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0 INTRODUCTION

0.1 Purpose

This document , i.e. SC30/WG1 N072, is a WG1 working document the results of which will be the production of the deliverables expected of ISO/IEC JTC1/SC30 topic 14 (Identification and Analysis of Classes of Business Requirements in Relation to Open-edi Scenarios) and Topic 15 (Requirements on FDTs and Registration Procedures).

0.2 Organisation

This document is organised as follows:

Chapter 1 on the "Characteristics of Open-edi" provides criteria on what distinguishes Open-edi from other electronic flows of information that are not Open-edi.

The first four chapters pertain to the deliverables under Topic 14. Chapter 2 provides the detailed specification of Open-edi scenarios and their components organised into two sections. The first, i.e. Chapter 2.1 currently labelled "template" has as purpose ensuring that all the information required for the Business Operational View of an Open-edi scenario is captured in a systematic and explicit manner. Chapter 2.1 is based on requirements already identified in 4.1 of DIS 14662. The order of the items in the template is based on the practical experience of WG1 in the development of examples of Open-edi scenarios based on actual business cases (See Chapter 4 below). More items may be added to this template and other modifications made based on further practical work. Chapter 2.2. focuses on the identification of rules governing scenarios and their components including their relationships. Work on this section is also guided by 4.1 of IS 14662.

The purpose of Chapter 3 is to state the Open-edi user constraints. Its purpose is to ensure that any user of Open-edi scenarios as an Open-edi party has complete knowledge of what is understood to be an Open-edi party and participate in an instantiation of an Open-edi scenario.

In Chapter 4 are provided a series of examples of business cases and their accompanying examples of these being defined as Open-edi scenario descriptions. It is the plan of WG1 to include several examples here in order to test the draft "template" and amend it if necessary as well as furthering other parts of this document.

The purpose of Chapter 5 is to provide a consolidated list of the BOV requirements on the FSV including business demands on the Open-edi support infrastructure.

In Parts 2, 3 and 4, WG1 intends to capture the deliverables pertaining to Topic 15. Here Chapter 6 "Requirements on FDTs" has already been identified. As WG1 work progresses, the additional Chapters that may required for Parts 2, 3 and 4 will be identified.

This document concludes with References and a series of Annexes. Of these the first two, i.e. Annex A "BOV Related Constructs" and Annex B " Questionnaire" are related to deliverables for Topic 15 while the next two Annexes C and D pertain to capturing results of WG1 considerations pertaining to "terminology" and "implementation" respectively. The purpose of these +two Annexes is to ensure that the information of useful experiences of the work of WG1 will be

passed on to users of Open-edi (e.g. that from working through various examples of business cases and construction of the associated BOV part of Open-edi scenario description. The last annex is to give an example on how to use standardised techniques for describing a scenario. In this annex the scenario description is made by using IDEF diagrams.

1 CHARACTERISTICS OF OPEN-EDI

The key characteristics which define Open-edi are as follows:

Commitment of the Parties Involved

Open-edi is a class of electronic flows of information which involves predefined types and states of commitments of the parties concerned. These involve tasks or functions to be carried out, obligations to be entered into etc. Commitments exist and are either implicit or explicit. They must be stated clearly and unambiguously and understood by all parties involved. These commitments are of several types and exist at several levels. The obligations arising from commitments can be fulfilled either directly by the parties, or through agents acting on their behalf.

Rule-Based

A second key characteristic of Open-edi is, that it is rule-based. Open-edi rules must be predefined. Rules formally specify the role(s) of parties involved in Open-edi and the expected behaviours as seen by other parties. Open-edi rules apply to

the information content of the flows; and
the flows themselves

Together these form the basis for a shared, consistent universe of discourse. Parties must have a common semantic understanding of the information exchanged. They must also have a consistent generic procedural views on their interaction. Rule sets used must be agreed upon in advance by those using Open-edi. This is a major component of the agreement required among parties.

Several families of rules exist and must be described for Open-edi to succeed. The classification of these rules should be made along the same lines as the classification of the functions required in Open-edi: data functions, services functions, flow management functions, business functions.

Automated

Open-edi activities are machine-to-machine and application-to-application. They occur with no required human intervention. As a consequence of this characteristic it should always be possible to implement a certain set of Open-edi activities by using an automata, or a computer program. Open-edi addresses application-to-application interchanges and does not address the interchange of information between programs, terminals or humans. These data are required to be processable automatically.

States of Parties

The state description of a party, as perceived by another party, includes only the knowledge necessary for a particular Open-edi activity to take place. The state description is the characteristic of a party at a given point of time which allows prediction of its behaviour (or possible range of behaviour). It is defined in terms of those characteristics which must be available to other parties. States should be stable, sustainable and persistent in order to support commitment. Allowable changes of states should be defined. Changes of state of one party should be available to all other parties for whom this change has an importance.

Autonomy of Parties

Open-edi is intended to preserve the autonomy of parties as they engage in business. This allows systems to maintain their individuality in the way they internally process information by making externally observed behaviour conform to agreed upon specifications. The characteristic of autonomy is crucial from several perspectives including the ability to commit from a business/operational, technical, legal and audit perspective. Just as commitment can be of several types and may exist at several levels, so also autonomy can be of several types and exist at several levels.

Multiple Simultaneous Transactions

It is also a requirement of Open-edi that a party be able to participate in an unspecified number of distinct Open-edi transactions simultaneously.

The above six characteristics are not mutually exclusive. They serve as criteria which must be satisfied in order for an electronic flow of information or data to be considered Open-edi. These criteria apply irrespective of the application areas of electronic data interchange.

2 DETAILED SPECIFICATION OF OPEN-EDI SCENARIOS AND THEIR COMPONENTS

An Open-edi scenario is a formal specification of a class of business transactions having the same business goal.

An Open-edi scenario may be composed of two or more roles.

2.1 Open-edi Scenario

An Open-edi scenario may be described with the following attribute types:

- Name
- Purpose
- Business requirements
- Laws and regulations
- Generic scenario reference (potentially)
- Security requirements
- Role constraints
- Communication service quality
- Response time

The scope of a scenario is captured by purpose of a scenario. The boundary of a scenario is defined by its components.

There is a need for a scenario to be able to reference other scenarios in order to reuse existing scenarios as building blocks. The referencing needs to be done between roles taking into account the sequence of information bundles and clearly addressing the "right point of (relative) time" when another scenario is to be executed. The reference does not address a specific scenario (e.g. "Transport order in international trade") but a class of scenarios (e.g. a transport order scenario).

Editor's note (originating from the Paris meeting):

A new action type is needed. This can be called e.g. "Invoke scenario"

Testing of consistency of all sub-scenarios needs to be made possible

2.2 Role

A role is the description of the business behaviour of a participant within an open-edi scenario.

A role may be described with the following attribute types:

- Name
- Purpose
- Generic role reference
- Business requirements
- Laws and regulations
- Constraints
- Security features

A role must be a component of one or more scenarios.

A role may be related to one or more roles.

The behaviour of a role may be described by states, transitions, events, actions and internal functions.

2.2.1 State

A state describes the status of a role, and may be changed when a transition has occurred.

A state may be described by the following attribute types:

- Name
- Definition

A state may be current state to one or more transitions, and may be next state to one or more transitions.

A state must belong to only one role.

2.2.2 Transition

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

- the current state of the role,
- the event which triggers the transition,
- the actions started by this transition,
- the next state of the role after this transition.

A transition may be described by the following attribute types:

- State/transition matrix row number; is an user-specified display sequence number.

A transition must belong to only one role.

A transition may be triggered by only one event, and may start one or more actions, and may have one current state and may have one next state.

2.2.3 Event

An event triggers a transition, and is triggered by only one information Bundle or by only one internal function of a role.

An event may be described with the following attribute types:

- Name
- Definition

2.2.4 Action

An action is started by a transition, and may send one or more information Bundles and/or trigger one or more internal functions.

An action may be described by the following attribute types:

- Name
- Definition

Potential need: 2.2.5 Internal function

An internal function is a procedure which describes the internal behaviour of a role.

An internal function may be described by the following attribute types:

- Name
- Definition

An internal function may trigger one event, and may be triggered by one or more actions.

Editor's note: it is still unclear whether internal functions need to be included in the text or not. If this paragraph will be decided to be a part of the final document, text from WG1 N040 could be taken here.

2.3 Information Bundle

Each information bundle has an unique ID. This ID can be constructed either autonomously or an information bundle can take its ID or a part of it, from the scenario of which it is part. This requirement is stated in the context of unambiguous identification for referencing, maximising reuseability and minimising redundancy of semantic components.

An information Bundle is the formal description of the semantics of the information exchanged by Open-edi Parties playing roles in an Open-edi scenario. Information Bundles are constructed using semantic components.

An information Bundle may be described by the following attribute types:

- Name
- Purpose
- Business rules
- Laws and regulations
- Confidentiality
- Integrity

An information Bundle must be sent by only one action, and must trigger only one event. An information Bundle shall be composed of one or more semantic components.

2.3.1 Semantic Component

Each semantic component has an unique ID. This ID can be constructed either autonomously or a semantic component can take its ID or a part of it, from the Information bundle of which it is part. This requirement is stated in the context of unambiguous identification for referencing, maximising reuseability and minimising redundancy of semantic components.

A semantic component must be a component of at least one information Bundle.

A semantic component may be using an object class as root node in a hierarchical information Bundle structure.

An information bundle can be modelled by using several modelling techniques (hierarchical modelling, EAR, object modelling etc.). The instantiation of the information bundles must be in compliance with the model used

2.4 Template on how to specify an Open-edi Scenario and its Components [Hereafter referred to as the "BOV Template"]

The purpose of Chapter 2.4, labelled, "template" is to ensure that all the information required for the Business Operational View (BOV) of an Open-edi Scenario and its components is captured in a systematic and explicit manner. Chapter 2.4 is based on requirements already identified in Chapter 4.1 of ISO/IEC 14662 Open-edi reference model. The order and grouping of the items in the "BOV Template" is based on the practical experience of WG1 in the development of examples of Open-edi scenarios based on actual business cases {See Chapter 4 below}. More items may be added to this template and other modifications made based on further practical work.

Scenario

Registration and management

- ID
- Name
- Purpose (may state exclusions)
- Class(es) of business requirements
- Laws and regulations
- Cross reference(s) to other scenario(s)
- ...

Role (Two or More per Open-edi Scenario)

Registration and management

- ID
- Name
- Purpose
- Business goal(s)
- Business rules
- Regulations
- ...

Demands on OeP

- Constraints on OeP characteristics
- Constraints on maximum number of OePs playing a role
- Constraints imposing a role to be conditional
- Constraints on different OePs playing this role
- ...

Demands on interoperability

- IBs for role
- Timer expiration
- Error conditions
- IB sequence
- ...

Demands on Open-edi Support Infrastructure

- From catalogue

[Note: Need to replace "catalogue" with a "checklist"]

Information Bundle (Two or more per Role)

Registration and management

- ID
- Name
- Purpose
- Business rules controlling content or concept(s) of IB
- Regulations governing content or concept(s) of IB

Information for interoperability

- List of SCs and definitions
- Relationships of SCs within IBs
- ...

Demands on Open-edi Support Infrastructure

- From catalogue

[Note: Need to replace "catalogue" with a "checklist"]

Scenario attributes

Demands on OePs

[to be completed]

Demands on interoperability

- Relationships among roles
- Relationships among SCs of different IBs
- ...

Demands on Open-edi Support Infrastructure

- From catalogue

[Note: Need to replace "catalogue" with a "checklist"]

3. OPEN-EDI PARTIES' CONSTRAINTS ON THE USE OF OPEN-EDI SCENARIOS

The concepts in the Open-edi BOV are related to business transactions. The following relationships exist:

- A business transaction may be specified as one or more Open-edi scenarios.
- An Open-edi scenario may specify one or more business transactions.
- An organisation may play one or more roles.
- A role may be played by one or more organisations.
- An activity may be performed as one or more roles.
- A role may perform one or more activities.
- An information flow may consist of one or more information Bundles.
- An information Bundle may belong to one or more information flow.

4. EXAMPLE OF AN OPEN-EDI SCENARIO

4.1 Catalog Order

4.1.1 Business Case Description

Two scenarios depicting the process of a Buyer executing a Catalog Order with a Seller are shown. Scenario A depicts a first time Buyer initiating a relationship with a Seller by providing required buyer information. Scenario B depicts the process of a Buyer ordering items from a catalog, having previously established a relationship with the Seller by providing Buyer information and receiving a Buyer ID.

Certain assumptions are made as part of these scenarios. The Buyer has a copy of the Seller's catalog. Both Buyer and Seller have a private/public security key pair using the same security method. How the Buyer acquired the catalog and how the public keys are made available are not important for this discussion. The cost of each item is not always included, as this is calculated from the listed Product Unit Price and the Quantity the Buyer orders. However, product price and currency are required when the catalog offers a product in multiple currencies. The Seller requires the buyer information before any Catalog Order is placed. As soon as the required buyer information is transmitted, the Buyer will indicate to the Seller a time in which a response is expected. Receiving no response in the specified time period terminates the scenario.

The benefit of a Buyer, having provided information about itself prior to ordering, is that the amount of information to be exchanged and the number of steps required to subsequently place a Catalog Order are reduced. This results in saving both the Buyer and the Seller processing time that reduces the cost of doing business.

Scenario A: a Buyer wanting to place a Catalog Order must have a Seller assigned Buyer ID. This scenario must be used to obtain such an ID. The Buyer will supply the Seller with the Buyer information before receiving a Seller assigned Buyer ID:

Buyer provides Buyer information (Buyer Name, Billing Information, Ship-to Information (if different from Billing), and Accounting Information). In order to ensure that the Buyer can be validated and to keep the Account Information secure, the Account Information is signed and encrypted using a private/public security keying method. Buyer provides to Seller a time period in which to expect the Buyer ID response. If the Buyer ID is not received in that time period, the Scenario is terminated.

Seller either assigns the Buyer Identifier or rejects the request (stating the reason) and sends it to Buyer to complete the scenario.

Scenario B: a Buyer placing a Catalog Order with a Seller will supply the Seller with three information Bundles before the Order can be acknowledged. This is because the Seller has Buyer information on file that is keyed to the Buyer Identification. There is no need to resend Buyer information unless the Buyer has changed this information since previously sending it to the Seller.

Buyer sends to Seller a Catalog Order containing Buyer Identification and Order Information.

Buyer provides to Seller a time period in which to expect the Order Identification response. If an acknowledgement is not received in that time period the scenario is terminated.

Seller either assigns the Order Identification or rejects the request (stating the reason) and sends it to the Buyer, to complete the scenario.

4.1.1.1 Detailed Explanation of Scenario A

A Buyer finds one or more items in a Catalog which the Buyer needs. The Buyer has never conducted business with the Seller before. Thus the Buyer expects that the Seller will need specific information from the Buyer before the Catalog Order can be placed using Scenario B.

The Buyer starts the scenario by sending to the Seller the following information:

a. Buyer Information to include:

Buyer's name [Business name by which the Buyer wants to be known by the Seller]

Billing Information

Address [Address to which the Buyer wants the bill to be sent]

Contact Name [Name of the person to whom the Buyer wants billing inquiries to be directed]

Phone Number [Telephone number of the person to whom the Buyer wants billing inquiries to be directed]

Ship-to Information to include (only required if different from Billing Information):

Address [Address to which the Buyer wants ordered goods to be shipped]

Contact Name [Name of the person to whom the Buyer wants shipping inquiries to be directed]

Phone Number [Telephone number of the person to whom the Buyer wants shipping inquiries to be directed]

Accounting Information (signed and encrypted) to include:

Credit Card Holder Name [Name of the owner of the credit account the Buyer chooses to provide to the Seller as a credit reference]

Type of Credit Card [Type of credit account, recognised by the credit card industry, that the Buyer chooses to provide to the Seller as a credit reference]

Credit Card Number [Identification of the credit account that the Buyer chooses to provide to the Seller as a credit reference]

Expiration Date [Date on which the credit account that the Buyer chooses to provide to the Seller as a credit reference is no longer valid]

Buyer ID Response Time Information to include:

Respond-by Date [Final date on which the Seller can respond to the Buyer with a Buyer ID before the scenario is terminated]

When the Buyer Information is received, the Seller assigns a Buyer Identification or rejects the request (stating the reason) and sends it to Buyer to complete the scenario:

b. Buyer Identification Information to include:

Seller's Buyer ID [Seller assigned identification by the which the Seller uniquely recognises a Buyer]

OR

c. Buyer ID Rejection Information to include:

Reason for rejection [Seller stated reason for not assigning a Buyer ID to the Buyer, e.g. insufficient Billing Information, invalid credit account, etc.]

4.1.1.1 Detailed Explanation of Scenario B

A Buyer, having a Seller assigned Buyer Identification, finds one or more items in a Seller's Catalog that the Buyer needs. Since the Seller knows the Buyer, the Buyer only needs to provide the Seller assigned Buyer Identification, the Ordering information and Response Time Information. The Seller will respond either with an assigned Order Identification or reject the request (stating the reason) and send it to the Buyer to complete the scenario.

The Buyer starts the scenario by sending to the Seller the following information:

a. Buyer Identification:

Seller's Buyer ID [Previously defined]

b. Order Information to include:

Product Catalog Number [Unique identification of a product in the Seller's catalog]

Product Unit Price (if required; is required when the catalog offers the product in multiple currencies) [Monetary amount cost per single item (or per unit of measure) of the product as stated in the Seller's catalog]

Product Unit Price Currency Code (if required; is required when the catalog offers the product in multiple currencies) [Identification of the currency of the Product Unit Price]

Line Item Quantity [Number of items (or units of measure) of the product to be ordered]

Line Item Unit of Measure (if required) [Unit of measure as stated in the Seller's catalog for selling bulk products]

Product Characteristics Type (if required) [Product variation such as colour, size, etc.]

Product Characteristics Code (if required) [Product offerings within a product variation]

Delivery Method [Means and timing of delivery per order as selected by the Buyer from Seller provided options]

To conclude the exchange the Buyer sends to the Seller the Response Time Information to indicate by what date a response is expected from the Seller. If no response is received the scenario is terminated.

c. Order ID Response Time Information to include:

Respond-by Date [Final date on which the Seller can respond to the Buyer with an Order ID before the scenario is terminated]

When the Response Time Information is received, the Seller assigns an Order Identification or rejects the request (stating the reason) and sends it to Buyer to complete the scenario:

d. Order Identification Information to include:

Order Identification [Seller assigned order identification for tracking the status of an order in a Buyer's account until payment is made]

OR

e. Order Rejection Information to include:

Reason for rejection [Seller stated reason for not assigning an order from the Buyer, e.g., no Buyer Identification, insufficient Order Information, insufficient credit, etc.]

4.1.2 Open-edi SCENARIO description

The two scenario business case for catalog order are described according to the proposed Open-edi scenario template in Sections 4.1.2.1 and 4.1.2.2. Refer to Appendix E for the application of an FDT to these scenarios.

4.1.2.1 Scenario A

Scenario Registration and Management

Name: Buyer ID (Scenario A)

Purpose (may state exclusions): to establish Buyer ID with Seller. Excluded are any requirements related to jurisdictional and geographical constraints, etc. because they are not part of scenario A.

Class(es) of business requirements: none (there's no classification of business requirements at the moment. An issue is raised regarding this subject)

Laws and regulations: none

Cross reference to other scenarios: none

Role Registration and Management

Name: Buyer

Purpose: establish a trading relationship with a Seller

Business goal(s): send Buyer information and receive Buyer ID

Business rules: must contact Seller to supply buyer information; must have Seller's assigned Buyer ID before placing an order

Regulations: none

Demands on OeP: Buyer acts as OeP

Constraints on OeP characteristics: none

Constraints on maximum number of OePs playing a role: only the Buyer can play this role

Constraints imposing a role to be conditional: none

Constraints on different OePs playing this role: none

Demands on interoperability

IBs for role:

Input IBs

- Buyer Identification Information OR Buyer ID Rejection Information

Output IBs:

-Buyer Information

Timer expiration: handled explicitly by Buyer ID Response Time Information IB

Error conditions: none

IB sequence:

Buyer

Seller

>> Buyer Information >>

<< Buyer identification Information OR Buyer ID Rejection Information <<

Demands on Open-edi Support Infrastructure

- From catalogue: 8859-1 character set limitation for all IBs

Role Registration and Management

Name: Seller

Purpose: establish trading relationships with buyers

Business goal(s): receive Buyer information and send Buyer ID

Business rules: must have buyer information prior to qualifying a buyer; must have a catalog; assignment of Buyer ID is a prerequisite to receiving an order; must issue Buyer ID rejection if buyer not qualified.

Regulations: none

Demands on OeP: Seller acts as OeP

Constraints on OeP characteristics: none

Constraints on maximum number of OePs playing a role: only the Seller can play this role

Respond-by Date [Final date on which the Seller can respond to the Buyer with a Buyer ID before the scenario is terminated]
(date)

Relationships of SCs within IBs: Billing Phone Number is associated with Billing Contact; one Billing contact and Billing phone number must be provided per IB. Ship-to Phone Number is associated with Ship-to Contact; one Ship-to contact and Ship-to phone number must be provided per IB.

Demands on Open-edi Support Infrastructure

- From catalog: This IB must be signed and encrypted for security.

Information Bundle Registration and Management

Name: Buyer Identification Information

Purpose: to indicate that a buyer is qualified to buy. Seller assigns a Buyer Identification to the Buyer in order to identify a buyer / to allow a buyer to later reference the ID assigned by the Seller.

Business rules controlling content or concept(s) of IB: Buyer can only place an order with a Buyer ID.

Regulations governing content or concept(s) of IB: none

Information for interoperability

List of SCs and definitions:

Seller's Buyer Identification [Seller assigned identification by the which the Seller uniquely recognizes a Buyer]
(identifier)

Relationships of SCs within IBs: One and only one Buyer ID is mandatory.

Demands on Open-edi Support Infrastructure

- From catalog: none

Information Bundle Registration and Management

Name: Buyer ID Rejection Information

Purpose: to indicate to a buyer that an attempt to establish a trading relationship with the seller has failed. Subsequent orders will be rejected.

Business rules controlling content or concept(s) of IB: Buyer can only place an order with a Buyer ID. Any order placed without a Buyer ID will be rejected.

Regulations governing content or concept(s) of IB: none

Information for interoperability

List of SCs and definitions:

Reason for rejection [Seller stated reason for not assigning a Buyer ID to the Buyer, e.g., insufficient Billing Information, invalid credit account, etc.]

(character string)

Relationships of SCs within IBs: One and only one Reason for Rejection is mandatory.

Demands on Open-edi Support Infrastructure

- From catalog: none

Scenario attributes

Demands on OePs: both Buyer and Seller must be present

Demands on interoperability

- Relationships among roles:

Some of the IB's are optional and the sequence may vary. The first four IB's must be sent by the buyer but there's no particular order between those four, yet all those IB's must be sent. When the buyer info timeout IB is sent, the seller is expected to respond by sending "buyer identification assignment IB" or a rejection.

Several options are possible: either all the first four information Bundles must be sent together or one or more IB's can be sent. In the latter case one more component (a common factor) must be included in all the Bundles in order to make it possible to the receiver to combine the information Bundles and understand that they belong together. This new component belongs to the FSV level (i.e. the receiving system must keep track where the IB's came from).

The role "buyer" gets the buyer identification from the role "seller" by sending the first four IB's to the role "seller". The buyer initiates the scenario by sending an IB to the role "seller".

When the Seller receives Buyer ID Response Time Information, it is known that all IBs have been received from the Buyer.

- Relationships among SCs of different IBs

Billing Information is used as a default in the absence of Ship-to Information

Billing Information Contact Name equals Credit Card Holder Name

Demands on Open-edi Support Infrastructure

- From catalogue: none

Editor's note:

It was decided in the Paris meeting, that it must be possible to allow a scenario to have several starting points. The starting point(s) need to be specified in a role definition. Some text needed explaining this requirement.

4.1.2.2 Scenario B

Scenario Registration and Management

Name: Catalog Order (Scenario B)

Purpose (may state exclusions): to order from a catalog. Excluded are any requirements related to jurisdictional and geographical constraints, etc. because they are not part of Scenario B.

Class(es) of business requirements: none (there's no classification of business requirements at the moment. An issue is raised regarding this subject)

Laws and regulations: none

Cross reference to other scenarios: Buyer ID (Scenario A)

Role Registration and Management

Name: Buyer

Purpose: purchase articles from a catalog

Business goal(s): place an order and receive acknowledgement

Business rules: must have Seller's catalog; must contact Seller to supply buyer information; must have Seller's assigned Buyer ID before placing an order; Buyer has internal order reference number.

Regulations: none

Demands on OeP: Buyer acts as OeP

Constraints on OeP characteristics: must have Buyer Identification

Constraints on maximum number of OePs playing a role: only the Buyer can play this role

Constraints imposing a role to be conditional: none

Constraints on different OePs playing this role: none

Demands on interoperability

IBs for role:

Input IB's

- Order Identification Information OR Order Rejection Information

Output IB's:

- Buyer ID

- Order Information
- Order ID Response Time Information
Timer expiration: handled explicitly by Order ID Response Time Information IB
Error conditions: none
IB sequence:
Buyer Seller
 >> Buyer ID Information >>
>> Order Information >>
 >> Order ID Response Time Information >>
 << Order identification Information OR Order Rejection Information <<
Demands on Open-edi Support Infrastructure
 - From catalogue: 8859-1 character set limitation for all IBs

Role Registration and Management

Name: Seller

Purpose: sell articles from a catalog

Business goal(s): receive an order and acknowledge the order

Business rules: must have a catalog; assignment of Buyer ID is a prerequisite to receiving an order; upon acceptance of an order, an Order ID is assigned and transmitted; a negative acknowledgement is transmitted for any rejected order.

Regulations: none

Demands on OeP: Seller acts as OeP

Constraints on OeP characteristics: none

Constraints on maximum number of OePs playing a role: only the Seller can play this role

Constraints imposing a role to be conditional: none

Constraints on different OePs playing this role: none

Demands on interoperability

IBs for role:

Input IB's:

-Buyer Information

-Billing Information

-Ship-to Information

-Accounting Information

-Buyer ID Response Time Information

Output IB's:

- Buyer Identification Information OR Buyer ID Rejection Information

Timer expiration: handled explicitly in acting on Buyer ID Response Time Information IB

Error conditions: none

IB sequence:

Seller

Buyer

 << Buyer ID <<

 << Order Information <<

 << Order ID Response Time Information <<

 >> Order Identification Information OR Order Rejection Information >>

Demands on Open-edi Support Infrastructure

 - From catalogue: none

Information Bundle Registration and Management

Name: Buyer ID

Purpose: to identify Buyer by Buyer Identification previously assigned

Business rules controlling content or concept(s) of IB: none

Regulations governing content or concept(s) of IB: none

Information for interoperability

List of SCs and definitions:

Buyer Identification [Seller assigned identification by the which the Seller uniquely recognizes a Buyer]
(identifier)

Relationships of SCs within IBs: none

Demands on Open-edi Support Infrastructure

- From catalog: none

Information Bundle Registration and Management

Name: Order Information

Purpose: to specify information about an order

Business rules controlling content or concept(s) of IB: content controlled by the Seller's catalog. Buyer ID must be previously assigned by the Seller (see Buyer Identification Information IB)

Regulations governing content or concept(s) of IB: none

Information for interoperability

List of SCs and definitions:

Product Catalog Number [Unique identification of a product in the Seller's catalog]
(identifier)

Product Unit Price (if required) [Monetary amount cost per single item (or per unit of measure) of the product as stated in the Seller's catalog]
(amount)

Product Unit Price Currency Code (if required) [Identification of the currency of the Product Unit Price]
(code)

Line Item Quantity [Number of items (or units of measure) of the product to be ordered]
(number)

Line Item Unit of Measure (if required) [Unit of measure as stated in the Seller's catalog for selling bulk products]
(code)

Product Characteristics Type (if required) [Product variation such as color, size, etc.]
(code)

Product Characteristics Code (if required) [Product offerings within a product variation]

Delivery Method [Means and timing of delivery per order as selected by the Buyer from Seller provided options]
(code)

Relationships of SCs within IBs: Only one delivery method allowed; one or more catalog numbers; one or more of the set (Product Unit Price, Product Unit Price Currency Code, Line Item Quantity, Line Item Unit of Measure, Product Characteristics Type and Product Characteristics Code) per Product Catalog Number

Demands on Open-edi Support Infrastructure

- From catalog: none

Information Bundle Registration and Management

Name: Order ID Response Time Information

Purpose: to inform the Seller about the time period over which the order is valid

Business rules controlling content or concept(s) of IB: Buyer expects Order Identification Information IB or Order Rejection Information IB within the given time.

Regulations governing content or concept(s) of IB: none

Information for interoperability

List of SCs and definitions:

Respond-by Date [Final date on which the Seller can respond to the Buyer with an Order ID before the scenario is terminated]
(date)

Relationships of SCs within IBs: One and only one time is mandatory.

Demands on Open-edi Support Infrastructure

- From catalog: none

Information Bundle Registration and management

Name: Order Rejection Information

Purpose: to inform the Buyer the order was rejected

Business rules controlling content or concept(s) of IB: If the order is rejected the Buyer expects the reason to be provided in an Order Rejection Information IB.

Regulations governing content or concept(s) of IB: none

Information for interoperability

List of SCs and definitions:

Reason for rejection [Seller stated reason for not assigning an order from the Buyer, e.g., no Buyer Identification, insufficient Order Information, insufficient credit, etc.]
(character string)

Relationships of SCs within IBs: One and only one Reason for Rejection is mandatory.

Demands on Open-edi Support Infrastructure

- From catalog: none

Scenario attributes

Demands on OePs: both Buyer and Seller must be present

Demands on interoperability

- Relationships among roles: none

- Relationships among SCs of different IBs: Expiration Date must not precede the order delivery date.

Demands on Open-edi Support Infrastructure

- From catalogue: none

5. BUSINESS REQUIREMENTS ON FSV (BUSINESS DEMANDS ON OPEN-EDI SUPPORT INFRASTRUCTURE)

Text about communications, security, quality of service, character sets, DMA, open-edi user data, audit trails, record keeping and other requirements to be added here.

Input documents: Revised Norwegian contribution (WG1 N040) and WG1 N003, page 21, six first bullet points.

Editor's note: these are the first six bullet points from N003, page 21:
The following relationships exist between BOV and FSV:

- An Open-edi Scenario may be implemented by one or more Open-edi Configuration
- An Open-edi Configuration may support one or more Open-edi Scenarios
- A role may be played by one or more DMAs
- A DMA may play one or more roles
- An information parcel may be mapped to one or more Open-edi User Data
- An Open-edi User Data may be mapped to one or more information parcels

Editor's note: ...and this is the extract from N040:

The interactions between internal functions and roles may be mapped to one or more implementation models in the FSV, which implies that the current FSV concepts should be updated:

- Add a new concept: "Information system", as an implementation of an internal function.

- Add new relationships between "Information system" and Open-edi User Data

This two concepts will be needed if the interface between information systems and DMA should be modelled; as an application program interface (API), as a client/server connection, etc. The corresponding model in the BOV will define the semantic and platform independant specification of the possible interfaces in FSV.

6. REQUIREMENTS ON FORMAL DESCRIPTION TECHNIQUES FOR OPEN-EDI SCENARIOS

6.1 Introduction:

In the Open-edi Reference Model the concepts of an Open-edi scenario and its components have been introduced as the key modelling entities for the Business Operational View. It is required by the Open-edi Reference Model that such scenarios should be expressed using Formal Description Technique(s). The purpose of this document is to provide a consolidated statement of the requirement for an Open-edi description technique (OeDT, see IS 14662) and the criteria for evaluation of the proposed OeDT for Open-edi scenarios. It should be noted that the main function of this document is to provide a working document for the definition of the requirements on the OeDT. As a consequence the structure of the document is as follows_. Section 1 presents the requirements on the FDTs to be used for the definition of scenarios. Section 2 provides evaluation criteria for the proposed OeDT. An informative annex contains a discussion on the main assumptions that serve as the basis for the requirements

6.2 Requirements on FDTs.

NEED 1

An FDT must have the ability to support a hierarchical decomposition of the scenario and its component parts.

NEED 2

It should provide for both a human and a computer interpretation, since human beings will have to be able to assess scenarios before they can instruct their computer systems to deal with them.

POTENTIAL NEED 3

Several steps in the scenario have to be modelled and interrelated. This means that a process modelling technique has to be chosen for modelling role interaction, in contrast to a data modelling technique. SC30 N057 (WG1 N014) has identified several classes of such techniques and given specific examples of existing FDTs for each of these classes (for instance IDEF, Petri Nets, Data Flow Diagrams, etc.).

POTENTIAL NEED 4

The OeDT has to be capable of representing both the choices made by roles and the events that influence the execution of a role as well as their concurrent interoperation in an efficient manner. The combination of both these capabilities is not a trivial matter, since many techniques are only strong in one area. For instance, state transition diagrams or networks are weak in the expression of concurrency but strong in choice. PERT diagrams are exactly the inverse.

POTENTIAL NEED 5

Internal choices made by roles need to be represented, although it is questionable whether the actual rules governing these choices should be modelled as well. These are usually confidential to the organisation. For an Open-edi scenario the only relevant aspects of such choices are the possible outcomes. Since the input of such a choice may be some error message coming out of the FSV there should be a method of modelling events that trigger these internal decisions (other than the arrival of a new information Bundle to be handled).

POTENTIAL NEED 6

The state of each of the Open-edi parties should be represented in order to be able to analyse the dynamic properties of a scenario. The information in these states may also have to capture the level of commitments that parties have to each other if this turns out to be necessary information in the execution of an Open-edi transaction.

The initial state (starting point) and the final state (termination point) of each Open-edi Party should be unambiguously stated.

NEED 7

The ordering of the exchanges of information flow may have strict temporal specifications, for instance in an i-edi transaction. Hence, both absolute and relative temporal constraints have to be expressible in the OeDT as well.

POTENTIAL NEED 8

Open-edi scenarios will be written by different user communities and shall be compliant with the BOV related standards. For this reason, it is obvious that FDTs included in the BOV related standards need to be standardised.

POTENTIAL NEED 9

In order to produce Open-edi scenarios, the user communities will need to use modelling tools which help them in producing specifications based on these FDTs. In order to speed up the use of Open-edi it is of the highest importance that such tools already exist on the market at the time the FDTs are chosen for the BOV related standards.

POTENTIAL NEED 10

Moreover, it is highly desirable that several tools exist on the market and that the standards of the FDTs provide for a neutral format of exchange between the tools in order that specifications produced on one tool of the market can be reused and modified on another modelling tool of the market.

POTENTIAL NEED 11

In addition, since the compliance of scenario descriptions against the FDT will need to be assessed. Therefore, the FDT shall be such that compliance checking of scenario descriptions against the syntax of the FDT can be verified.

POTENTIAL NEED 12

Conformance testing of the implementations of Open-edi scenarios in the Open-edi systems will need to be assessed. Therefore any tool associated to the FDT which can facilitate the development of this testing environment will be helpful and welcome.

POTENTIAL NEED 13

The FDT for information Bundles :

Needs to represent the relationships between the semantic components.

Needs to describe both atomic and compound semantic components.

Needs to represent cardinality of relationships.

Needs to express constraints between the semantic components such as : if semantic component A is present, then semantic component B is mandatory. Another example could be : if the value of the instance of semantic component is XX, then semantic component B is mandatory.

Provide the capability to verify the compliance of the information Bundle specifications with the syntax of the FDT. Therefore, the FDT shall be such that compliance checking of an information Bundle description against the syntax of the FDT can be verified.

POTENTIAL NEED 14

An OeDT should model a scenario so, that it is capable to use other scenarios.

7 REGISTRATION ISSUES

Editor's note: Contributions needed. At the moment there are no contributions available regarding these questions

8 CRITERIA FOR MEASURING THE QUALITY OF PROPOSED FDT'S

The following five additional properties can be used as a yardstick to measure if a certain representation is primitive, in the sense that it has the sufficient and necessary modelling constructs to represent phenomena from a certain domain (in the case of Open-edi this domain is the exchange of data among parties)_:

Finitude: the number of modelling constructs must be smaller than the number of real-world phenomena these constructs can represent.

Comprehensiveness: every phenomenon within the boundaries of the domain to be modelled can be expressed as a structure of modelling constructs

Completeness: describing a phenomenon in terms of modelling constructs reveals all the necessary information about this phenomenon.

Independence: no modelling construct is definable in terms of another construct

Canonicity: no two unique phenomena are definable by the same structure of modelling constructs.

Every OeDT shall allow for the verification whether all possible initiation paths of a scenario lead to allowable termination.

Editor's note: More contributions needed. In the Paris meeting Issue 2 (see N071) was decided to be solved as follows:

Guidance for implementation is to provide help on how providers of FDTs should use the example scenario in chapter 4 to validate that their particular FDT meets the requirements (chapter 6) using the criteria outlined in chapter 8.

Experience of prototyping is to help WG1 to outline how to test a submission (see issue 2A). Since this must be complete before asking for submission on FDTs, this issue must be resolved first. Therefore we recommend that contributions to this issue and chapter 8 are given a high priority.

References

References from the document N003 (N005) are to be placed here

Informative annex A.

General assumptions on the BOV related constructs.

This section presents the general assumptions made at the construction of this document. Although these may have to change due to discussions related to Topic 14, it is assumed that this will be done explicitly. A motivation for such changes and a precise description of their nature should be provided in order to maintain the internal consistency of the document.

It is understood that the general idea behind Open-edi is to enable companies to participate in EDI with minimal prior agreements about the way the data are to be exchanged among them. In contrast with the current EDI, this means that not only the data has to be structured and standardised, but also the context in which this data is exchanged. More precisely, the computer systems of the Open-edi partners need to be able to handle incoming messages_ automatically. The specification of this 'message handling' process is the essence of an Open-edi scenario. In some sense it can be compared with the current Message Implementation Guidelines, which usually not only describe how one single message needs to be interpreted, but also relates several messages with each other. The key difference however is that Open-edi scenarios are specified in a standardised, computer interpretable manner.

It is not the duty of SC30 to develop these scenarios themselves. However, in order to be computer interpretable and interoperable among autonomous parties, and that they have to be described in a formal way which can be understood by an automated system. The requirements on such an FDT are the final result that this document should achieve, hopefully in a limited amount of iterations.

The concepts that have been provided by the Open-edi Reference model are roles, information bundles and scenario attributes. These concepts are discussed in Sections 1.1, 1.2 and 1.3 respectively.

A.1 Roles

The roles are understood to model the externally visible behaviour. It depends on the users of such descriptions to define the boundary between internal and external behaviour. It is not the responsibility of SC30 to decide whether for instance a large company should be seen as one single entity with a huge internal process or a number of individual entities (departments) with each a smaller internal process. The concept of a role should allow both cases to be modelled. The key knowledge the roles will entail is the knowledge on how to handle incoming and outgoing messages. In Figure 1 the concept of a role is related to business processes and information Bundles.

-

This figure is to be understood as follows. It represents an operation of Open-edi from the point of view of an autonomous organisation, which wants to use it to support a certain business process. The outside world may have constraints on this process (for instance particular jurisdictions may restrict certain activities), and the organisation may have internal rules governing their processes in general. This is represented in the top left-hand corner._

The process itself consists of a number of steps. After the completion of each step a new state is reached and some internal choice will be made to decide which step will be executed next. This decision is based on the result of the previous step using an internal rule-base. The choice can result in multiple steps executed in parallel or in a number of alternatives.

The Open-edi scenario is only concerned with those parts of these process steps that are related to the exchange of IBs. It is assumed that this particular information will be the role description. In other words, the role description in this view only contains knowledge on the inter-dependencies of the information Bundle exchanges. This also implies that the entire specification of the EDI relevant part of the business process will be done by multiple roles which are inter-connected within a scenario (using scenario attributes). A different approach is to define the role as the combination of all these process steps, and call the different subsets differently, for instance episodes or activity units.

Although it seems that this is a rather fundamental decision to make, the view can also be taken that this is only a naming issue if it is assumed that multiple levels of decomposition can take place at the role level. From a modelling perspective it is not really relevant whether something is called a role, sub-scenario or episode, since the information that is captured in the models is of the exact same kind (sending-receiving of IBs). The relationships between all these modules need to be defined unambiguously, which is always the case if modularity or hierarchical decomposition is introduced.

Note that although the picture shows that a certain process step is implemented by a specific role, it may be the case that actually several alternative models can be used for this purpose. For instance, the process step 'get product information' can be implemented by a single IB exchange with the seller or by

A second advantage of this approach is that at the Open-edi scenario level, the only information needed is the identification of the information Bundle and a reference to the repository where the formal description of the semantics can be found.

A.3 Scenario Attributes.

The only scenario attributes that have been discussed so far are the requirements on the FSV. It is obvious that an Open-edi scenario should be capable of defining its needs on the underlying Open-edi System in terms of Open-edi Support Systems. At the moment it is assumed that this will be done through the catalogue of demands. From a modelling perspective this means that a formal way to describe these requirements is needed, possibly in the format of a simple syntax. Since each information exchange may require a different level of security, this information should be associated with the information Bundles in the model. Hence, it can be envisioned that the description of an information Bundle only contains the name and reference (see previous section) and a list of FSV requirements.

The other attributes specified in the Open-edi reference model still have to be dealt with. Certain scenario attributes will need an FDT to be computer interpretable. An example of such a scenario attribute is the relationship amongst roles.

Informative annex B
Questionnaire

Informative annex C
Terminology considerations

Informative annex D
Implementation considerations

Informative annex E
Scenario description using IDEF diagrams

IDEF Diagrams for Catalogue Order Scenario

IDEF0 (Activity) Diagrams

A-0 Diagram: Catalog Order (Diagram Page 1)

Purpose: This model describes a buyer ordering from a seller's catalog. The buyer may or may not have an established business relationship with the seller. Viewpoint: the model is described from the viewpoint of the buyer.

A0 Diagram: Order from Catalog (Diagram Page 2)

Having determined that there is a requirement to order, there are two possibilities depending upon whether or not the buyer has a Seller's Buyer ID (i.e., depending on whether or not the buyer and the seller already have a business relationship).

If the buyer does not have a Seller's Buyer ID, the buyer provides information to the seller after which the buyer receives an Identification number from the seller (Seller's Buyer ID).

If the buyer has a Seller's Buyer ID (i.e., a business relationship is established), the order information can be provided from the catalog.

Ultimately, the seller provides the buyer with an Order Reference Number.

A1 Diagram: Provide Buyer Information (Diagram Page 3)

The buyer information provided to the seller in order to receive a Seller's Buyer ID is the Buyer Name, Billing details (Billing Address, Phone Number and Account Information) and delivery details (Address and Phone Number) if different from the billing details. Note, add to text on this diagram the fact that account information includes credit card information.

A3 Diagram: Provide Order Information (Diagram Page 4)

The order information provided by the buyer to the seller is: the Seller's Buyer ID, the Delivery Information, Payment Method, Product Number, Quantity Ordered and Product Characteristics. The Product Number, Quantity Ordered and Product Characteristics are extracted from the Seller's catalog.

IDEF3 (Process) Diagrams

IDEF3, Process Flow Description (PFD) Diagrams

Top level Diagram (Ordering from catalog) (Diagram Page 5) In our example, complete buyer data must be supplied at some point resulting in the seller assigning a buyer ID. Then, the order information can be provided. Finally, the seller returns an order reference identifier to the buyer.

Level Two Diagram (Provide Buyer Information) (Diagram Page 6)

The buyer information includes the buyer name, billing details (address, phone number, and account information), and delivery details (address and phone number). For simplicity, it is assumed that there is only one delivery point for the entire order.

Level Three Diagram (Provide Order Information) (Diagram Page 7)

The order information includes the buyer ID, product information, delivery timing and payment method. Products are identified by supplying their numbers and quantities, and, if applicable, additional characteristics. The delivery timing and payment method are optional data which complete the order.

IDEF3, Object State Transition Network (OSTN) Diagrams

OSTN Diagram for Object: Provide Buyer Information (Diagram Page 8)

The state of No buyer Information is moved to the state of Buyer Information received through the provision of buyer name, delivery details and billing details.

OSTN Diagram for Object: Provide Order Information (Diagram Page 9)

The Order is moved from the state of Blank Order to the state of Order Placed by the provision of the seller's buyer ID, the Delivery Timing, Payment Method, product number, quantity and product characteristics.

OSTN Diagram for Object: Provide Order Reference Number (Diagram Page 10)

Moving from the state of No Order Reference Number to Order Reference Number Received requires order information to be provided.

OSTN Diagram for Object: Provide Seller's Buyer ID (Diagram Page 11)

Moving from the state of No Seller's Buyer ID to the state of Seller's Buyer ID Requested required the provision of Buyer Information. In order to move to the state of Seller's Buyer ID on File' the Sellers Buyer ID has to be received.

IDEF1X (Data) Diagram (Page 12)

Reading an IDEF1X Diagram

The boxes are "entities". These are persons, places, things, concepts, et cetera that are of importance in this context. Entities are "object classes" without behavior. The name of the entity is written above the box. (Boxes with rounded corners are considered "child entities" and have no relevance in this model. Along with other features mentioned above, they are an artifact of the normal use of IDEF1X for providing structure to relational databases.)

The links among entities are "relationships". The relationships are labeled with a verb phrase written along the line. The relationship is normally read toward the end with the dot. The number of entity instances to be expected at each end of the relationship is called "cardinality". A dot on the end indicates zero, one, or more. A dot with a P means one or more. No dot means one.

"Attributes" are equivalent to "data elements" in EDI. The names of the attributes describing an entity are listed in each box.

There are other features of a data model that are not covered here. Many other icons can be used in an E-R diagram, but are not of use in this structure. In addition, to be complete, there should be a description of each entity and attribute—including its definition.

In this model:

A Buyer has a Buyer Identification by which the Buyer is known by the Seller.

A Buyer has a "shipped to" Site and a "billed at" Site.

The Site has a Contact person who can be telephoned for information.

A Buyer has an Account and the Account has an expiration Date.

The Buyer can place an Order with a Seller.

The Order has a Delivery that has a Date.

The Order has one to many Line Items.

Each Line Item has a Product.

Each Product has zero to many Product Characteristics such as colour, size, et cetera.

DIAGRAMS: SEE DOCUMENT N072ATT.PDF

_ This list is based on a study by Winograd (1978) on typical features of semantic primitives.

_ The term 'message' is used to denote an information flow among two or more parties, which may not necessarily correspond with current ideas of 'messages' (compare for instance I-edi which consists of many small messages exchanged in a dialogue).

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...

Rules-Constraints

Rules-Constraints

Process Step 1

Process Step 2.1

Process Step 2.N

Process Step M.1

Process Step M.N

Rules-Constraints

Business Process

Acts on

Acts on

Composed of

Internal
Choice

Govern

Trigger

Trigger

Trigger

Role C

Role A

Role B

IP 1.1... 1.N

IP 2.1... 2.N

IP M.1... M.N

Uses

Uses

Uses

Modelled as

Modelled as

Modelled as