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Centre for the Facilitation of Procedures and

Practices for Administration, Commerce and Transport

Sixth session, 27-30 March 2000

Item 4 of the provisional agenda

REPORT OF THE

BUSINESS PROCESS ANALYSIS WORKING GROUP (BPAWG)

Submitted by the Chair of BPAWG *

This report is submitted to the Centre for discussion and noting.

* This document is reproduced in the form in which it was received by the secretariat.

Business Process Analysis Working Group (BPAWG)

1. Introduction

The BPAWG was established by the UN/CEFACT Steering Group (CSG) in August 1997 and approved as a UN/CEFACT permanent working group by the UN/CEFACT Plenary during its September 1997 meeting, as the Business Analysis Working Group (BAWG). This was changed to the Business Process Analysis Working Group (BPAWG) by the UN/CEFACT Plenary in March 1999.

The purpose of the BPAWG (as stated in its mandate) is to analyse functional business processes, to identify constraints that adversely impact on the mission and objectives of UN/CEFACT, and to propose appropriate changes to those business processes.

The BPAWG will serve as a catalyst to meet UN/CEFACT's mission to "facilitate international transactions through the simplification and harmonisation of procedures and information flows, and so contribute to the growth of global commerce"¹ by:

- analysing and understanding the key elements of international transactions and working for the elimination of constraints"; and
- promoting best practices through channels such as government, industry and service associations".

2. The Vision

To simplify, streamline and standardise functional business processes through the use of value chain principles and structured analysis.

3. BPAWG Deliverables

BPAWG deliverables in support of the vision are:

- functional area models (requirements specifications) and diagrams with textual structured information describing the functional business processes and roles of players involved for submission to working groups for further detailed specification;
- proposals to resolve overlaps, redundancies, and bottlenecks identified during review analysis of completed working groups' models.

¹ Trade/R.650 11 October 1996 Recommendations for the Establishment of CEFACT (The Centre for the Facilitation of Procedures and Practices for Administration, Commerce, and Transport)

- reports containing proposals for guidance and use by working groups in developing solutions to discrepancies.

4. **Modelling Methodology**

As reported to the UN/CEFACT Plenary in March 1999, the TMWG had developed a Unified Modelling Methodology (UMM) for use by UN/CEFACT working groups (CEFACT/TMWG/N090).

The BPAWG has been using UMM to test the methodology in a Prototype Analysis Case.

5. **Prototype Analysis Case**

The BPAWG informed the UN/CEFACT Plenary in March 1999 of its intention to test the Unified Modelling Methodology using the International Trade Transaction Model (ITT Model).

Using the ITT model as a basis, the group has worked on the development of a new International Supply Chain Domain Model. The initial application chosen has been with special reference to purchasing.

The BPAWG Model of the International Supply Chain Domain (CEFACT/1999/BPO15) was approved at its meeting held on 25 January 2000 for circulation to EWG for comments and contributions. Joint meetings were planned to be held with the EWG in Paris, 20-24 March 2000. A copy of CEFACT/1999/BPO15 is attached in Annex A.

6. **BPAWG Sub-Groups**

6.1 **BPAWG – UK**

This group was launched in January 1999 and has concentrated on the analysis of both Import and Export Supply Chains.

6.2 **BPAWG – EUROPE**

This second group was started in April 1999 and, with assistance from TMWG, has been responsible for the testing of the Unified Modelling Methodology in the Purchasing Domain.

7. **Regional BPAWGs**

7.1 **Asia/Pacific**

During the EWG held in Canberra, 20-24 September 1999, in which BPAWG participated, a proposal was made to set up an Asia/Pacific BPAWG which would concentrate on Financial and International Payment issues in the International Supply Chain Domain. This group would give a first report to the EWG scheduled to be held in Taipei, in September 2000.

7.2 Europe

At its meeting held on 26 November 1999, the BPAWG agreed to merge its UK and European groups into a single European Regional group. This group will complete the work on the Purchasing Domain before moving on to the transport and import/export domains.

8. Future Developments

The acceptance of the Prototype Analysis Case should allow UN/CEFACT to adopt the Unified Modelling Methodology for use within the UN/CEFACT life cycle. Requirement specifications can then be developed and submitted to ITPWG for the simplification and harmonisation of trade procedures, and to EWG groups for message development, as foreseen in the UN/CEFACT Work Programme.

ANNEX A

BPAWG Model of the The International Supply Chain Domain

An initial application of the proposed UN/CEFACT Unified Modelling Methodology
With special reference to purchasing.

Original document: UN/CEFACT/BPAWG/BP015.Rev.2 - January 2000

Source: BPAWG

Status: Interim Report

Action: For EWG Comments / Contributions

Note:-

This document is an interim report prepared in time for presentation at the EWG in Canberra in September 1999 and for issue in Paris in March 2000. It is far from complete but is issued to illustrate the modelling approach adopted by BPAWG and to seek comment from EWG. The model will be expanded and refined as the work progresses and as feed back is received.

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BPAWG Business Model - International Supply Chain

Introduction

The Business Process Analysis Working Group of UN/CEFACT has set out to model the International supply chain using the UML based methodology proposed by TMWG. This paper represents an interim report of that work. It presents a high level description of the International Supply Chain Domain expressed as Business Use Cases and Business Objects. It is planned to expand the level of detail in future reports so as to provide UN/CEFACT with a reference model that can support more detailed standardisation work and trade facilitation actions within UN/CEFACT working groups.

To demonstrate how this model can be developed to describe e-business requirements and EDI messages, the model has been expanded in the area of Ordering to encompass the Call Off Order based on the Simpl-EDI work carried out by the ANA.

The report also gives an illustration showing how a UN/EDIFACT message may be designed on the basis of the model.

The document follows the process described in UN/CEFACT/TMWG/N090, UN/CEFACT Unified Modelling Methodology. This methodology involves the following 4 workflows :-

1. Business Domain Modelling
2. e-Business Requirements
3. Analysis
4. Design

The deliverables for each workflow are expressed as UML artifacts together with a glossary of definitions and table of e-business requirements.

In this methodology the Business Domain Model will be technology independent but the deliverables from Analysis and Design will become increasingly technology specific.

BPAWG is primarily responsible for the first of these workflows, but this document covers aspects of the 4 workflows to demonstrate how they link together. It must also be remembered that, in practice, these workflows are iterative and the model must be refined from "bottom up" as well as be driven "top down".

1. Business Domain Model

1.1 Objectives

To produce a high level model of the International Supply Chain and expand it in the area of purchasing/supply, building on ITT, EAN, ANA (Simple-EDI) and other work.

The work will be used to:-

- Act as an example of new methodology proposed for use within UN/CEFACT
- Validate the CEFACT Unified Modeling Methodology proposed by TMWG
- Provide a basis for trade facilitation actions and an educational tool in place of the ITT Model
- Drive UN/CEFACT's Standards development activities and simplification and harmonization of trade procedures.

1.1.1 Deliverables

Deliverables for January 2000

- Draft Business Model
- Example of e-Business Requirements for purchasing (call off)
- Input for EWG T9

Long Term Deliverables

- Business Domain Model
- Glossary of Business Terms
- Input to EWG for definition of e-Business Requirements
- Input to ITPWG for Trade simplification actions

1.1.2 Scope

The International Supply Chain Domain covers all stages following the recognition of need by a Customer for a product or service to the fulfillment of an order by a supplier and the resulting financial settlement. It incorporates any necessary activities carried out by Intermediaries and authorities. Figure 1, below, shows the main parties involved and the flows of goods and information between them.

1.1.3 References

ITT Global Reference Model - UN/CEFACT www.un-ece.org/trade/itt/itt_tip.htm

Java Framework for Simple EDI - ANA, May 1998

SIMPL-EDI, ANA (UK) Ltd, November 1997

UN/CEFACT Unified Modeling Methodology -TMWG/N090

1.1.4 Project Stakeholder

UN/CEFACT CSG

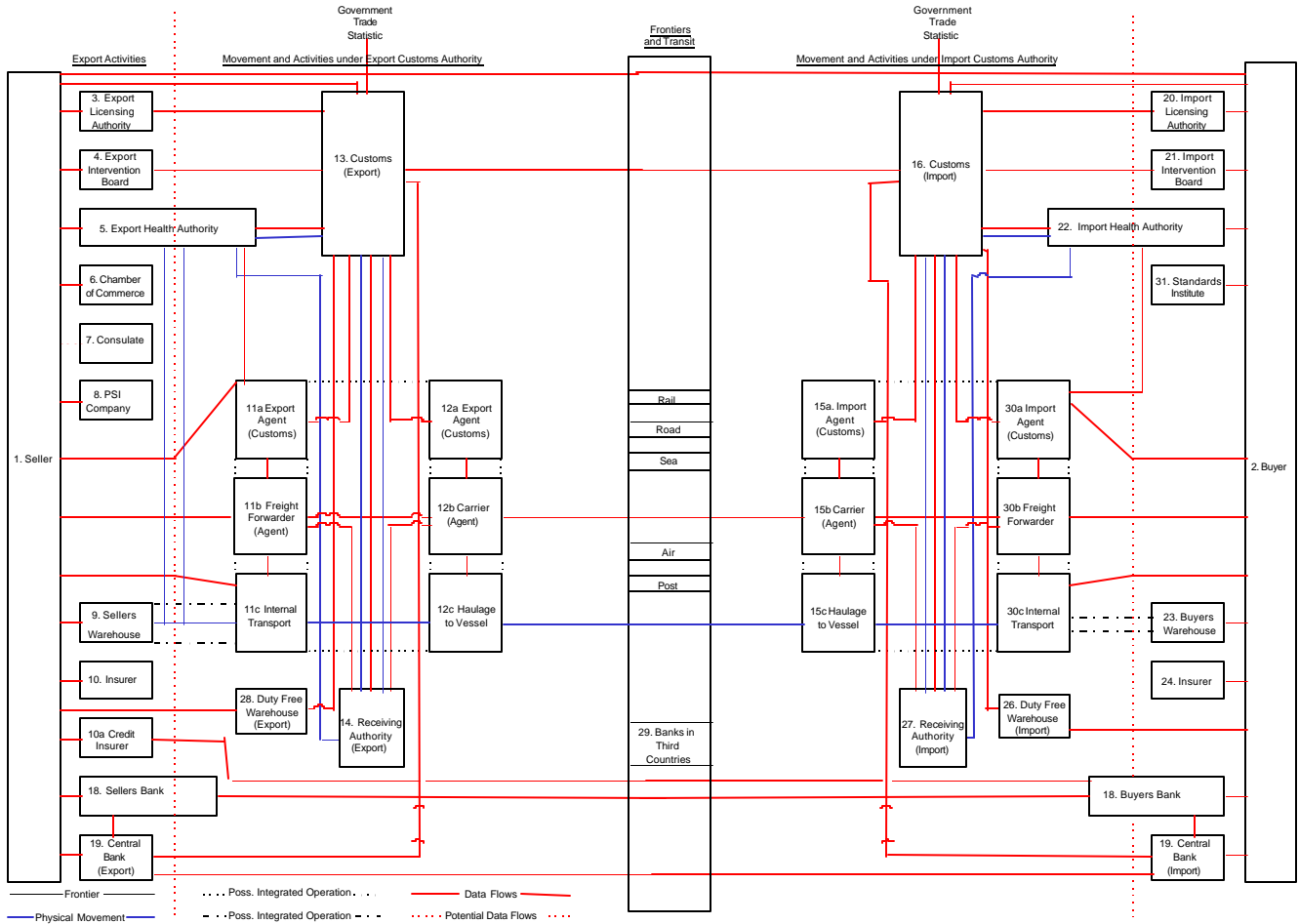


Figure 1. Parties and Information Flows in the International Supply Chain

1.2. Business Opportunities/Problem Statement

The procedures for international purchasing and supply are often cumbersome, time consuming and inefficient. This can affect a country's economic viability as well as introduce unnecessary cost to the consumer and poor service to customers.

The procedures and activities identified in the modeling process can be assessed to identify any that do not add significant value or enhance security or safety, and provide opportunities for facilitation actions. The model of the international purchasing and supply domain can be used to show "best practice" as a way to highlight opportunities for improvements for all countries, businesses, governments or economies. The use of e-business and Simple EDI can bring efficiency gains to organisations for who do not yet benefit from EDI. Simplified procedures can aid countries seeking to expand their international trade. The revised work plan of UN/CEFACT including the formation of T8 and T9 Groups and the growing recognition that object based modeling can support message design, EDI standardisation and facilitate software development, make this a good time to introduce model based developments within UN/CEFACT.

1.2.1 Boundaries of the Domain Actors

These may be categorised as **Customer, Supplier, Authority, and Intermediary.**

Customer A party who acquires, by way of trade, goods or services

Supplier A party who provides, by way of trade, goods or services

Authority A statutory body existing within a jurisdiction and a specific area of responsibility that administers legislation to regulate trade and/or monitors compliance with existing legislation.

Intermediary A commercial party who provides services to Customers, Suppliers or Authorities within the international supply chain.

Some of the roles carried out by the Actors in these 4 categories are listed in 1.2.3 below.

Business objects

An initial list of high-level business objects is given below. Their definitions may be found in the Glossary, Annex 2. (To be expanded)

Object Name
Product
Supplier (Potential Supplier or actual Supplier)
Customer (Potential Customer or actual Customer)
RFI Document
RFQ document
Quote
Catalog
Price
Delivery time
Payment terms
Delivery terms
Contract document
Framework Agreement
Order
Order Response including Order Change, Order

Confirmation, Order Cancellation.
Credit rating
Transport document
Consignment
Transport
Regulations
Locations
Invoice
Payment documents
Letter of credits
Payment
Call-off order

Outside the Boundary

Credit checking by the supplier, and manufacturing of product, are considered to be outside the scope of this use case. They will be addressed at a later stage.

Constraints

- Political - Terrorist Countries
- Trade Barriers/Embargoes
- Government Regulation
- Economic - Ability to Pay
- Environmental - Hazardous Goods, Health
- Physical - Weight, Physical form

1.2.2 Stakeholders' Needs

Customer - Knowledge of sources of supply, Best products /services at the best prices, simpler procedures, reduced restrictions, minimum costs of operation.

Supplier - Increased market share, optimum profit, reduced restrictions to market, simpler procedures, reduced documentation, guaranteed payment.

Authority - Ensure regulations are enforceable easily/effectively to protect consumer from risk or protect economy.

Intermediary - Efficient procedures with minimum of imposed restrictions/delays

Sponsor Stakeholder

UN/CEFACT - Initial results to be available for presentation to September EWG meeting and possibly form the basis for a T9 demonstrator project.

1.2.3 Actors and Use Cases

Actors		Possible Roles
Customer		Consignee
		Buyer
		Payor
Supplier		Consignor
		Seller
		Payee
Authority		
	Customs	Export or Import Control, Collector of Statistics
	Licensing	
	Intervention Board (EU)	
	Health	
	Consular	
	Chamber of Commerce	
	Standards Institute	
	Receiving Authority(Port Authority)	
Intermediary		
	Import Agent	
	Export Agent	
	Freight forwarder	
	Carrier	
	Receiving authority	
	Bank	Services to Customer or Supplier, Central Banking Services
	Insurer	
	Credit insurer	
	Inspection company	
Broker		
	Commission Agent	Any of the Commercial Roles

Identify Business Use Cases

Name of Use Case - Purchase and Supply Internationally

Actors - Customer, Supplier, Intermediaries, Authorities

The Use Case for Purchase and Supply Internationally can be expressed as 5 Use Cases reflecting the major stages in the process. These are:-

Identify potential partner (Market intelligence gathering, RFI)

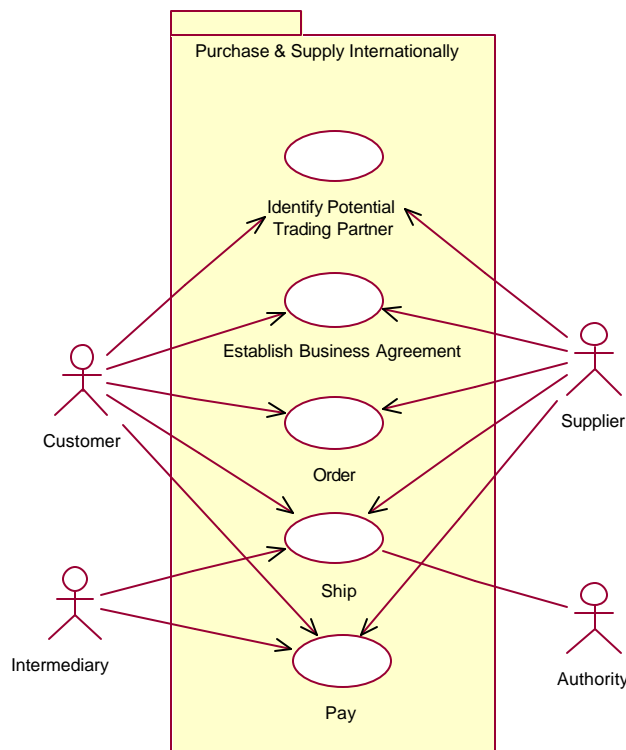
Establish Business Agreement (RFQ, Selection/negotiation, Establish framework or contract with selected supplier including agreement on payment terms and delivery terms (Data Alignment))

Order (Including order change, confirmation etc)

Ship (Including transport and all appropriate administrative and regulatory actions)

Pay (Including Invoicing or other means of instigating a payment, disbursements, taxes, and the payment itself)

Figure 2. Use Case Diagram - Purchase and Supply Internationally



Note: - There is no sequence implied by the placing of the use cases within the figure. Arrows imply that use case may be initiated by the actor(s) on the end of the arrow.

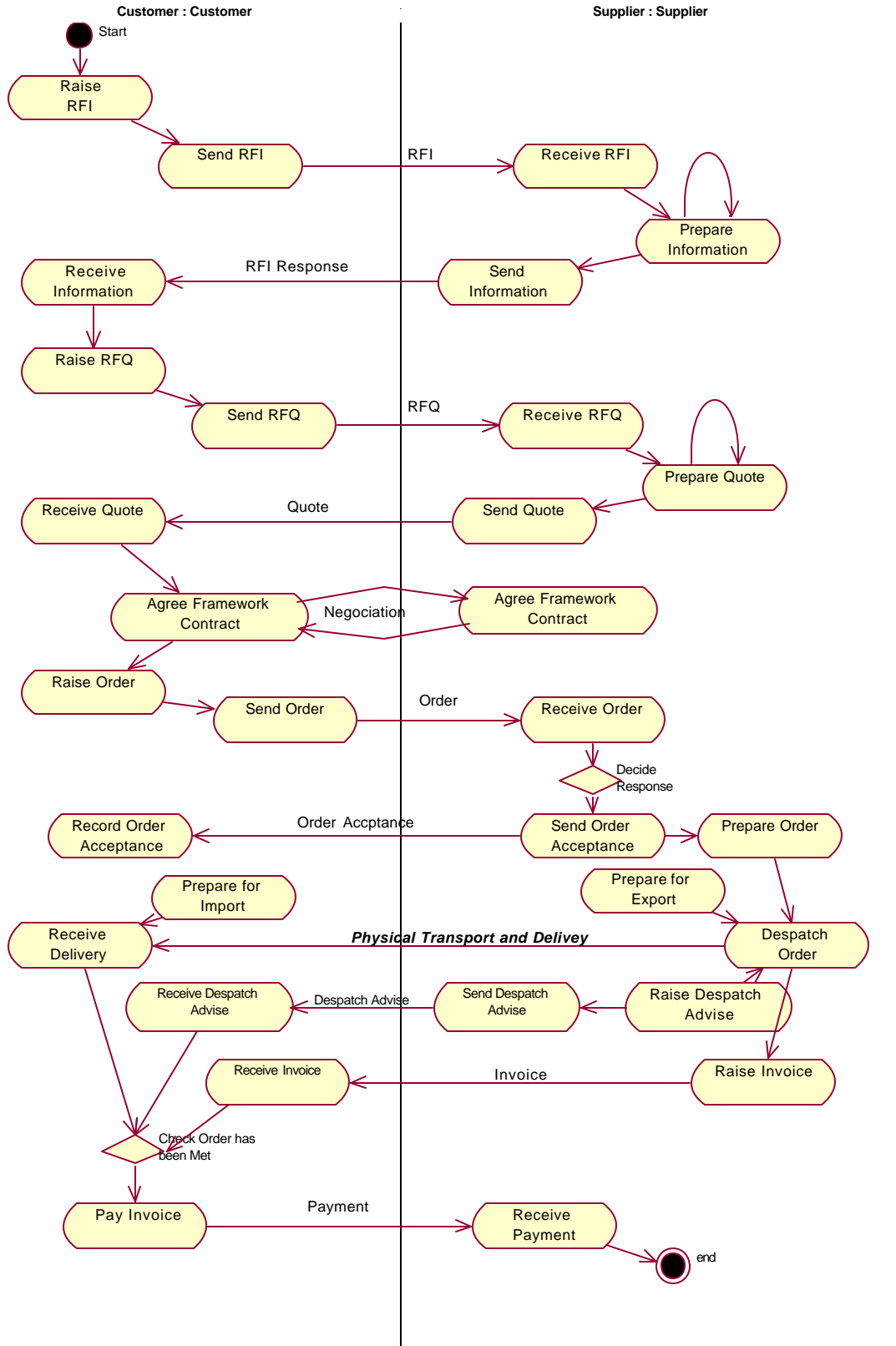
Business Domain Use Case Description - Purchase and Supply Internationally

Name	Purchase and Supply Internationally
Actors	The Customer, the Supplier, Intermediary and Authority
Description*	The customer recognises a need for a product, gathers market intelligence on suppliers, establishes contract arrangement with selected supplier, places order, product is shipped and customer pays supplier according to agreed terms of trade.
Pre-condition	Customer recognises need for product. Potential supplier exists.
Post-conditions	Customer has product and supplier received agreed payment
Scenario*	<ul style="list-style-type: none"> - the Customer requests information from Suppliers - Suppliers respond - Customer issues request for quote - Suppliers respond - Customer establishes framework agreement or contract with selected Supplier - Customer raises order - Supplier decides if he can fulfill it - the Supplier confirms acceptance - Order is Shipped after both Customer and Supplier have meet any necessary regulatory and contractual requirements - Customer pays Supplier - Customer may raise further orders under the framework/contract
Alternative * Scenarios	<p>Supplier send unsolicited information to potential Customer etc</p> <p>Supplier rejects Order</p> <p>Supplier develops counter proposal (Order-Change) etc.</p>

**Note. Use Case descriptions should be written from the viewpoints of all Actors. This may necessitate elaborating different scenarios or choosing words that each actor recognises in expressing the single scenario.*

The activities that are involved in the scenario described in the Use Case are illustrated in figure 3, below. This diagram also shows the information (messages) that pass between the Customer and Supplier. These are candidate Business Entities required later in the modelling process.

Figure 3. Activity Diagram - Purchase and Supply Internationally



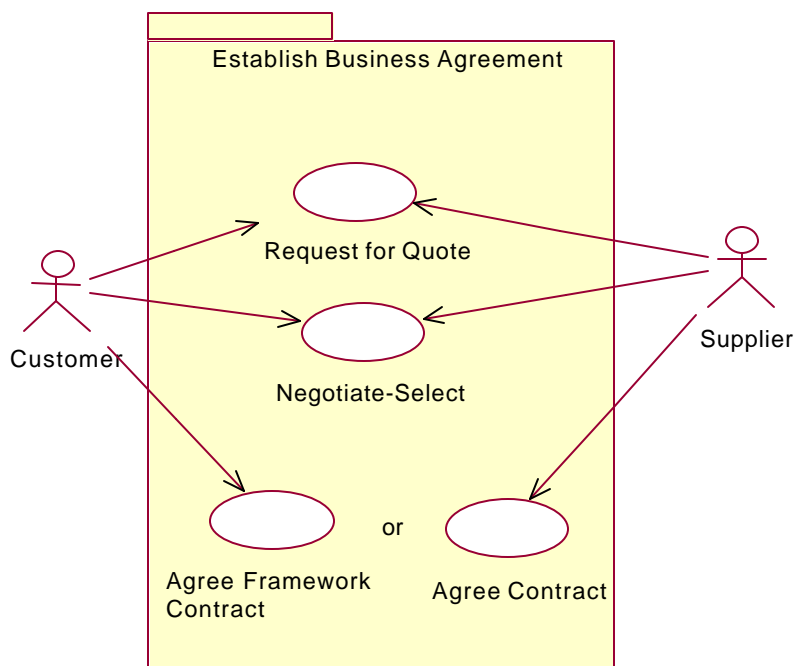
1.2.4. Use Case Elaboration

The 5 Use Cases that are defined to make up the Purchase and Supply Use Case are described briefly below. Use Case Diagrams for the Establish Business Agreement, Ship and the Order Use Cases are further detailed. These will be further elaborated in later versions of the model.

Name	Identify potential partners
Actors	Customer, Supplier
Description	The customer looks for potential suppliers and the supplier looks for potential customers. A Customer issues a Request for information and interested suppliers respond or a Supplier sends information to potential customers with whom they would like to do business.

Name	Establish Business Agreement
Actors	Customer, Supplier
Description	A Customer issues a Request to Quote to Suppliers. Suppliers responds or Supplier sends an unsolicited quote to a potential Customer. Customer negotiates with the selected suppliers to agree the terms for a Framework agreement or a "one off" Contract.
Pre-condition	Customer has identified potential suppliers.

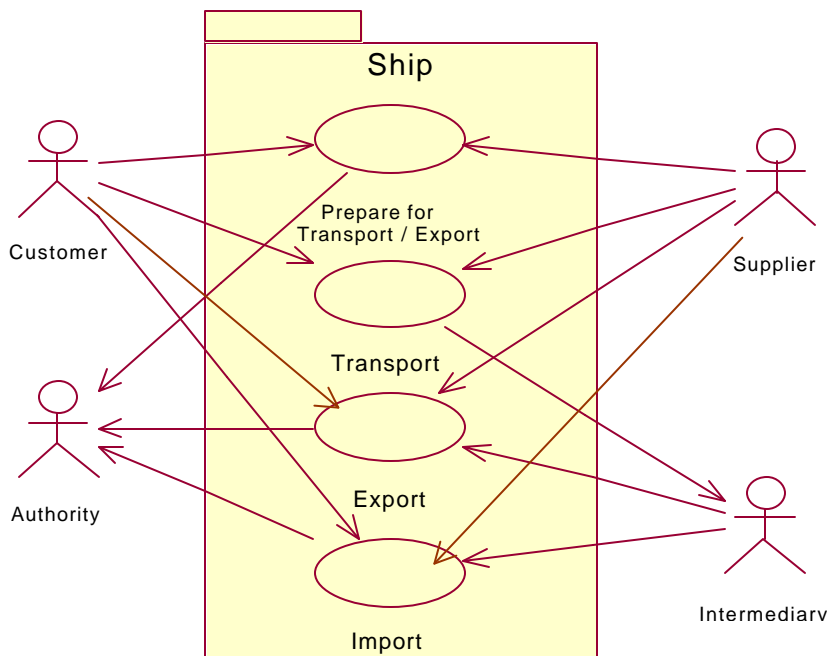
Figure 4. Use Case Diagram - Establish Business Agreement



Name	Order
Actors	The Customer, the Supplier
Description	The customer recognises a need for a product and places an Order under an established contact or a framework agreement. The supplier receives order and responds.
Pre-condition	A contract or a framework agreement exists

Name	Ship
Actors	The Customer, the Supplier, Intermediary, Authority
Description	The supplier dispatches the products according to the terms of trade specified and the customer receives the product. All transport arrangements are made and executed and the requirements laid down by the relevant authorities are met.
Pre-condition	An order sent by customer has been accepted and confirmed by the supplier.

Figure 5. Use Case Diagram - Ship



Name	Pay
Actors	The Customer, the Supplier, Intermediary, Authority
Description	A demand for payment is raised. The payor makes the payment and the payee receives the payment according to the terms of trade agreed.
Pre-condition	The terms of trade specified in the Contract or Framework agreement that apply to the transaction have been met.

The next stage in the modeling process is to consider in detail each of the Use Cases discovered so far that involve relationships between pairs of actors. In this report we have considered only the Customer Supplier relationship for the Order Use Case and restrict it to a scenario of an order raised under a Framework agreement - the Order- CallOff.

Use Case Model - Order- CallOff

Name	Order-CallOff
Actors	The Customer, the Supplier
Description	The customer recognises a need for a product and places a call-off under a frame agreement. The supplier receives order and responds
Pre-condition	A framework agreement exists
Begins When	When Customer recognises a need for a product the supply of which is covered by a framework agreement with a particular supplier
Ends When	When supplier confirms acceptance of order and conditions
Post-conditions	The order is accepted.
Scenario	- the Customer raises an Order-CallOff - the Supplier confirms acceptance
Alternative Scenarios	Supplier rejects order. The supplier can't meet all the order conditions and sends a counter proposal. An iterative process might ensue. The Customer accepts the revised order. Customer cancels order.

Figure 6. Use Case Diagram Order-CallOff

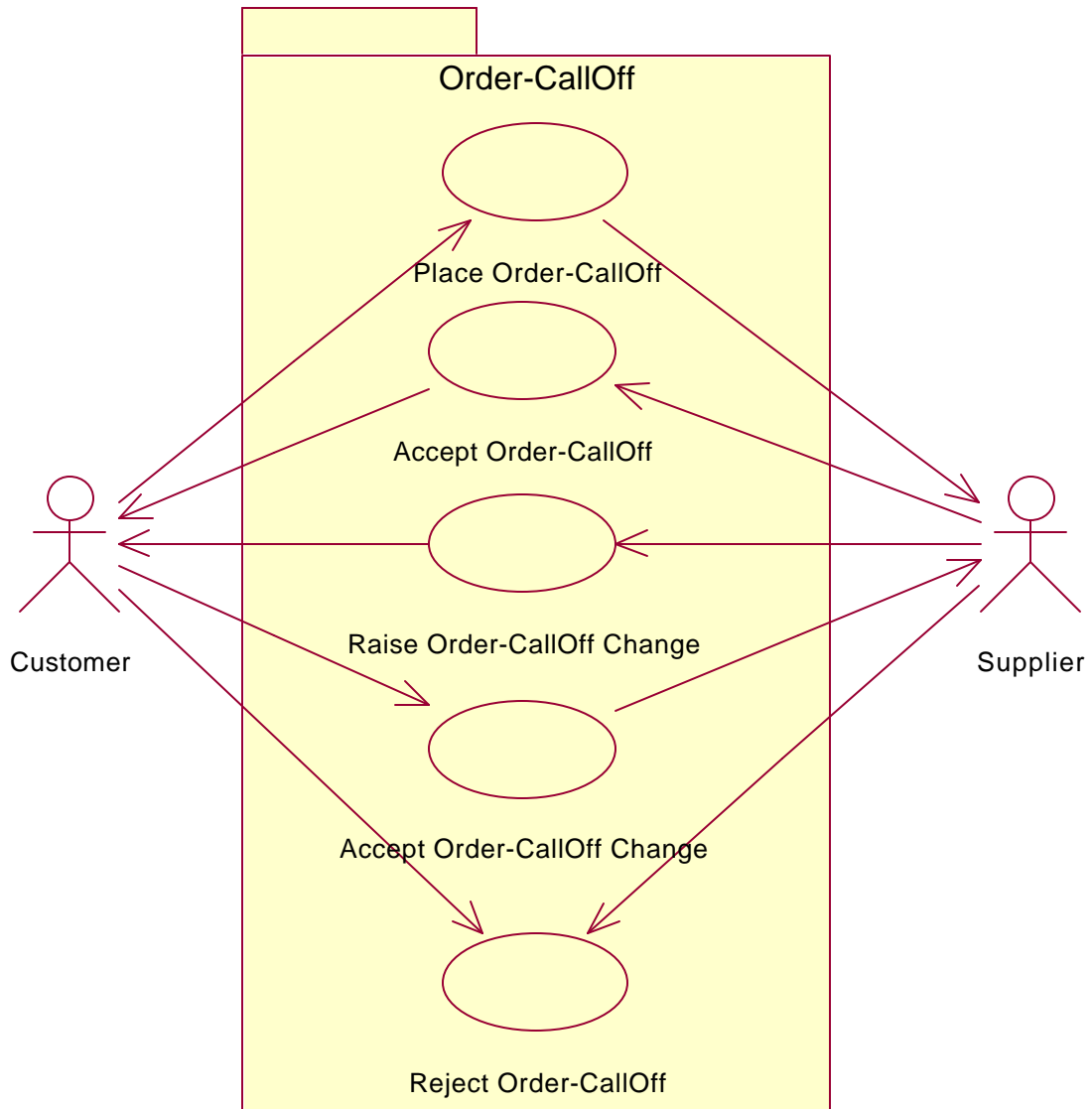
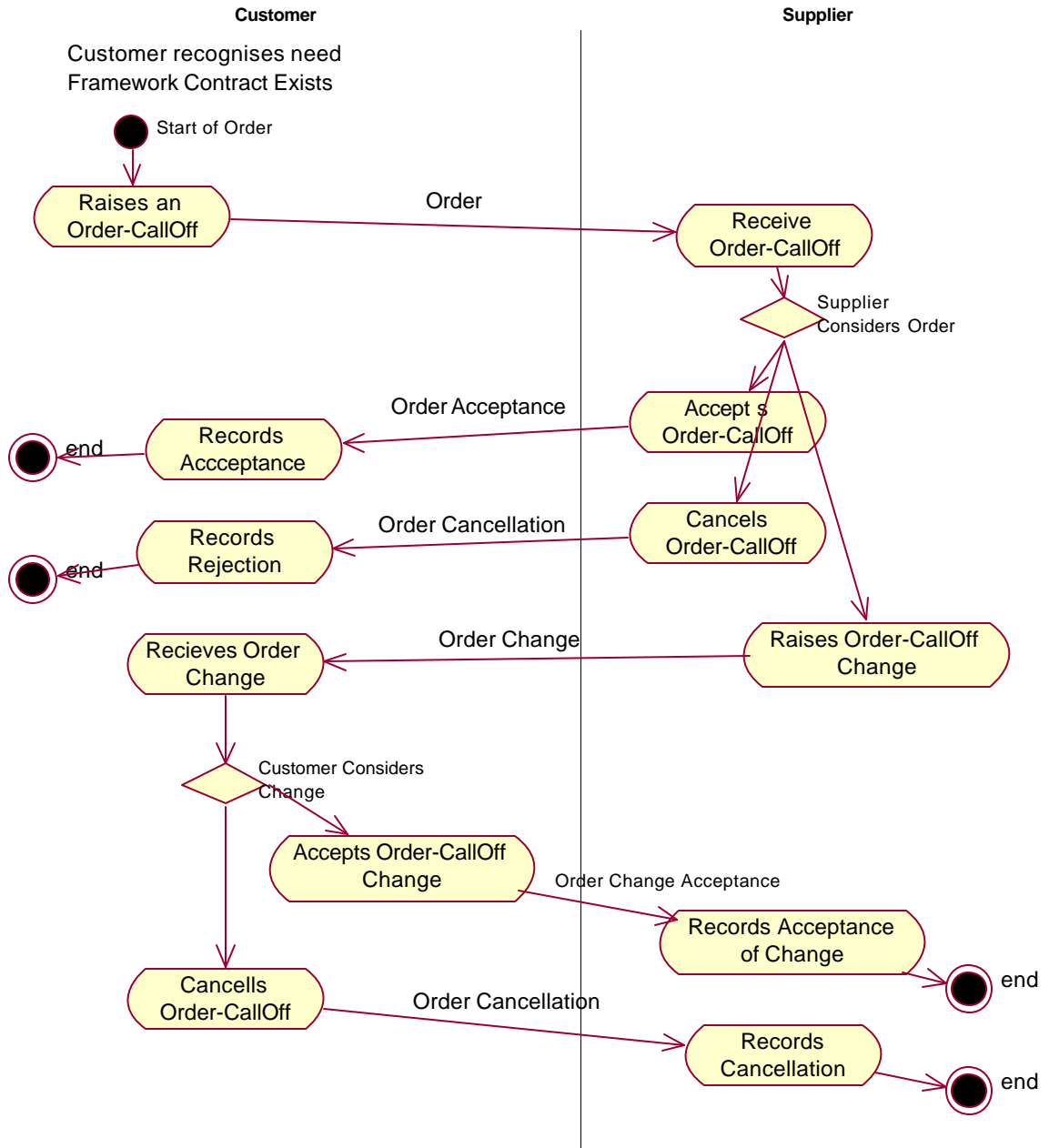


Figure 7. Activity Diagram- Order-CallOff



Business Requirements

The Objects required in a CallOff Order are tabled below and the business requirements are recorded in the Annex 3. This list will be expanded as each use case is detailed further.

Objects participating in a Call Off Order

Object	Attributes
Order-CallOff	Order Number
Line Item	Line Number
Product	Product Name Product I.d.
Quantity	Amount Unit of Measure
Location	Delivery Address LOCODE
Date/Time	Delivery Date/Time Issue Date/Time
Customer	Customer Name Customer I.d
Supplier	Supplier Name Supplier I.d.
Framework-Agreement	Framework Agreement Reference No. Data Annex Reference No.

The Customer and Supplier objects, and indeed the other objects that describe the Actors in this domain, may be generalised into a Party Object. This Party object will contain the attributes common to all Actors. In this case just their Name and I.d.

This may be illustrated in a class diagram as shown below.

Party Object created to provide a generalisation for Actors

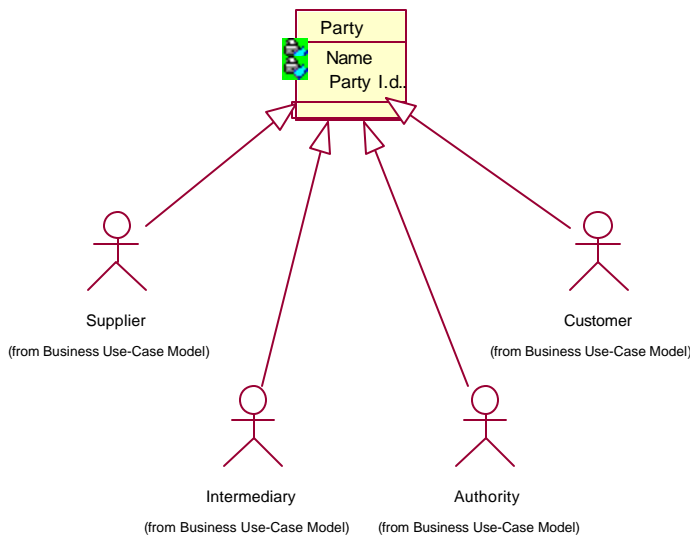


Figure 8. Class Diagram - Framework-Agreement

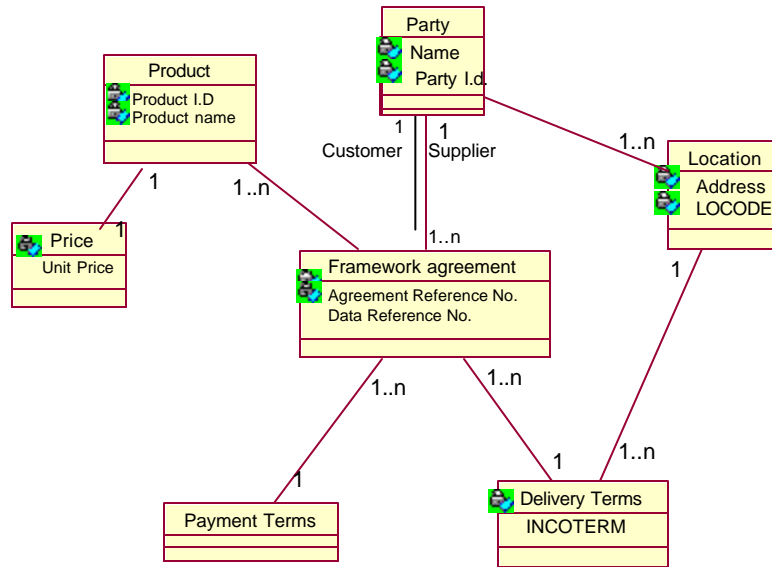
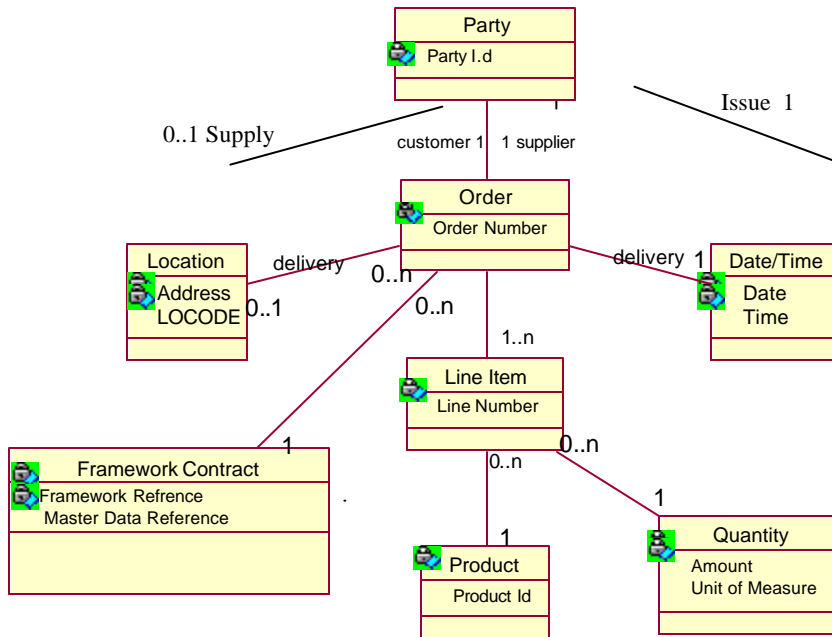


Figure 9. Class Diagram - Order-CallOff



2. e- Business Requirements

2.1 Vision for Purchasing

The details for the e-business requirements have been abstracted from the ANA paper on Simple EDI that has specific application in retailing.

This requirements specification relates to the **Establish Business Agreement, Order, Ship and Pay** use cases identified as part of the International purchase and supply chain model. It is restricted to consideration of the establishment of a purchasing framework agreement and the subsequent Call-of Order, Invoice and Advise of Dispatch.

(e-Business Requirements for other business scenarios in the International Supply Chain Domain and specific to other business sectors, will be considered at a later stage.)

2.2 Goals and Objectives

The ANA Framework supporting Simple EDI shall provide facilities to allow:

- Existing EDI users to trade with Small and Medium Enterprise using Simple EDI standards.
- Small and Medium Enterprises to trade with other Small and Medium Enterprises using Simple EDI.
- A simpler standardised set of business processes for all.

Constraints and Criteria

The e-business solution must enable appropriate levels of security to be incorporated to provide integrity, confidentiality and reliability.

It must be simple to use and:

- Allow any entity to leverage their existing infrastructure to transact/trade with a new partner/entity.
- Allow the use of the simplified messages of Simple EDI whilst still supporting the Old World EDI processes.
- Allow the use of New World EDI processes between those that adopt Simple EDI.

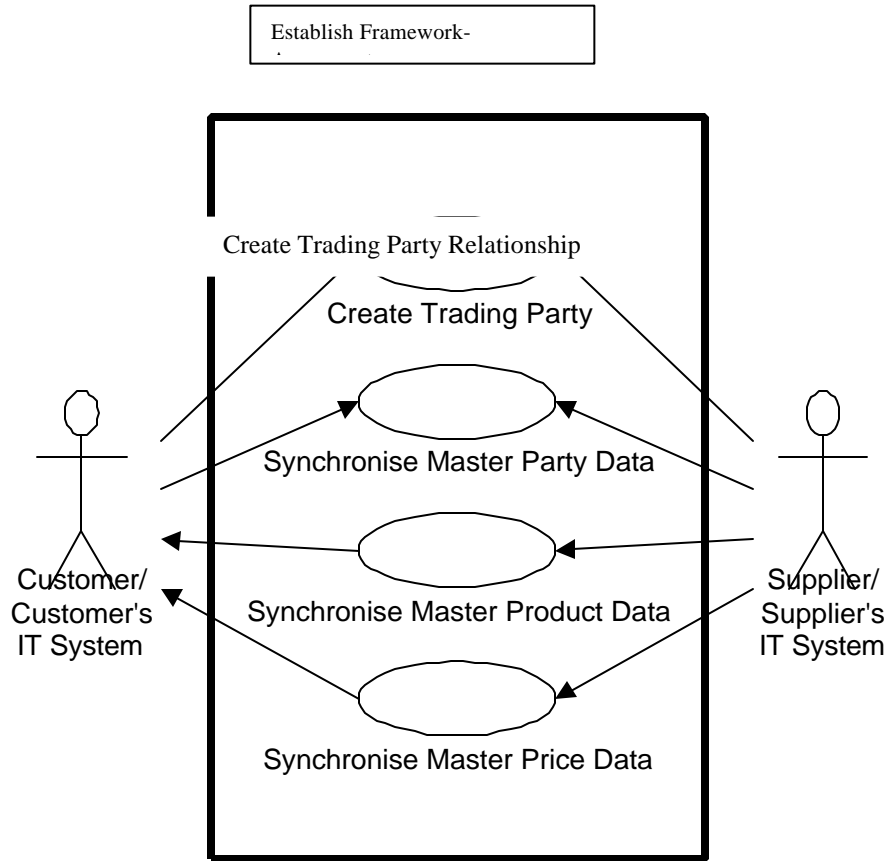
Encourage ubiquity of Simple EDI message standards and processes

2.3 Use Case Diagrams

The following diagrams show the Use Cases that the Simple EDI System proposed by the ANA should support to provide an e-business solution for Purchase and Supply Internationally.

The first diagram shows those Use Cases related to the Establish a Framework Agreement (used by the Establish Business Agreement Use Case described in Section1), by creating the trading party relationship and synchronising Master Data between trading parties.

Figure 10. Establish Framework-Agreement Use Case



Use Case	Create Trading Relationship
Actors	Customer/Customer's IT System, Supplier/Supplier's IT System.
Purpose	Allow a Customer and Supplier to create a Trading Relationship between them, which provides the context for that relationship.
Overview	A Customer and Supplier create the Trading Relationship between them which provides the context in which they plan to trade. Once a Trading Relationship is in place, the parties can agree on a shared view of Party Master Data, Product Master Data and Price Master Data. A Trading Relationship must exist before trades can occur.
Notes	A structured Trading Relationship may involve both parties having a synchronised view (electronic or otherwise) of Product and Price Master Data (by copy or reference) which is contractually agreed. In both cases, a Trading Relationship exists and the Customer and Supplier are sharing a common view of Master Data.

Use Case	Synchronise Party Master Data
Actors	Customer/Customer's IT System, Supplier/Suppliers IT System
Purpose	Allows a Customer and Supplier to share <i>party master data</i> with each other.
Overview	A Customer and Supplier exchange basic information about themselves. This information includes Names, Locations, Tax Details, Mailbox address, etc.

Use Case	Synchronise Product Master Data
Actors	Supplier/Suppliers IT System, Customer/Customer's IT System
Purpose	Allow a Supplier to share <i>product master data</i> with a Customer .
Overview	A Supplier shares technical specifications identifying and describing (excluding pricing details) the goods/service the Supplier provides to a particular Customer .

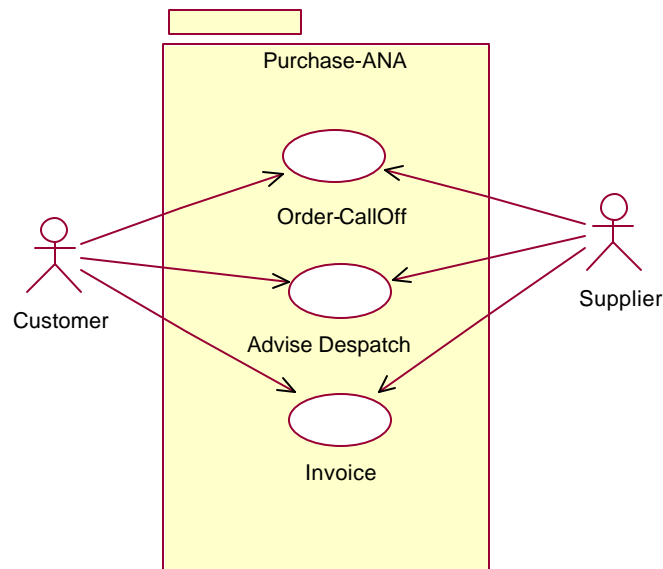
Use Case	Synchronise Price Master Data
Actors	Supplier/Suppliers IT System (Initiator), Customer/Customer's IT System
Purpose	Allow a <i>Supplier</i> to distribute pricing information about his goods and services to a <i>Customer</i> .
Overview	A Supplier provides a Customer with pricing information relating to the goods/service the Supplier provides.

2.4 Purchase-ANA Use Case

Use case Diagram

This diagram shows the Use Cases related to carrying out business transactions once Master Data has been synchronised. The Purchase-ANA Use Case uses specific scenarios from the Order-CallOff, Ship, and Pay Uses Cases described in Section 1.

Figure 11. Use Case Diagram Purchase -ANA



Use Case Descriptions .

The following sub sections describe each Use Cases for Simple EDI system at a high level. Each Use Case describes an interaction between one or more Actors and the system that is of value to those Actor's in it's own right.

Use Case	Order-CallOff-ANA
Actors	Customer/Customer's IT System, Supplier/Supplier's IT System.
Purpose	Allow a Customer to place an order with a Supplier and allow a Supplier to notify a Customer of his intent to completely fulfil a Order.
Overview	A Customer/Customer's IT System submits a single Order-Call Off for goods or services to a single Supplier/Supplier's IT System for the delivery of those goods or services to a single location at a single point in time. A Supplier/Supplier's IT System having received a Order from a Customer via the Order-CallOff Use Case sends an Order Response to the Customer acknowledging receipt of the Order and his <i>intention to fulfil</i> the Order. The Supplier intends to supply the specified goods/services to the specified location at the specified point in time.
Notes	The Customer/Customer's IT System will generate a number which it uses to uniquely identify the Order.

Use Case	Invoice
Actors	Supplier/Supplier's IT System (Initiator), Customer/Customer's IT System.
Purpose	Allow a Supplier to issues an Invoice to a Customer requesting payment for dispatched goods or services.
Overview	A Supplier/Supplier's IT System issues a single Invoice to a Customer claiming full payment for dispatched goods or services as specified and referenced in a single Order placed by the Customer using the 'Order-CallOff-ANA' Use Case.

Use Case	Advise-Dispatch
Actors	Supplier/Supplier's IT System (Initiator), Customer/Customer's IT System.
Purpose	Allow a Supplier to notify a Customer that he has dispatched the goods/services for a specified Order.
Overview	A Supplier having received a Order from a Customer via the 'Order' Use Case and responded with an Order Response via the 'Acknowledge ability to fulfil Order' Use Case, submits a Dispatch Advice to the Customer to advise the Customer that the Supplier <i>has already dispatched</i> the goods/services as specified in the 'Order' at a particular point in time.

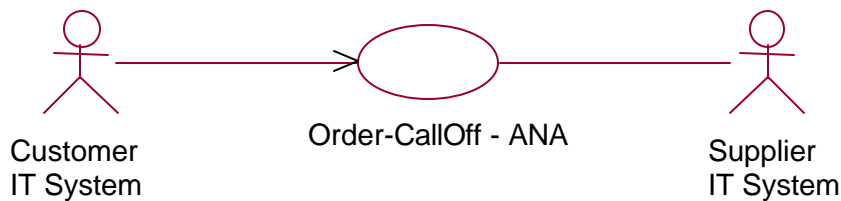
2.5 Use Case Elaboration

This section provides more detailed descriptions of the Use Cases listed above. At this stage we will only consider the Order-CallOff Use Case

Order-CallOff-ANA Use Case

Allows a **Customer** to place an Order-Call Off with a **Supplier** with whom the Customer has a Trading Relationship, and the Supplier to confirm that he intends to completely fulfil the order.

Figure 12. Order-CallOff-ANA Use Case



Preconditions

- The **Customer** wishes to place an order for a **Product** with a specific **Supplier**
- The **Customer** and **Supplier** must have completed the 'Create Trading Relationship' Use Case to create a trading relationship between them.
- The **Customer** and **Supplier** must have completed the 'Synchronise Party Master Data' Use Case.
- The **Customer** and **Supplier** must have completed the 'Synchronise Product Master Data' Use Case.
- The **Customer** and **Supplier** must have completed the 'Synchronise Price Master Data' Use Case.

Typical Scenario

1. The **Customer/Customer's IT System** specifies the version of the Framework-Contract that he wishes to refer to in the transaction. If the default version is not to be used.
2. The **Customer/Customer's IT System** specifies the versions of the Supplier's Party, Product and Price Master Data that he wishes to use for the transaction.
3. The **Customer/Customer's IT System** adds one or more Line Items to the Order, each of which specifies the Product that is required from the **Supplier** and the corresponding Quantity required.

This can be repeated many times.

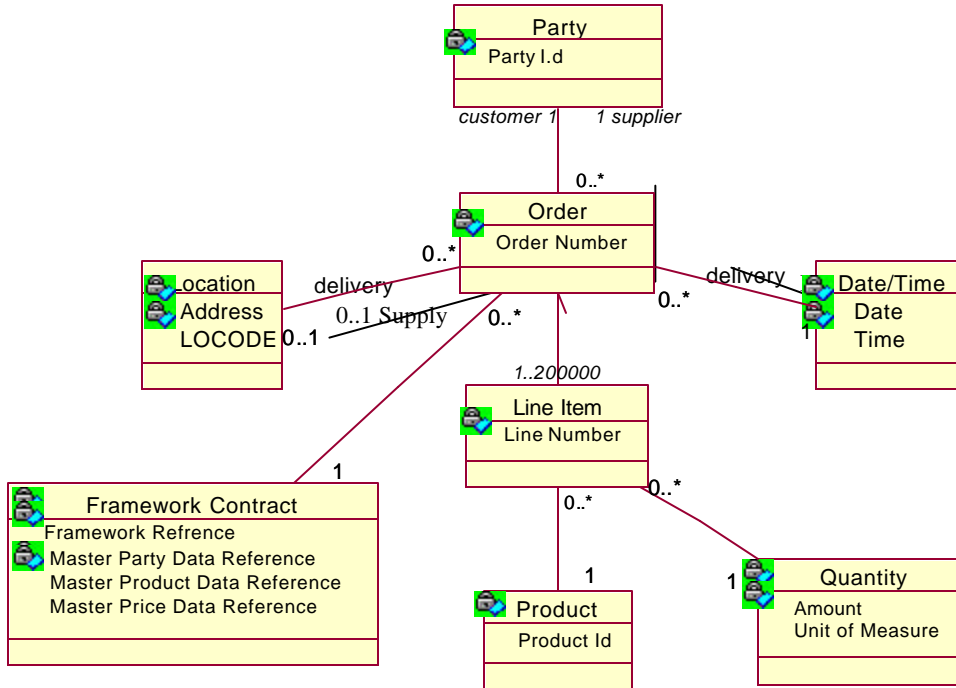
6. The **Customer/Customer's IT System** optionally specifies the deliver-to and ship-from Location for the Order-CallOff.
7. The **Customer/Customer's IT System** specifies the time (or range of times) when he would like the Products specified in the Order-Call Off to be delivered. All Products to be delivered at the same time and to the same location.
8. The **Supplier /Supplier's IT System** checks that requirements can be met and acknowledges acceptance of the Order-Call Off
9. The **Customer/Customer's IT System** records acceptance

Postconditions

- The Order-CallOff that was submitted by the Customer/Customer's IT System has been accepted by the Supplier/Supplier's IT System and the Customer/Customers IT system has recorded the acceptance.

2.6 Class diagram

Figure 13. Class Diagram - Order-Call Off- ANA



3. Analysis

In this phase of the Modelling methodology, the Use Cases and Class Diagrams are analysed to identify key concepts. Use Cases and Objects may be generalised to provide re useable components and interaction diagrams produced. This is not pursued further here. However it will be noted that the Party Object has already been introduced to represent the common attributes of the Actors and a Date/Time object has been introduced. Also the Pay Use Case has been defined in general terms so as to enable its use outside the Supply Chain Domain.

4. Design of UN/EDIFACT Message

In the modelling methodology, this step handles the conversion of the UML artifacts into EDI messages or systems designs for e-Business applications. In this section the example of the ANA Simpl EDI order is used to illustrate the design of an EDIFACT message based on the models produced in the e-Business Requirements (section 2.)

A similar approach can be used to define messages in XML or other syntax.

4.1 Mapping Objects to UN/EDIFACT Segments

The objects (Business Entities) identified in the Class Diagram from the Purchase and Supply Domain may be mapped into EDIFACT segments. (There may not always be a one to one mapping and in some cases the mapping will have to be done at a data element / attribute level where no obvious segment mapping can be found.)

In this example the Classes from the Class diagrams for the Order-CallOff and Framework Agreement Use Cases are mapped to UN/EDIFACT segments as a complete domain level Class Diagram has not yet been produced.

Business Entities (Objects)	UN/EDIFACT Segments
Party - Customer	NAD
- Supplier	
Line Item	LIN
Product	LIN / PIA / IMD
Quantity	QTY
Location	NAD or LOC
Date/Time	DTM
Terms of Delivery	TOD
Terms of Payment	PAT
Price	PRI

Attributes of Business Entities(Objects)	UN/EDIFACT Segment
Framework Agreement reference	RFF
Master Data references	RFF
Order Number	BGM

4.1.1 Segment Qualifiers and Segment Group Structures etc.

The relationships between the objects in the class diagram will be represented in UN/EDIFACT messages by the hierarchical grouping of segments in segment groups or by qualifier codes in the segment qualifier. Thus for example, the "deliver " relationship between the Order and the Date /Time objects in figure 9 is reflected in the "delivery" code for the segment qualifier in the UN/EDIFACT DTM segment. The number of repeats of a segment or segment group will reflect the cardinality shown for the relationships in the class diagram .

4.2 Design of an UN/EDIFACT Simpl-EDI Order Message

This message is based on the Order-CallOff-ANA models created in section 2.

4.2.1 The Function of the Message

This can be found from the Use Case description, the Actors involved and the definitions. It may be stated as :-

A message sent from a Customer to a Supplier with whom he has already established a trading relationship for the supply of specified goods or services under the conditions set out in a framework agreement.

4.2.2 Data items required in Simpl EDI Order

These can be found from the Use Case description and Class Diagram (Figure 13).

Customer I.d
Supplier I.d
Order number
Order issue date/time
Framework Contract Reference
Party Master Data Reference
Product Master Data Reference
Price Master Data Reference
Delivery date/time
Delivery Location
Ship from Location
Line Item Number
Product I.d
Product Quantity and Unit of Measure

4.2.3 Possible Structure for UN/EDIFACT SIMPL-EDI Order Message

<i>Segment</i>	<i>Status</i>	<i>Max no of Repeats</i>	<i>Segment Name</i>	<i>Business data</i>	
UNH	M	1	Message Header		
BGM	M	1	Beginning of Message	Order number	
DTM	M	2	Date and Time	Order date/time Delivery date/time	
RFF	M	4	Reference	Framework Agreement ref. Master Data references	
NAD	M	4	Name and Address	Names / I.d /Roles of Parties Delivery to/Ship from address	
SG25	M	200000	Segment Group	Max.no.of line items in an order	
	LIN	M	1	Line Item	Product I.d
	QTY	M	1	Quantity	Quantity and Unit of Measure
UNT	M	1	Message Trailer		

5. Conclusions

This interim report presents the early results obtained by BPAWG from the application of the UN/CEFACT Modelling Methodology, proposed by TMWG, to the International Supply Chain Domain. It illustrates how the application of this methodology enables the development of a UML model of a business domain and enables the resulting artifacts to be used to create UN/EDIFACT messages or messages in any syntax. Thus even though the model of the international supply chain is still far from complete, it can be used by EWG groups developing UN/EDIFACT or XML messages. EWG groups are asked to comment on the work so far so as to enable the model to be enhanced and expanded and also to consider how BPAWG and EWG Groups can evolve this approach to cover all areas of UN/CEFACT's EDI work. Together with the work being carried out in T9, this report should provide UN/CEFACT with information and the practical experience necessary to develop the procedures for introducing formal model based EDI developments into UN/CEFACT as envisaged by CSD.

ANNEX 1 Glossary of Technical Terms in the Unified Modelling Methodology

TERM	DEFINITION
ACTIVITY	A task that transforms inputs into outputs via the work of mechanisms under the instruction of controls. Activities occur over time and have identifiable outputs.
ACTIVITY DIAGRAM	The activity diagram displays a sequence of activities including alternative and concurrent execution.
ACTOR	An actor represents a role played in relation to a use case by someone or something in the business domain.
ANALYSIS WORKFLOW	The third stage in UN/CEFACT unified process.
ATTRIBUTE	Any named property used as a data abstraction to describe its enclosing object, class, or extent.
BUSINESS ENTITY	Something that is accessed, inspected, manipulated, produced, and so on in the business.
BUSINESS ENTITY CLASS	Group of items which are structured in the same way: - that serves the fundamental missions of the company. - that has legal and/or commercial basis. - which may participate in exchanges with partners. - which will be implemented into objects (object technology) through a modelling process For example: order is a business entity class.
BUSINESS PROCESS	The means by which one or more activities are accomplished in operating business practices.
BUSINESS RULE	Rules, regulations and practices for business.
BUSINESS DOMAIN MODEL	The first stage in UN/CEFACT unified process.
BUSINESS EXPERT	A person who is knowledgeable about the business area being modelled.
CLASS	Any uniquely identified abstraction of a set of logically related instances that share the same or similar characteristics.
CONSTRAINT	A condition or restriction.
DIAGRAM	A graphical depiction of all or part of a model
DOMAIN	An area of knowledge or activity.
EVENT	An event is an occurrence that may cause the state of a system to change.
MODEL	1. Any abstraction that includes all essential capabilities, properties, or aspects of what is being modelled without any extraneous details. 2 Any cohesive set of requirements or design information.
OBJECT	Any real or abstract thing about which we store data and the operations to manipulate those data.
OPERATION	Any discrete activity, action, or behavior that is performed by an object or class.
REQUIREMENT	A statement of business needs and constraints.
REQUIREMENT WORKFLOW	The second stage in UN/CEFACT unified process.
STAKEHOLDER	Someone or something that is materially affected by the outcome of the system but may or may not be an actor.
STAKEHOLDER NEED	The business or operational problem (opportunity) that must be fulfilled in order to justify purchase or use.
SYSTEM	A system is a set of items which interact with each other and interact also with an external environment. The system is aimed at specific goals .
USE CASE	A use case is a description of the possible sequences of interactions among a system and one or more actors in response to some initial event from an actor to the system. A use case includes events and system operations that are visible to the actors.
SCENARIO	The sequence of activities performed in a business that produces a result of observable value to an individual actor of the business.

ANNEX 2 Glossary of Business Terms

Name	Definition	Source
Actors		
Customer	A party who acquires, by way of trade, goods or services	EDIFICE
Supplier	A party who provides, by way of trade, goods or services	
Intermediary	A party who provides commercial or transport services to Customers, Suppliers or Authorities within the international supply chain.	BPAWG
Authority	A statutory body existing within a jurisdiction and a specific area of responsibility that administers legislation to regulate trade and/or monitors compliance with existing legislation.	BPAWG
Business Entities		
Consignment	To be defined	
Contract	A legally binding agreement between two parties in which the specific titles, rights, commitments, and obligations of both parties are defined.	
Delivery Terms	Terms agreed between supplier and customer under which the supplier undertakes to deliver goods or services to the customer.	
Delivery Time	The day/time at which the supplier contracts to deliver the goods or service at the location specified in the delivery term.	CJC
Framework Contract	A contract agreed between a customer and a supplier setting out the conditions of trade and technical details under which a customer may place orders with the supplier for products over a specified period.	CJC
Invoice	A document claiming payment for goods or services supplied under conditions agreed by seller and buyer.	
Line Item	The identification of one individual product or service and its specific conditions for purchase.	
Location	A place at which a transaction takes place.	CJC
Order	A document by means of which a customer initiates a transaction with a supplier involving the supply of goods or services as specified, according to conditions set out in an offer, or otherwise known to the customer.	
Order Acceptance	A document issued by the seller confirming to the customer that the order will be met in accordance to the agreed terms of business.	CJC
Order Cancellation	A document issued by the seller to cancel the order previously placed with the supplier.	CJC
Order Change	A document proposing changes to an order previously issued.	CJC
Order-CallOff	A simplified order for supply of specified goods or services under the conditions set out in a framework agreement.	CJC
Payment	A transfer of money in exchange for goods or services received	
Payment Term	Terms agreed between customer and supplier under which the customer agrees to pay the supplier for goods or services.	
Product	Goods or services that can be purchased and sold	
Quote	A document issued by the supplier setting out terms for the supply of goods or services in response to a customer's request for a quotation.	CJC
Regulation	Legal conditions governing how trade must be conducted	
RFI	A request for information on products or services sent from a customer to potential suppliers.	
RFQ	A request to suppliers sent from a customer specifying goods or services required and the conditions for supply and inviting quotations.	

Annex 2 (contd.). Glossary of Business Terms

Name	Definition	Source
Actors Roles		
Advising Bank	A bank asked by the issuing bank to advise the credit to the beneficiary when payment is guaranteed by a documentary letter of credit.	ITT
Carriage Insurer	A party who provides insurance cover for the goods during carriage.	ITT
Carrier	A party undertaking or arranging transport of goods between named points. (Employed by either the buyer or seller)	TDED
Chamber of Commerce	A party who can issue "certificates of origin" of goods and certify signatures on commercial documents used for international purposes.	ITT
Consular Authority	A Government representative of the importers country based in the exporters country who legalise consular invoices and commercial documents to enable good to be imported into the importers/buyers country.	ITT
Credit Checking Agency	A commercial organisation that carries out checks on the financial state of the buyer, his ability to pay for the goods and his credit risk.	ITT
Customs Authority	A government body who protect society and collect appropriate revenue. They examine goods that are exported or imported and the declarations that accompany them. They act as agents for other Government departments in the checking of health documents, export licenses etc.	ITT
Export Control Authority	A party responsible for issue of Export licenses and the monitoring of compliance	ITT
Exporter/Seller	A party who supplies goods to the buyer (or Importer). He has title to the goods and is able to sell this to the customer for a consideration.	ITT
Freight Forwarder	An Intermediary employed by buyer or seller (depending on the terms of trade) who may carry out a variety of tasks concerned with the movement of goods. These can include collection and transport of goods and the completion of an export declaration on the exporter's behalf.	ITT
Health Authority Import	A party who ensures that products are suitable to be sold/consumed in the Country of Import	ITT
Health Authority Export	A party who carries out inspection or product where required, and issues certificates to state the suitability of the product.	ITT
Import Control Authority	A party who is responsible for the issuance of import licenses. Controls the import of restricted products.	ITT
Importer/ Buyer	A party who purchases the goods from the seller(or exporter)	ITT
Intervention Board	An organisation responsible for the supervision of the CAP (Common Agricultural Policy) arrangements. They issue licenses for import or export of some agricultural (CAP) products to non-EC countries and register traders involved in activities that result in payment or refunds under CAP.	ITT
Issuing Bank	A bank instructed by the applicant (normally the Exporter) to issue a Documentary Credit and who undertakes that payment will be made to the Beneficiary upon presentation of stipulated documents.	ITT
Receiving Authority Import	A body within the maritime regime (normally the Port Authority) who has responsibility for the safe unloading of the goods from the vessel.	ITT
Receiving Authority Export	A body (normally a Port or Airport Authority) who has responsibility for receiving the goods, for their safe storage and the loading of the goods onto the transport.	ITT

Annex2 (contd.) USE CASE Definitions

Use Cases	
Identify potential partner Use Case	A use case encompassing the means by which a customer discovers a potential supplier and a supplier discovers a potential customer.
Order Use Case	A use case encompassing the raising of an order by a customer and the resulting interchange of information between supplier and customer until the order is confirmed or cancelled.
Ship Use Case	A use case which encompasses all the interchanges between customer, supplier, Intermediary or authority until the order has been Shipped according to the conditions specified in the framework-agreement
Establish Business Agreement Use Case	A use case covering issue of a Request for Quote by the customer to suppliers, the suppliers response, the negotiation with the selected suppliers to agree the terms for a Framework agreement or for a one off Contract
Pay Use Case	A use case covering the raising of an Invoice or other means of instigating payment and the payment process until the supplier's account is credited appropriately.
Order-CallOff Use Case	A use case encompassing the raising of a simple order (Order-CallOff) in accordance with the conditions set out in a framework agreement, and the confirmation of acceptance of that order by the supplier

ANNEX 3 Business Requirements List

Req. #	Statement	Type	Source	Date	Status
1	A framework-agreement specifies the customer and supplier, the products, their specification and price, the terms of delivery and the payment terms.	Data	CJC	29/9/99	Open
2	A framework agreement can only involve one customer and one supplier.				
3	A framework agreement must have a reference number and may have data annexes that may be separately referenced.		ANA Framework for Simple EDI	May'98	
4	Several Order-CallOff s may be raised under one framework agreement.				
5	An Order-CallOff must be identified by an order number (unique between the two trading partners) and the issue date.				
6	An Order-CallOff must reference the framework agreement and may specify the delivery location and/or ship to location if that is not uniquely defined in the framework agreement.				
7	An Order-CallOff must identify the product by its reference number and specify the quantity to be provided.				
8	All line items on an Order-CallOff may be required to be delivered at the same date-time (Simple EDI-ANA) or may have individual delivery dates-times.		ANA Framework for Simple EDI	May'98	
