standards to enable secure electronic business using proven, open standards such as TCP/IP, HTTP, SOAP, XML, and SOAP signature and encryption. ebXML is also evolutionary in nature, built on 25 years of EDI experience, designed to work with existing EDI solutions, or be used to develop an emerging class of internet-based electronic business applications based on XML. This means that existing EDI messages (EDIFACT, and X12) as well as XML messages can be exchanged.

FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 501: General guidelines for use of ebXML

1 Scope

This part of IEC 62325 provides general guidelines how to use the ebXML technology and architecture in energy markets based on the ISO 15000 ISO series “Electronic business eXtensible Markup Language (ebXML)” together with migration scenarios and an implementation example. For recommended profiles, see IEC 62325-502.

2 Normative references

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

ISO/IEC 14662, *Information Technology – Open-edition reference model*

ISO 7372, *Trade data interchange – Trade data elements directory*

ISO 9735 (all parts), *Electronic data interchange for administration, commerce and transport (EDIFACT)*

ISO/TS 15000-1:2004, *Electronic business eXtensible Markup Language (ebXML) – Part 1: Collaboration-protocol profile and agreement specification (ebCPP)*

ISO/TS 15000-2:2004, *Electronic business eXtensible Markup Language (ebXML) – Part 2: Message service specification (ebMS)*

ISO/TS 15000-3:2004, *Electronic business eXtensible Markup Language (ebXML) – Part 3: Registry information model specification (ebRIM)*

ISO/TS 15000-4:2004, *Electronic business eXtensible Markup Language (ebXML) – Part 4: Registry services specification (ebRS)*

ANSI ASC X12, Release 4040, December 2000

UN/EDIFACT, D.01A Directory, January 2001

UN/CEFACT *Modelling Methodology (UMM)*, NO90 R12 or higher

UN/CEFACT *ebXML Technical Architecture Specification*, v1.04 or higher

UN/CEFACT *ebXML Business Process Specification Schema*, v1.10 or higher

In this part of IEC 62325, RFCs (Request for comments) from the Internet Engineering Task Force (IETF) and recommendations from other Organisations such as the World Wide Web Consortium (W3C) and the Organization for the Advancement of Structured Information Standards (OASIS) are mentioned which are not included here because these documents are referenced in the references above.

3 Terms, definitions and abbreviations

3.1 Terms and definitions

None.

3.2 Abbreviations

A2A	Application-to-Application
AES	Advanced Encryption Standard
B2B	Business-to-Business
BDS	Business Document Specification (instance)
BDSS	Business Document Specification Schema
BIE	Business Information Entity
BOV	Business Operational View
BPMS	Business Process Management System
BPSS	Business Process Specification Schema (or instance)
BSI	Business Service Interface
CC	Core Component (based on BIE)
CIM	Common Information Model
CPA	Collaboration Protocol Agreement
CPP	Collaboration Protocol Profile
DSO	Distribution System Operator (of power system)
DUNS	Data Universal Numbering System (North America)
EAN	European Article Number (Europe)
ebMS	ebXML Messaging Service
ebXML	electronic business XML
EDI	Electronic Data Exchange
EIA	Enterprise Application Integration
EMS	Energy Management Systems
ERP	Enterprise Resource Planning
FOV	Functional Service View
FTP	File Transfer Protocol
HTTP	Hypertext Transport Protocol
ICT	Information and Communication Technology
ISO	Independent System Operator
IT	Information Technology
MIME	Secure/Multipurpose Internet Mail Extensions
MIS	Market Identification Schema
MOM	Message-oriented middleware
MSH	Message Service Handler
PKI	Public Key Infrastructure
QoS	Quality of Service
RPC	Remote Procedure Call
RR	Registry/Repository

SAML	Security Assertion Mark-up Language
SCADA	Supervision, Control, and Data Acquisition
SMTP	Simple Mail Transfer Protocol
SO	System Operator (of power system)
SOAP	Simple Object Access Protocol
TLS	Transport Layer Security
TSO	Transmission System Operator (of power system)
UML	Unified Modelling Language
UMM	UN/CEFACT Modelling Methodology
VPN	Virtual Private Network
WS	Web Services
WSDL	Web Services Definition Language
XML	eXtensible Markup Language
XKMS	XML Key Management Specification

4 Generic technical architecture

4.1 General

The following text is mainly based on the public description of the ebXML initiative (<http://www.ebxml.org/>) and is intended to provide a basic understanding of the technology. For details, refer to the ebXML implementation framework specification and the ebXML architecture document of the initiative.

4.2 Architecture

4.2.1 General

The vision of ebXML is to create a single global electronic marketplace where enterprises of any size and in any geographical location can meet and conduct business with each other through the exchange of XML based messages. ebXML is a complete set of specifications to enable secure, global, electronic business using proven, open standards such as TCP/IP, HTTP, SOAP, and XML. ebXML is also evolutionary in nature, built on 25 years of EDI experience, designed to work with existing EDI solutions, or be used to develop an emerging class of internet based electronic business applications based on XML.

Since systems integration and software interoperability are the cornerstones of any successful IT infrastructure, ebXML is built on an infrastructure that ensures electronic interoperability. This is accomplished by providing an open semantics framework that allows enterprises to find each other, agree to become trading partners, and conduct business. The evolution of many new business models will be enabled by ebXML, through business process patterns and the 'commoditization' of such business processes.

The electronic business infrastructure provided by ebXML is broad in scope and well integrated. And perhaps most importantly, ebXML is platform and vendor neutral, providing an industry solution based on open standards, designed through a collaborative and open process.

ebXML is a set of specifications that together enable a modular, yet complete electronic business framework for using the Internet. The ebXML architecture provides:

- A way to define business processes and their associated messages and content.
- A way to register and discover business process sequences with related message exchanges.

- A way to define company profiles.
- A way to define trading partner agreements.
- A uniform message transport layer.

The ebXML framework is designed for electronic interoperability, allowing businesses to find each other, agree to become trading partners and conduct business. All of these operations can be performed automatically, minimising, and in most cases completely eliminating the need for human intervention. This streamlines electronic business through a low cost, open, standard mechanism.

In order for enterprises to conduct electronic business with each other, they should:

- Discover each other and the products and services they have to offer.
- Determine which shared business processes, and associated document exchanges, to use for obtaining products or services from each other.
- Determine the contact points and form of communication for the exchange of information.
- Agree on the contractual terms on the above chosen processes and associated information.
- They can then: exchange information and services in an automated fashion in accordance with these agreements.

ebXML is designed to meet these needs and is built on three basic concepts: provide an infrastructure that ensures data communication interoperability; provide a semantics framework that ensures commercial interoperability; and provide a mechanism that allows enterprises to find each other, agree to become trading partners and conduct business with each other. The infrastructure to ensure data communication interoperability is provided through:

- A standard message transport mechanism with a well defined interface, packaging rules, and a predictable delivery and security model.
- A 'business service interface' that handles incoming and outgoing messages at either end of the transport.
- A semantic framework to ensure commercial interoperability is provided through a meta model for defining business process and information models.
- A set of re-useable business logic based on core components that reflect common business processes and XML vocabularies.
- A process for defining actual message structures and definitions as they relate to the activities in the Business Process model.
- A mechanism to allow enterprises to find each other, agree to establish business relationships, and conduct business, is provided through shared repository where enterprises can register and discover each other's business services via partner profile information.
- A process for defining and agreeing to a formal Collaboration Protocol Agreement (CPA), if so desired or where required.
- A shared repository for company profiles, business process models and related message structures.

The ebXML implementation framework defines the ebXML Technical Architecture. The technical architecture is composed of five main area of emphasis: Business Process and Information Model, Collaboration Protocol Profiles Company Profiles, Messaging Services, Registry and Repository, Collaborative Partner Agreements.

4.2.2 Business process description

The Business Process models define how business processes are described. Business Processes represent the "verbs" of electronic business and can be represented using modelling tools. The specification for business process definition enables an organisation to express its business processes so that they are understandable to other organisations. This enables the integration of business processes within a company, or between companies.

Figure 1 shows the graphical presentation of the BPSS (Business Process Specification Schema) process specification to provide a basic understanding of the technology. The main elements are multiparty collaborations and binary collaborations. Both include (reference) business transactions, which govern the business document flow.

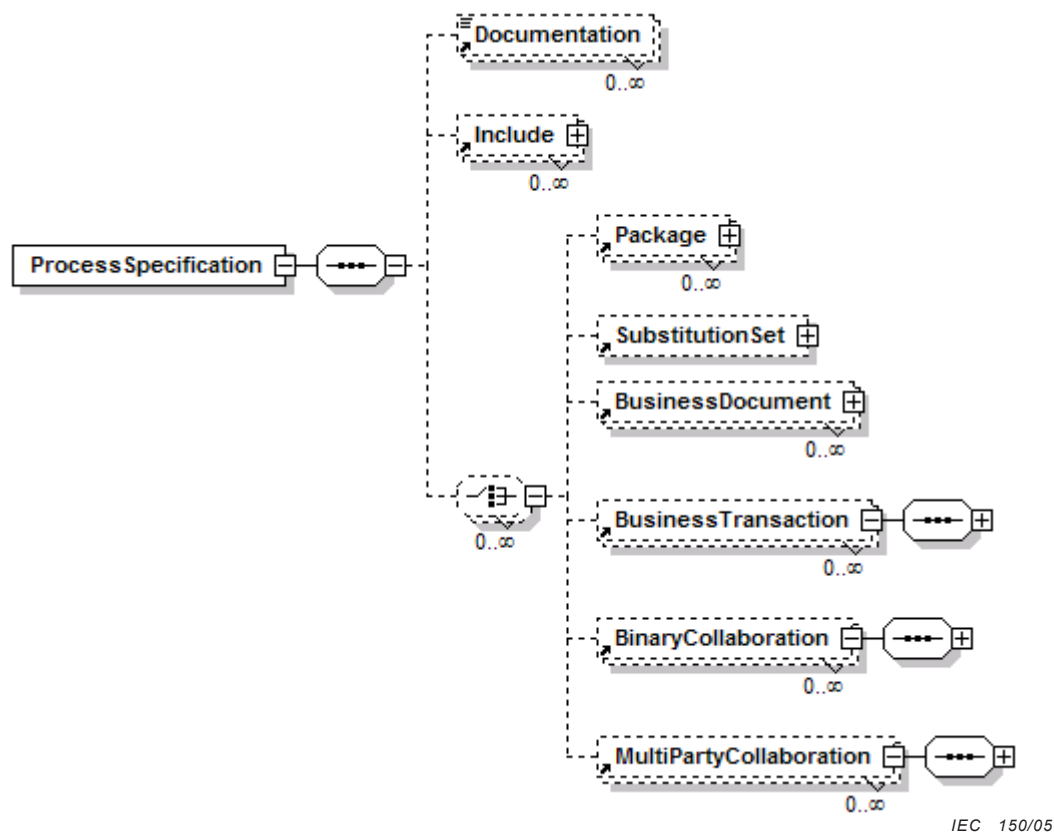


Figure 1 – Process specification

Figure 2 shows the graphical presentation of the business transaction from the Business Process Specification Schema (BPSS).

The business transaction consists of a requesting business activity and a responding business activity each associated with a document envelope (which includes the business documents and attachments).

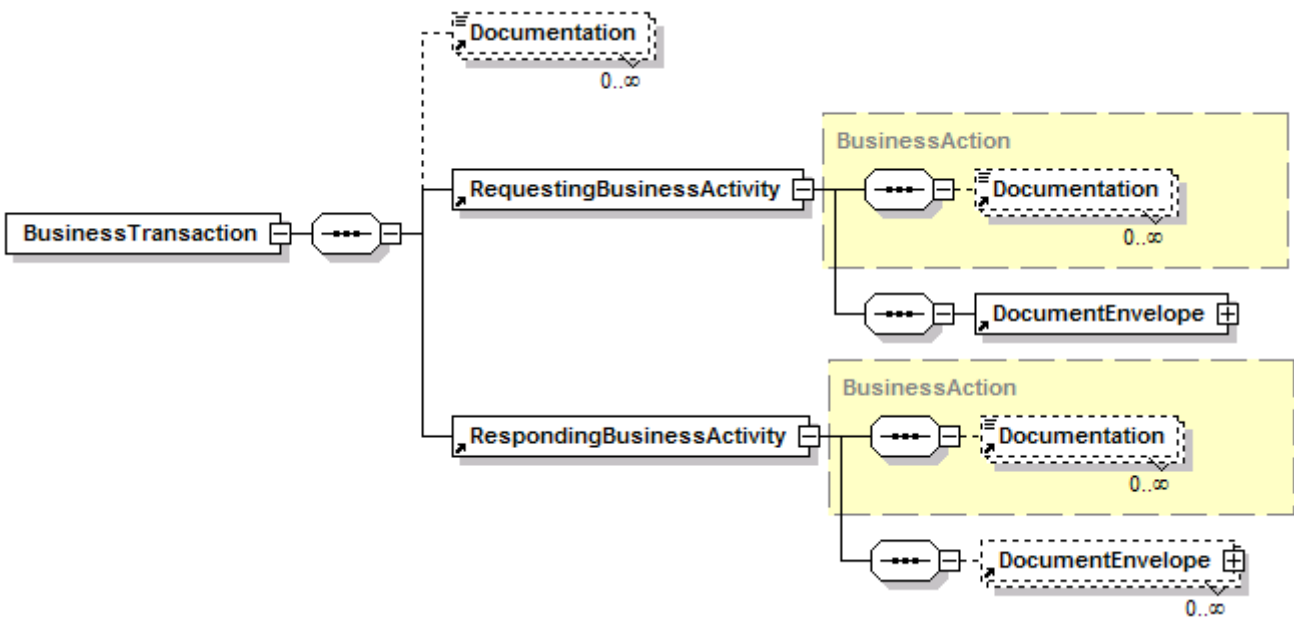
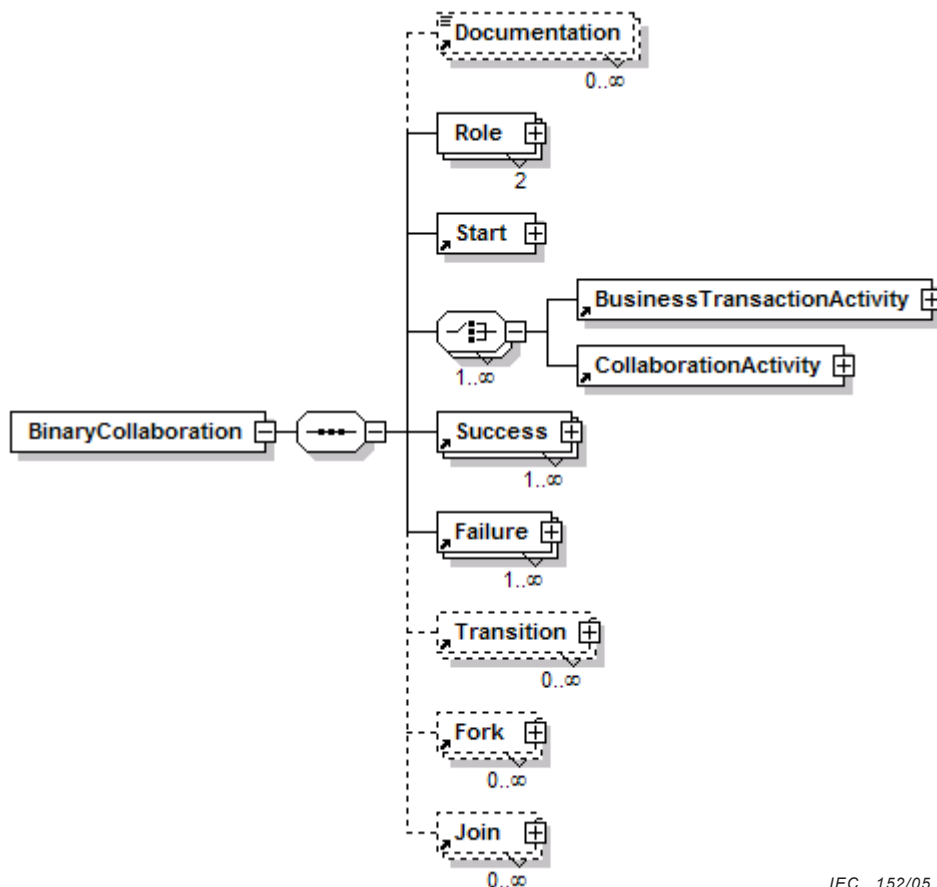


Figure 2 – Business transaction

IEC 151/05

Figure 3 shows the graphical presentation of the binary collaboration from the Business Process Specification Schema (BPSS). Specific business process specifications are derived from the UML activity diagram (see IEC 62325-502). The Business Process Specification Instance uses the BPSS and is, besides the CPP/CPA, the most innovative part of ebXML. BPSS, CPP/CPA are shared between business partners and are used for both documentation and system configuration.

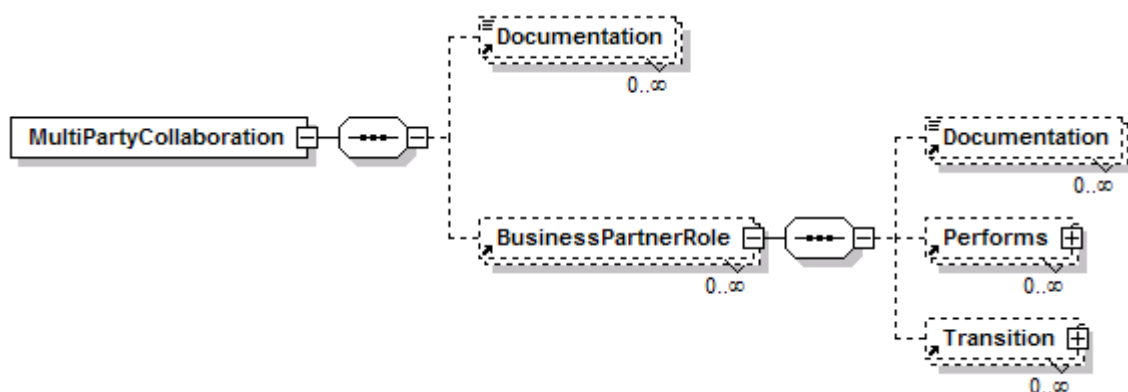
The binary collaboration is between two business partners with one partner in the initiating role and the other partner in the responding role. It includes business transaction activities and (nested) collaboration activities. These activities reference business transactions respective collaborations. Collaborations have a start state (Start) and a completion state (Success or Failure). From start to end there can be pseudo-states fork (Fork) and join (Join) for parallel transactions. The transition state specifies that a given activity be followed by another activity.



IEC 152/05

Figure 3 – Binary collaboration

Figure 4 shows the graphical presentation of the multiparty collaboration from the Business Process Specification Schema (BPSS). The multiparty collaboration is between more than two partners and consists of multiple binary collaborations. It is defined by the business partner's role, which performs (Performs) one or more roles in various binary collaborations. Transitions (Transition) can be added to define the transition from one business transaction activity to the other.



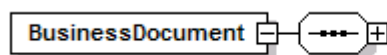
IEC 153/05

Figure 4 – Multiparty collaboration

4.2.3 Business documents

The Information models define reusable components that can be applied in a standard way within a business context. These Core Components represent the "nouns and adjectives" of electronic business. They are defined using identity items that are common across all businesses. This enables users to define data that is meaningful to their business while also maintaining interoperability with other business applications.

Figure 5 shows the graphical presentation of the business document from the Business Process Specification Schema (BPSS). Business documents are derived in the UMM design workflow from UML class diagrams of messages and incorporate information entities (re-usable core components). Business documents can be of any syntax (also EDIFACT or X12) but XML is the preferred syntax within ebXML.



IEC 154/05

Figure 5 – Business document

4.2.4 Business agreement

The Collaborative Partner Profiles (CPP) and Collaborative Partner Agreements (CPA, build from the intersection of two CPP) captures critical information for communications between applications and business processes and also records specific technical parameters for conducting electronic business. IEC 62325-502 specifies the profile.

Figure 6 shows the graphical presentation of the collaboration protocol profile from the Collaboration Protocol Profile (CPP) Schema. For collaboration role, delivery channel, transport, and document exchange, see the following Figures 7 to 10. Party Identification (PartyId) identifies and party reference (PartyRef) references the business partners.