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Information technology — Open-edi reference model

Technologies de l'information — Modèle de référence EDI-ouvert

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Foreword

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

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

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 14662 was prepared by Technical Committee ISO/TC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

This second edition cancels and replaces the first edition (ISO/IEC 14662:1997), which has been technically revised.

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Introduction

The economic advantages of Electronic Data Interchange (EDI) are widely recognized. However, the cost of setting up an EDI relationship has been very high due to the need for a detailed bilateral business and technical agreement between the involved business partners. The initial high cost of establishing such an agreement does not justify short term partnerships. It has also been found that implementations involving the management of a large number of partners and their associated agreements are not productive. Consequently, most EDI implementations have been successful only:

— in long term partnerships;

— between a limited number of partners.

Open-edi lowers these barriers by introducing standard business scenarios and the necessary services to support them. Once a business scenario is agreed upon, and the implementations conform to the Open-edi standards, there is no need for prior agreement among trading partners, other than the decision to engage in the Open-edi transaction in compliance with the business scenario. Since Open-edi takes a generic approach, it enables organizations to establish short term relationships quickly and cost effectively. Business scenarios and the necessary supporting services will be available to all who wish to use them, thus providing the necessary means for implementing Open-edi.

The field of application of Open-edi is the electronic processing of business transactions among autonomous multiple organizations, authorities or individuals within and across sectors (e.g., public/private, industrial, geographic). It includes business transactions which involve multiple data types such as numbers, characters, images and sound.

The Open-edi Reference Model has been developed primarily in order to provide standards required for the inter-working of organizations, through interconnected information technology systems. This model is independent of specific:

— information technology implementations;

— business content or conventions;

— business activities;

— parties participating in business activities.

The Open-edi Reference Model identifies the required standards for Open-edi and provides a reference for those standards by defining the basic concepts used to develop them. It serves as the basis for co-ordination of work between the different agencies involved in EDI standardization. It provides the framework for this co-ordination and for the integration of existing and emerging standards and the development of future standards. The Open-edi Reference Model places existing electronic business standards in perspective. Some of Open-edi standardization areas and types of standardization activities are presented in Annex A and some of the requirements for Open-edi standards in Annex B.

The Open-edi Reference Model uses two views to describe the relevant aspects of business transactions:

— the Business Operational View (BOV);

— the Functional Service View (FSV).

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The BOV, addresses the aspects of

a) the semantics of business data in business transactions and associated data interchanges;

b) the rules for business transactions, including:

   — operational conventions;

   — agreements;

   — mutual obligations,

   which apply to the business needs of Open-edi.

The FSV addresses the supporting services meeting the mechanistic needs of Open-edi. It focuses on the Information Technology aspects of:

a) functional capabilities;

b) service interfaces;

c) protocols.

Such functional capabilities, services interfaces and protocols include:

   — capability of initiating, operating and tracking the progress of Open-edi transactions;

   — user application interface;

   — transfer infrastructure interface;

   — security mechanism handling;

   — protocols for inter working of information technology systems of different organizations;

   — translation mechanisms.

0.1 The co-ordination needs of the Open-edi Reference Model

Standards required for Open-edi cover a large spectrum of areas including but not limited to:

   — business aspects;

   — support for national and international law and regulation;

   — information technology generic standards, such as information modelling standards;

   — software engineering standards;

   — data modelling standards;

   — information technology standards specific to one sector;

   — interconnection standards, such as message handling, file transfer, transaction processing, network management;

   — security standards.

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Development of standards for electronic business is already taking place in several standardization bodies and industry groups.

The co-ordination of standards development is essential in order to:

- avoid duplication of effort;
- ensure interoperability of standard conforming solutions;
- ensure technical consistency of standards;
- identify and remedy deficiencies and voids in standards;
- identify and eliminate redundancies and overlaps in standards.

Annex A describes how the Open-edi Reference Model can serve as the basis for co-ordination of work of the different agencies involved in standardization of electronic business.

0.2 The technical requirements of the Open-edi Reference Model

Each view of the Open-edi Reference Model corresponds to a class of necessary standards. One class of standards, associated with the BOV in the Open-edi Reference Model, addresses the business issues of Open-edi. Another class of standards, associated with the FSV in the Open-edi Reference Model addresses Information Technology (IT) issues. Each class of standards requires a specific type of expertise needed for their development. By separating the business user aspects of Open-edi from the IT aspects, the Open-edi Reference Model and its associated standards provide flexibility in accommodating changes in IT and user demands without impacting the Open-edi standards related to the business user aspects of Open-edi. Methods of implementing the standards which comply with this framework are not constrained by the model. Therefore interworking among Open-edi systems will be guaranteed while preserving flexibility in implementation.

The implementations of Open-edi will require the co-operation among different types of experts, primarily business users aided by information analysts and IT specialists including telecommunications experts.

In order to support an Open-edi activity, models must be developed which consider aspects of both the external and internal behaviour of Open-edi Parties. The boundary between the external and internal behaviour will vary among Open-edi Parties depending on how the implementation has been carried out. The models to be developed must consequently take into consideration those aspects which are necessary to ensure interoperability. Only the external behaviour of Open-edi Parties affects the interoperability of Open-edi systems. The description of the internal behaviour of Open-edi systems is provided in the model only to support the definition and exposition of the interoperability aspects, and to offer insight to the definitions of the external interfaces required.

0.3 Use of “Person”, “person”, and “party” in the context of business transactions and commitment exchange

When the ISO/IEC 14662 Open-edi Reference Model standard was first developed, the “Internet” and “WWW” were in their embryonic stage and their impact on private and public sector organizations was not fully understood. Consequently, in the First Edition (1997), the Business Operational View (BOV) was initially defined as:

- “a perspective of business transactions limited to those aspects regarding the making of business decisions and commitments among organizations which are needed for the description of a business transaction”.

The 1984 ISO/IEC 6523 standard definition of “organization” was used in in the first edition of ISO/IEC 14662. This was changed in 1998 and ISO/IEC 6523 became a two-part standard. The fact that today Open-edi through the Internet and WWW also involves “individuals” has been taken into account in the revision of this standard. Further, ISO/IEC 14662 did not define “commitment”, nor the discrete properties and behaviors an

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entity must have to be capable of making a “commitment” as well as bridging legal and IT perspectives in the dematerialized world of the Internet. During the development of ISO/IEC 15994-1 the term “commitment” was defined.

At the same time it was recognized that in order to be able to make a commitment, the term Open-edi Party was not specific enough to satisfy scenario specifications when the legal aspects of commitment were considered. In many instances commitments were noted as being actually made between and among machines (automata or computer programs) acting under the direction of those legally capable of making commitment, rather than the individuals in their own capacities. It was also recognized that in some jurisdictions commitment could be made by ‘artificial’ persons such as corporate bodies. To address these extended requirements an additional term: Person, was created. The construct of Person has been defined in such a way that it is capable of having the potential legal and regulatory constraints applied to it.

The reader should understand that:

— the use of the Person with a capital “P” represents Person as a defined term, i.e., as the entity within an Open-edi Party that carries the legal responsibility for making commitment(s);

— “individual”, “organization” and “public administration” represent the three common subtypes of “Person”. Definitions for these terms and their use are found in ISO/IEC 15944-1.

The words “person(s)” and/or “party(ies)” are used in their generic contexts in this standard. A “party to a business transaction” has the properties and behaviours of a “Person”. {See further ISO/IEC 15944-1, Clause 6, and in particular 6.1.3 and 6.2}.

0.4 Electronic business and Open-edi: areas of activity and participation

The following tables illustrate the general context within which electronic business activities take place. Table 1 presents the areas of activity; Table 2, the types of bodies which should fulfil those areas of activity; Table 3 identifies typical actors at the time of this International Standard. It is expected that working documents will be created identifying all relevant sectorial actors.

The application of the Open-edi reference model specified in this International Standard enables the evolution of the organization of the activities detailed in Table 1. That evolution is found in Annex A, and in particular in Tables A.1 and A.2.

Table headings are explained in Annex A. Tables 1, 2 and 3 have, in addition, a new dimension, below that of Environment, which is characterized as "Formal Recognition". This is a specific stage between Environment, which is understood to be the existence of all that there is in the development of standard frameworks, and Activity Models, which are understood to be business modelling methods and techniques identified by the frameworks.

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Table 1 — Areas of activity

	Meta-standards A	Standards B	Guidance C	Produce product D	Conformance and certification E	Take into use by F
1. Environment	Languages	Laws, Practices	Business Guidelines		Courts, Tribunals	Contracts
2. Formal recognition	Frameworks	Reference Models	BOV & FSV		Testing Bodies	Toolsets
3. BOV activity models	Modelling Languages	Business Scenarios	Conventions		Test Definitions	Applications
4. BOV data models	Modelling Languages	Message Standards	Usage Guidelines		Test Definitions	Actual data
5. FSV technology	Tools, Techniques	Inter-operability Standards	Profiles		Inter-operability Standards	Software, Hardware

Table 2 — Types of bodies that should be involved in performing the different tasks for each cell

<table>
<tr><th></th><th>Meta-standards
A</th><th>Standards
B</th><th>Guidance
C</th><th>Produce product
D</th><th>Conformance and certification
E</th><th>Take into use by
F</th></tr>
<tr><td>1. Environment</td><td>LEGAL and</td><td>REGULATORY BODIES</td><td>FRAMEWORK</td><td rowspan="5">IMPLEMEN-TORS and USERS</td><td rowspan="5">TESTING and CERTIFICA-TION BODIES</td><td rowspan="5">IMPLEMEN-TORS and USERS</td></tr>
<tr><td>2. Formal recognition</td><td colspan="2">STANDARDIZATION</td><td></td></tr>
<tr><td>3. BOV activity models</td><td></td><td>PROCESS</td><td></td></tr>
<tr><td>4. BOV data models</td><td></td><td></td><td>BODIES</td></tr>
<tr><td>5. FSV technology</td><td></td><td></td><td></td></tr>
</table>

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Table 3 — Current participants

	Meta-standards	Standards	Guidance	Produce product	Conformance and certification	Used by
Environment	Cultural Adaptability	International National Bilateral	Lawyers		Courts	Commerce and government
Formal recognition	ISO/IEC JTC 1/SC 32	ISO, ISO/IEC, ITU National and regional standards bodies UN/ECE CEN IETF ASTM OASIS	ISO/IEC JTC1 SC 32 UN/ECE ASTM		ISO/IEC	Standards bodies Suppliers Users
BOV activity models	ISO/IEC JTC 1/SC 7 and SC 32 ISO/TC 184	ISO, IEC and ITU sectorial bodies CEN National standards bodies WfMC	WfMC	Non-standard products		Users
BOV data models	ISO/IEC JTC 1/SC 32 ISO/TC 211	Trade bodies User groups WTO WCO ICAO IMO SWIFT ebXML UN/ECE	as previous column plus sectorial groups	Suppliers	UN/CEFACT	Suppliers Users
FSV technology	ISO/IEC JTC 1 ISO TC211 IETF	ISO/IEC various TCs and JTC1/SCs CEN IETF W3C	ISO/IEC JTC 1/SC 32 JTC1/SC 27 TC 215 CEN/TC 251 IETF W3C	Manufacturers Suppliers	Many NIST Open Group	Suppliers Users

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Information technology — Open-edi reference model

1 Scope

This International Standard specifies the framework for co-ordinating the integration of existing standards and the development of future standards for the inter-working of Open-edi Parties via Open-edi and provides a reference for those standards. As such it serves to guide the standards work necessary to accomplish Open-edi by providing the context to be used by developers of standards to ensure the coherence and integration of related standardized modelling and descriptive techniques, services, service interfaces, and protocols.

This International Standard describes, through two perspectives of business transactions, significant aspects relevant to the interoperability of information technology systems used by Open-edi Parties engaging in Open-edi. The perspectives are:

a) business aspects such as business information, business conventions, agreements and rules among Open-edi Parties;

b) information technology aspects which are necessary in the Open-edi systems to support the execution of business transactions.

This International Standard is not an implementation specification nor is it a basis for appraising the conformance of implementations.

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

ISO 6523-2:1998, *Information technology — Structure for the identification of organizations and organization parts — Part 2: Registration of organization identification schemes*

ISOIEC 15944-1:2002, *Information technology — Business agreement semantic descriptive techniques — Part 1: Operational aspects of Open-edi for implementation*

3 Technical normative elements

3.1 Definitions

For the purposes of this document, the following definitions apply:

3.1.1
Application Program Interface (API)
a boundary across which application software uses facilities of programming languages to invoke services

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3.1.2
business
a series of processes, each having a clearly understood purpose, involving more than one party, realized through the exchange of information and directed towards some mutually agreed upon goal, extending over a period of time

3.1.3
Business Operational View (BOV)
a 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

3.1.4
business transaction
a predefined set of activities and/or processes of parties which is initiated by a party to accomplish an explicitly shared business goal and terminated upon recognition of one of the agreed conclusions by all the involved parties even though some of the recognition may be implicit

3.1.5
Electronic Data Interchange (EDI)
the automated exchange of any predefined and structured data for business purposes among information systems of two or more parties

NOTE This definition includes all categories of electronic business transactions.

3.1.6
Formal Description Technique (FDT)
a specification method based on a description language using rigorous and unambiguous rules both with respect to developing expressions in the language (formal syntax) and interpreting the meaning of these expressions (formal semantics)

3.1.7
Functional Service View (FSV)
a perspective of business transactions limited to those information technology interoperability aspects of IT Systems needed to support the execution of Open-edi transactions

3.1.8
Information Technology System (IT System)
a 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

3.1.9
Open-edi
electronic data interchange among multiple autonomous Persons to accomplish an explicit shared business goal according to Open-edi standards

3.1.10
Open-edi Standard
a standard that complies with the Open-edi Reference Model

3.1.11
Open-edi Party (OeP)
an organization that participates in Open-edi

3.1.12
Open-edi scenario
a formal specification of a class of business transaction having the same business goal

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3.1.13
Open-edi transaction
a business transaction that is in compliance with an Open-edi scenario

3.1.14
Person
an entity, i.e. a natural or legal person, recognized by law as having legal rights and duties, able to make commitment(s), assume and fulfil resulting obligation(s), and able to be held accountable for its action(s)

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

NOTE 2 Person is capitalized to indicate that it is being utilized as formally defined in the International Standard and to differentiate it from its day-to-day use.

NOTE 3 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”.

3.2 Symbols and abbreviations

API Application Program Interface

BIM Business and Information Modelling

BOV Business Operational View

DMA Decision Making Application

EDI Electronic Data Interchange

EDIFACT EDI For Administration, Commerce and Transport

EWOS European Workshop for Open Systems

FDT Formal Description Technique

FSV Functional Service View

IB Information Bundle

IPD Information Processing Domain

IT Information Technology

OeCI Open-edi Control Information

OeDT Open-edi Descriptive Technique

OeP Open-edi Party

OeSE Open-edi Support Entity

OeUD Open-edi User Data

OSI Open System Interconnection

SC Semantic Component (in the context of Open-edi scenarios)

SC Sub-Committee (in the context of ISO or IEC)

SGML Standard Generalized Mark-up Language

TC Technical Committee

TDID Trade Data Interchange Directory

TI Transfer Infrastructure

UN/ECE United Nations / Economic Commission for Europe

WG Working Group

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4 The Open-edi Reference Model

The Open-edi Reference Model provides a reference framework for the identification, development, and co-ordination of Open-edi standards. This framework addresses two perspectives of business transactions. One, the BOV, captures the business users aspects, the other, the FSV, captures the information technology aspects. A class of standards is associated with each view. They are respectively called the BOV related standards and the FSV related standards. Figure 1 sets out the relationship between the model and these views.

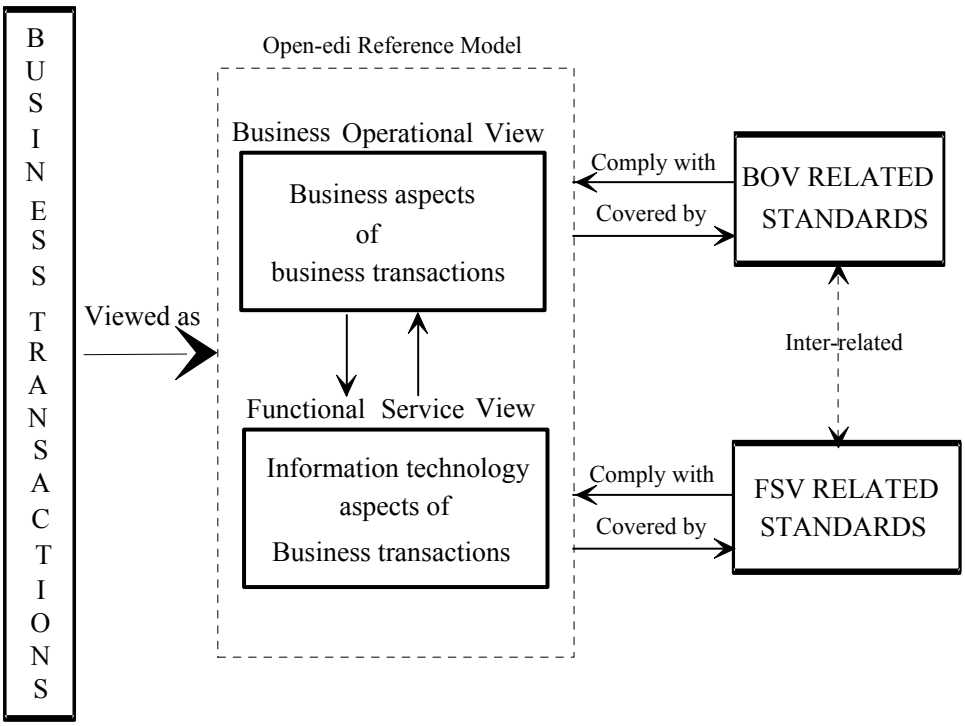

Figure 1 — Open-edi environment

These perspectives are defined as follows:

— **Business Operational View (BOV)**: a 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;

— **Functional Service View (FSV)**: a perspective of business transactions limited to those information technology interoperability aspects of IT Systems needed to support the execution of Open-edi transactions.

The BOV related standards are tools and rules by which users, who understand the operating aspects of a business domain, may create scenarios. Registration authorities will reference the BOV related standards when considering scenarios for registration.

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If those Open-edi scenarios are standardized they are called standardized Open-edi scenarios and are not "BOV related standards".

The FSV related standards are used by the information technology experts. The information technology experts are those within an organization who use this technology to design and/or build IT systems which support the business needs. These experts produce products and services conforming to FSV related standards (Open-edi systems) which can potentially support the execution of Open-edi transactions.

As shown in Figure 2, the effective inter-relationship between these two classes of standards is a critical factor of the Open-edi reference model. The FSV related standards shall take into account the BOV related standards and vice versa. Open-edi scenarios, built using BOV related standards, formulate requirements which are demands placed on the IT product and services conforming to FSV related standards executing the corresponding Open-edi transaction. These demands include:

— identification of functional capabilities necessary to support Open-edi transactions;

— the quality of service required from the functional capabilities for these Open-edi transactions.

Formal specification(s) of the functional components needed to support Open-edi transactions, through IT Systems, are developed using FSV related standards.

The intention is that, once an Open-edi scenario is agreed upon, if implementations conform to the FSV related standards, there is no need for prior agreement between the Open-edi Parties, other than the agreement to engage in the Open-edi transaction in compliance with the Open-edi scenario. The intention is that the sending, by an Open-edi Party, of information from a scenario, conforming to Open-edi standards, shall allow the acceptance and processing of that information in the context of that scenario by one or more Open-edi Parties by reference to the scenario and without the need for agreement. However, the legal requirements and/or liabilities resulting from the engagement of an organization in any Open-edi transaction may be conditioned by the competent legal environment(s) or the formation of a legal interchange agreement between the participating organizations. Open-edi Parties need to observe rule-based behaviour and possess the ability to make commitments in Open-edi (e.g., business, operational, technical, legal and/or audit perspectives).

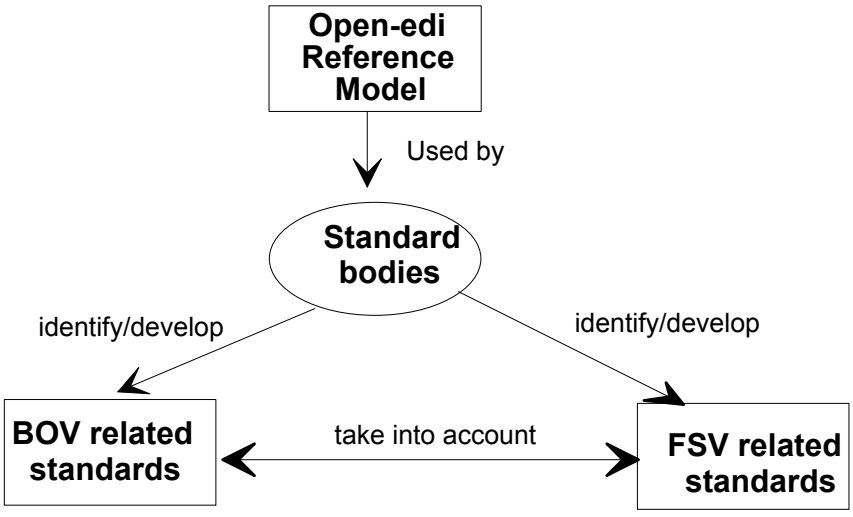

Figure 2 — The creation of BOV and FSV standards

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4.1 Business operational view

The BOV addresses the business requirements for inter-working among Open-edi Parties, as well as demands on supporting IT products and services. These business requirements include business conventions, agreements and rules among organizations.

4.1.1 BOV related standards

BOV related standards provide the tools for formal business description(s) of the external behaviour of Open-edi Parties, as seen by other Open-edi Parties, in view of achieving a business goal. As such, the BOV related standards provide a means for capturing the static and dynamic requirements of business.

The BOV related standards provide a specification of how to model the business and associated requirements as an Open-edi scenario. This specification includes the modelling standard containing the Open-edi Description Technique to be used.

Open-edi Description Technique (OeDT): a specification method such as a Formal Description Technique, another methodology having the characteristics of a Formal Description Technique, or a combination of such techniques as needed to formally specify BOV concepts, in a computer processable form.

The BOV related standards provide the tools and rules to permit and ensure:

- the specification of an Open-edi scenario;
- the reusability of components of Open-edi scenario;
- the harmonization of components of Open-edi scenario among user communities.

4.1.2 Open-edi scenarios

Different user groups will generate Open-edi scenarios in accordance with the specification given in the BOV related standards. Open-edi scenarios shall be specified in conformity to the BOV related standards. Business communities can propose Open-edi scenarios as candidates for standardization and registration into (an) Open-edi scenario repository (ies). Procedures to be used for introducing new Open-edi scenarios and updating Open-edi scenarios in one or more repositories are specified in a BOV related standard.

Parties will have a need for both generic and specific scenarios. Generic scenarios set out the overall scenario structure for a business transaction; however, these are realized through profiles for specific scenarios which support particular sectorial, legislative and other requirements.

All the specifications included in an Open-edi scenario are made at an abstract level. This is independent of matters such as data representation, coding, encoding.

The OeDT to be used for these scenarios shall therefore allow for both hierarchical decomposition and a modular approach.

Therefore, BOV related standards shall provide for the possibility of defining Open-edi scenarios with different levels of granularity.

Open-edi scenarios include the following components:

- roles;
- information bundle(s);
- scenario attribute(s).

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4.1.2.1 Roles

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

Businesses carry out their activities by performing roles, e.g. buyer, seller. Roles describe external business interactions with other parties in relation to the goal of the business transaction.

The behaviour of an OeP playing a role is expressed through the OeDT as specified in the BOV related standards. Example FDTs used to describe the behaviour of a role are shown in Annex C.

A role includes the following characteristics:

- all information relevant to the interoperability, within the BOV perspective, of Open-edi systems. It provides the means for the Open-edi system to determine the allowable sequence(s) of information bundles exchanges and the conditions in which a role is allowed to send an information bundle. Such conditions include, but are not limited to:
  - the receipt of an information bundle from another role;
  - internal decisions;
  - timer expiration related to the goal of the business transaction (for example payment delay);
  - exceptional conditions or errors related to the business goal of the business transaction (for example receipt of damaged goods).
- demands on Open-edi Support Infrastructure which reference the functional capabilities (see section 4.2.1) and their quality of service satisfying the Open-edi scenario requirements on a role. The catalogue of predefined demands on Open-edi Support Infrastructure is a BOV related standard. Security features associated with a role are such an example. The related Open-edi configuration (see section 4.2.2) satisfies these demands.
- demands on OePs which specify the Open-edi scenario constraints imposed on a role. Such constraints impose restrictions on how roles may be assumed by OePs. Such constraints include but are not limited to:
  - constraints on the characteristics for the OeP which can play this role;
  - constraints imposing a role being played only by a maximum number of OePs;
  - constraints imposing a role to be conditional;
  - constraints of preconditions before a role can be played;
  - constraints on the ability of an OeP to assign all or part of a role to another OeP;
  - constraints on different OePs playing a role, i.e. as it moves through the various "acts" or "scenes" in an Open-edi scenario.

The related Open-edi configuration (see section 4.2.2) satisfies these demands.

- registration and management information pertinent to the reusability of a role such as:
  - purpose of the role;
  - business goals of the role;

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- business rules controlling the role;
- regulations governing the role.

4.1.2.2 Information bundles

Information Bundle (IB): the formal description of the semantics of the recorded information to be exchanged by Open-edi Parties playing roles in an Open-edi scenario.

The IB is used to model the semantic aspects of the business information. Information bundles are constructed using Semantic Components.

Semantic Component (SC): a unit of information unambiguously defined in the context of the business goal of the business transaction.

A SC may be atomic or composed of other SCs.

SCs are defined by knowledgeable parties such as user groups and proposed for standardization and registration in one or more repositories. Procedures to be used for defining, introducing and updating SCs are BOV related standards. Technical procedures for electronic access to one or more repositories are candidates for standardization.

The information bundle includes the following characteristics:

- all information relevant to the interoperability, within the BOV perspective, of Open-edi systems. It is composed of SCs and describes their relationships;
- demands on Open-edi Support Infrastructure which reference the functional capabilities (see section 4.2.1) and their quality of service satisfying the Open-edi scenario requirements on IBs. The catalogue of predefined demands on Open-edi Support Infrastructure is a BOV related standard. Such features include but are not limited to:
  - confidentiality of the IB;
  - integrity of the IB.
- registration and management information pertinent to the reusability of an information bundle such as:
  - name of the IB;
  - purpose of the IB;
  - business rules controlling the content or concept(s) of the IB;
  - regulations governing the content or concept(s) of the IB.

4.1.2.3 Scenario attributes

scenario attribute: the formal specification of information, relevant to an Open-edi scenario as a whole, which is neither specific to roles nor to information bundles.

Classes of scenario attributes include the following:

- all information relevant to the interoperability, within the BOV perspective, of OePs for example:
  - relationships among roles;

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- relationships among SCs of different IBs;
- syntax of these relationships.

— demands on Open-edi Support Infrastructure which reference the functional capabilities (see section 4.2.1) and their quality of service satisfying the Open-edi scenario requirements. The catalogue of predefined demands on Open-edi Support Infrastructure is a BOV related standard. Such features include but are not limited to:

- the quality of service required for the communication services to support the execution of the business transaction;
- the security features required to support the execution of the Open-edi transaction.

— demands on OePs which specify the Open-edi scenario constraints. Such constraints impose restrictions on how roles may be assigned to OePs. Such constraints include but are not limited to:

- the constraint imposing that two specific roles be played by different OePs;
- the constraint imposing that two or more roles be played by the same OeP.

The related Open-edi configuration (see section 4.2.2) satisfies these demands.

— registration and management information pertinent to the reusability of an Open-edi scenario such as:

- name of the Open-edi scenario;
- class(es) of business requirements of Open-edi scenario;
- purpose of Open-edi scenario;
- laws and regulations governing the Open-edi scenario.

4.2 Functional Service View

Within the FSV, the interoperability addresses the interactions between the IT Systems supporting the Open-edi Parties. Interoperability implies that two or more IT systems, conforming to the standards related to the FSV, are able to co-operate and support the execution of business transactions that are in compliance with Open-edi scenarios. FSV related standards address information technology interoperability aspects which are generic to business transactions.

The FSV identifies and models the generic functional capabilities of IT Systems which are needed to support the execution of Open-edi transactions. In addition, it provides the basic concepts which will allow the FSV related standards to accommodate different configurations of organizations and IT systems to provide these functional capabilities. For example, the FSV related standards will accommodate the need for Open-edi Parties to delegate a part of the execution of Open-edi transactions to service providers.

4.2.1 Functional concepts and capabilities

Open-edi System: an information technology system which enables an Open-edi Party to participate in Open-edi transactions.

An Open-edi system may be considered as containing two functions. The first is a Decision Making Application function. The second is the function of an Open-edi Support Infrastructure needed to support the carrying out of Open-edi transactions for an OeP.

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Decision Making Application (DMA): the model of that part of an Open-edi system that makes decisions corresponding to the role(s) that the OeP plays, as well as originating, receiving and managing data values contained in instantiated information bundles, which is not required to be visible to the other OePs.

The DMA functions are one aspect of the FSV. Decisions made by the DMA are not necessarily business decisions.

Open-edi Support Infrastructure (OeSI): a model of the set of functional capabilities for Open-edi systems which, when taken together with the Decision Making Applications, allows OePs to participate in Open-edi transactions.

The Open-edi support infrastructure applies to all Open-edi transactions and specifies:

a) the services offered to Decision Making Applications;

b) the inter-working of components of the Open-edi support infrastructure.

The set of functional capabilities modelled in the OeSI provides for initiating, operating, and tracking the progress of Open-edi transactions.

The list of functional capabilities includes:

- handling of DMA requests;
- negotiation of role playing;
- specification of the Open-edi configuration;
- interpreting and processing of a role;
- making available the data values received from information bundles from Open-edi systems;
- capture of the data values provided as a result of behaviour choice;
- provision of security services and auditing services;
- tracking and notification of Open-edi transaction status and progress across applications;
- management of error reporting;
- management of communications.

In addition to the functional capabilities required to execute any business transaction, the set of functional capabilities of the Open-edi Support Infrastructure shall implement the catalogue of predefined demands on the Open-edi Support Infrastructure which are specified in a BOV related standard.

Decision Making Application Interface (DMA Interface): the set of requirements that permit a Decision Making Application to interact with the Open-edi Support Infrastructure.

The purpose of the DMA interface is to promote the independence of DMAs from the structure of the OeSI.

The generic mechanisms used to translate SC values into a transfer syntax from the information bundle specification (or SC specification) and vice versa, are specified in a FSV related standard.

The objective of DMAs is to make business decisions. In order to conduct business transactions, DMAs will exchange information (logical exchanges). These exchanges are accomplished when DMAs request services from the OeSI.

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4.2.2 Implementation concepts

Information Processing Domain (IPD): an Information Technology System which includes at least either a Decision Making Application and/or one of the components of an Open-edi Support Infrastructure, and acts/executes on behalf of an Open-edi Party (either directly or under a delegated authority).

The concept of IPD is used in the implementation of Open-edi scenarios. An OeP may encompass all the functional components (DMA and OeSI) into a single IPD or may delegate the provision of some functional components to different IPDs (Service Providers). Different OePs may play the same role. An OeP may play different roles of an Open-edi scenario. These roles may be played by the same IPD or different IPDs of the OeP.

An Open-edi System includes at least an IPD having a DMA. An IPD which supports several Open-edi Parties is part of each Open-edi System associated with these OePs. An Open-edi System must include one and only one IPD having a DMA, however it may include multiple IPDs.

An IPD shall conform to the FSV related standards associated with interfaces and protocols it implements.

Open-edi support organization: an organization, acting on behalf of an Open-edi Party(ies) to provide necessary support enabling execution of Open-edi transactions, but which is not modelled as a role(s).

IPD(s) operated by an Open-edi Support Organization have no DMA.

Open-edi Configuration: a formal specification of an operational configuration of Open-edi Parties and their associated IPDs, which can execute Open-edi transactions corresponding to a given Open-edi scenario.

An Open-edi Configuration refers to the all set of Open-edi Systems participating in the execution of an Open-edi scenario. It satisfies the demands specified in the Open-edi scenario and includes:

— the identifier of the OeP (s) for each role of the scenario;

— the address of the IPDs, for each OeP.

Based on the Open-edi configuration, the instantiation of the scenario can be accomplished by the initiation of an Open-edi transaction.

Figure 3 shows a possible relationship among the functional components of two sample Open-edi Systems. The goal of these relationships is to support the interaction between DMAs of the Open-edi Parties. For this interaction, DMAs use, through their DMA Interface, the services of the OeSI. Although Figure 4 shows two Open-edi systems, the concept is extended to more than two Open-edi Systems.

The configuration of Open-edi systems may reflect the delegation of parts of OeSI to other Open-edi Parties. Whenever this situation occurs, an IPD will be conFigured with OeSI. This IPD will support other IPD(s) within the same Open-edi system, and may be shared by different Open-edi systems.

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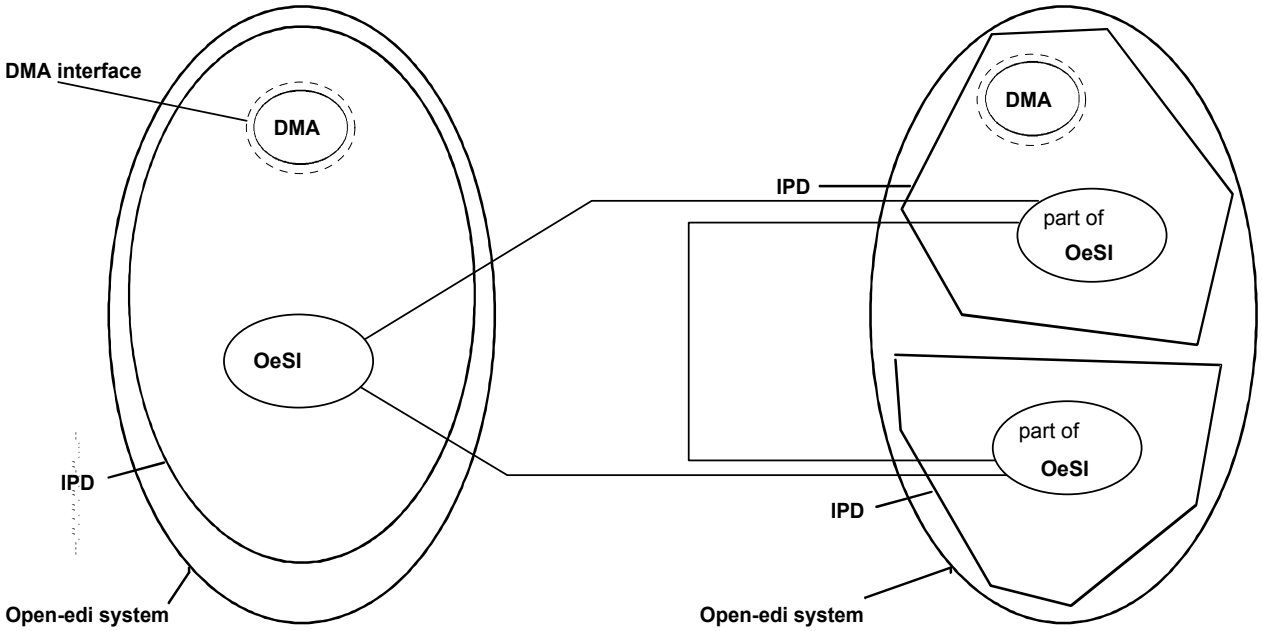

Figure 3 — Open-edi system relationships

Some informative additional implementation concepts are specified in Annex D, Clause D.2.

4.3 Open-edi Reference Model related standards

The BOV related standards include:

- a modelling standard including the OeDT to be used for specifying Open-edi scenarios;
- procedures to be used for introducing new Open-edi scenarios and updating Open-edi scenarios in a repository(ies);
- procedures to be used for introducing new SCs (atomic or compound) and updating SCs (atomic or compound) in a SC repository(ies);

The FSV related standards include:

- the specification of the OeSI and its components with their associated interfaces and protocols (see Informative Annex D);
- the specification of DMA interface;
- the generic mechanisms used to translate SC values into a generic transfer syntax from the information bundle specification (or Semantic Component specification) and vice versa.

The FSV related standards shall rely on communication standards for communication among IPDs.

4.4 Use of BOV and FSV related standards

The BOV and the FSV related standards are used in the following activities:

- production of Open-edi scenarios by user communities and the registration of Open-edi scenarios by registration authorities;
- production of Open-edi compliant IPDs.

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IT implementors are expected to enable the execution of Open-edi transactions using registered scenarios and compliant conFigured IPDs.

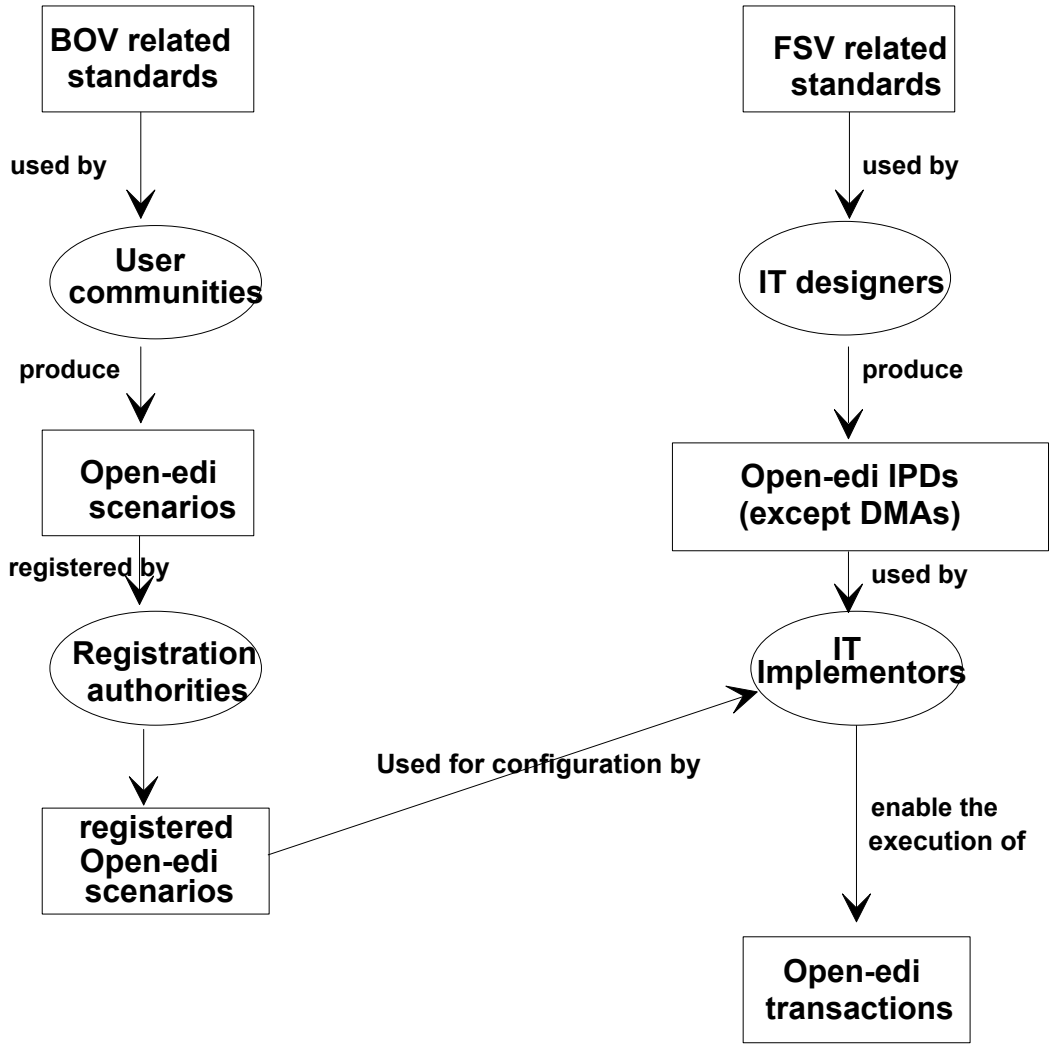

Figure 4 — The use of BOV and FSV standards

5 Conformance Statement

Conformity to the Open-edi Reference Model shall apply only to BOV and/or FSV related standards.

BOV and FSV related standards in conformity to this Open-edi Reference Model shall state:

- the class of the standard it belongs to, that is either the BOV or FSV related standards;
- which item of section 4.3 of this Open-edi Reference Model it pertains to;
- the list of the basic concepts of the Open-edi Reference Model to which it refers (reference to the number of the concept in section 3 and 4 of this Open-edi Reference Model);
- that all other concepts of the standard are consistent with and defined in reference
- to the here above mentioned basic concepts.

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Annex A
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Standardization areas and types of standardization activities for Open-edi

The purpose of this annex is to identify areas of standardization activities related to Open-edi in order to serve as the basis for the co-ordination of Open-edi standardization. This Annex outlines the framework for this co-ordination, and for this purpose it provides a matrix of activities based on the areas and levels of activity in standardization and classification of Open-edi standards.

The Figure A.1 illustrates the relationships between the Open-edi standardization areas and other standardization areas. The work of ISO/IEC JTC 1 SC 32/WG 1 focuses on the development of the generic Open-edi standards in the "INFORMATION TECHNOLOGY GENERIC STANDARDS" box.

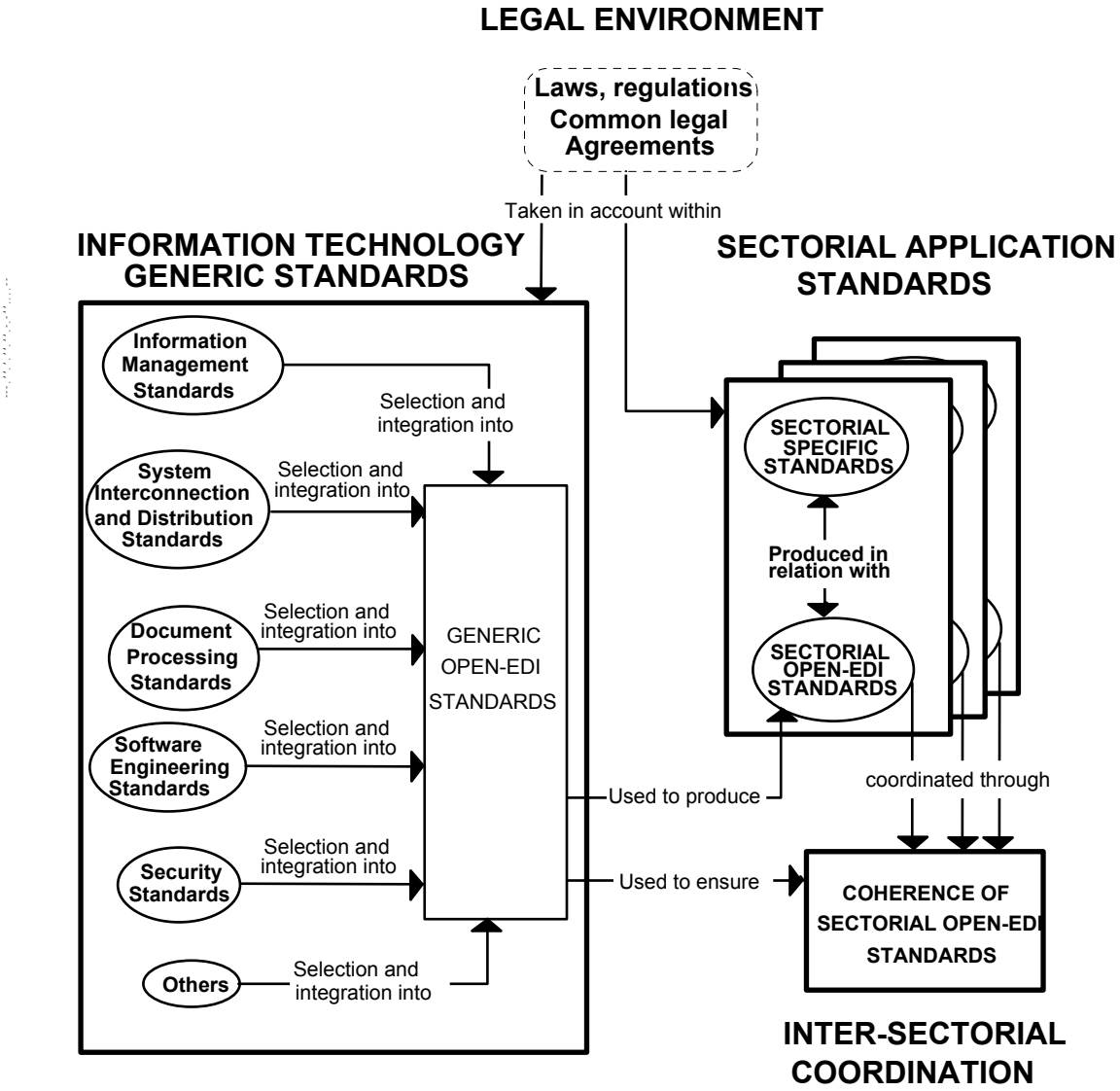

Figure A.1 — Relationships of Open-edi standardization areas with other standards and impact of the legal environment

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A.1 Open-edi Standardization areas

Following from the Open-edi reference model, the following standardization areas are identified as necessary to achieve Open-edi:

a) legal environment for Open-edi;

b) generic Open-edi standards;

c) sectorial Open-edi standards;

d) inter-sectorial co-ordination of Open-edi sectorial standards.

A.1.1 Legal environment for Open-edi

The legal environment is the framework of requirements, (e.g. provisions, procedures, constraints, etc.) arising from laws and regulations which govern business transactions executed through Open-edi.

A.1.2 Generic Open-edi standards

The generic Open-edi standards are Information Technology Generic Standards. They include the BOV related standards and the FSV related standards.

The BOV related standards are the generic tools used by all sectors to define their own Open-edi sectorial standards and to ensure the inter-sectorial coherence.

The FSV related standards are the standards used by implementors to develop Open-edi implementations which interoperate and offer the required services to support the execution of Open-edi transactions.

These generic Open-edi standards are closely related to other Information Technology generic standards areas such as Software Engineering, Security, Open Systems Interconnection and Distribution, Document Processing and Information Management.

Generic Open-edi standards may include existing electronic business related standards where these comply with the Open-edi Reference Model.

A.1.3 Sectorial Open-edi standards

The sectorial Open-edi standards cover the contents, and processes of the business transactions, by defining Open-edi scenarios. This area is therefore dependent on the existence of the BOV related standards. In addition, for a given sector, the sectorial Open-edi standards are closely related to other Information Technology standards of this sector.

Sectorial Open-edi standards may include existing electronic business related standards where these comply with the Open-edi Reference Model.

A.1.4 Inter-sectorial co-ordination of Open-edi sectorial standards

Coherence of various sectorial Open-edi standards is ensured by harmonization of Open-edi scenarios developed by various sectors. It is done through the use of the common formalism and the registration procedures included in the generic Open-edi standards. This area is therefore dependent on the existence of the BOV related standards.

A.2 Classification of Open-edi Standards

Four typical areas of activity are encountered when realising a business transaction using electronic means.

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A.2.1 Environment

The framework of legal provisions, business codes, practices, and trade procedures within which all business transactions occur.

A.2.2 Activity Models

Definitions of the business and technical processes which transfer information in a business transaction. These models capture the dynamic aspect of the transaction.

A.2.3 Information models and representation

Models for the data transferred in a transaction, including models for its possible presentation in data elements or documentary format for example on paper, fax, or www-technologies.

A.2.4 Technology

The means that enable computers to interoperate including APIs which allow application to access the services providing interoperability.

A.3 Levels of activity

From the generic subject of meta-standard down to the specific subject of an implementation, there are intermediary levels of subject of activity such as standards and conformity and certification.

A.3.1 Meta-Standards

The generic standards, definitions languages and other tools and techniques used to specify and express standards, guidance's material, tests and implementations.

A.3.2 Standards

Documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose.

A.3.3 Guidelines

Guidelines development result in materials which interpret the standards into more specific form for the guidance or assistance of the users of the standards.

A.3.4 Conformity and certification

Assurance of conformity: confirmation by examination of evidence that a product process or service fulfils specified requirements.

Certification: procedure by which a third party gives written assurance that a product process or service conforms to specified requirements.

A.3.5 Implementation

The action taken by the business user and by software and hardware suppliers to the business user.

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A.4 Application to Open-edi

Based on the definition of areas of activities a table can be used to serve as a framework. This framework can be populated by Open-edi related activities. The result is shown in Table A.1.

The two perspectives of BOV and FSV are mapped in the 5 activity areas:

— BOV corresponds mostly to the areas of environment, activity models and information models and to a limited extent to technology area required for the link with FSV related standards.

— FSV related standard correspond mostly to the technology area and to a limited extent to data models area required for the link with BOV related standards.

Table A.1 — Positions of Open-edi activities

<table>
<tr><th></th><th colspan="2">meta-standards</th><th>Standards</th><th>guidelines</th><th>conformity and certification</th><th>implementation</th></tr>
<tr><td>environment</td><td rowspan="3">B
O
V</td><td rowspan="3">Open-edi
Description
Technique</td><td rowspan="3">Open
Edi
Scenario</td><td>business and legal guidelines</td><td></td><td rowspan="4">Open-edi transaction</td></tr>
<tr><td>activity models</td><td></td><td></td></tr>
<tr><td>information models</td><td></td><td></td></tr>
<tr><td>representation</td><td>F
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V</td><td></td><td>SC values to Transf. Syntax translation</td><td></td><td></td></tr>
<tr><td rowspan="3">T
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Y</td><td>B
O
V</td><td>catalogue of demands</td><td>demands on Open-edi support-Inf.</td><td></td><td></td><td rowspan="2">IPDs of an Open-edi Configuration</td></tr>
<tr><td>F
S
V</td><td>OeSI specifications</td><td>DMA interface
OeSI components interfaces and protocols</td><td></td><td></td></tr>
<tr><td></td><td></td><td>interconnection protocols</td><td></td><td></td><td>Transfer Infrastructure</td></tr>
</table>

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Annex B
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Requirements for Open-edi standards

B.1 Business organizational requirements

B.1.1 Multi-sectorial electronic business

The evolution of information and communication technology has created a need and opportunity for different user groups to engage in business relationships, using these technologies. This requires automatic methods to carry out electronic business among parties. These parties have not only different computer systems and independent databases, but also different business partners and a variety of business practices. Their business exchanges involve different types of data representations, syntaxes, protocols and communication systems.

The user groups whose requirements should be taken into account are active in very diverse sectors, such as: trade, commerce, banking, transport, manufacturing, healthcare, libraries, education, public administration, public services, construction industry etc. Since it is likely that these groups will eventually engage in electronic business with each other, there is a need for a solution which crosses all sectors.

B.1.2 Open environment

An environment is said to be open in the sense that all requirements for inter-working are satisfied by the implementation of publicly available, non-proprietary standards or rules. There should be no need for private agreements in order to resolve ambiguities in exchanges. The freedom to use private agreements in addition to and in the framework of a shared agreement is of course always available.

The lack of such an environment means:

— bilateral agreements may be necessary between electronic business participants. These extend to technical matters, not only to the “agreement to inter-work”. Such agreements must cover all necessary domains, involving the participants at many different levels (i.e. business aspects, general policies, telecommunications, information systems);

— individual parties may have to support a range of different sets of interworking facilities depending on the participants. This support must be ready to evolve across time, domains and technologies, thus loading each participant with increasing duties and problems.

Partially open approaches (such as market sector based communities of common interest) only ease this requirement; they do not eliminate it. They may even entrench incompatibilities between communities when cross-community and cross-border traffic is a major growth area for electronic business. Furthermore, business users have also highlighted the need for an open environment to facilitate and minimize the set-up costs for electronic business relationships with new business partners entering their business environment.

B.1.3 Organizational flexibility

Parties require flexibility in their operation, for example for delegating a part of their business to sub-contractors. The introduction of EDI should not limit these possibilities to achieve such a flexibility. Also, parties may want to delegate a part of the operation of the required services to support electronic business. Open-edi needs to provide this flexibility, in the description of the business models and in the systems needed to support Open-edi.

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B.2 Business information requirements

B.2.1 Integration of different data types

Exchanges of all information types need to be covered, as long as they are predefined, structured and processible by applications at both ends. These include alphanumeric structured data, but may also cover the exchange of Computer Aided Design drawings, images, texts, voice recordings, etc. within a business transaction. The need is to integrate many different data types and components and to express relationships between these components. It is also necessary to maintain these relationships throughout the business transaction. Integration of these different data-types needs to be in line with existing or future standards.

B.2.2 Modelling

The early development of EDI standards has been carried out largely on the basis of reproducing in electronic form the equivalent transactions to those previously handled with paper. User groups are now finding that it is necessary to agree on a high level description of re-engineered business transactions. The reasons for this need are the following:

— management of change or business process re-engineering cannot take place unless the processes in question have been documented;

— functions where EDI is to be applied need to be identified in relation to the overall business. Traditional boundaries and functions may be affected;

— it is necessary to identify the regulations and any requirement for legislative compliance which are met by current non-EDI solutions and would need to be met by any electronic business solution;

— the selection or use of a specific EDI solution in terms of standards and techniques should be as transparent as possible to business functions.

In addition to the need to describe business transactions, user groups have identified the need to agree on information models at the semantic level before agreeing on specific data structures and data representations to be exchanged between parties. Such agreement on information models are needed for the following reasons:

— agreement on semantics of information flows can be achieved faster than agreement on data representation;

— agreement on semantics of data is needed to reconcile and co-ordinate different data representations used in different industry sectors;

— agreed information models allow completeness and consistency controls on data exchanged between parties.

B.2.3 Registration of business models

Finally the user groups have identified the need to use modelling facilities to produce business and information models expressed in a common formalism in order to be registered.

Registration of these models facilitates their reusability by different user communities and industry sectors. Such registration is necessary to harmonize these models.

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B.3 Business interchange requirements

B.3.1 Independence of business aspects from information technology aspects

User groups have expressed the need for electronic business to be independent from the communication services. In particular, business and information models should be independent of the type of communication used.

Despite this need for independence of business aspects from communication, electronic business requires communication and data transfer. In addition, some business constraints may have consequences on communication characteristics. Examples of such constraints are the following:

— in specific cases, there are strict constraints on the response time needed for data transfer, for example in the airline industry;

— some electronic business transactions imply high volume of data transfer, some others do not.

B.3.2 Interoperability of business interchanges

To be replaced by text focusing on the BOV view of interoperability during the FCD ballot. Contributions are welcome.

B.3.3 EDI transactions

There is the a need for cross-references to relate business interchanges with each other. Therefore, it is necessary to consider a multi-partner electronic business transaction as well as bilateral exchanges. This requires specific capabilities in the systems supporting electronic business and the consideration of the interoperability aspects for the support of electronic business transactions. This consideration is very relevant to interactive collaboration.

B.3.4 Standardized APIs

The lack of APIs in electronic business currently results in significant implementation efforts specific to the proprietary electronic business software used to support any application.

Standardized APIs are needed to provide portability thereby offering more flexibility in the choice of suppliers for individual components. They also allow application developers to ignore the underlying services used. Furthermore, they ensure independence of the application from the underlying services.

B.3.5 Conformance testing

There is a need for the availability of a conformance testing environment for relevant components of an Open-edi implementation.

B.4 Security

Businesses have created and evolved procedures and controls to safeguard their assets. Some controls have been devised to protect businesses from their trading partners, others to protect them from competitors and some to ensure compliance with legislation. These safeguards must be identified and where a common requirement is identified, made available for use in electronic business. Appropriate services and tools need to be available.

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B.5 Legal aspects

Many uses of information communication technologies (ICT) have legal or regulatory impacts which may be determined by the countries of parties using ICT, or even the countries through which the business documents are transmitted. This may range from sending a purchase order (contract law) to transferring medical information (data protection legislation) or shipping pharmaceuticals (bilateral drugs agreements). It is essential that there is significant co-ordination between those preparing Open-edi standards and relevant legal and security experts to ensure that a framework is created which can be modified and adopted as electronic trade replaces paper based trading systems. Although legal implications of business interactions vary in different jurisdictions, it should be possible to model concepts such as rights, obligations, permissions, prohibitions and contract formation.

B.6 Migration

Users have been investing in standardization of EDI messages for the past years. Implementations based on these standards are used. Therefore there is a need to offer a migration path from existing EDI towards Open-edi. This migration path concerns both the existing standards and the existing implementations.

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Annex C
(informative)

Example formal description techniques for modelling role behaviour

This informative annex presents some example formal description techniques (FDTs) that may be used for the modelling of the role behaviour. FDTs are needed to be able to specify this behaviour in a formal and abstract manner. They will provide unambiguous role descriptions. Furthermore, most FDTs are supported by Computer Aided Software Engineering (CASE) tools, which will facilitate the modelling and implementation of role descriptions. Although this annex only focuses on the role behaviour, similar techniques will be needed for other Open-edi Scenario concepts. The FDTs eventually chosen for the various Open-edi Scenario concepts will be BOV related standards.

This annex does not mandate any specific FDT technique. Examples of decomposing one particular scenario are now given to illustrate the validity of alternate methods. The scenario is now described, and is followed by decomposition using different methods.

A relatively simple situation from the healthcare sector is chosen as an example. Consider the situation in which a business participant acts as a centre or agency of acquiring organs for those that need organ transplants. The roles to be modelled are the organ requester, the organ centre, the organ donor.

In this example only one organ requester, organ centre and organ donor are shown, while in general there could be several requesters and donors connected to one centre. It would also be possible to extend this example to include transporters, finance departments, banks, etc. However, the goal with an example is illustration, not exhaustive.

The behaviour of the different roles of our example may briefly be described as:

- the organ requester will request the organ centre for organs, remind the organ centre of earlier requests, accept organs, cancel requests (patient died (or recovered!), or internal supply of organ), receive refusal of request from organ centre;

- the organ centre will receive and reply to requests for organs from the organ requester, request organs from organ donor if no organ is locally available, receive organs from organ donor, refuse requests, cancel requests towards organ donor (request cancelled by organ requester or internal supply available);

- the organ donor will receive requests for organs from the organ centre, receive cancellations for earlier request, offer organs to the organ centre.

Several concepts of role behaviour can be distinguished. This is illustrated in Figure C.1

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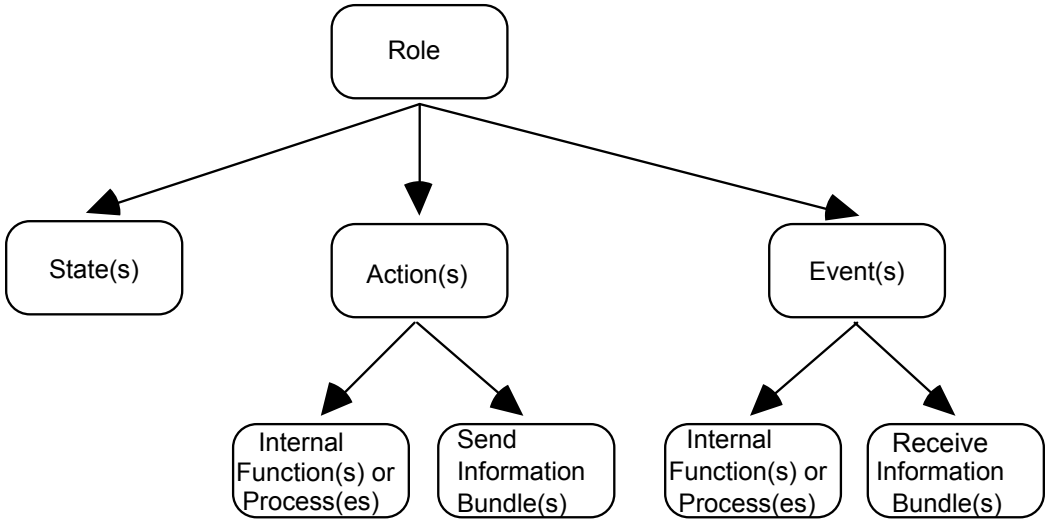

Figure C.1 — Concepts of role behaviour

C.1 Aspects of role behaviour based on a state transition FDT

A transition is the process of changing from one state to another within a given role. Within an Open-edi scenario, a transition is described by the following:

— the current state of the role;

— the event which triggers the transition;

— the action(s) produced by this transition;

— the next state of the role after this transition.

The first dynamic aspect of the Open-edi scenario is the sequence of information bundle exchanges. The sequence shows the order information bundles are expected to be sent and received by each role.

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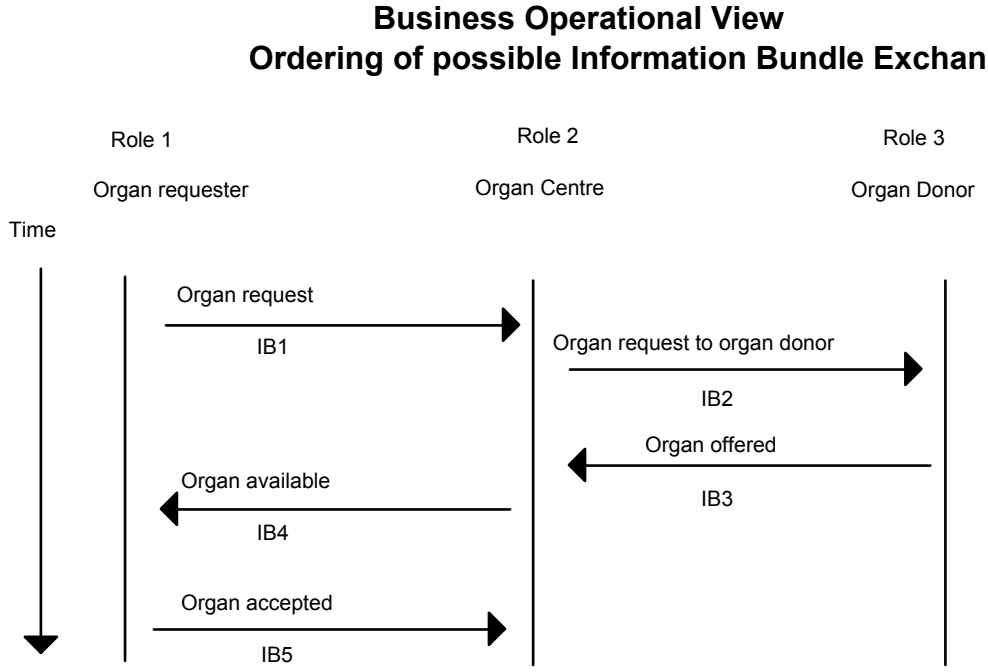

Figure C.2 — Information Bundle sequence chart

The second dynamic aspect of the Open-edi scenario is the state/transition. The behaviour of a role is described by states, transitions, and events. The purpose of a state/transition is to further define a role and capture its dynamic behaviour.

Table C.1 — State/transition table for role 2

Event	State	Actions	State
Receive Organ request IB1	Initial	Process request and send request to organ donor (IB2)	S1
Receive Organ offered IB3	S1	Process organ offer and send organ available (IB4)	S2
Receive Organ accepted IB5	S2	Request filled	Final

C.2 Aspects of Role Behaviour based on a Petri Net FDT

Another class of FDTs are based on Petri Nets. Petri Nets allow both a static and a dynamic representation of role behaviour. One of the main advantages of Petri Nets is that they offer a graphical representation but are nevertheless based on strong mathematical foundations. This allows the formal analysis of properties such as the avoidance of dead-lock states etc. The Petri Net representation shown below is an extension of the classical Petri Nets in order to include absolute time (deadlines) and to be able to distinguish various IB types, called Documentary Petri Nets[1)] . In Figures C.3, C.4 and C.5 the Documented Petri Net models of the organ requester, the donor and the organ centre role are depicted. Circles represent regular control states and boxes represent information bundles.

1) See for instance Bons, R.W.H., Lee, R.M., Wagenaar, R.W.,Wrigley, C.D. Modelling Interorganizational Trade Procedures Using Documentary Petri Nets, Proceedings of the 28 Annual HICSS conference, IEEE Computer Society Press, 1995, ISBN 0-81866940-3.

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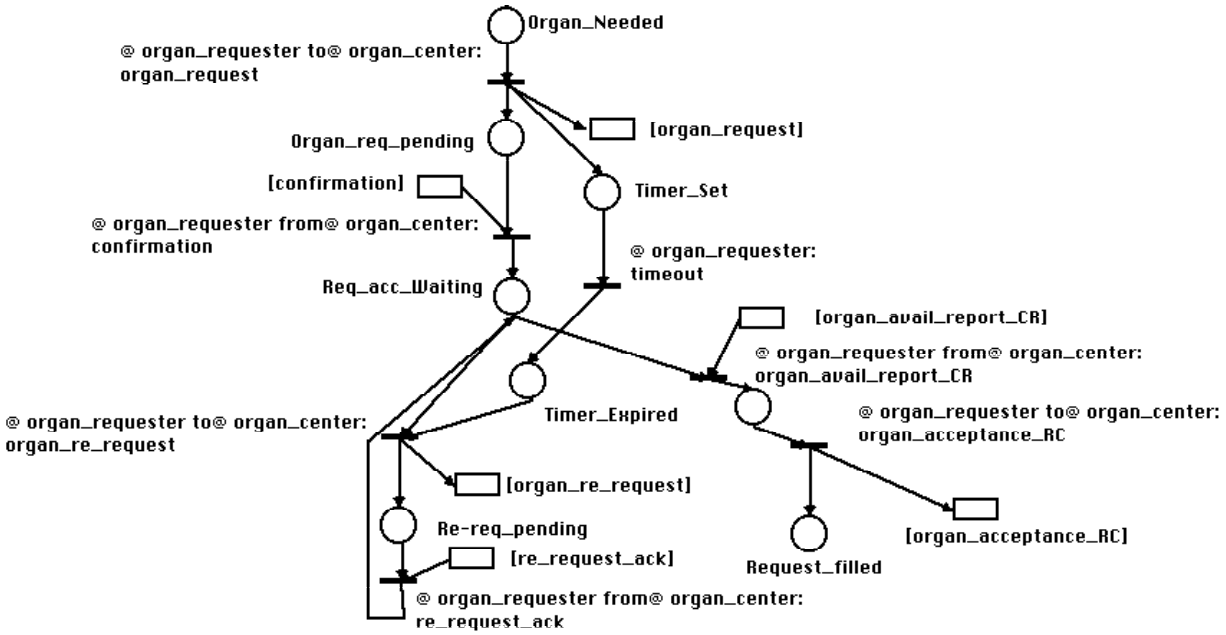

Figure C.3 — The Organ-Requester role

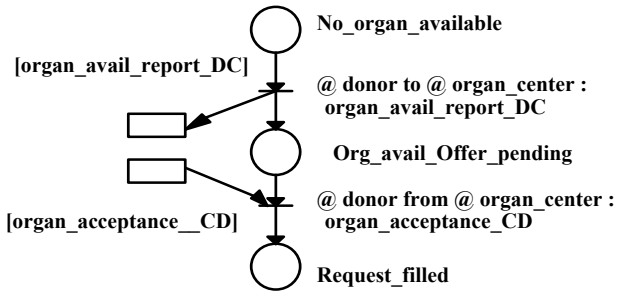

Figure C.4 — The Donor role

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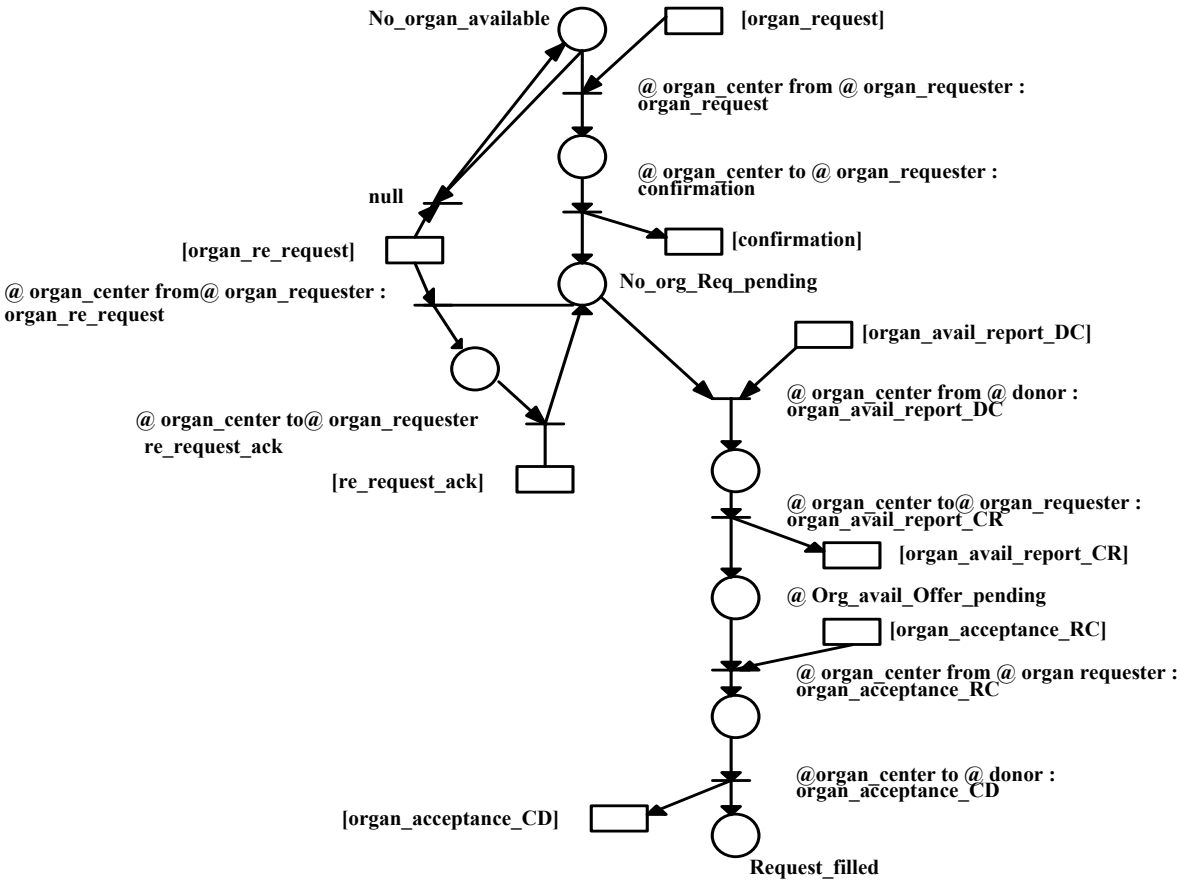

Figure C.5 — The Organ-Centre role

C.3 Aspects of role behaviour based on UML

A third class of FDTs is based on the Unified Modeling Language (UML). UML offers many representations of role behaviour, including use case, activity and state diagrams. Well-defined meta-model semantics underlie the UML graphical representations, which are also mathematically based. Figure C.6 illustrates the organ requester, organ centre and donor roles in the «swim lanes» of an activity diagram. The states of the requester, centre and donor roles are shown in synchronous alignment with respect to the states of two business objects: Donor Request and Organ. Information bundles that are exchanged must contain information needed to identify the business objects that are affected by the Open-edi scenario. In addition, information bundles contain semantic components that satisfy the requirements for exchange of information required to be shared in the Open-edi scenario. Semantic components are generally the attributes of affected business objects that must be shared in order to align the partners' views of those business objects. Rounded boxes represent the activities of the requester, centre and donor. Square boxes represent the Donor Request and Organ business objects, with indication of their respective states in parentheses.

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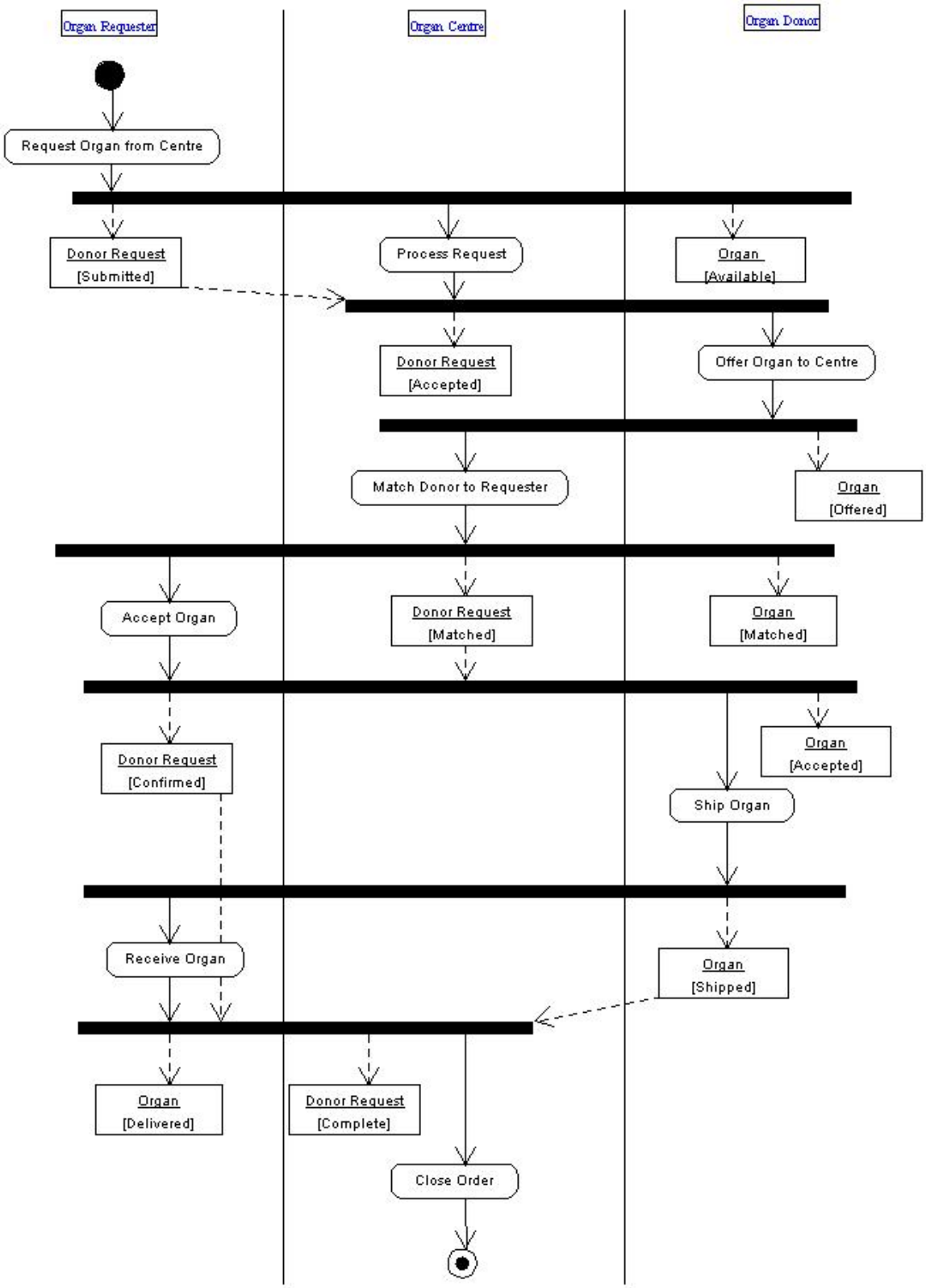

Figure C.6

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Annex D
(informative)

An approach for detailing concepts of the FSV

This annex suggests an approach for further detailing the concepts described in chapters 4.2 and 4.3.

The Open-edi Support Infrastructure is composed of:

— Open-edi Support Entities;

— Transfer Infrastructure.

D.1 Functional concepts

Open-edi Support Entity (OeSE): a functional component of the Open-edi support infrastructure used to model a subset of generic functional capabilities.

The identification of such a subset of functional capabilities shall take into account the possibility that the corresponding OeSE may be implemented in a different Open-edi system.

Open-edi Support Entity Interface: the set of specifications that allows access to the services the Open-edi Support Entity provides.

Transfer Infrastructure (TI): the complete set of functional capabilities offering interconnection services.

Transfer Infrastructure Interface: the set of specifications that allows Open-edi Support Entities to access the interconnection services the Transfer Infrastructure provides.

The TI Interface promotes the independence of OeSEs from the structure of underlying interconnection services and their functionality and protocols. The use of current available standards for interconnection services will be maximized. The TI allows OeSEs and DMAs to inter-work without concern to their location (location transparency).

Open-edi Support Entity Protocol: a set of rules and data formats (semantic and syntactic) which models the interaction among peer Open-edi Support Entities.

The purpose of the OeSE protocol is to ensure the interoperability of implementations of OeSEs which are operated by different organizations.

OeSE Protocol includes specification of Open-edi Control Information and possibly Open-edi User Data.

Open-edi Control Information (OeCI): the information exchanged among Open-edi Support Entities to co-ordinate their operation.

Open-edi User Data (OeUD): instances of information bundles or components of information bundles (as Semantic Components).

The OeSEs groups functional capabilities that provide services to support Open-edi transactions. As such, each OeSE inter-works with at least two of the other functional components, (DMAs, other OeSEs on the same Open-edi system, peer OeSEs on other Open-edi Systems and/or TI).

The purpose of the DMA interface is to promote the independence of DMAs from the structure of the set of OeSEs.

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Figure D.1 depicts the logical inter-working of each component. Each column represents an Open-edi System and its inter-working relationships at each layer. The objective of DMAs (top layer) is to make business decisions. In order to conduct business transactions, DMAs will exchange information (logical exchanges). These exchanges are accomplished when DMAs request services from the OeSEs through the OeSE Interface. The OeSEs inter-work with other OeSEs through OeSE Protocols (logical exchanges). The OeSEs request services from the TI through the TI Interface. Eventually, the TI provides a physical link to peer Open-edi System implementations. The process is repeated, in reverse, on the peer Open-edi system to complete the DMA to DMA logical interconnection.

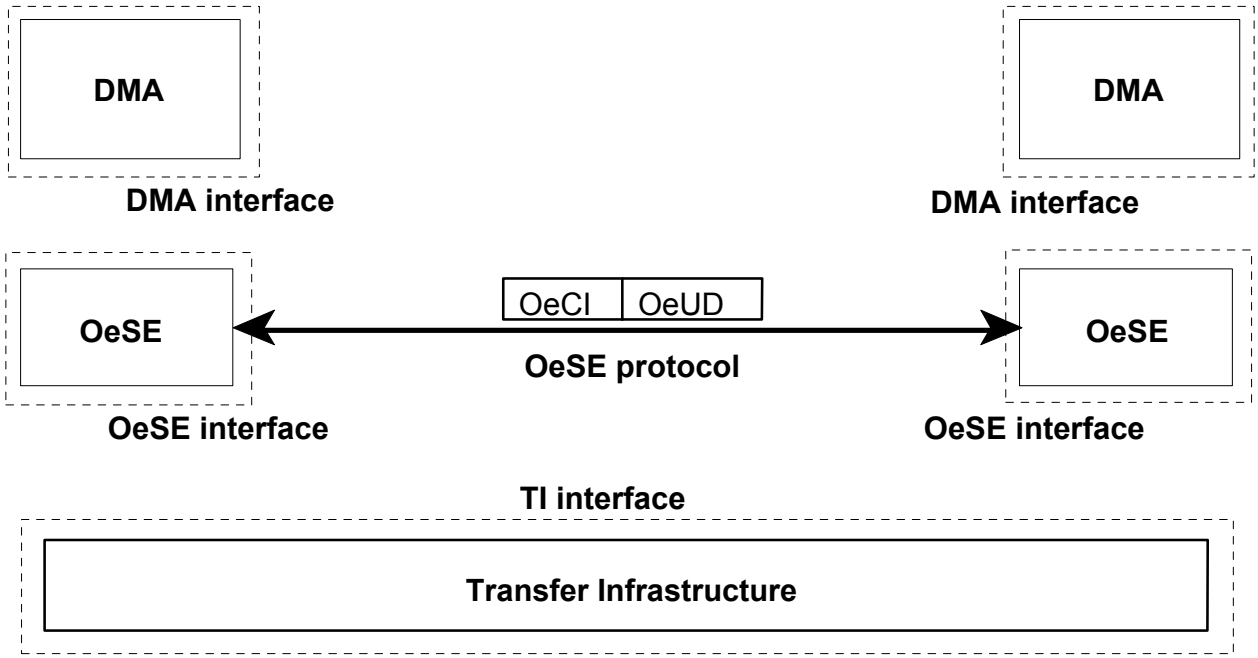

Figure D.1 — Relationships between functional components

Figure D.2 provides an expanded view of functional components in an Open-edi systems environment.

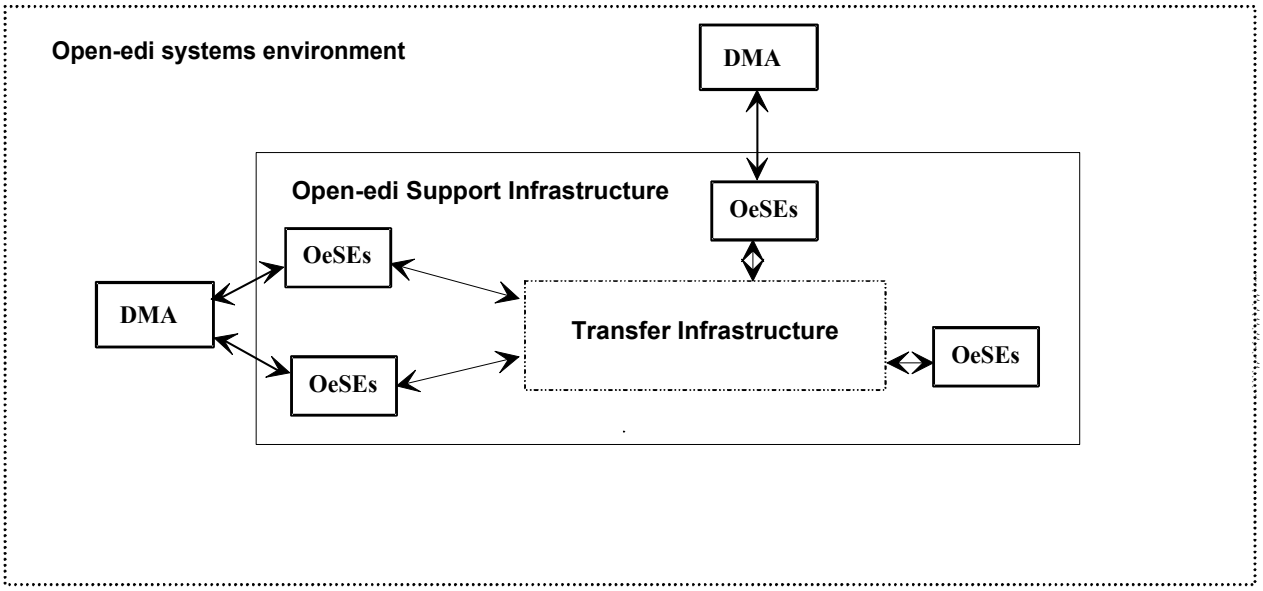

Figure D.2 — Functional Service View of the Open-edi systems environment

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D.2 Implementation concepts

An OeP may encompass all the functional components (DMA and OeSEs and TI) into a single IPD or may delegate the provision of some functional components to different IPDs (Service Providers).

An Open-edi Configuration refers to the all set of Open-edi Systems participating in the execution of an Open-edi scenario. It satisfies the demands specified in the Open-edi scenario and includes:

— the identifier of the OeP (s) for each role of the scenario;

— the address of the IPDs, including the identifications of their OeSEs, for each OeP.

Figure D.3 shows a possible relationship among the functional components of two sample Open-edi Systems. The goal of these relationships is to support the interaction between DMAs of the Open-edi Parties. For this interaction, DMAs use, through their DMA Interface, the services of OeSEs and TI. The OeSEs provide value added services to DMAs via consistent OeSE Interfaces. Each OeSE may inter-work with DMAs, other OeSEs and the TI. The interconnection service is provided by the TI. OeSEs interact with each other via the OeSE Protocol over the TI. The primary responsibility of the TI is to provide reliable interconnection services. Although Figure 5 shows two Open-edi systems, the concept is extended to more than two Open-edi Systems.

The configuration of Open-edi systems may reflect the delegation of OeSEs to other Open-edi Parties. Whenever this situation occurs, an IPD will be conFigured with one or more OeSE(s) and a TI. This IPD will support other IPD(s) within the same Open-edi system, and may be shared by different Open-edi systems.

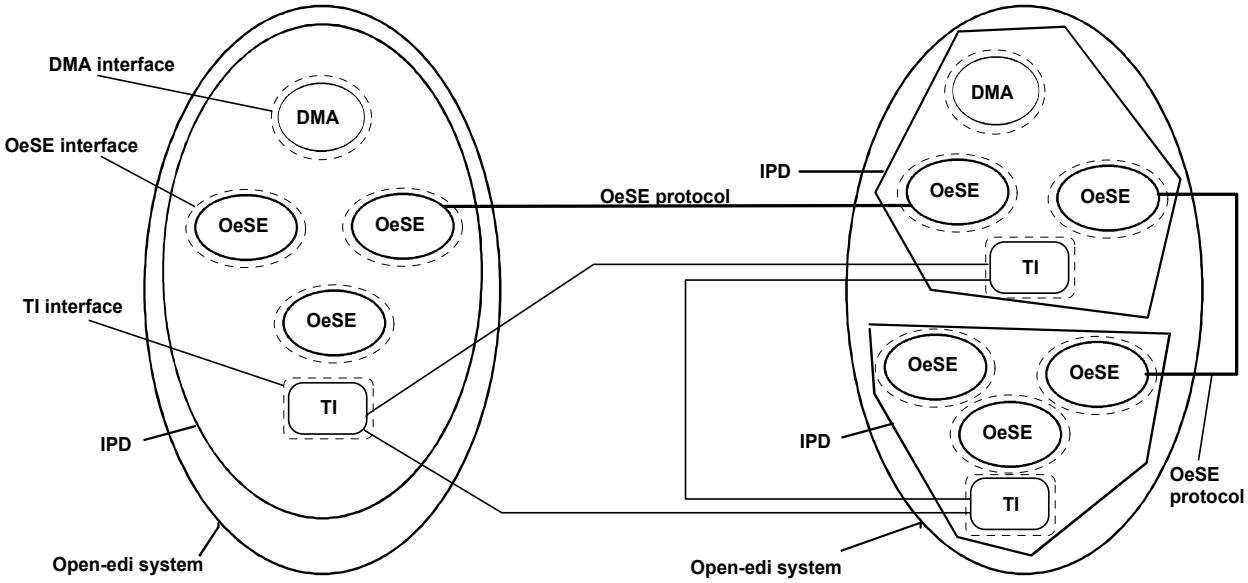

Figure D.3 — Open-edi system relationships

D.3 List of FSV related standards

The FSV related standards include:

— the list of the OeSEs and their specifications (see section D4);

— the specification of DMA interface;

— the specification of TI interface;

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- the specification of OeSEs protocols;
- the specification of OeSE interface, (OeSE interfaces will be specified as business needs dictate);
- the generic mechanisms used to translate SC values into a generic transfer syntax from the information bundle specification (or Semantic Component specification) and vice versa.

The FSV related standards shall rely on communication standards for communication among IPDs.

D.4 Open-edi Support Entities examples

Examples of OeSE candidates include:

- role trading to accept/issue requests to play roles;
- role interpretation;
- translation services to support EDI syntaxes;
- security services;
- addressing services;
- auditing services.

A brief description of the services offered by two key OeSEs follows.

D.4.1 Role Trader

The Role Trader is the OeSE which provides services to negotiate ("trade") the playing of roles with other OePs. This OeSE must be present in every Open-edi System. The services offered by the Role Trader are:

- keeping track of the roles of Open-edi scenarios the OeP is able to play;
- maintaining characteristics (e.g. maximum security level supported);
- handling of requests to play roles coming from other OePs;
- issuing of requests to ask other OePs to play roles related to Open-edi transactions started locally or by other OePs.

D.4.2 Role Interpreter

The Role Interpreter provides services to "integrate" roles of scenarios in accordance with their formal specification on behalf of the OeP. This OeSE includes services to generate instance of roles within a scenario. An instance of a role is made at the occurrence of a Trigger Event. Some types of trigger events are:

- a request bundle received from an other OeP through the role trader;
- decision by a DMA, (e.g. start of an Open-edi transaction (which is done locally), playing of a role, etc.);
- the role must be started at the start up of the Open-edi System: the role is marked as "always running" in the scenario definition.

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Starting from roles and scenarios description, a DMA must be able to play a role within a scenario. Some role interpretation services are:

- interpretation of the business rules;
- services to declare roles of scenario for which the interpretation may be later required;
- services to require the playing of roles (creation of role instances);
- services to get report and status of role instances;
- services to manage application protocols errors.

The role interpretation is carried on in accordance with the DMA. The role interpreter services gives the control to the DMA when one of the following events occurs:

- Open-edi User Data received from another OeP must be passed to the DMA;
- Open-edi User Data that must be sent to another OeP must be provided by the DMA;
- a choice that the DMA must solve, occurs during the role interpretation.

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Annex E
(informative)

English-French equivalents

business	affaires
Decision Making Application (DMA)	Application à pouvoir de décision
Scenario attribute	Attribut de scénario
Semantic Component (SC)	Composant sémantique
Open-edi Configuration	Configuration d'EDI-ouvert
Information Processing Domain (IPD)	Domaine de traitement de l'information
Open-edi User Data (OeUD)	Données d'utilisateur d'EDI-ouvert
Electronic Data Interchange (EDI)	Échange de Données Informatisé
Open-edi	EDI-ouvert
commitment	engagement
Open-edi Support Entity (OeSE)	Entité de support d'EDI-ouvert
Information Bundle (IB)	Faisceau d'informations
Open-edi Control Information (OeCI)	Information de commande d'EDI-ouvert
Transfer Infrastructure (TI)	Infrastructure d'échange
Open-edi Support Infrastructure (OeSI)	Infrastructure de support d'EDI-ouvert
Decision Making Application Interface (DMA Interface)	Interface d'application à pouvoir de décision
Transfer Infrastructure Interface	Interface de l'infrastructure d'échange
Open-edi Support Entity Interface	Interface d'entité de support d'EDI-ouvert
Open-edi Standard	Norme d'EDI-ouvert
organization {IS0 6523}	organisation {IS0 6523}
Open-edi support organization	Organisation de support d'EDI-ouvert
Open-edi Party (OeP)	Partenaire d'EDI-ouvert
Open-edi Support Entity Protocol	Protocole d'entité de support d'EDI-ouvert
role	rôle
Open-edi scenario	scénario d'EDI-ouvert
Open-edi System	Système d'EDI-ouvert
Information Technology System (IT System)	Système d'information
Open-edi Description Technique	Technique de description d'EDI-ouvert
Formal Description Technique (FDT)	Technique de description formelle
business transaction	transaction d'affaires
Open-edi transaction	transaction d'EDI-ouvert
Functional Service View (FSV)	Vue fonctionnelle des services
Business Operational View (BOV)	Vue opérationnelle des affaires
Person	Personne

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