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### Information technology — Business operational view —

#### Part 21:

## Application of Open-edi business transaction ontology in distributed business transaction repositories

ICS: 35.240.63

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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.

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

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC32, *Data management and interchange*.

A list of all parts in the ISO/IEC 15944 series can be found on the ISO website.

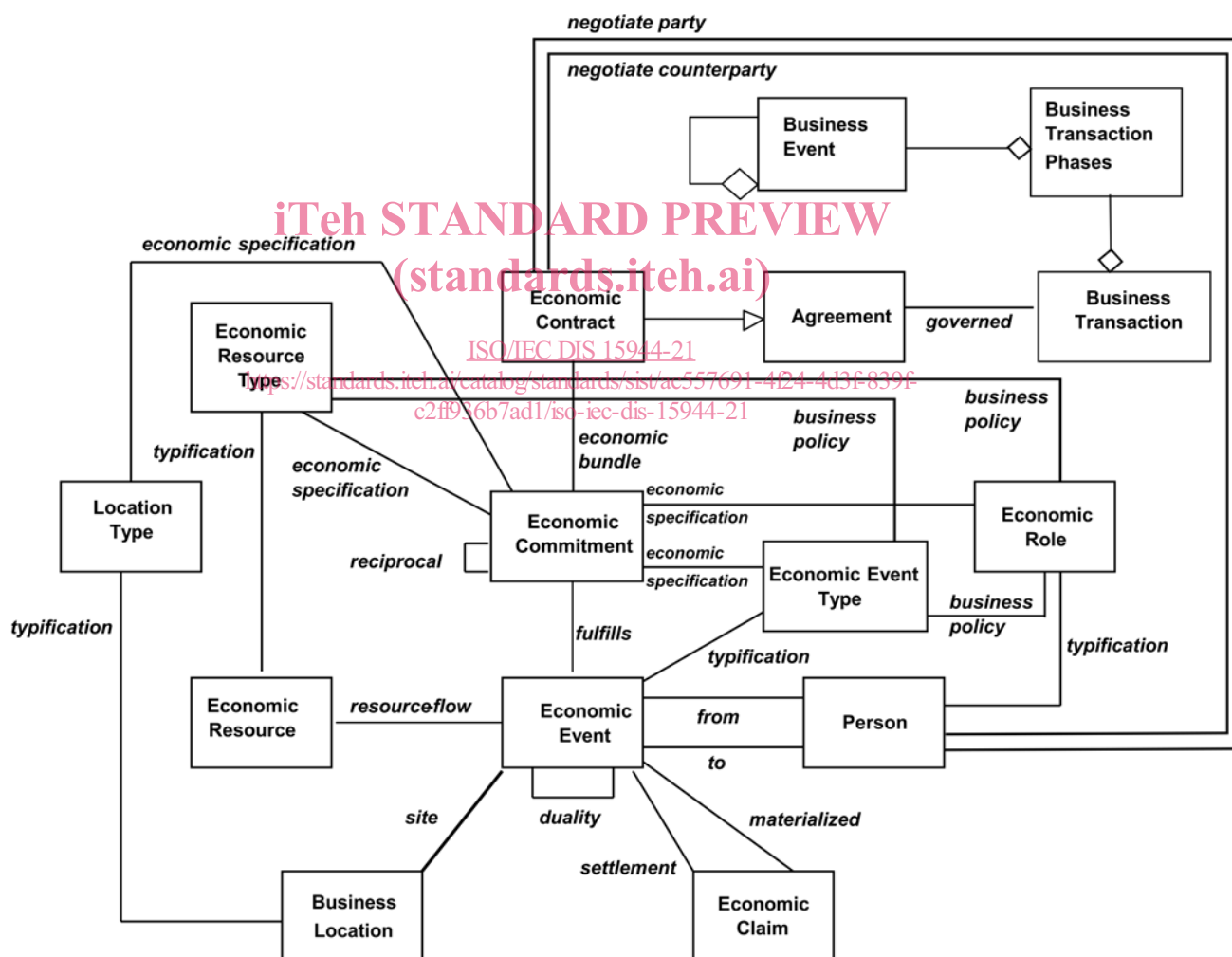
Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Introduction

ISO/IEC 15944-4 (Part 4), Business transaction scenarios — Accounting and economic ontology, defines the Open-edi Business Transaction Ontology (OeBTO) as a formal, rule-based specification and definition of the concepts pertaining to business transactions and scenarios and the relationships that hold among these concepts.

[Figure 1](#) overviews the ontology of a business transaction and is taken from Figure 21 of Part 4, modified as follows to bring to light certain properties that were not illustrated at the time:

- the generalization of “Partner” to “Person” is according to Figure 18 of Part 4,
- the business policy connections between the three types (Economic Resource Type, Economic Event Type, and Economic Role), and
- the connections of party (OeP) and counterparty (OeCP) are shown as distinct persons having negotiated the Economic Contract.



### Figure 1 — Open-edi Business Transaction Ontology

Per Part 4, each business entity, depicted as a box in the diagram, is a computable representation of a real-world entity that participates, occurs, or is materialized during a business transaction. These are either static representations for the duration of the business transaction or dynamically changing representations implemented as individual state machines. Different business events effecting the business transaction are inputs influencing different sets of one or more of the state machines and changing their individual states. The particular states that each business entity can exhibit are established prior to

the business transaction starting in order that the state machines act as deterministic automata for the duration. Initiating the business transaction instantiates the state machine of each business entity based on its negotiated definition.

The concept of a business collaboration that is illustrated in Figure 2 is updated from Figure 3 of Part 4 also to bring to light the party (OeP) and counterparty (OeCP) as distinct persons of a generic nature, not necessarily a buyer nor a seller.

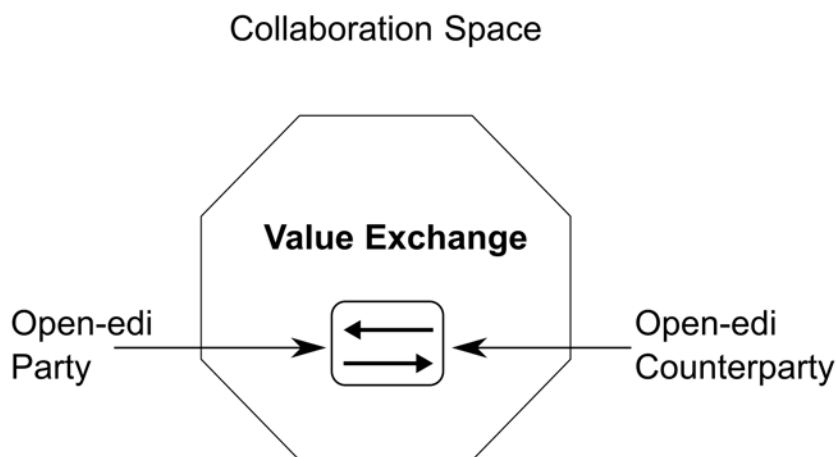


Figure 2 — Concept of a Business Collaboration

The collaboration space captures the information regarding a value exchange between the party and counterparty who have entered into an economic contract. The business transaction occurs within this space. The duality of the business transaction is that it involves two economic events, that is, two transfers of value in the value exchange. One transfer of value is from the OeP to the OeCP, and the other transfer of value is from the OeCP to the OeP.

Part 4 describes the ontology as the properties of this active multi-step process of the business transaction between party and counterparty from planning through to post-actualization. The business transaction transits through a series of states, one with each step, with each state stimulus being a business event. After any business event in the business transaction one can view the status of the interrelations between the ontology components as an outcome of that event.

This Part 21, Application of Open-ed business transaction ontology in Distributed Business Transaction Repositories, supplements Part 4 by describing the Open-ed Distributed Business Transaction Repository (OeDBTR) properties of an indelible history or formal record of these changes in interrelations. This history can subsequently be queried or inspected. Without such a history of the state transitions of business entities, there is no record of the life cycle of the business transaction from instantiation to termination.

# Information Technology — Business Operational View —

## Part 21:

# Application of Open-edi business transaction ontology in Distributed Business Transaction Repositories

## 1 Scope

### 1.1 Statement of scope

ISO/IEC 15944-21 specifies the Business Operational View of an implementation of an Open-edi Distributed Business Transaction Repository (OeDBTR), building on the principles and concepts defined in ISO/IEC 15944-4 of a business transaction. The repository stores the history of the transitions in state of the economic claim and/or other business entities that happen over the course of a business transaction, and does so for a collection of business events. These business events, comprised of transactions and their states, can be identified unambiguously so as to provide the ability to inspect or query the information at some point after the record has been made. The distributed nature of the repository offers users ubiquitous and robust access to the recorded history.

A history of business transactions of market exchanges can be useful in auditing or other memoing-based activities, looking back at the immutable record of the interactions between Parties.

### 1.2 Exclusions

ISO/IEC 15944-21 does not specify the Functional Services View of a particular implementation of an Open-edi Distributed Business Transaction Repository. For best performance, candidate technologies would likely exhibit properties of long-term permanence, robust immutability, decentralized access, distributed resilience, and fine-grained addressability.

## 2 Normative References

ISO/IEC 15944-4:2015, *Information technology — Business Operational View — Part 4: Business transaction scenarios — Accounting and economic ontology*

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1 business

series of processes, each having a clearly understood purpose, involving more than one [Person](#), realised through the exchange of information and directed towards some mutually agreed upon goal, extending over a period of time

[ISO/IEC 14662:2010, 3.2]

### 3.2 business event

occurrence in time that an [Open-edi Party](#) and an [Open-edi Counterparty](#) in a [business transaction](#) wish to monitor or control

NOTE 1 Business events are the workflow tasks that business partners need to accomplish to complete a business transaction among themselves. As business events occur, they cause a business transaction to move through its various phases of planning, identification, negotiation, actualization, and post-actualization.

NOTE 2 Occurrences in time can either: (a) be internal as mutually agreed to among the parties to a business transaction and/or (b) reference some common publicly available and recognized date/time referencing schema (e.g. one based on using ISO 8601 and/or ISO 19135 standards).

[ISO/IEC 15944-4:2015, 3.5 (adapted)]

### 3.3 Business Operational View BOV

perspective of [business transactions](#) limited to those aspects regarding the making of business decisions and commitments among [Persons](#), which are needed for the description of a [business transaction](#)

[ISO/IEC 14662:2010, 3.3]

### 3.4 business transaction

predefined set of activities and/or processes of [Persons](#) which is initiated by a [Person](#) to accomplish an explicitly shared [business](#) goal and terminated upon recognition of one of the agreed conclusions by all the involved [Persons](#) although some of the recognition might be implicit

[ISO/IEC 14662:2010, 3.4]

### 3.5 business transaction entity

computable representation of any real-world entity that participates, occurs, or is materialized during a [business transaction](#)

[ISO/IEC 15944-4:2015, 3.9]

### 3.6 collaboration space

business activity space where an [economic exchange](#) of valued resources is viewed independently and not from the perspective of any business partner

NOTE 1: In collaboration space, an individual partner's view of economic phenomena is de-emphasized. Thus, the use of common business and accounting terms like purchase, sale, cash receipt, cash disbursement, raw materials, and finished goods, etc. is not allowed because they view resource flows from a participant's perspective.

[ISO/IEC 15944-4:2015, 3.12]



**3.7****commitment**

making or accepting of a right, obligation, liability or responsibility by a [Person](#) that is capable of enforcement in the jurisdictional domain in which the [commitment](#) is made

[ISO/IEC 14662:2010, 3.5]

**3.8****constraint**

rule, explicitly stated, that prescribes, limits, governs or specifies any aspect of a [business transaction](#)

NOTE 1 Constraints are specified as rules forming part of components of Open-edi scenarios, i.e., as scenario attributes, roles, and/or information bundles.

NOTE 2 For constraints to be registered for implementation in Open-edi, they must have unique and unambiguous identifiers.

NOTE 3 A constraint may be agreed to among parties (condition of contract) and is therefore considered an "internal constraint". Or a constraint may be imposed on parties (e.g., laws, regulations, etc.), and is therefore considered an "external constraint".

[ISO/IEC 15944-1:2011, 3.11]

**3.9****data**

reinterpretable representation of [information](#) in a formalized manner suitable for communication, interpretation, or processing

NOTE Data can be processed by humans or by automatic means.

[ISO/IEC 2382-1:1993 (01.01.02)]

[ISO/IEC DIS 15944-21](#)

<https://standards.iteh.ai/catalog/standards/sist/ac557691-4f24-4d3f-839f-c2ff936b7ad1/iso-iec-dis-15944-21>

**3.10****eBusiness**

[business transaction](#), involving the making of commitments, in a defined collaboration space, among [Persons](#) using their [Information Technology System](#), according to [Open-edi standards](#)

NOTE 1 eBusiness can be conducted on both a for-profit and not-for-profit basis.

NOTE 2 A key distinguishing aspect of eBusiness is that it involves the making of commitment(s) of any kind among the Persons in support of a mutually agreed upon goal, involving their IT systems, and doing so through the use of EDI (using a variety of communication networks including the Internet).

NOTE 3 eBusiness includes various application areas such as e-commerce, e-administration, e-logistics, e-government, e-medicine, e-learning, etc.

NOTE 4 The equivalent French language term for "eBusiness" is always presented in its plural form.

[ISO/IEC 15944-7:2009, 3.6]

**3.11****economic claim**

expectation of one [Person](#) to receive a future inflow of an [economic resource](#) from another [Person](#) because of an [economic exchange](#) which is currently incomplete

[ISO/IEC 15944-4:2015, 3.21]

### 3.12

#### **economic event**

occurrence in time wherein ownership of an economic resource is transferred from one [Person](#) to another [Person](#).

NOTE 1 Occurrences in time can either: (a) be internal as mutually agreed to among the parties to a business transaction and/or (b) reference some common publicly available and recognized date/time referencing schema (e.g. one based on using ISO 8601 and/or ISO 19135 standards).

[ISO/IEC 15944-4:2015, 3.25]

### 3.13

#### **economic exchange**

type of a [business transaction](#) where the goal is an exchange of [economic resources](#) between two [Persons](#) where both parties derive higher utility after the settlement of the [business transaction](#).

NOTE 1 An economic exchange usually involves two economic events with different types of economic resources flowing in opposite directions. For example, an exchange of cash for a good involves a shipment with a required payment following.

[ISO/IEC 15944-4:2015, 3.27]

### 3.14

#### **economic resource**

good, right, or service of value, under the control of a [Person](#).

[ISO/IEC 15944-4:2015, 3.28]

### 3.15

#### **Electronic Data Interchange**

##### **EDI**

automated exchange of any predefined and structured data for [business](#) purposes among information systems of two or more [Persons](#)

NOTE This definition includes all categories of electronic business transactions.

[ISO/IEC 14662:2010, 3.8]

### 3.16

#### **entity**

any concrete or abstract thing that exists, did exist, or might exist, including associations among these things

*Example 1.*

A person, object, event, idea, process, etc.

NOTE An entity exists whether data about it are available or not.

[ISO/IEC 2382-17:1999 (17.02.05)]

### 3.17

#### **external constraint**

[constraint](#) which takes precedence over [internal constraints](#) in a [business transaction](#), i.e. is external to those agreed upon by the parties to a [business transaction](#)

NOTE 1 Normally, external constraints are created by law, regulation, orders, treaties, conventions or similar instruments.

NOTE 2 Other sources of external constraints are those of a sectorial nature, those which pertain to a particular jurisdictional domain or mutually agreed common business conventions (e.g., INCOTERMS, exchanges, etc.).

NOTE 3 External constraints can apply to the nature of the good, service and/or right provided in a business transaction.

NOTE 4 External constraints can demand that a party to a business transaction meet specific requirements of a particular role.

*Example 2.*

Only a qualified medical doctor may issue a prescription for a controlled drug.

*Example 3.*

Only an accredited share dealer may place transactions on the New York Stock Exchange.

*Example 4.*

Hazardous wastes may only be conveyed by a licensed enterprise.

NOTE 5 Where the Information Bundles (IBs), including their Semantic Components (SCs) of a business transaction are also to form the whole of a business transaction (e.g., for legal or audit purposes), all constraints must be recorded.

*Example 5.*

There may be a legal or audit requirement to maintain the complete set of recorded information pertaining to a business transaction, i.e., as the information bundles exchanged, as a "record".

NOTE 6 A minimum external constraint applicable to a business transaction often requires one to differentiate whether the Person that is a party to a business transaction is an "individual", "organization", or "public administration". For example, privacy rights apply only to a Person as an "individual".

[ISO/IEC 15944-1:2011, 3.23]

### 3.18

#### Functional Service View

##### FSV

perspective of [business transactions](#) limited to those information technology interoperability aspects of [Information Technology Systems](#) needed to support the execution of [Open-edi transactions](#)

[ISO/IEC 14662:2010, 3.10]

### 3.19

#### information

knowledge concerning [objects](#), such as facts, events, things, [processes](#), or ideas, including concepts, that within a certain context has a particular meaning

[ISO 2382-1:1993 (01.01.01)]

### 3.20

#### Information Bundle

##### IB

formal description of the semantics of the [recorded information](#) to be exchanged by [Open-edi Parties](#) playing [roles](#) in an [Open-edi Scenario](#)

[ISO/IEC 14662:2010, 3.11]

### 3.21

#### Information Technology System IT System

set of one or more computers, associated software, peripherals, terminals, human operations, physical processes, information transfer means, that form an autonomous whole, capable of performing information processing and/or information transfer

[ISO/IEC 14662:2010, 3.13]

### 3.22

#### internal constraint

constraint which forms part of the commitment(s) mutually agreed to among the parties to a business transaction

NOTE Internal constraints are self-imposed. They provide a simplified view for modelling and re-use of scenario components of a business transaction for which there are no external constraints or restrictions to the nature of the conduct of a business transaction other than those mutually agreed to by the buyer and seller.

[ISO/IEC 15944-1:2011, 3.11]

### 3.23

#### materialized

association between an economic event and an economic claim where the occurrence of the economic event causes the economic claim to come into existence

[ISO/IEC 15944-4:2015, 3.40]

### 3.24

#### medium

physical material which serves as a functional unit, in or on which information or data is normally recorded, in which information or data can be retained and carried, from which information or data can be retrieved, and which is non-volatile in nature

NOTE 1 This definition is independent of the material nature on which the information is recorded and/or technology used to record the information [e.g. paper, photographic (chemical), magnetic, optical, ICs (integrated circuits), as well as other categories no longer in common use such as vellum, parchment (and other animal skins), plastics (e.g., bakelite or vinyl), textiles (e.g., linen, canvas), metals, etc.].

NOTE 2 The inclusion of the "non-volatile in nature" attribute is to cover latency and records retention requirements.

NOTE 3 This definition of "medium" is independent of:

- i) form or format of recorded information;
- ii) physical dimensions and/or size;
- iii) any container or housing that is physically separate from material being housed and without which the medium can remain a functional unit.

NOTE 4 This definition of "medium" also captures and integrates the following key properties:

- i) the property of medium as a material in or on which information or data can be recorded and retrieved;
- ii) the property of storage;
- iii) the property of physical carrier;
- iv) the property of physical manifestation, i.e., material;
- v) the property of a functional unit;