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Information technology — Business Operational View

Part 4: Business transaction scenarios — Accounting and economic ontology

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee IST/40, Data management and interchange.

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ISO/IEC 15944-4

Second edition
2015-04-01

Information technology — Business Operational View —

Part 4: Business transaction scenarios — Accounting and economic ontology

Technologies de l'information — Vue opérationelle d'affaires —

Partie 4: Scénarios de transactions d'affaires — Ontologie comptable et économique

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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

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

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 32, *Data management and interchange*.

This second edition cancels and replaces the first edition (ISO/IEC 15944-4:2007), of which it constitutes a minor revision.

ISO/IEC 15944 consists of the following parts, under the general title *Information technology — Business Operational View*:

— *Part 1: Operational aspects of Open-edi for implementation*

— *Part 2: Registration of scenarios and their components as business objects*

— *Part 4: Business transaction scenarios — Accounting and economic ontology*

— *Part 5: Identification and referencing of requirements of jurisdictional domains as sources of external constraints*

— *Part 6: Technical introduction to e-Business modelling* [Technical Report]

— *Part 7: eBusiness vocabulary*

— *Part 8: Identification of privacy requirements as external constraints on business transactions*

— *Part 9: Business transaction traceability framework for commitment exchange*

— *Part 10: IT-enabled coded domains as semantic components in business transactions*

— *Part 20: Linking business operational view to functional service view to functional service view*

The following parts are under preparation:

— *Part 11: Descriptive techniques for foundational modelling in Open-edi*

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0 Introduction

0.1 Purpose and overview

This work is motivated with important ideas from the ISO Open-edi specifications as represented in ISO/IEC 15944-1. In ISO/IEC 15944-1 and in some of its earlier foundational expositions, such as ISO/IEC 14662, there were important concepts defined and interrelated such as business transaction, fundamental activities of a business transaction, commitment, Person, role, scenario, and others. A need for relating all of these concepts in a formal framework for the Open-edi work is apparent.

This is a question of ontology: a formal specification of the concepts that exist in some domain of interest and the relationships that hold them[17]. In this case, the domains of interest are those that encompass Open-edi activities, that is, law, economics, and accounting in an extended sense, not the internal accounting of one particular firm, but the accountabilities of each of the participants in a market-based business transaction.

Ontologies are generally classified as either upper-level ontologies, dealing with generalized phenomena like time, space, and causality, or domain ontologies, dealing with phenomena in a specific field like military operations, manufacturing, medical practice, or business. The economic and accounting ontology being used in electronic business eXtended Markup Language (ebXML), in the UN/CEFACT modelling methodology, and E-Commerce Integration Meta-Framework (ECIMF) work is entitled the Resource-Event-Agent (REA) ontology[1)]. REA is used here as an ontological framework for specifying the concepts and relationships involved in business transactions and scenarios in the Open-edi sense of those terms. The resulting framework is titled the Open-edi business transaction ontology (OeBTO).

The REA ontology is actually an elementary set of concepts derived from basic definitions in accounting and economics. These concepts are illustrated most simply with a UML class diagram. See Figure 1, which illustrates the simple Resource-Event-Agent structure that gives REA its name. A business transaction or exchange has two REA constellations joined together, noting that the two parties to a simple market transfer expect to receive something of value in return when they trade. For example, a seller, who delivers a product to a buyer, expects a requiting cash payment in return.

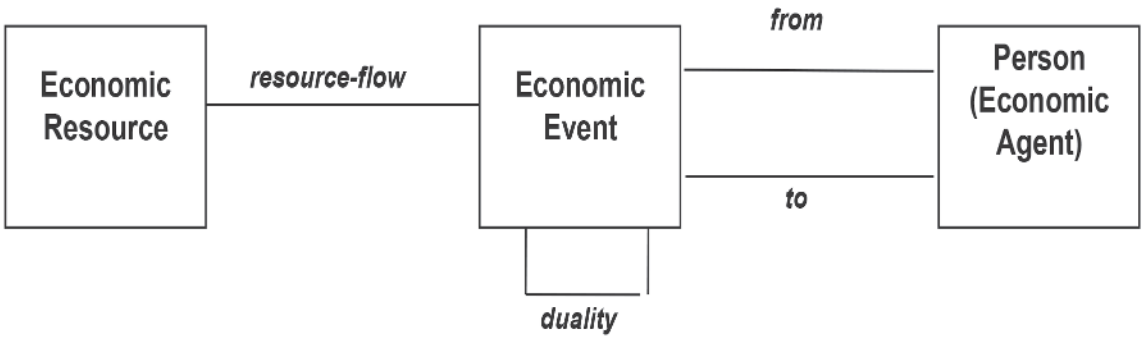

Figure 1 — Basic economic primitives of the Open-edi ontology

There are some specific points of synergy between the REA ontology and the ISO Open-edi specifications as represented in ISO/IEC 15944-1.

ISO/IEC 15944-1, 3.9 defines commitment as *"the making or accepting of a right, obligation, liability, or responsibility by a Person..."*. Commitment is a central concept in REA. Commitments are promises to execute future economic events, for example, to fulfill an order by executing a delivery event.

ISO/IEC 15944-1, 6.1.3, Rule 1 states: *"Business transactions require both information exchange and commitment exchange."* REA firmly agrees with and helps give definition to this assertion. Reciprocal commitments are exchanged in REA via economic contracts that govern exchanges, while information

1) Elements of the REA ontology as they are used in other standards work are explained in Annex B.

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exchange is tracked via business events that govern the state transitions of business transaction entities that represent various economic phenomena.

ISO/IEC 15944-1, 6.3.1, Rule 39 states: *"Conceptually a business transaction can be considered to be constructed from a set of fundamental activities. They are planning, identification, negotiation, actualization, and post-actualization."* For REA, actualization is the execution of economic events that fulfill commitments. Planning and identification involve business partners with types of economic resources, events, and persons, while negotiation is finalized by an economic contract which is a bundle of commitments. The UN/CEFACT Business Process Group has also defined negotiation protocols that assist in forming commitments. The Open-edi set of activities and the REA economic concepts will help each other tie together all the activities into a cohesive business transaction, and then unite that transaction definition with its related information models.

Finally, with regard to the preliminary agreement between Open-edi and REA, the two major sets of ideas that characterize the Open-edi work, the specification of business transactions and the configuration of scenarios, correspond well at the aggregate level to what the REA ontology calls the accountability infrastructure and the policy infrastructure. A business transaction specifies, in a descriptive sense, actual business events of what has occurred or has been committed to. Conversely, a scenario is more prescriptive: it configures what could be or should be. The realm of both descriptions and prescriptions is important both to Open-edi and REA, and they can work well in developing standards for each.

0.2 Definition of Open-edi Business Transaction Ontology (OeBTO)

According to the most widely accepted definition from Tom Gruber (1993), an ontology is a formal, explicit specification of a shared conceptualization.[2)] The individual components of this meaning are each worth examining.

— formal = machine-readable;

— explicit specification = concepts, properties, relations, constraints, and axioms are explicitly defined;

— of a shared = consensus knowledge;

— conceptualization = abstract model of some phenomenon in the real world.

At present, the REA model is certainly an explicit specification of a shared conceptualization of economic phenomena in the accounting community. A formal, machine-readable specification is not proposed in this part of ISO/IEC 15944; however, such extensions may follow in other standards work.

This part of ISO/IEC 15944 focuses on integrating the Gruber definition of ontology with a REA-based approach. It does so from an accounting and economic ontology perspective within an Open-edi Reference Model context. This is achieved through the introduction of the concept (or construct) of "Open-edi Business Transaction Ontology (OeBTO)", which is defined as follows:

formal, rule-based specification and definition of the concepts pertaining to business transactions and scenarios and the relationships that hold among those concepts.

0.3 Use of the "independent" and "trading partner" perspective in the Open-edi ontology work

In normal business use, the naming perspective for the ontological primitives would be that of the entrepreneur or of one of the two trading partners engaged in collaborative commerce. The other trading partner would ordinarily have a mirror-image view. Thus, a sale, a cash receipt, or a resource inflow for a particular entrepreneur would become a purchase, a cash disbursement, or a resource outflow for a corresponding trading partner. From this perspective, business events and their accompanying economic phenomena would be modeled twice, once in the database of each trading partner. However, for Open-edi purposes, or for that matter for any other independent modeling of business collaborations like the Business Requirement View BRV level of the UN/CEFACT modeling methodology, this redundancy

2) See also the expert contribution by Dr. Jake V. Knoppers in the JTC1/SC32/WG1 document N0220, "*Draft Definition for Open-edi Business Transaction Ontology (OeBTO)*", 2002-05-06.

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is not acceptable because it allows the states of the two representations to become inconsistent. This difference in naming perspective is explained below and illustrated in Figure 2.[3)]

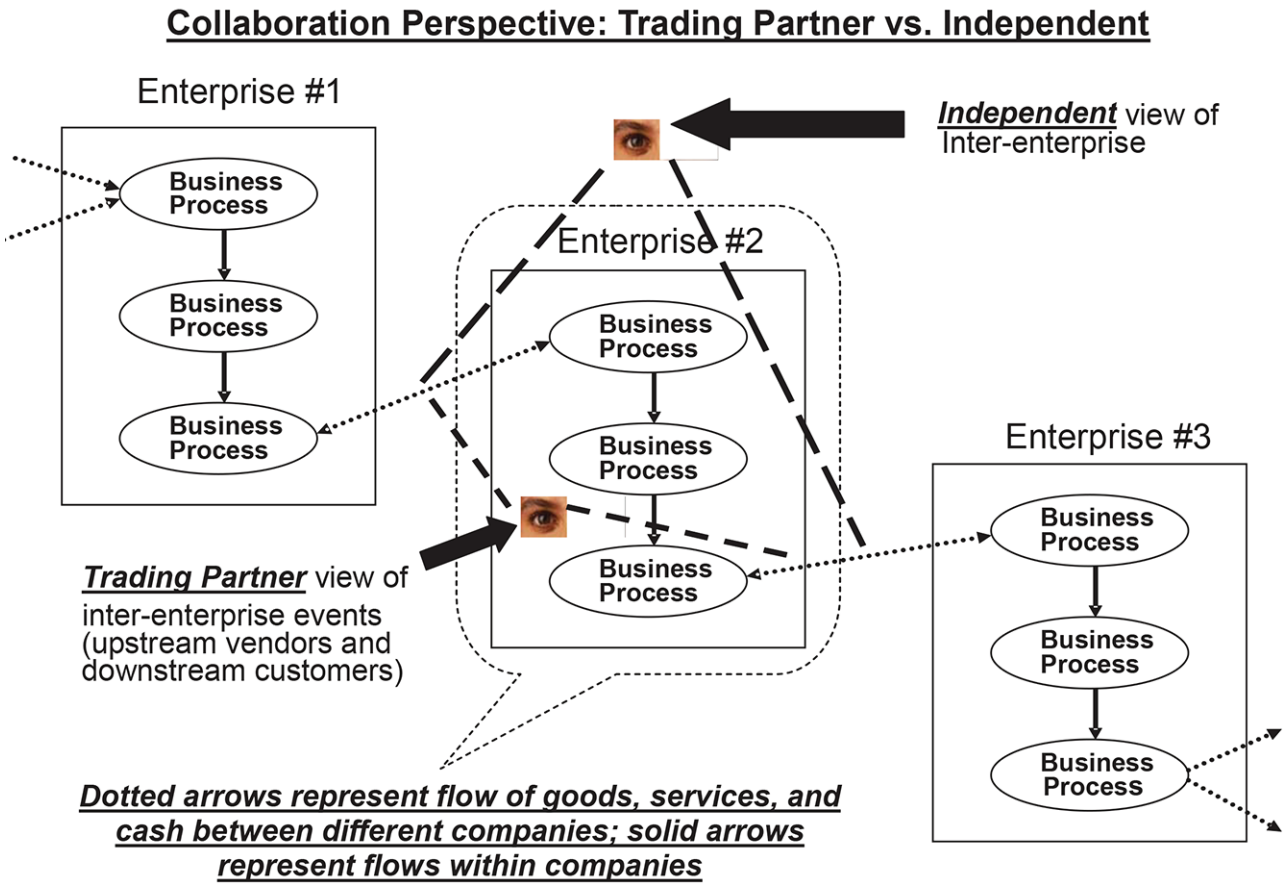

Figure 2 — Different views of business collaboration

Figure 2 illustrates three independent value chains for three different enterprises. Each company has a connected network of business processes that takes its initial input of resources (called factor inputs for their production functions) and transforms them via cumulative flows of goods, services, rights, and/or cash into an output for that firm's downstream customers. For Open-edi collaboration modeling, these internal processes are not relevant until a resource flow crosses enterprise boundaries, as is illustrated for Enterprise #2 which accepts materials from Enterprise #1 and which delivers materials to Enterprise #3 (most probably in both cases for cash payments in return). The two dotted lines with double-headed arrows show these inter-enterprise events.

The independent or collaboration perspective of resource flows is anchored on the view of the eye outside of Enterprise #2. This view sees both exchanges as conceptually similar with flows of materials being requited by flows of funds. Such a perspective is quite different from that of the eye inside of Enterprise #2, which sees the flow between Enterprise #1 and Enterprise #2 as a "purchase" and the flow between Enterprise #2 and Enterprise #3 as a "sale". Note that an eye inside of Enterprise #1 (not shown on diagram) would have modeled the "purchase" of Enterprise #2 as a "sale" of Enterprise #1, hence the redundancy and the inevitable inconsistency.

Business process modeling can take either of the perspectives shown by the eyes of Figure 2, but the independent perspective is clearly the choice for Open-edi. This leads to the concept of a business

3) Figure 2 was contributed by the Japanese delegation to SC 32, led by Katsuhiro Morita, during the Open-edi group meeting in Victoria in October 2001. {See further, the JTC1/SC32/WG1 document N1 N0190 "*AIW15944-4, Information technology — Business Agreement Descriptive techniques Part 4: Open-edi Ontology*", 2001-10-22} (Morita 2001). Some conceptual changes and naming conventions have been added since that [illegible]

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collaboration that is illustrated in Figure 3[4]. Most generally, there is a value exchange between two Persons, with one assuming the role of a "buyer" (has money, desires goods, services, and/or rights) and the other assuming the role of a "seller" (has goods, services, and/or rights, desires money). It is also possible to anchor the independent view on time, with one event being the initiating flow and the requiting event being the responding flow. For internal database purposes of corporate accountability, "trading partner perspective" terms are directly derivable from "independent perspective" terms.

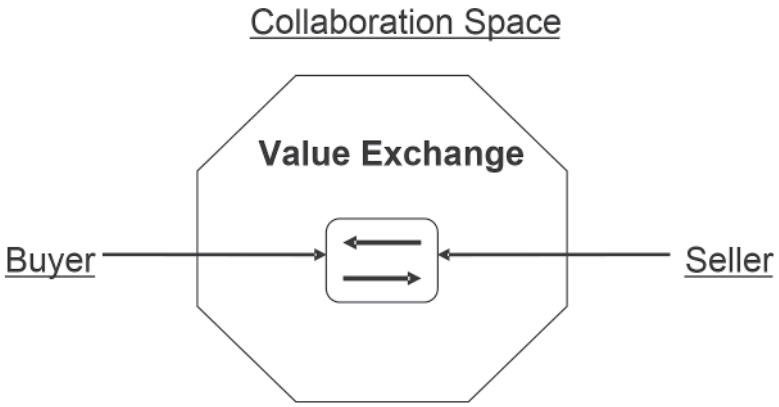

Figure 3 — Concept of a business collaboration

0.4 The "Open-edi Business Transaction Ontology" (OeBTO)

"Definition of Open-edi Business Transaction Ontology (OeBTO)" and "Use of 'independent' and 'trading partner' perspective in the Open-edi ontology work" have suggested

— that the components of the REA domain ontology model are sufficiently well-defined, stable, and well-known that they can clearly serve as the basis for an ontological specification of the concepts involved in collaborative exchanges between trading partners, and

— that the components of that model must be viewed from the outside perspective of a modeler viewing the economic phenomena independently.

Because the primitive economic terms are being adopted here for use with the operational aspects of Open-edi from ISO/IEC 15944-1, the ontology to be defined will be termed the "Open-edi Business Transaction Ontology" (OeBTO). Its definition is

formal, rule-based specification and definition of the concepts pertaining to business transactions and scenarios and the relationships that hold among these concepts

From the definitional foundations of both ISO/IEC 15944-1 and the REA model, it follows that the OeBTO will follow these five principles:

— as a business transaction ontology, a distinguishing characteristic of OeBTO is that in addition to information exchange, it incorporates commitment exchange among autonomous Persons;

— an OeBTO requires the use of clear and pre-defined rules, principles, and guidelines (see ISO/IEC 15944-1, 5.1);

— an OeBTO is neutral in terms of technology, representation, and application;

— the scope of an OeBTO covers all areas of business transactions (public/private, industry sectors, international, regional, etc.);

— the semantics of the concepts represented in an OeBTO are explicitly specified and constrained.

4) Figure 3 was contributed by the Japanese delegation to SC 32, led by Katsuhiro Morita, during the Open-edi group meeting in Seoul, in May 2002.

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0.5 Organization and description of this part of ISO/IEC 15944

Clause 1 and Clause 2 provide scope and normative references for OeBTO. The basic OeBTO definitions are first enumerated in Clause 3, while Clause 4 provides a table of symbols and abbreviations. Clause 5 provides the declarative substance for this part of ISO/IEC 15944, which is a set of UML class diagrams and conceptual explanations that circumscribe the Open-edi Business Transaction Ontology. Clause 6 explains the mechanics of a business transaction state machine, which is the procedural component of an OeBTO, while Clause 7 explains the (internal) constraint component of OeBTO, which is its repository for business rules.

At the end of this part of ISO/IEC 15944 are some helpful Annexes that provide elaboration on the points raised in the main body. Normative Annex A is a consolidated list of all the terms and definitions used in this part of ISO/IEC 15944 in both ISO English and ISO French. The other normative annex is Annex C, which is common to ISO/IEC 15944-2, ISO/IEC 15944-4, ISO/IEC 15944-5, and ISO/IEC 15944-8. Annex B is informative text providing more detailed background information on the REA Model. This part of ISO/IEC 15944 concludes with a bibliography.

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Information technology — Business Operational View —

Part 4: Business transaction scenarios — Accounting and economic ontology

1 Scope

This part of ISO/IEC 15944 provides a set of UML class diagrams and conceptual explanations that circumscribe the Open-edi Business Transaction Ontology (OeBTO). It explains the mechanics of a business transaction state machine, the procedural component of an OeBTO, and the (internal) constraint component of OeBTO, its repository for business rules.

This part of ISO/IEC 15944 addresses collaborations among independent trading partners as defined in ISO/IEC 15944-1. This part of ISO/IEC 15944 applies to both binary collaborations (buyer and seller) and mediated collaborations (buyer, seller, third-party). The ontological features described herein propose standards only for the Business Operational View (BOV), that is, the business aspects of business transactions as they are defined in ISO/IEC 15944-1.

2 Normative references

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

NOTE One or more terms and definitions of the referenced International Standards listed below are used in Clause 3 Terms and definitions.

ISO/IEC 6523-1:1998, *Information technology — Structure for the identification of organizations and organization parts — Part 1: Identification of organization identification schemes*

ISO/IEC 11179-3:2003, *Information technology — Metadata registries (MDR) — Part 3: Registry metamodel and basic attributes*

ISO/IEC 14662:2010, *Information technology — Open-edi reference model*

ISO/IEC 15944-1:2011, *Information technology — Business Operational View — Part 1: Operational aspects of Open-edi for implementation*

ISO/IEC 15944-5:2008, *Information technology — Business Operational View — Part 5: Identification and referencing of requirements of jurisdictional domains as sources of external constraints*

3 Terms and definitions

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

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3.1
agent
Person (3.52) acting for another *Person* (3.52) in a clearly specified capacity in the context of a *business transaction* (3.8)

Note 1 to entry: Excluded here are agents as "automatons" (or robots, bobots, etc.). In ISO/IEC 14662, "automatons" are recognized and provided for but as part of the Functional Services View (FSV) where they are defined as an "Information Processing Domain (IPD)".

[SOURCE: ISO/IEC 15944-1:2011, 3.1]

3.2
attribute
characteristic of an *object* (3.42) or *entity* (3.32)

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

3.3
bilateral transaction
sub-type of a *business transaction* (3.8) where the *Persons* (3.52) include only the *buyer* (3.11) and the *seller* (3.61), or alternatively other *Persons* (3.52) acting as *agents* (3.1) for the *buyer* (3.11) and/or *seller* (3.61)

3.4
business
series of *processes* (3.53), each having a clearly understood purpose, involving more than one *Person* (3.52), realized through the exchange of *recorded information* (3.56) and directed towards some mutually agreed upon goal, extending over a period of time

[SOURCE: ISO/IEC 14662:2010, 3.2]

3.5
business event
occurrence in time that *partners* (3.51) to a *business transaction* (3.8) wish to monitor or control

Note 1 to entry: 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 to entry: 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).

3.6
business location
geographic site where an *economic event* (3.25) is deemed to occur with its attendant transfer of an *economic resource* (3.28) from one *Person* (3.52) to another

3.7
Business Operational View
BOV
perspective of *business transactions* (3.8) limited to those aspects regarding the making of business decisions and *commitments* (3.13) among *Persons* (3.52), which are needed for the description of a *business transaction* (3.8)

[SOURCE: ISO/IEC 14662:2010, 3.3]

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3.8
business transaction
predefined set of activities and/or processes of *Persons* (3.52) which is initiated by a *Person* (3.52) to accomplish an explicitly shared business goal and terminated upon recognition of one of the agreed conclusions by all the involved *Persons* (3.52), although some of the recognition may be implicit

[SOURCE: ISO/IEC 14662:2010, 3.4]

3.9
business transaction entity
computable representation of any real-world entity that participates, occurs, or is materialized during a *business transaction* (3.8)

3.10
business transaction entity type
abstract specification of a *business transaction entity* (3.9), detailing its recommended characteristics, its recommended methods, and its recommended life-cycle states

Note 1 to entry: A business transaction entity type will usually specify the types of business events that cause a business transaction entity of this type to proceed through its different states as the business transaction itself progresses through its phases of planning, identification, negotiation, actualization and post-actualization.

3.11
buyer
Person (3.52) who aims to get possession of a good, service, and/or right through providing an acceptable equivalent value, usually in terms of money, to the *Person* (3.52) providing such a good, service, and/or right

[SOURCE: ISO/IEC 15944-1:2011, 3.8]

3.12
collaboration space
business activity space where an *economic exchange* (3.27) of valued resources is viewed independently and not from the perspective of any business partner

Note 1 to entry: 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.

3.13
commitment
making or accepting of a right, obligation, liability, or responsibility by a *Person* (3.52) that is capable of enforcement in the jurisdiction in which the *commitment* (3.13) is made

[SOURCE: ISO/IEC 15944-1:2011, 3.9]

3.14
constraint
rule, explicitly stated, that prescribes, limits, governs, or specifies any aspect of a *business transaction* (3.8)

Note 1 to entry: 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 to entry: For constraints to be registered for implementation in Open-edi, they must have unique and unambiguous identifiers.

Note 3 to entry: 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".

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

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3.15
custody
association between a *Person* (3.52) and an *economic resource* (3.28) where the *Person* (3.52) has physical control only over the resource or controls access

Note 1 to entry: Having custody of a good, service, and/or right does not imply and is differentiated from having economic control of the same (e.g. a Person may have economic control of a good even though it is not under its custody).

3.16
data (in a business transaction)
representations of *recorded information* (3.56) that are being prepared or have been prepared in a form suitable for use in a computer system

[SOURCE: ISO/IEC 15944-1:2011, 3.14]

3.17
defined market model
trade model where the *buyer* (3.11) and *seller* (3.61) accept the entry terms of a specified market in advance and where that market has an accepted and recognized source for business rules and conventions

Note 1 to entry: In a defined market, the phases of a business transaction, planning, identification, negotiation, actualization, and post-actualization are governed by the rules and conventions of the particular defined market.

3.18
duality
association between *economic events* (3.25) where one is the legal or economic consideration for the other in an exchange

Note 1 to entry: Duality is the conceptual analog of double entry in traditional bookkeeping. For example, a shipment from a partner requires a matching flow in, like a payment, to balance accounts between the parties.

3.19
economic agreement
arrangement of reciprocated *economic commitments* (3.22) between two *partners* (3.51) where the abstract specification of terms of trade is incomplete and not subject to legal enforcement

3.20
economic bundle
association between *economic commitments* (3.22) and the *economic contract* (3.23) that bundles those promises and binds them to the two *partners* (3.51) who negotiated them

3.21
economic claim
expectation of one *Person* (3.52) to receive a future inflow of *economic resources* (3.28) from another *Person* (3.52) because of an *economic exchange* (3.27) which is currently incomplete

3.22
economic commitment
type of *commitment* (3.13) by one *Person* (3.52) to transfer *economic resources* (3.28) to another *Person* (3.52) at some specified point in the future

3.23
economic contract
bundling of reciprocated *economic commitments* (3.22) between two *partners* (3.51) where the abstract specification of the proposed *economic exchange* (3.27) is deemed to be complete

3.24
economic control
association between a *Person* (3.52) and an *economic resource* (3.28) where the *Person* (3.52) either owns the *economic resource* (3.28) or is otherwise able to derive economic benefit (utility) from it

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3.25
economic event
occurrence in time wherein ownership of an *economic resource* (3.28) is transferred from one *Person* (3.52) to another *Person* (3.52)

Note 1 to entry: 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).

3.26
economic event type
abstract specification of an *economic event* (3.25) where its grouped properties can be designated without attachment to an actual, specific occurrence in time

Note 1 to entry: Examples of attributes at the type level for events might be expected-duration or standard-pricing-percentage.

3.27
economic exchange
type of a *business transaction* (3.8) where the goal is an exchange of *economic resources* (3.28) between two *Persons* (3.52) where both parties derive higher utility after the completed *business transaction* (3.8)

Note 1 to entry: 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 requited payment following.

3.28
economic resource
good, right, or service of value, under the control of a *Person* (3.52)

3.29
economic resource type
abstract specification of an *economic resource* (3.28) where its grouped properties can be designated without attachment to an actual, specific *economic resource* (3.28)

Note 1 to entry: Example of attributes at the type level for an economic resource like an automobile might include its designated fuel capacity or its maximum expected range.

3.30
economic role
abstract specification of a *Person* (3.52) for economic purposes where its grouped properties can be designated without attachment to an actual *Person* (3.52)

EXAMPLE An economic role might be a qualified buyer or approved shipper, i.e. from an economic perspective only.

3.31
economic specification
association between an *economic commitment* (3.22) and the abstract properties of an *economic event* (3.25), an *economic resource* (3.28), a *partner* (3.51), or a *business location* (3.6)

3.32
entity
concrete or abstract thing that exists, did exist, or might exist including associations among these things

Note 1 to entry: An entity exists whether data about it are available or not.

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

[SOURCE: ISO/IEC 2382-17:1999, 17.02.05]

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3.33
external constraint
constraint (3.14) which takes precedence over *internal constraints* (3.38) in a *business transaction* (3.8), i.e. is external to those agreed upon by the parties to a *business transaction* (3.8)

Note 1 to entry: Normally, external constraints are created by law, regulation, orders, treaties, conventions, or similar instruments.

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

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

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

EXAMPLE 1 Only a qualified medical doctor may issue a prescription for a controlled drug.

EXAMPLE 2 Only an accredited share dealer may place transactions on the New York Stock Exchange.

EXAMPLE 3 Hazardous wastes may only be conveyed by a licenced enterprise.

Note 5 to entry: 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 4 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 to entry: A minimum external constraint applicable to a business transaction often requires one to differentiate whether the Person, i.e. 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".

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

3.34
fulfillment
association between an *economic commitment* (3.22) and an *economic event* (3.25) where the event executes the promised resource flow from one *Person* (3.52) to another

EXAMPLE A delivery to a customer would fulfill that customer's sale order.

3.35
governed
association between an *economic agreement* (3.19) and the *business transaction* (3.8) whose conduct and phases are subject to that *economic agreement* (3.19)

3.36
individual
Person (3.52) who is a human being, i.e. a natural person, who acts as a distinct indivisible entity or is considered as such

[SOURCE: ISO/IEC 15944-1:2011, 3.28]

3.37
Information Bundle
IB
formal description of the semantics of the information to be exchanged by *Open-edi Parties* (3.45) playing *roles* (3.60) in an *Open-edi scenario* (3.46)

[SOURCE: ISO/IEC 14662:2010, 3.11]

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3.38
internal constraint
constraint (3.14) which forms part of the *commitment(s)* (3.13) mutually agreed to among the parties to a *business transaction* (3.8)

Note 1 to entry: Internal constraints are self-imposed. They provide a simplified view for modeling and re-use of scenario components of a business transaction for which there are no external constraints or restrictions on the nature of the conduct of a business transaction other than those mutually agreed to by the buyer and seller.

[SOURCE: ISO/IEC 15944-1:2011, 3.33]

3.39
location type
abstract specification of an economic location where its grouped properties can be designated without attachment to an actual place

EXAMPLE A location type might be an accepted shipping facility or approved hospital location.

3.40
materialized
association between an *economic event* (3.25) and an *economic claim* (3.21) where the occurrence of the *economic event* (3.25) causes the *economic claim* (3.21) to come into existence

3.41
mediated transaction
sub-type of a *business transaction* (3.8) where a *third party* (3.65) mediates between the *partners* (3.51) as mutually agreed to by the *partners* (3.51)

3.42
object
anything perceivable or conceivable

Note 1 to entry: Objects may be material (e.g. an engine, a sheet of paper, a diamond), immaterial (e.g. a conversion ratio, a project plan), or imagined (e.g. a unicorn).

[SOURCE: ISO 1087-1:2000, 3.1.1]

3.43
Open-edi
electronic data interchange among multiple autonomous *Persons* (3.52) to accomplish an explicit shared *business* (3.4) goal according to Open-edi standards

[SOURCE: ISO/IEC 14662:2010, 3.14]

3.44
Open-edi Business Transaction Ontology
OeBTO
formal, rule-based specification and definition of the concepts pertaining to *business transactions* (3.8) and scenarios and the relationships that hold among those concepts

3.45
Open-edi Party
OeP
Person (3.52) that participates in *Open-edi* (3.43)

Note 1 to entry: Often referred to generically in this, and other eBusiness standards, (e.g., parts of the ISO/IEC 15944 multipart "eBusiness" standard) as "party" or "parties" for any entity modelled as a Person as playing a role in Open-edi scenarios.

[SOURCE: ISO/IEC 14662:2010, 3.17]

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3.46
Open-edi scenario
OeS
formal specification of a class of *business transactions* (3.8) having the same *business* (3.4) goal

[SOURCE: ISO/IEC 14662:2010, 3.18]

3.47
organization
unique framework of authority within which a person or persons act, or are designated to act, towards some purpose

Note 1 to entry: The kinds of organizations covered by this part of ISO/IEC 15944 include the following examples.

EXAMPLE 1 An organization incorporated under law.

EXAMPLE 2 An unincorporated organization or activity providing goods and/or services including: (a) partnerships, (b) social or other non-profit organizations or similar bodies in which ownership or control is vested in a group of individuals, (c) sole proprietorships, and (d) governmental bodies;

EXAMPLE 3 Groupings of the above types of organizations where there is a need to identify these in information interchange.

[SOURCE: ISO/IEC 6523-1:1998, 3.1]

3.48
organization part
any department, service, or other *entity* (3.32) within an *organization* (3.47), which needs to be identified for information interchange

[SOURCE: ISO/IEC 6523-1:1998, 3.2]

3.49
organization Person
organization part (3.48) which has the properties of a *Person* (3.52) and thus is able to make *commitments* (3.13) on behalf of that *organization* (3.47)

Note 1 to entry: An organization can have one or more organization Persons.

Note 2 to entry: An organization Person is deemed to represent and act on behalf of the organization and to do so in a specified capacity.

Note 3 to entry: An organization Person can be a "natural person" such as an employee or officer of the organization.

Note 4 to entry: An organization Person can be a legal person, i.e. another organization.

[SOURCE: ISO/IEC 15944-1:2011, 3.46]

3.50
participates
association between an *economic event* (3.25) and each of the two *Persons* (3.52) participating in the *economic event* (3.25)

Note 1 to entry: Usually there is a "from" association and a "to" association, depending upon the direction of the flow of the economic resource.

3.51
partner
sub-type of *Person* (3.52) that includes *buyer* (3.11) and *seller* (3.61)

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3.52
Person
entity (3.32), i.e. a natural or legal person, recognized by law as having legal rights and duties, able to make *commitment(s)* (3.13), assume and fulfill resulting obligation(s), and able to be held accountable for its action(s)

Note 1 to entry: Synonyms for "legal person" include "artificial person", "body corporate", etc., depending on the terminology used in competent jurisdictions.

Note 2 to entry: Person is capitalized to indicate that it is being utilized as formally defined in the standards and to differentiate it from its day-to-day use.

Note 3 to entry: Minimum and common external constraints applicable to a business transaction often require one to differentiate among three common subtypes of Person, namely, "individual", "organization", and "public administration".

[SOURCE: ISO/IEC 15944-1:2011, 3.47]

3.53
process
series of actions or events taking place in a defined manner leading to the accomplishment of an expected result

[SOURCE: ISO/IEC 15944-1:2011, 3.53]

3.54
public administration
entity (3.32), i.e. a *Person* (3.52), which is an *organization* (3.47) and has the added attribute of being authorized to act on behalf of a *regulator* (3.57)

[SOURCE: ISO/IEC 15944-1:2011, 3.54]

3.55
reciprocal
association between *economic commitments* (3.22) where the promise by one *partner* (3.51) to execute an *economic resource* (3.28) transfer in the future is reciprocated by the other *partner* (3.51) promising a requited transfer in the opposite direction

3.56
recorded information
any information that is recorded on or in a medium, irrespective of form, recording medium, or technology utilized, and in a manner allowing for storage and retrieval

Note 1 to entry: This is a generic definition and is independent of any ontology (e.g. those of "facts" versus "data" versus "information" versus "intelligence" versus "knowledge", etc.).

Note 2 to entry: Through the use of the term "information", all attributes of this term are inherited in this definition.

Note 3 to entry: This definition covers: (a) any form of recorded information, means of recording, and any medium on which information can be recorded and (b) all types of recorded information including all data types, instructions, or software databases, etc.

[SOURCE: ISO/IEC 15944-1:2011, 3.56]

3.57
regulator
Person (3.52) who has the authority to prescribe *external constraints* (3.33) which serve as principles, policies, or rules governing or prescribing the behavior of *Persons* (3.52) involved in a *business transaction* (3.8), as well as the provisioning of goods, services, and/or rights interchanged

[SOURCE: ISO/IEC 15944-1:2011, 3.59]

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3.58
resource-flow
association between an *economic event* (3.25) and an *economic resource* (3.28)

EXAMPLE A resource-flow between some inventory and the shipment that caused control of that inventory to flow from one Person to another.

3.59
responsibility
association between *Persons* (3.52) where one is responsible for the other or between a *Person* (3.52) and an *organization Person* (3.49) where that *Person* (3.52) is assigned

Note 1 to entry: Sub-types of Persons include individuals, organizations, and public administrations. An "individual" is non-divisible but organizations and public administrations are and as such will assign specific responsibilities to organization Persons.

Note 2 to entry: See ISO/IEC 15944-1, 6.2.7 and Figure 17.

3.60
role
specification which models an external intended behaviour (as allowed within a scenario) of an *Open-edi Party* (3.45)

[SOURCE: ISO/IEC 14662:2010, 3.25]

3.61
seller
Person (3.52) who aims to hand over, voluntarily or in response to a demand or a request, a good, service, and/or right to another *Person* (3.52) and in return receives an acceptable equivalent value, usually in money, for the good, service, and/or right provided

[SOURCE: ISO/IEC 15944-1:2011, 3.62]

3.62
Semantic Component
SC
unit of *recorded information* (3.56) unambiguously defined in the context of the *business* (3.4) goal of the *business transaction* (3.8)

Note 1 to entry: An SC may be atomic or composed of other SCs.

[SOURCE: ISO/IEC 14662:2010, 3.27]

3.63
settlement
association between a requiting *economic event* (3.25) and an *economic claim* (3.21) where the occurrence of the event causes the *economic claim* (3.21) to expire

3.64
site
association between an *economic event* (3.25) and the *business location* (3.6) where the transfer of *economic resources* (3.28) involved in that event is deemed to have occurred

3.65
third party
Person (3.52) besides the two primarily concerned in a *business transaction* (3.8) who is *agent* (3.1) of neither and who fulfills a specified role or function as mutually agreed to by the two primary *Persons* (3.52) or as a result of *external constraints* (3.33)

Note 1 to entry: It is understood that more than two Persons can at times be primary parties in a business transaction.

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[SOURCE: ISO/IEC 15944-1:2011, 3.65]

3.66
typification
association between a concrete *entity* (3.32) and the abstract specification of its grouped properties

3.67
undefined market model
trade model where participants are not registered in advance and where that market does not have accepted and recognized sources for business rules and conventions

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4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply:

AAA	American Accounting Association
BDV	Business Domain View
BRV	Business Requirements View
BOV	Business Operational View
BTE	Business Transaction Entity
BTET	Business Transaction Entity Type
BTV	Business Transaction View
ebXML	electronic business eXtended Markup Language
ECIMF	E-Commerce Integration Meta-Framework
EDI	Electronic Data Interchange
IB	Information Bundle
IPD	Information Processing Domain
IPR	Intellectual Propery Rights
OCL	Object Constraint Language
OeBTO	Open-edi Business Transaction Ontology
OeDT	Open-edi Descriptive Technique
OeP	Open-edi Party
OeS	Open-edi Scenario
REA	Resource-Event-Agent
SC	Semantic Component
UML	Unified Modeling Language
UMM	UN/CEFACT Modelling Methodology
UN	United Nations
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business

5 The declarative component of an OeBTO — Primitive and derived data classes

5.1 Person and economic resources

One of the most fundamental ideas in Open-edi is the category of Person as an entity recognized as having legal rights and duties, able to make commitments, and fulfill resulting obligations. Based on applicable external constraints, a Person can be decomposed into three separate sub-types, namely,

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"individual", "organization", and "public administration"[5]. These sub-types are illustrated in the UML class diagram of Figure 4.

In this part of ISO/IEC 15944, the focus is on the OeBTO from an internal constraints perspective only[6]. However, users of this part of ISO/IEC 15944 should note that where and whenever Person is utilized, it covers the three sub-types of individual, organization, and public administration.

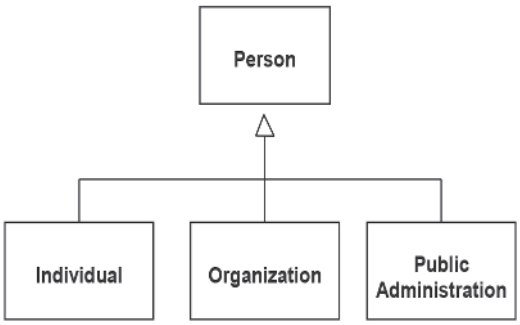

Figure 4 — Sub-types of Person based on external constraints

Rule 1:

Irrespective of the use of any particular information technology and related devices, Persons shall be the only entities which are legally recognized as able to make commitments, able to agree to the rights and obligations entered into, and able to be held accountable for their actions, etc., i.e., Persons are the only entities able to participate in a business transaction and able to make commitments for exchanges of value[7].

Persons are the entities who drive the economic exchanges forward in Open-edi collaborations. Ontologically and normatively, they are considered as *homo economicus* in the classical microeconomic sense; that is, they are parties interested in commercial activity as a means of maximizing utility.

Besides Person, a second very important notion in the OeBTO is the concept of an economic resource which is something of value under the control of a Person. These two fundamental categories appear on the left of Figure 5, connected by an economic control relationship which indicates that the Person either owns the resource or is otherwise able to derive economic value (utility) from it.

5) See further in ISO/IEC 15944-1:2011, 6.2 "*Rules governing Person*" and in particular, 6.2.7 "*Person and external contraints: individual, organization and public administration.*"

6) With respect to incorporating external constraints, see further ISO/IEC 15944-5:2008; in particular, see 5.2.2 "*Collaboration space — internal constraints only*" and 5.2.3 "*Collaboration space — the role of "regulator" representing "external contraints"*, and Annex G.

7) This Rule 1 is based on ISO/IEC 15944-1:2011, 6.2, Rule 11.

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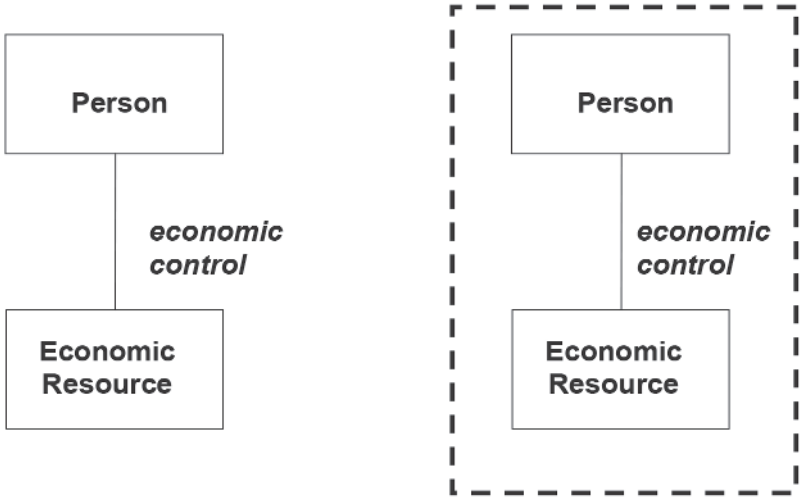

Figure 5 — Person and economic resource as the basis for exchange

Onto the right side of Figure 5 (inside the dotted lines) is now added an additional Person and economic resource association, thus setting the stage for a possible exchange where both parties might view control of the other Person's resource as a means of deriving higher utility than present circumstances render. This "value exchange" as it is titled in the collaboration space of Figure 3 is the basis for what Open-edi calls a business transaction between the two Persons.

Rule 2:

An Open-edi Business Transaction is an economic exchange occasioned by the presence of two Persons as trading partners, each possessing a resource of value desirable to the other party, and these Persons shall be autonomous parties with competing economic interests, able to commit to a requited exchange with the other Person.

The Open-edi Business Transaction Ontology does not construct exhaustive classification hierarchies for the primitive classes of Person and economic resource, but it does provide a limited taxonomy for both. The hierarchical decomposition of both of these ontology items beyond 2-3 levels becomes very dependent upon the context of industry structure. Particular decompositions beyond the second or third level may be joined to the minimum classification structures illustrated here to give more detailed taxonomies for a particular industry domain.

In addition to being classified on identity, Persons may also be classified on the basis of their roles, which are the abstract specification of the functions they perform in business transactions. This functional decomposition through three levels is illustrated in the UML class diagram of Figure 6 and explained below.

— *Partner* which itself further specializes to *Buyer* (has money, desires goods) and *Seller* (has goods, desires money).

— *Regulator* which represents Persons who impose external constraints on Business Transactions.

— *Third Party* which specializes to a number of other classes such as *Escrow, Guarantor, Mediator,* and *Notary.*

— *Agent* which is a special sub-type in Open-edi that can act for any other Person in a clearly specified capacity, most commonly for a buyer or a seller.

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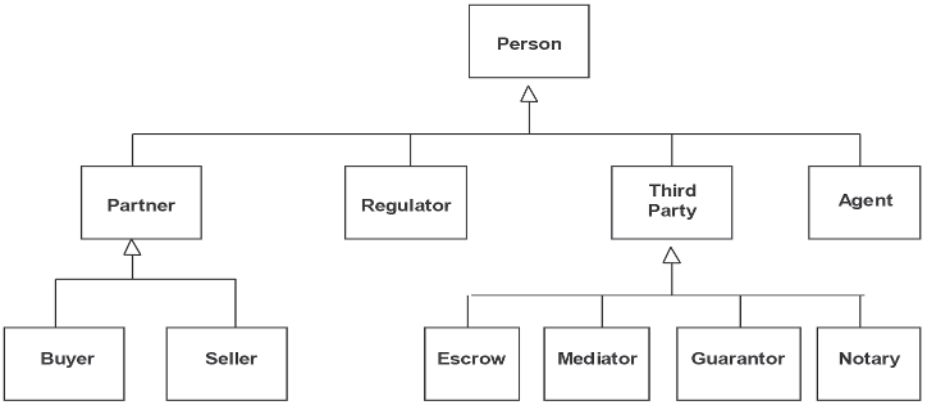

Figure 6 — Sub-types of Person based on roles in a business transaction

When fully-specified business transactions occur, Persons are able to play roles as indicated by the different sub-typing shown in Figure 6. Again, this taxonomy could be extended with industry-specific specializations of these role levels[8)].

Figure 7 illustrates some of the possible sub-typing for the other OeBTO primitive – economic resource – illustrated in Figure 5. This taxonomy has a second level derived directly from the text of 15944-1 which categorizes resources as:

— *Goods* which are tangible resources to include:

  — *Materials* including capital assets (like trucks), basic raw materials and natural resources (like steel or petroleum) plus sub-components of a larger assembled product (like seats for an automobile).

  — *Funds* like money or marketable securities.

  — *Real Estate* like office buildings or warehouses.

— *Services* which are the provision of value-adding activities by a seller to a buyer to include:

  — *Regulatory Services* such as the right to import/export or the right to do business in a certain segment or area.

  — *Transportation Services* like packing/picking or actual shipments.

  — *Human Services* like temporary workers or consultants.

  — *Warranty Services* such as the automatic provision of replacement goods under faulty judgments.

  — *Insurance Services* such as guaranteed payment under exigent circumstances.

— *Rights* which are intangible resources to include examples like Intellectual Property Rights (IPR) and Rights-of-way.[9)]

8) Because of this industry specificity, these hierarchical decompositions should be viewed as informative rather than normative. This is especially true of the decomposition of "third party" where industry specificity gives rise to many different types of role names.

9) Again as in Figure 6, these hierarchical decompositions should be viewed as informative rather than normative. This is especially true of the third level decomposition in Figure 7 which is clearly designed as an example enumeration.

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