ELECTRONIC CATALOGUES IN ELECTRONIC PUBLIC PROCUREMENT

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Executive Summary

The new EU legislative framework of public procurement Directives 2004/17/EC and 2004/18/EC, adopted in 2004, introduces for the first time a coherent and comprehensive framework for the use of electronic public procurement in the EU. Amongst its most innovative provisions, it authorises the use of electronic catalogues (eCatalogues) as a tool for the electronic submission of tenders. In line with its Action Plan for eProcurement, adopted in 2004, the European Commission commissioned this Study to analyse rules and current practices for the use of eCatalogues in both the public and the private sectors, with a view to formulating requirements and recommendations for their further development.

The present Study is split into three parts:

- **State of Play**: presents eCatalogue initiatives in the public sector in the EU and in private companies, highlighting common points, differences, needs and requirements
- **Standardisation Activities**: presents current standardisation activities on eCatalogues and product description and classification schemes, and makes recommendations for the adoption of appropriate standards in Europe to increase interoperability
- **Functional Requirements**: defines preliminary functional and non-functional requirements for establishing eProcurement systems which may use eCatalogues as a tool for tender submission

The attached report presents the findings of the analysis of eProcurement Standardisation Initiatives.

The increasing needs for the electronic support of Business-to-Business (B-2-B) and Business-to-Government (B-2-G) transactions have intensified the need for standardisation through the establishment of open and commonly acceptable standards. One of the areas that standards attempt to address concern that of electronic public procurement. Standardisation activities in this area can contribute to the interoperable exchange of information between organisations, using the latest communication technologies. The use of standards can result in cost and time savings, as well as in the expansion to new markets. In addition, standardisation can play a significant role in building the confidence of European market players (i.e. consumers, vendors and economic operators) in eProcurement.

The EU legislative framework in public procurement, amongst its provisions, authorises the use of electronic catalogues for forming tenders, as it is envisaged that both suppliers and buyers can substantially benefit from their use. This is primarily due to the automated processing they can offer. The automated processing of eCatalogues however appears to be possible only when eCatalogues are formed and exchanged in a standardised manner i.e. when they are interoperable. Hence, standardisation in this field is necessary to increase efficiency through the reduction, or even elimination, of manual intervention.

Currently, there is a great number of electronic catalogue formats, as well as of product description and classification schemes for the exchange of electronic catalogues between consumers, vendors and economic operators. This report aims at identifying and presenting the existing eBusiness initiatives/standards developed by the international standardisation bodies (OASIS, CEN/ISSS and UN/CEFACT) in the area of eCatalogues. Two main eCatalogue standards have been emerging in parallel, namely UBL 2.0 and c-Catalogue developed by OASIS and CEN/ISSS respectively. The c-Catalogue is not yet an official standard, and is currently under further development by UN/CEFACT. This report compares these two prevailing initiatives/standards in terms of their business documents, processes and messages, in order to identify similarities and differences. Furthermore, issues concerning the extension of their use in the pre-awarding phases of the procurement cycle are identified and discussed.

The existence of UBL and c-Catalogue, as well as, several other eCatalogue standards, has created a substantial interoperability gap amongst organisations that make use of eCatalogues in order to conduct business electronically. OASIS and UN/CEFACT have recognised this issue and are currently taking actions towards the convergence of UBL and c-Catalogue with an objective to establish one unique standard to accommodate all needs. This convergence effort has started in 2007 and according to the action plan, results are expected to be published by November 2007.

In addition to eBusiness inititiatives/standards, this report discusses the standardisation activities in the area of product description and classification schemes. Such schemes consistute a core component of eCatalogues, offering the possibility to accurately categorise and describe products and services contained in eCatalogue prospectuses using standardised product hierarchies and sets of attributes. The interoperability of eCatalogues is closely associated with the interoperability of classification schemes used to describe products within eCatalogues. Strong points of such schemes are identified and presented in this report, and measures to achieve interoperability are proposed.

Current experiences regarding eCatalogue implementations are also presented, taking into consideration the progress made by EU Member States. Specifically, 6 European countries that already make use of eCatalogues in eProcurement have been investigated to study and analyse practices and standards.

The findings of this report are summarised below, with regards to actions/initiatives to be undertaken by Member States, Standardisation Bodies and the European Commission, in order to improve the current setting. The set of open issues and recommendations focus on improving the current situation from a standardisation-oriented point of view.

- Consider and promote the use of existing standards before creating tailor-made specifications. The existing standards, and especially the imminent convergence of UBL and c-Catalogue, are expected to facilitate the exact specifications upon which eCatalogues are used in public procurement. (Actor: Member States)
- Perform the convergence of UBL and c-Catalogue in one unified standard, further enhance it with eCatalogue related messages and processes to support the pre-awarding phases of public procurement and engage into promotional activities in order to achieve the wide use of the standard across Europe, both in the public and private sector (Actor: Standardisation Bodies)
- Harmonise the use of product description and classifications schemes, establishing also specifications for describing products/services within eCatalogues. This harmonisation can be achieved either by establishing one, unique product description and classification scheme, or by establishing a framework of interoperable co-existence of many schemes. Achieve harmonisation and engage in necessary promotional activities for the wide use of the selected framework (Actor: Standardisation Bodies)
- Review existing eProcurement systems with a view to establish “eCatalogue stock management systems” which utilise standardised, interoperable “eCatalogue prospectuses”, in order to support all phases of the procurement cycle, both for “pre” and “post” award purposes (Actors: Member States)

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1 Introduction

In 2004, the new EU legislative framework of public procurement, Directives 2004/17/EC and 2004/18/EC, was adopted. It introduces for the first time a coherent and comprehensive framework for public procurement in the EU, including the use of electronic means (eProcurement). Amongst others, they foresee the use of electronic catalogues (eCatalogues) for forming tenders or parts of them. The use of eCatalogues in public procurement must be in line with all rules and regulations that apply for the use of electronic means, the electronic submission of tenders, as well as, the general principles for eProcurement.

The use of eCatalogues in public procurement can significantly benefit both buyers and suppliers due to the automated processing it can offer. Electronic catalogues can form tenders or parts of them. The use of this new tool can simplify the processes followed by suppliers to create offers, while buyers can automate processes for reception, evaluation, purchasing and invoicing.

The goal of automated processing can however be realised only when eCatalogues are formed in a standardised way, which in turn can enable the deployment of efficient practices and systems. The current situation in Europe, regarding the use of eCatalogues in public procurement, demonstrates an environment where eCatalogues are created based on tailor-made specifications set by contracting authorities. This results to a large number of eCatalogue formats, which are non-interoperable, and defined to meet only specific needs. This in turn limits the possibilities for automated processing, while it offers limited benefits to suppliers. It is currently widely understood that standardising the use of eCatalogues in public procurement can significantly increase the efficiency of procurement procedures.

In the area of eCatalogues, standardisation activities are carried out by OASIS, UN/CEFACT and CEN/ISSS standardisation bodies. OASIS and UN/CEFACT along with CEN/ISSS have developed the ebXML framework, on the basis of which they further developed standards for addressing the use of eCatalogues in the post-awarding phases of eProcurement. Both UBL 2.0 (developed by OASIS) and c-Catalogue standards (c-Catalogue was initially developed by CEN/ISSS and currently its further development is undertaken by UN/CEFACT) define business processes, messages and documents for the exchange of catalogue information between trading partners. A gap analysis and convergence of the two standards is currently underway. Despite these efforts however, there is still limited work in standards to cover the pre-awarding phases of public procurement, and no standards on how products should be described within an eCatalogue. Therefore, although there is progress in standards for using eCatalogues for public procurement, significant effort must be dedicated before a standard is adequately extended and enhanced in order to cover all needs of public procurement.

In addition, schemes for product classification and description have been developed by various organisations and institutions, each one for the coverage of particular needs. These schemes provide mechanisms for classifying and describing products in a standardised way within an eCatalogue. Through the use of such schemes high interoperability of eCatalogues can be achieved. However, currently there are no mechanisms for the interoperable co-existence of these schemes. This again leads to an interoperability gap, where trading partners use different schemes to classify their products. In this respect, the establishment of one standard for all purposes or mechanisms for the co-exististence of product classification and description schemes is also an important issue to be addressed.

Currently there is a number of Member States that are active in establishing procedures for the use of eCatalogues in the context of public procurement. Most activitities relate to the implementation of eInvoicing solutions using the UBL 2.0 standard.

The structure of the report is as follows:

- Overview of Standardisation Bodies: Describes the structure and the latest major activities of the standardisation bodies (OASIS, UN/CEFACT, CEN/ISSS) that undertake initiatives in the standardisation of the eProcurement processes, focusing mainly on the field of eCatalogues.
- Description of Standardisation Initiatives: Provides an overview on the key standardisation initiatives related to eProcurement and e-Cataloguing, covering ebXML, UBL, UN/EDIFACT, and a number of CEN Workshops.
- Standards for product classification: Presents widely-used standards for product description and classification: CPV, UNSPSC, eCl@ss, NATO Codification System, GPC and eOTD. Standards are analysed and compared in terms of their classification structure and product description through attributes. Resolution measures on interoperability issues are proposed.
- eCatalogue standardisation activities in selected Member States and EEA countries: Several Member States presenting significant progress on eProcurement are investigated and their initiatives, concerning the practical use of standards, are analysed.
- Analysis and assesment of the current standardisation environment: Presents the role of standardisation in the field of public procurement, and explains the current situation of several standards which however are inadequate to meet the goals set. It provides a detailed comparison of the two most prominent standards for conducting business electronically, UBL and c-Catalogue.
- Conclusions: Outlines the main findings of the analysis on the standardisation initiatives and classification schemes, providing recommendations for the further progress in standardisation.
- Annex I: Standardisation Bodies Teams & Contact Points: Presents the Technical Committees related to the development of eProcurement standards, with the respective contact points.
- Annex II: Invoice content details/attributes: Details the content that is included in electronic invoices according to the EU Directive on VAT Invoicing and the CEN/ISSS eInvoicing Workshop.
- Annex III: Comparison between UBL 2.0 and c-Catalogue: Compares the business processes, documents/messages, activity diagrams, and information entities of UBL and c-Catalogue.
- Annex IV: Use of UBL 2.0 and c-Catalogue in pre-awarding phases: Presents the messages of UBL 2.0 and c-Catalogue which could be used in the various pre-awarding phases of public procurement.

2 Overview of Standardisation Bodies

This chapter provides an overview of the main standardisation bodies OASIS, UN/CEFACT and CEN/ISSS working in the field of eProcurement, and particularly in the area of eCatalogues.

The information provided for each standardisation body includes:

- A brief description of the structure, mission, activity focus and persons involved in the standardisation process. The overall structure of each standardisation body is illustrated through an organisational chart. In addition, a brief description of their working groups is provided in Annex I.
- An outline of the activities related to the standardisation of eProcurement and eCatalogue practices, processes and messages.
- An overview of the membership policy followed by the standardisation bodies for accepting the participation of organisations and individuals in the development of standards.

UN/CEFACT and CEN/ISSS collaborate closely for the establishment of standards in a number of areas. The synergies between the two groups are also discussed in this chapter, along with the dissemination activities of all three groups for promoting their work.

2.1 OASIS

2.1.1 General Description

Organisation for the Advancement of Structured Information Standards (OASIS) *[1]* is a not-for-profit international consortium. Its mission is the establishment and adoption of open standards in the eBusiness domain, with particular focus on the eXtensible Markup Language (XML).

OASIS is a business-driven consortium focusing on the facilitation of B-2-B transactions. In particular, it is very active in the development of standards for the exchange of electronic documents within the eBusiness sector such as ODF[1], UDDI[2] and SAML[3].

Two of its major initiatives related to eCatalogues are:

- The **electronic business eXtensible Markup Language** (ebXML), developed in cooperation with UN/CEFACT (described in detail in section 3.3.1).
- The **Universal Business Language** (UBL) constitutes a set of standard business messages for the exchange of catalogue information between trading partners in the procurement life cycle (described in detail in section 3.1).

[1] ODF: An open standard for the transformation of office applications (e.g. text, spreadsheets, charts, and graphical elements) into other XML-based document file formats by leveraging and reusing existing standards wherever possible.

[2] UDDI: An open protocol that enables enterprises and applications to dynamically identify and use existing Web services over the Internet.

[3] SAML: An XML-based framework for the secure exchange of information, as well as, for authentication and authorisation of data between any online partners.

OASIS members include individuals and companies (e.g. Novell, IBM, Adobe, Intel, Sun Microsystems, etc.). The members form Technical Committees (TCs), through which they collaborate for the establishment of standards. The specifications approved by the TCs are further submitted to public review and must be implemented (from prototype, proof-of-concept, to shrink-wrapped software) by a minimum of three OASIS member organisations. After that, the specifications are released for a 30 days public review where comments are solicited by OASIS. The responsible TC incorporates all the provided comments, and produces a revised specifications document, which is presented to OASIS members for 15 days, in order to make themselves familiar with the new specifications. At the end of the introductory period, the OASIS members have another 15 days for approving or rejecting the proposed specifications. In order for the proposed specifications to become a standard, a minimum of 15% positive votes and no more than 15% negative votes is required.

Figure 1 presents an overview of the TCs engaged in the standardisation activities of the eBusiness/eProcurement processes. (The same TCs are presented in Annex I.1 along with a short description).

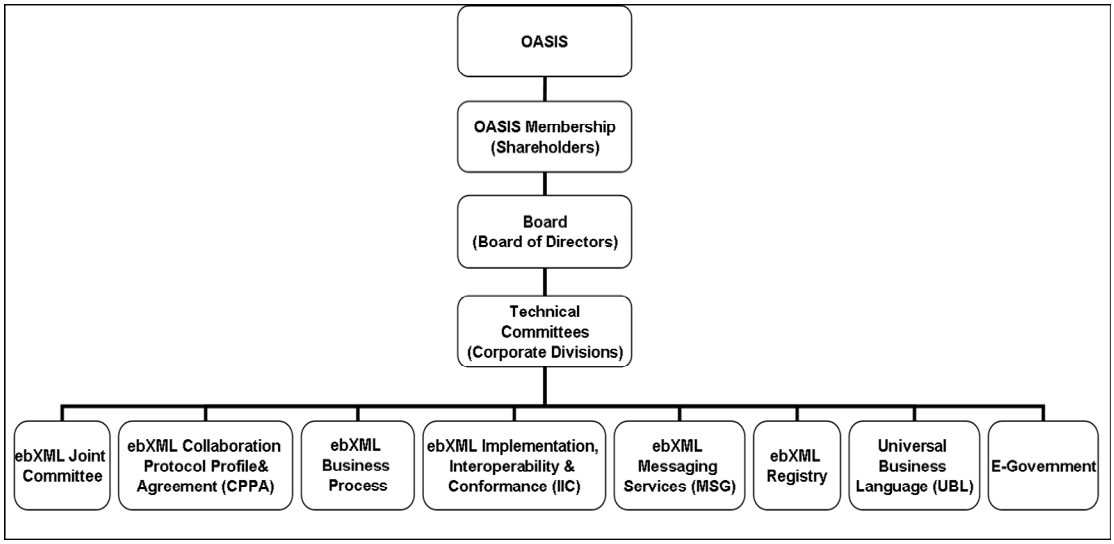

Figure 1: OASIS organisation chart

The OASIS Board of Directors formulates the policy and the OASIS Technical Advisory Board (TAB) mainly provides technical input. Both bodies consist of elected officers, serving two-year terms.

2.1.2 OASIS Membership Policy

OASIS membership is open to all interested parties who may apply via internet. Members have the possibility to select a membership category according to their preferences and needs.

Each membership category corresponds to a particular level of participation. The levels of participation range from Individual and Associate-level membership (annual fee of $300) allowing participation in Committee work without receiving visibility or benefits up to a foundational sponsor membership (annual fee of $50,000) receiving the highest level of visibility and promotional benefits. The promotional benefits include logos featured on OASIS home page and in OASIS booth, listing in OASIS press releases and on the Consortium data sheets, as well as, voting on official Consortium business, (e.g. elections on OASIS Standards and Board of Directors). Furthermore, there is a Contributor-level membership (ranging from $1,100 to $8,000) and a Sponsor-level membership (ranging from $10,000 to $16,000). Contributors may actively participate in the development and approval of open standards without receiving any promotional benefits, whereas Sponsors are recognised for their contributions.

Access to the different membership areas on the internet is available only to members (e.g. providers, users, implementers, influencers, and technology specialists), after submitting their user credentials (user name and password). Members may participate either as Observer or as Active (Voting) Members, depending on their membership level, in one or more Committees.

2.1.3 OASIS Key Characteristics

The following table provides a summary of the OASIS key characteristics

Key Characteristics	Description
Organisation Description	Organisation for the Advancement of Structured Information Standards (OASIS) - Not-for-profit international consortium - Founded in 1993 - More than 5,000 participants/members - Transparent Governance - Focuses on XML – based standards development within eBusiness sector
Mission	Development, Convergence & Adoption of eBusiness Standards
Activities/Milestones Linked to e-Cataloguing	- Electronic Business eXtensible Markup Language (ebXML) in cooperation with UN/CEFACT - Universal Business Language (UBL)
Policy on licenses & royalties	- The existing membership categories with their corresponding annual fees and benefits are provided by the OASIS Membership Benefits Matrix *[2]* - Membership Agreement terms and conditions include OASIS Policies and Procedures *[3]*
Other Interesting Characteristics	OASIS policy is user-oriented
	Industry Support: - OASIS Foundational Sponsors: BEA Systems Inc.; EDS; IBM; Innodata Isogen; SAP; Sun Microsystems - Other Sponsor organisations

Table 1: OASIS key characteristics

2.2 UN/CEFACT

2.2.1 General Description

The **United Nations Centre for Trade Facilitation and Electronic Business** (UN/CEFACT) *[4]* is hosted by the **United Nations Economic Commission for Europe** (UN/ECE). The primary objective of UN/CEFACT is the development and promotion of international trade standards for the improvement of electronic business transactions through their harmonisation.

UN/CEFACT has developed standards, which are available in the form of business and technical specifications, to realise the interoperable exchange of business information. The standards relevant to eCatalogues are:

- The **United Nations rules for EDI For Administration, Commerce and Transport** (UN/EDIFACT) framework
- The **ebXML** framework, developed in collaboration with OASIS
- The **Business Requirements Specification** (BRS) for cross-industry catalogues. BRS catalogue processes and messages are described in more detail in section 3.2

In addition, UN/CEFACT has developed the following catalogue messages:

- The PRICAT (Price/Sales Catalogue)
- The PRODAT (Product Data)

UN/CEFACT has developed an Open Development Process (ODP) *[5]* for the development and evolution of Technical Specifications (e.g. XML Naming and Design Rules, Business Documents, Transformation rules) for any software application independently of the communication protocol, the underlying operating system or the hardware platform.

The enhancement of ODP, in order to support additional procedures for the implementation and maintenance of standards is currently under consideration by the Forum Management Group (FMG). The ODP is open to all interested parties that wish to participate at the standards development process worldwide.

The UN/CEFACT is structured internally in the following groups where decisions are taken via Consensus:

- **Plenary:** UN/CEFACT policy-maker
- **Bureau:** Ensures the execution of Plenary decisions
- **Forum:** Includes **Permanent Groups** (PGs) which are in charge of the specifications development. Each Permanent Group (PG) consists of **Working Groups** (WGs). The supervision of the Forum is undertaken by the Forum Management Group (FMG)

The list of currently active PGs along with a short description is contained in **Table 41**, in Annex I. In the same annex, a separate table is provided with the WGs that belong to **International Trade and Business Process Group** (TBG) PG and are related to e-Cataloguing standards development (**Table 42**)

Figure 2 illustrates the structure of UN/CEFACT along with the list of all groups that are currently active.

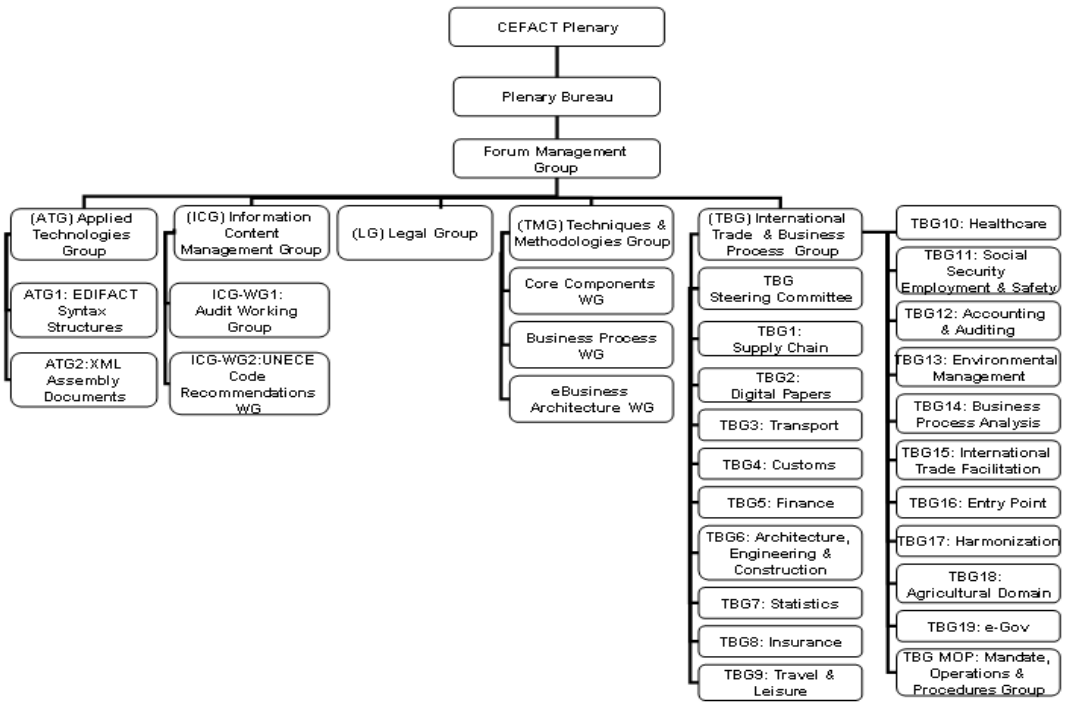

Figure 2: UN/CEFACT organisation chart

2.2.2 UN/CEFACT Membership Policy

Membership to each Permanent Group (PG) is open to experts with knowledge related to the corresponding PG. Members should have extensive knowledge in the current techniques and methodologies used within UN/CEFACT for the technological development of standards as well as, in the functions and requirements of each individual group. In the following, **Table 2** describes the expertise required for participating to each PG. Furthermore, officers (e.g. chair and the vice chair) may invite technical experts to participate in the work of the group.

Request for participation to a PG may be completed offline and sent via e-mail to the secretary of the selected PG.

Table 2 provides membership requirements for each PG

Permanent Group	Knowledge Requirements for Membership Participation
Applied Technologies Group (ATG)	Expertise for implementation of syntaxes, protocols and tools for the packaging of data for exchange
Information Content Management Group (ICG)	Knowledge regarding semantics of business practices and codification, information modelling in the application of reusable design practices and/or syntax conversant with the rules defined for the syntax solutions supported by UN/CEFACT
Legal Group (LG)	Knowledge in the area of legal issues
International Trade & Business Process Group (TBG)	Expertise in the modelling of processes & procedures in the international trade and eBusiness sectors
Techniques & Methodologies Group (TMG)	Broad knowledge in the area of existing business process, information and communications specifications, architecture, as well as current techniques and methodologies used within UN/CEFACT

Table 2: CEFACT membership requirements

2.2.3 UN/CEFACT Key Characteristics

The following table provides a summary of the UN/CEFACT key characteristics

Key Characteristics	Description
Organisation Description	Centre for Trade Facilitation and Electronic Business (UN/CEFACT) - Belongs to the United Nations Economic Commission for Europe (UN/ECE) - Established in 1996 - Focuses on the use and promotion of Information Technologies - Cooperates with a series of international organisations & standardisation bodies
Mission	Facilitation & amelioration of trade and eBusiness transactions at an international level
Activities/Milestones Linked to e-Cataloguing	- International standard for electronic data interchange (EDIFACT) - Electronic Business eXtensible Markup Language (ebXML) (in cooperation with OASIS) - Business Requirements Specification for Cross-Industry Catalogue (within c-Catalogue project under CEN/ISSS eBES Workshop)
Policy on licenses & royalties	- Implements the Open Development Process, according to which no fees are required for participating in UN/CEFACT Technical Specifications development - Copyright, terms of use and disclaimer notices are common for all PGs [6]
Other Interesting Characteristics	- UN/CEFACT purpose is to make available “simple, transparent and effective processes for global Commerce” - UN/CEFACT Plenary is represented by UNECE and other UN Member States, Intergovernmental & Non-Governmental Organisations, recognised by the UN Economic and Social Council (ECOSOC) - A Chair and five Vice-chairs are selected, who act in the name of the Plenary between Plenary sessions - Rapporteurs are also chosen and charged with particular works

Table 3: UN/CEFACT key characteristics

2.3 CEN/ISSS

The **Comité Européen de Normalisation / European Committee for Standardisation** (CEN) *[7]* was established in 1961 by the national standardisation organisations in the European Economic Community and European Free Trade Association (EFTA) countries. CEN standardisation activities focus on the development of technical standards that encourage free trade, interoperability of networks and public procurement. CEN has established an **Information Society Standardisation System (CEN/ISSS)** for the promotion of standardisation services and products in the Information and Communication Technology (ICT) domain.

CEN/ISSS initially focused on the development of EDI-based standards in the area of eBusiness. However, after the introduction of the ebXML framework, its focus shifted towards the development of XML-based standards. Currently, CEN/ISSS cooperates with UN/CEFACT on the promotion of the ebXML framework and the production of the BRS for the development of Cross Industry Catalogues. Furthermore, it works on issues relevant to the standardisation needs and gaps in e-Cataloguing and product classification.

CEN/ISSS comprises:

- **Eight Technical Committees (TCs)**: These committees deal with formal European Standards or Technical Specifications (TSs); TCs consist of national delegations
- **Workshops**: These ongoing short-term working groups provide a direct method for standardisation and address issues in a series of sectors (see **Figure 3**). Workshops are accessible to anyone interested and their results - after being approved by consensus - take the form of CEN Workshop Agreement (CWA)
- **Focus Groups**: These Groups have a consulting role dealing within a given area of activity (e.g security, eProcurement, eGovernment etc.) and making further suggestions upon future activities

CEN/ISSS input to eProcurement/e-Cataloguing standardisation is mainly provided through Workshops, organised under the umbrella of eBusiness and eCommerce sectors. Workshops dealing with eProcurement/e-Cataloguing are presented along with a brief description in Annex I.3 while more detail details are available in section 3.4.

Figure 3 presents the CEN/ISSS organisation chart including in particular the workshops dealing with eProcurement/e-Cataloguing.

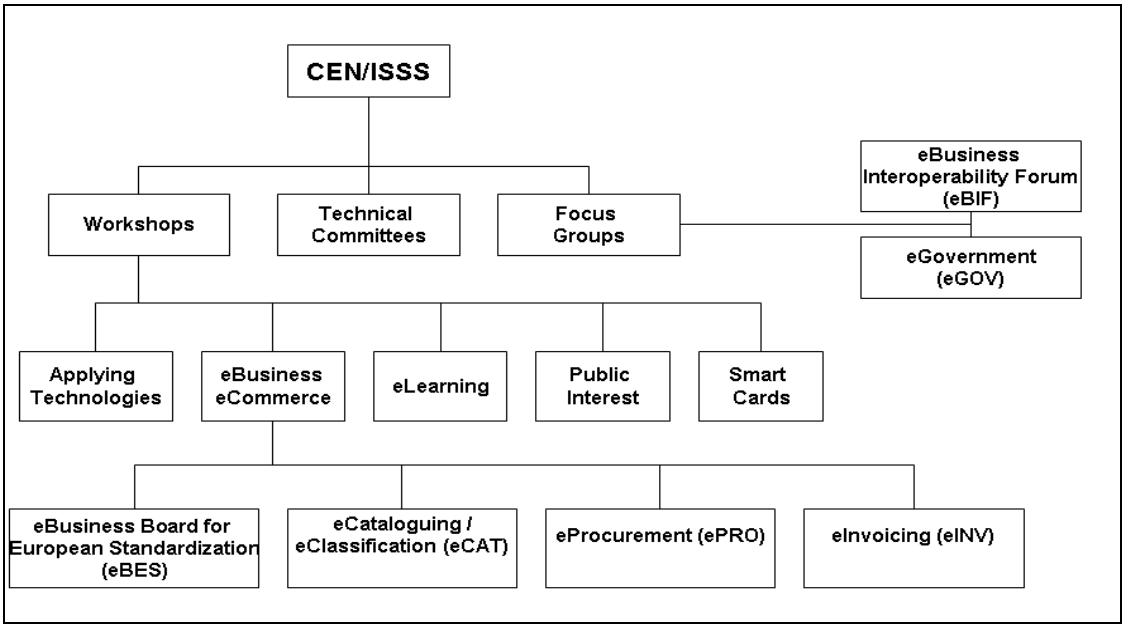

Figure 3: CEN/ISSS organisation chart

2.3.1 CEN/ISSS Membership Policy

Membership is open to every interested party and participation may take place either by physical presence or electronically. Participation in the Workshops requires formal registration accompanied by the relevant subscription fee, set out in the Business Plan of each Workshop.

The membership application form may be downloaded by the website of CEN or filled in and sent online.

New participants are called to accept CEN strategy with regards to Exploitation Rights Assignment Statement and pay the appropriate fee before they become a member of CEN/ISSS.

2.3.2 CEN/ISSS Key Characteristics

The following table provides a summary of the CEN/ISSS key characteristics

Key Characteristics	Description
Organisation Description	CEN Information Society Standardisation System (CEN/ISSS) Belongs to the European Committee for Standardisation (CEN) - Created in 1997 - Works closely with UN/CEFACT - Establishes Workshops for addressing standardisation issues in a direct method
Mission	Promotion of the Information Society
Policy on licenses & royalties	- Provided in CEN "Exploitation Rights Assignment Statement" [8]
Activities/Milestones Linked to e-Cataloguing	- eBusiness Board for European Standardisation Workshop (WS/eBES) - e-Cataloguing & e-Classification Workshop (WS/eCAT) - eProcurement Workshop (WS/ePRO) - eInvoicing Workshop (WS/eINV) - e-Government Group (eGOV) - eBusiness Interoperability Forum Focus Group (FG/eBIF)
Other Interesting Characteristics	- CEN/ISSS Forum is made of one delegate of each CEN member, Chairmen of ISSS TCs, Chairmen of ongoing Workshops, and Representatives of the Commission and EFTA

Table 4: CEN/ISSS key characteristics

2.4 Synergies between UN/CEFACT & CEN/ISSS

CEN/ISSS and UN/CEFACT collaborate closely and a great number of experts work in both organisations. Specifically, CEN/eBES/EEG1 was established in 1986 being responsible to develop UN/EDIFACT messages in the areas of trade, material management, logistics as well as product and quality data. EEG1 submitted 90% of the UN/EDIFACT messages in these areas.

UN/CEFACT and CEN/ISSS follow a specific process for the development of cross-industry c-Catalogue standard. CEN/eBES/EEG1 captures business requirements for eCatalogues, which are modelled using UMM and included in Business Requirements Specification (BRS) document. Specifically, BRS consists of Business Requirements (Use Cases), Activity Diagrams as well as Information Models (Class Diagrams). BRS is then used in order to map the information model with Core Components (CCs) of the UN/CEFACT CCs library. This mapping is delivered into the Requirement Specifications Mapping (RSM) document consisting of Canonical Models, Conceptual Models, Business Information Entities (BIEs) and Aggregate Business Information Entities (ABIEs). Subsequently, RSM is used for the creation of XML schemes.

The following Table indicates the status of BRS and RSM produced from the cooperation between CEN/ISSS EEGs and UN/CEFACT TBG WGs.

Business Process	Working Groups	Work Progress
eTendering	TBG6 & EEG5	- "Business Requirements Specifications v1.0" approved by TBG 1 (*March 2005*) - "Draft Business Requirements Specifications v2" (*August 2005*) - "Draft Requirements Specification Mapping v2" (*January 2005*)
eOrdering	TBG1 & EEG1	- "Business Requirements Specifications" approved by TBG 1 for Cross Industry Ordering (*June 2006*). To be provided to TBG SC for approval
eInvoicing	TBG1 & EEG1	- "Requirements Specification Mapping" approved by TBG 1for: o Cross Industry Invoice (*January 2006*) and o Cross Industry Remittance Advice (*January 2006*)
eCatalogue	TBG1, TBG6 & EEG1	- 'Business Requirements Specifications" approved by TBG1: Cross Industry Catalogue (*May 2006*)

Table 5: Work progress of UN/CEFACT and CEN/ISSS synergies

UN/CEFACT XML Schemes regarding Cross Industry Invoice, Cross Industry Remittance Advice as well as eTendering messages are expected to be the first XML Schemes to be delivered within 2007.

2.5 Dissemination Activities

The three Standardisation Bodies carry out a series of activities for disseminating and promoting their work (e.g. standards, specifications). **Table 6** enlists the dissemination activities implemented by OASIS, UN/CEFACT and CEN/ISSS.

Standardisation Body	Dissemination Activities
OASIS	OASIS TC-Hosted Webinars *[9]*: Online events hosted by TCs or groups of TCs for disseminating educational information on OASIS standards and promoting global adoption of TCs work
	OASIS Adoption Services Program [*10]*: Aims at the promotion of global adoption of OASIS Standards via various service offerings
	OASIS Media Relations Policy *[11]*: Deals with the communication procedures with the public. Key deliverables/initiatives of OASIS are promoted through press communications initiated either by the Consortium or by Member & non-Member organisations & individuals. The OASIS news & accomplishments are also promoted through the use of Web sites & Newsletters, as well as through presentations at conferences & seminars
	OASIS Case Study Guidelines *[12]*: The publication of case studies describing OASIS implementation experiences aims at promoting the adoption of Consortium Standards & specifications
UN/CEFACT	UN/CEFACT cooperates with national Governments, inter-Governmental organisations, non-Governmental organisations & organisations representing industry and commerce for encouraging implementation of its deliverables Promotes best business practices, through channels such as government, industry and service associations
	Provision of publications/deliverables on the Website & organisation of Workshops
CEN/ISSS	WS/eBES: Carries out activities in the area of awareness (i.e. seminars), localisation of specifications (i.e. translations), and technical consensus Establishes awareness campaigns, maintains dedicated web pages and organises seminars for informing European administrations and companies - including SMEs - of the possibilities for eBusiness using solutions such as ebXML The European ebXML Information Centre: Developed by WS/eBES in order to disseminate information on ebXML and its emerging standards (including OASIS and UN/CEFACT outputs). Information is provided in different European languages
Joint Initiatives	The Joint Marketing Team (JMT): Formed by OASIS and UN/CEFACT members for the promotion of ebXML implementations. Its responsibility includes the organisation of events and in general communication tasks focused on the dissemination of information regarding ebXML specifications

Table 6: Main dissemination activities of standardisation bodies

2.6 Summary

OASIS, UN/CEFACT and CEN/ISSS are standardisation organisations that contribute to the establishment and maintenance of open standards in the area of eBusiness. Their activities focus on the standardisation of the business processes and business documents exchanged between trading partners, as well as on the technical aspects for conducting business transactions.

Significant steps have been performed by the standardisation bodies in the area of eCatalogues, especially on the standardisation of processes and messages in the post-awarding phase of procurement (eOrdering and eInvoicing). Furthermore, they address standardisation issues, such as product classification or multilingualism in the use of eCatalogues.

Although each standardisation body has its own internal structure, procedures, and business plan for establishing standards, they rely on the evaluation results provided by the other standardisation bodies. OASIS and CEN/ISSS are closely cooperating in the development of XML business standards, since the conceptualisation phase of the ebXML framework, which has evolved through time into a catalogue standard. Based on the ebXML specifications, OASIS has developed the Universal Business Language (UBL) and CEN/ISSS the Business Requirements Specification (BRS). Although both standards are publicly available for download and use, free of charge, the use of BRS is currently limited to evaluation purposes, without any known practical implementation.

The input of CEN/ISSS into the standardisation initiative undertaken by UN/CEFACT is realised through the establishment of workshops, such as the eBES Workshop, which cooperates with UN/CEFACT for the development of BRS for eCatalogues. Apart from eBES, CEN/ISSS operates three other Workshops (eCAT, ePRO, and eINV) and one Focus Group (eBIF) that are related to eProcurement and address issues such as multilingualism in eCatalogues, classification and invoicing.

The next chapter describes in detail the aforementioned standards and standardisation initiatives.

3 eCatalogue standards and other relevant standardisation initiatives

This chapter presents the two main eCatalogue standards for the creation and exchange of eCatalogues, other standards that are relevant to eCatalogues and an overview of the most important standardisation initiatives in the field of electronic public procurement by OASIS, UN/CEFACT and CEN/ISSS. The standards and standardisation initiatives that are covered in detail in the following sections are outlined in the table below.

	Standard/Standardisation Initiative	Responsible Body	Description
Standards and Frameworks	UBL (Universal Business Language)	OASIS	A framework for electronic exchange of interoperable, XML-based business documents
	c-Catalogue	CEN/ISSS	A standard XML vocabulary for business documents
	ebXML (Electronic Business eXtensible Markup Language)	UN/CEFACT and CEN/ISSS	Standards and guidelines for the exchange of data elements and messages between different Information Systems
	Product description and classification schemes	Several bodies	CPV, UNSPSC, eCl@ss, NCS, GPC, eOTD
Workshops/Focus Groups	eBusiness Board for European Standardisation (eBES) Workshop	CEN/ISSS	Creation of a central reference point on the most recent technologies used for the standardising the electronic business data exchange, including multi-lingual and multi-cultural needs.
	Workshop on Multilingual e-Cataloguing and e-Classification in eBusiness (eCAT)/(ePDC 1 & ePDC 2)	CEN/ISSS	Establishment of interoperable and multi-lingual standards for product classification and their further application to eCatalogues
	eProcurement (ePRO) Workshop	CEN/ISSS	Review of eProcurement standardisation needs and assessment of international standards used by the public and private sectors
	eInvoicing (eINV) Workshop	CEN/ISSS	Harmonisation of VAT eInvoicing implementations within the EU Member States
	e-Government (eGOV) Focus Group	CEN/ISSS	Address European needs on e-Government, focus on data exchange, standardisation requirements, and establishment of common goals and roadmaps.
	European eBusiness Interoperability Forum (eBIF) Focus Group	CEN/ISSS	General - Interoperability issues

Table 7: Overview of the standardisation initiatives

3.1 UBL

The **Universal Business Language (UBL)** *[13]* was developed by the OASIS UBL Technical Committee (TC), with the aim to design an XML-based universal language readable by any business. UBL constitutes a standard XML vocabulary for business documents, the implementation of which is based on the ebXML Core Components Technical Specification (CCTS) v2.01.

The XML vocabulary incorporates XML-based business documents (i.e. purchase orders, invoices) from different XML libraries (i.e. cXML, xCBL) and different industry sectors into a central repository. In addition to the XML vocabulary, UBL provides XML Schemes as well as UML modelling concepts for the definition of the business documents and messages used for the exchange of information.

The UBL implementation is based on the "80/20 rule"; identifying and standardising 20 percent of the possible data elements, will lead in satisfying 80 percent of the usage scenarios. UBL is not sector-specific, which means that information following the UBL specification can easily be exchanged with customers in different parts of the world and under different sectors.

Table 8 illustrates the evolution of UBL within the past eight years starting from version 1.0 of the Common Business Library (CBL) up to version 2.0 of UBL.

Generation	Version	Organisation / Industry
G1 1998	CBL 1.0	Veo/NIST
G2 1999	CBL 2.0	Commerce One
G3 2000	xCBL 3.0	Commerce One and SAP
G4 2003	UBL 0.7	OASIS
G5 2004	UBL 1.0	OASIS
G6 2006	UBL 2.0	OASIS

Table 8: Six generations of UBL

UBL 1.0 was officially declared an OASIS Standard at the end of 2004. UBL, in its first release, defines eight basic document types (Order, Order Response, Order Response Simple, Order Change, Order Cancellation, Despatch Advice, Receipt Advice, and Invoice), which covered only the post-awarding phase (contracting, ordering and invoicing) of the eProcurement lifecycle. For defining UBL 1.0, the UBL Technical Committee has produced the following technical work:

- UBL 1.0 Small Business Subset (SBS) *[14]*: Identifies the elements of each UBL document model that should be included in small business implementations, in order to reduce the size, complexity and implementation cost of the UBL business documents. The first edition of SBS was developed by the OASIS Small Business Subcommittee (SBSC) and approved by UBL TC as a Committee Specification in April 2006
- UBL 1.0 Naming and Design Rules (NDRs) *[15]*: Provides the design rules and the naming conventions for the development of the XML schemes describing the business documents exchanged between two parties. It was produced on the basis of ebXML CCTS v2.01. The first edition of NDR[4] was developed by the UBL NDRs Subcommittee and approved by UBL TC as an OASIS Standard in January 2005.
- UBL 1.0 International Data Dictionary (IDD) *[16]*: Includes more than 600 standardised UBL 1.0 business data definitions for the description of basic documents like purchase orders and invoices. The definitions of the business terms are generated in the English language and translated by the UBL localisation subcommittees into Chinese (Traditional and Simplified), Japanese, Korean, and Spanish. The UBL TC approved the first edition of IDD as an OASIS Committee Draft in April 2005. The new edition of IDD is expected to provide corrections based on the users' feedback worldwide and the knowledge acquired during the translation

The UBL version 2.0 was approved as an OASIS Standard in December 2006 as well as a first-generation XML documents for eBusiness from UN/CEFACT. It contains more than one thousand XML data elements based on the ebXML Core Components Technical Specification and 31 document types covering extended procurement scenarios and basic transport processes. In addition to the order-to-invoice document types, UBL 2.0 provides:

- *Standardisation of code lists*: Simplifies the mechanism for the specification, modification and validation of the code lists
- *Specifications for UBL forms input software*: Provides specifications for the development of UBL compliant forms using open source forms input software (e.g. XForms)

[4] The first edition of the UBL NDR deliverable was different to the ebXML NDR. The latter formed the basis for building the former deliverable.

- *Additional support for U.S. and European taxation requirements:* Provides tax specific requirements (e.g. audit trail) to be included in the UBL specification and implementation guidance
- *New document types:* Introduces additional document types (covering the business processes for Sourcing[5], Billing, Payment and Fulfilment[6]) for extending the procurement processes supporting the post-awarding phase of the procurement lifecycle. The complete set of the UBL 2.0 document types is presented in **Table 9**.

According to the Transition Statement signed between OASIS and UN/CEFACT *[17]*, UN/CEFACT is expected to undertake the future development of UBL 2.0. The OASIS UBL TC, in cooperation with UN/CEFACT, will perform the harmonisation between the UBL 2.0 and the UN/CEFACT Core Components, the result of which is expected to provide the Core Component library of a new standard. Until the release of the new standard, OASIS will cooperate with UN/CEFACT with the promotion of UBL 2.0. UN/CEFACT has been granted a period of three years, starting at the release of UBL 2.0 as an OASIS Standard, in order to perform the harmonisation and develop the necessary documentation for the publication of UBL 3.0. In case that UN/CEFACT will not succeed to deliver a new standard within the agreed time frame, OASIS will initiate further negotiations for the development of UBL. Following the release of UBL 2.0 as an OASIS Standard, CEN/ISSS will submit the specification to ISO for the further recognition of UBL 2.0 as an ISO standard.

The following table represents UBL 2.0 document types. Those that already existed in the previous version (UBL 1.0) are highlighted with grey colour.

Sourcing	Ordering & Invoicing	Billing	Fulfilment	Payment	Supplementary Documents
Catalogue Request	Order	Credit Note	Bill of Lading	RemittanceAdvice	Application Response
Catalogue	Order Response	Account Response	Waybill	Statement	Attached Document
Catalogue Deletion	Order Response Simple	Self-billed Invoice	Forwarding Instruction		
Catalogue Item Specification Update	Order Change	Self-billing Credit Note	Certificate of Origin		
Catalogue Pricing Update	Order Cancellation	Debit Note	Packing List		
Request for Quotation	Despatch Advice	Remittance Advice			
Quotation	Receipt Advice	Statement of Account			
	Invoice				

Table 9: UBL document types

Members may get involved into the development of the UBL specifications by contributing in the definition of a common set of XML messages, supporting the establishment of an international B-2-B infrastructure. The contributions may take the form of business process activity diagrams, class diagrams and UBL spreadsheets (containing CCs).

The development of UBL 2.0 is supported by a number of European initiatives and its adoption is spreading worldwide. OASIS Foundational Sponsors such as SUN, SAP, and BEA are working closely with the members of UBL technical committee for its promotion. Furthermore, Nordic countries such as Denmark, Sweden, Norway, Finland, and Iceland along with UK have formed “The Northern European UBL 2.0 Subset Working Group” for the promotion of UBL 2.0. The European countries initiatives are further described in chapter 5.

[5] There are three kinds of sourcing (Catalogue provision, Customer initiated sourcing, Punchout

[6] Defines the collaboration for the exchange of goods and/or services from the Dispatch Party to the Delivery Party.

UBL Key Characteristics

A summary of the UBL key organisational and procedural characteristics/features are presented in the following **Table 10**.

Features	Description
Name of the Standard	Universal Business Language (**UBL**)
Responsible standardisation body	OASIS / UBL Technical Committee
Outline of UBL	- A standard XML cross-industry vocabulary for business documents, enabling the next generation of EDI - It is modular, re-usable and extensible It is intended to become an international standard for electronic commerce freely available to everyone without licensing or other fees
Description / Main characteristics	Electronic business framework - Was initiated in 2003 - Freely available under terms of the OASIS copyright *[18*] - Based on ebXML CCTS v2.01 - Based on xCBL 3 - Main concepts: o Naming and design rules for UBL XML schemes o Library of standard XML business information entities (BIEs) o Set of standard XML business documents (purchase order, invoice, shipping notice, price catalogue, etc.) o Context methodology to make the standard documents interoperate across industries
Deliverables	Approved Specifications: - UBL 1.0 Small Business Subset (SBS) - UBL 1.0 Naming & Design Rules (NDR) - UBL 1.0 International Data Dictionary (IDD) - UBL 1.0 Specifications - UBL 2.0 Specifications *[19]* Draft specifications: - UML Class Diagrams for UBL 2.0
Ongoing & recently completed activities	- UBL 2.0 first public review (20 January 2006 - 20 March 2006) - UBL 2.0 second public review (28 July 2006 - 12 August 2006) - UBL 2.0 third public review (21 September 2006 - 6 October 2006) - UBL 2.0 planned to be adopted by UN/CEFACT after its finalisation

Table 10: UBL key characteristics

3.2 c-Catalogue (UN/EDIFACT – eBES Workshop)

The Business Requirements Specification (BRS) for the definition of globally consistent cataloguing processes for the worldwide Supply Chains and eProcurement was developed in parallel with the specification of UBL 2.0. The c-Catalogue Project started as an initiative by the eBES European Expert Group 1 (EEG1) workshop and was developed into a Cross Industry Catalogue in 2005.

The **United Nations/EDI for Administration Commerce and Transport** (UN/EDIFACT) *[20]* framework comprises standards and guidelines for the exchange of data elements and messages between information systems. It was established by UN/EDIFACT Working Group (EWG), in 1986, to provide the rules and guidelines for the automatic processing and electronic transmission of structured business data (goods and services) between information systems from different industry sectors worldwide.

The **European Board for EDIFACT Standardisation** (EBES) was established by CEN/ISSS in the summer of 1999. The primary objective of EBES was to provide a European entry point to the development of the UN/EDIFACT standardisation programme (European-developed EDIFACT messages). Focus was given in the creation of a central reference point on the most recent technologies used for the standardisation of the electronic business data exchange, including multi-lingual and multi-cultural needs and implementation approaches.

In 2001, the European Board for EDIFACT Standardisation was replaced by the eBusiness Board for European Standardisation Workshop (WS/eBES) *[21]*. The WS/eBES represents the new European Entry Point into the UN/CEFACT process. In addition to the activities covered by its predecessor, WS/eBES addresses aspects related to the application of interoperable technologies, in the electronic exchange of business information. Furthermore, it maintains informative web pages, organises seminars concerning standardisation issues, undertakes translation tasks and achieves consensus around technical issues for the promotion of UN/EDIFACT and ebXML.

The WS/eBES establishes European Expert Groups (EEGs) that undertake work on specific issues such as transport, customs, banking, architecture, engineering and construction, statistics, insurance, healthcare and government. The EEG1 Supply Chain Group defines the European business requirements for Supply Chain-related business processes and transactions. It has expertise on business processes in the sectors of Supply Chain, eProcurement, Materials Management, Purchasing, Electronic cataloguing, and UN/CEFACT Standards development.

EEG1 is considered as the most important group of the WS/eBES in the area of electronic procurement and electronic catalogues. It has submitted over 90% of the UN/EDIFACT messages *[22]* and developed PRICAT and PRODAT EDIFACT messages that were further submitted through UN/CEFACT TBG1 (see section 2.2). (All Supply Chain Cross-Industry Business Requirements Specification (BRS) developed by EEG1 and their progress status are described in Section 2.4, along with the cooperation of CEN/ISSS with UN/CEFACT).

The EDIFACT messages PRICAT *[23]* (Price/Sales Catalogues) and PRODAT *[24]* (Product Data) have influenced the design of the UN/CEFACT catalogue messages in the Business Requirements Specification (BRS) for cross-industry c-Catalogue. An overview of the PRICAT and the PRODAT messages is presented below:

- *PRICAT*: A business message for the exchange of information regarding pricing and catalogue data for products and services offered by a supplier to a buyer. Buyers may also respond to a supplier's message by sending a message indicating either their acceptance or rejection of the offer. The PRICAT message role is neither the description of products characteristics nor the inclusion of logistics information. The message is limited to convey information about the availability of the products
- *PRODAT*: A business message for the exchange of technical and functional characteristics of products between trading partners. Products in the message are identified with the use of codes, descriptive, and other information. Information provided in a Product Data message facilitates the buyer's selection of goods. It may include product identification, product characteristics, technical data and handling information. It does not include commercial terms and conditions

The work within each EEG1 is performed by Project Teams (PT), which are organised for carrying out activities on specific areas, leading to cross-industry business solutions. The work of the c-Catalogue (core components for catalogue) Project Team is considered as the most relevant to this Study. The c-Catalogue Project Team was set up on January 2005, with a scope to standardise the messages required for the management of electronic catalogues. Its objective is the identification of basic core components (CCs) and business processes for the development of a cross-industry catalogue specifications based on known business requirements from trade, industry and public administration.

The c-Catalogue PT has issued the Business Requirements Specification (BRS) for Cross-Industry catalogue. The BRS *[25]* for Cross-Industry catalogue document defines catalogue processes in the area of eProcurement. The analysis of the business processes and transactions is presented using UMM and UML. The document provides a reference to the clusters that form the total set of procurement processes, covering the following areas: product information; basic information exchange; contracting; scheduling; shipping; invoicing; remittance and payment. However, analysis provided by the BRS covers only the Product Information cluster that defines the business processes and business transactions regarding catalogue data exchange.

The business processes described in the BRS for cross-industry c-Catalogue along with their corresponding transactions are summarised in the table below.

Business Process	Business Transaction
New catalogue on request	Request for Catalogue
	Catalogue
	Catalogue Request Rejection
	Catalogue Acceptance
	Catalogue Rejection
New Catalogue Publication	Catalogue
	Catalogue Acceptance
	Catalogue Rejection
New Catalogue Subscription	Catalogue Subscription Request
	Catalogue Subscription Acceptance
	Catalogue Subscription Rejection
Update Catalogue on request	Catalogue Update Request
	Catalogue Update
	Catalogue Update Request Rejection
	Catalogue Update Acceptance
	Catalogue Update Rejection
Update Catalogue	Catalogue Update
	Catalogue Update Acceptance
	Catalogue Update Rejection
Remote Catalogue data exchange	Catalogue Data Request
	Catalogue Data
	Catalogue Data Request Rejection

Table 11: Cross-industry catalogue messages

The first version of BRS for Cross-Industry c-Catalogue was finalised in May 2006 and has been forwarded to TBG1 for review and comments.

eBES Key Characteristics

The following table provides a summary of the WS/eBES key characteristics

Key Characteristics	Description
Name of Standardisation Initiative	eBusiness Board for European Standardisation (**eBES**) Workshop
Responsible body	CEN/ISSS
Outline of eBES Workshop	- Provides guidelines for the exchange of data elements and messages between different Information Systems - Developed BRS for the definition of globally consistent cataloguing processes for the worldwide eProcurement - Initiated c-Catalogue project - Main objective is the creation of a central reference point on the most recent technologies used for the standardisation of the electronic business data exchange, including multi-lingual and multi-cultural needs and implementation approaches - Developed EDIFACT messages influencing the development of c-Catalogue messages
Description / Main characteristics	- The "European Entry point" for the UN-ECE/CEFACT electronic business standardisation activity - Encompasses European Expert Groups (EEGs) EEG1 Supply Chain Group hosts the c-Catalogue (core components for catalogue) Project Team (PT) (since January 2005)
Deliverables	- In May 2006, eBES Workshop finalised the Business Requirements Specification (BRS) of the Cross industry c-Catalogue Process & forwarded the relevant documents to TBG1 for review - EEG1 developed PRODAT and PRICAT messages
Ongoing & recently completed activities	- Planned to deliver CEN Workshop Agreements CWA on ”eCatalogue and Classification’

Table 12: eBES workshop key characteristics

3.3 Other standards relevant to eCatalogues

This section presents the current setting of other standards that are relevant to eCatalogues. These comprise the ebXML framework, which has played a fundamental role in the development of UBL and c-Catalogue, as well as the most important standards regarding the product description and classification schemes which are expected to form a core component in standardising the presentation of eCatalogue content.

3.3.1 ebXML

The momentum of the XML-based standards, due to their interoperability, has motivated UN/CEFACT to approach OASIS for joining forces in the development of a new set of specifications for electronic business. The joint initiative started at the end 1999, and at the end of the first phase (mid 2001), a Memorandum of Understanding (MoU) was signed between UN/CEFACT and OASIS, defining the responsiblities of each participant for the completion of the remaining work.

The **Electronic Business eXtensible Markup Language (ebXML)** is the outcome of UN/CEFACT and OASIS cooperation for the development of a framework capable to support the overall needs for conducting business using electronic means. It is the first international open standard based on XML, SOAP, HTML, and SMTP specifications that provides a framework for the electronic exchange of interoperable business documents in the form of XML based messages.

The ebXML framework provides specifications and determines the business processes and documents for the exchange of product information and services between trading partners. Commenced in 1999, the ebXML development is characterised by the following four distinct phases:

- ***Initial phase***: OASIS and UN/CEFACT cooperated for creating a set of specifications related to electronic business (completed in May 2001).
- ***Second phase***: UN/CEFACT and OASIS signed a Memorandum of Understanding (MoU) on July 2001 according to which, the two parties allocated their tasks related to the development of ebXML framework.
- ***Third phase***: During this phase, the ebXML was approved as ISO/TS 15000 (completed mid-2005).
- ***Fourth phase***: A Cooperation Agreement was signed between the two parties on 17 June 2005. During this phase, the two parties agreed on the development of a coordination plan for promoting ebXML specifications. This phase is currently in progress along with the negotiations for the migration of UBL under the UN/CEFACT forum.

The ebXML framework covers both business and information technology aspects of the business transactions performed between trading partners. The description of the ebXML architecture is based on the following views:

- **Business Operational View (BOV):** Describes the business semantic content of the messages, including business processes and core components for performing business transactions. The BOV provides methodologies for defining company profiles, trading partner agreements, business processes, business messages and common semantics (vocabulary). Its development was the responsibility of UN/CEFACT. BOV-related components are summarised below:
    - **Business Processes (BPs)**: Specify the roles, tasks and interactions that should be established between the participating trading partners for their effective collaboration. The *Business Process Specification Scheme (ebBPSS) [26]* was developed by the UN/CEFACT Techniques and Methodologies Group (TMG). It defines configuration parameters and interoperable business processes necessary for the collaboration between the business partners through the exchange of business documents. It also provides guidelines and methods for the

creation of models that identify interoperable business documents and enable the collaboration amongst business partners.

- **Core Components (CCs)**: Provide context-neutral "building blocks" that can be used by trading partners to develop their own XML schemes and Business Information Entities (BIEs), which are context-specific CCs used in real business circumstances. The ebXML *Core Components Technical Specification (CCTS) [27]* was developed by UN/CEFACT TMG, in order to enable the reuse of business information across various business sectors. The ebXML CCTS describes a methodology according to which general types of business data can be represented by a common set of building blocks.
- **XML Naming and Design Rules (NDR)**: Based on the methodology indicated in CCTS, *XML Naming and Design Rules (NDR) [28]* were produced by UN/CEFACT Applied Techniques Group (ATG). They provide guidelines to be followed by UN/CEFACT for the development and maintenance of re-usable and interoperable XML scheme components. In March 2006, XML NDR v.2.0 was approved as a UN/CEFACT technical specification.

- **Functional Service View (FSV)**: Describes the available services and technical framework/infrastructure used for the secure storage and the interoperable exchange of business information. The FSV focuses on the technical aspects regarding functional capabilities, service interfaces and protocols. Its development was the responsibility of OASIS. FSV-related components are summarised below:
  - **ebXML Messaging Services (ebMS)**: Provide a transport protocol for the exchange of electronic business information in a secure and interoperable way. They are described in the *ebXML Messaging Service (ebMS) [29]* specification developed by OASIS ebXML Messaging TC. The ebMS extends the SOAP specification, in order to provide the security and reliability characteristics required by enterprises and eBusiness applications.
  - **Collaboration Protocol Agreements (CPA)**: Identify the technical requirements to be followed by each trading partner for completing the exchange of electronic messages. The *ebXML Collaboration Protocol Profile and Agreement (CPPA) [30]* specification was developed by OASIS CPPA TC. It defines the technical capabilities and the document agreements that should be established for the realisation of secure integration and electronic business collaboration between trading partners.
  - **Registries and Repositories (RR)**: The Registry Service constitutes an information system for the storage of information exchanged between business partners during their business transactions on Internet. Information data is registered as objects in the repository and metadata about registered objects are maintained in the registry. The specifications developed by OASIS ebXML Registry TC in order to achieve interoperable registries and repositories are the following:
    - *OASIS/ebXML Registry Information Model (ebRIM) [31]:* Defines the information model for the ebXML Registry (what kind of information is stored in the Registry and how it is organized)
    - *OASIS/ebXML Registry Services Specification (ebRS) [32]*: Defines the interface to the ebXML Registry Services (how to build Registry Services providing access to the information content in ebXML Registry)

Table 13 presents a synopsis of the ebXML specifications. It includes the specification titles with their versions, as well as the working teams responsible for their publication.

ebXML Specifications	Responsible Organisation
ebXML Business Process Specification Scheme v.2.0.3	UN/CEFACT Techniques & Methodology Group (TMG)
ebXML Core Components Technical Specification v.2.0.1	UN/CEFACT Techniques & Methodology Group (TMG)
ebXML Messaging v1.0, v2.0, v3.0	OASIS ebXML Messaging Services Technical Committee
ebXML Registry Information Model (RIM) v.1.0, v.2.0	OASIS ebXML Registry Technical Committee
ebXML Registry Services Specification (RS) v1.0, v.2.0	OASIS ebXML Registry Technical Committee
Collaboration Protocol Profile & Agreement (CPPA) v1.0 & 2.0	OASIS Collaboration Protocol Profile & Agreement (CPPA) Technical Committee (TC)

Table 13: ebXML specifications and responsible organisations

ebXML Key Characteristics

A summary of the ebXML key organisational and procedural characteristics/features are presented in **Table 14**.

Features	Description
Name of the Standard	Electronic business XML (**ebXML**)
Responsibility	OASIS & UN/CEFACT (By UN/CEFACT Applied Technologies permanent group (ATG) and in particular by UN/EDIFACT working group (EWG))
Description / Main characteristics	Electronic business framework - Started in 1999 - A 'bridge' between EDI & X? L - Serves the interoperable exchange of electronic XML-based business documents
Deliverables	Has delivered the following Specifications: - Collaboration Protocol Profile & Agreement (CPPA) v1.0 & 2.0 - ebXML Registry Information Model (RIM) v.1.0, v.2.0 - ebXML Registry Services & Protocols (RS) v1.0, v.2.0 - ebXML Messaging v1.0, v2.0, v3.0 - XML Naming & Design Rules v1.1, v2.0 - ebXML Business Process Specification Scheme - ebXML Core Components Technical Specification (CCTS)
Ongoing activities / Current Status	- OASIS develops UBL 2.0 based on ebXML CCTS v2.01 - UN/CEFACT works on Business Requirements Specification (BRS) and Requirements Specification Mapping (RSM) based on ebXML CCTS v2.01 - UN/CEFACT finalised on May 2006 BRS for Cross-Catalogue in cooperation with CEN/ISSS

Table 14: ebXML key characteristics

ebXML/ Complementarities between OASIS and UN/CEFACT

As mentioned above, the development of the ebXML framework began in 1999 as a joint initiative between OASIS and UN/CEFACT. The initial concept was to develop and maintain a technical framework for the XML-based exchange of electronic business data. The first development period of ebXML lasted 18 months and had worldwide participation by industry groups and corporations. During this initial phase, the two standardisation bodies worked in parallel and delivered the ebXML specifications (section 3.3.1).

On 11 July 2001, OASIS and UN/CEFACT signed a Memorandum of Understanding (MoU) that signalled the beginning of the second development phase of ebXML. The main goal of the MoU was to continue the promotion and advancement of the ebXML standard. In order to leverage each organisation's competences, the two bodies divided the tasks between them. As specified in the MoU, a distinction of responsibilities between OASIS and UN/CEFACT was established as follows:

- OASIS undertakes the 'Functional Service View' (FSV): OASIS develops the ebXML technical infrastructure building on its experience gained in the development of XML-based standards. (FSV is described in Section 3.3.1).

- UN/CEFACT undertakes the 'Business Operational View' (BOV): UN/CEFACT develops and maintains the ebXML semantic content building on its experience gained in developing EDIFACT (see section 3.3.1). (BOV is described in Section 3.3.1).
- The Joint Coordination Committee (JCC) and the Joint Marketing Team (JMT) assumed responsibility for ebXML Management and Promotion:
    - *The ebXML Joint Coordination Committee (JCC)*: Formed by ebXML contributors for the management and coordination of the overall management of ebXML development and implementation. It constitutes a management body for the liaison between OASIS and UN/CEFACT. During the second phase of the ebXML development, JCC undertook the coordination between the UN/CEFACT Working Groups and the OASIS Technical Committees. JCC was represented by five members from each one of the two organisations and its aim was to facilitate and coordinate their work and avoid overlapping of responsibilities.
    - *The Joint Marketing Team (JMT)*: Formed by OASIS and UN/CEFACT members for the promotion of ebXML implementations. Its prime responsibility comprised the dissemination of information regarding ebXML specifications through events and other initiatives.

The following figure illustrates the share of responsibilities between OASIS and UN/CEFACT regarding the development of ebXML framework.

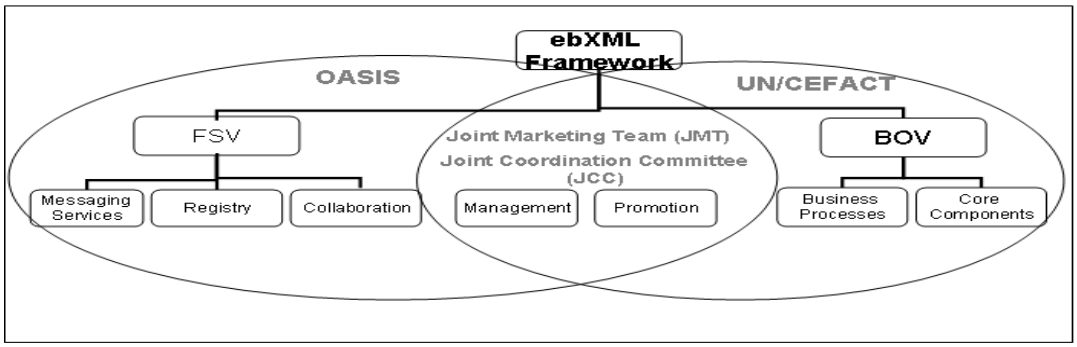

Figure 4: ebXML framework

In 17 June 2005, a new Cooperation Agreement was signed between United Nations Economic Commission for Europe (UN/ECE), on behalf of UN/CEFACT, and OASIS. With this agreement, the two organisations reaffirmed their commitment to cooperate for the development and delivery of international eBusiness standards, with a focus on the promotion and adoption of ebXML specifications. In addition to that, the two parties agreed to coordinate their actions regarding the harmonisation of UBL and of core data components; Naming and Design Rules and interoperable solutions for e-signatures.

3.3.2 Product description and classification standards

While UBL and c-Catalogue standardise the way eCatalogue business documents and messages are exchanged, product description and classification standards address the issues emerging from the way the content of eCatalogues is structured and presented. Content standardisation is indispensable in order to achieve the required interoperability when using eCatalogues. Therefore, effort should be also dedicated to standardise the way products and services are described within eCatalogues.

To this end, there exist several product description and classification schemes worldwide applied in eProcurement systems in the public as well as in the private sector. The most widely used among these schemes are CPV, UNSPSC, eCl@ss, NCS, GPC and eOTD. These are analysed in detail in chapter 4.

3.4 Workshops and standardisation initiatives relevant to eCatalogues

In addition to eCatalogue standards and the relevant standardisation setting described above, several other standardisation initiatives in the form of workshops, forums and working groups have contributed towards standardising the structure of eCatalogues. Their contribution is usually published in the form of Workshop Agreements covering specific aspects of eCatalogue standards. In the following, the most significant of such standardisation initiatives whose subject is related to eCatalogues are presented.

3.4.1 E-CAT Workshop

The Workshop on **Multilingual e-Cataloguing and e-Classification in eBusiness (WS/eCAT)** *[33]* was launched in 2002 by CEN/ISSS, in order to provide a methodology for the establishment and maintenance of multilingual eCatalogues. Within the framework of WS/eCAT, two projects were introduced: the **e-Cataloguing** and the **electronic Product Description and Classification** (ePDC) projects.

The **e-Cataloguing project** focused on the use of eCatalogues in a multilingual environment. It completed its activities in 2004, and provided the CWA 15045 "Multilingual catalogue strategies for eCommerce and eBusiness" *[34]*, published in July 2004. CWA 15045 provides an overview of eCatalogue standardisation (i.e. format, classification) and provides a roadmap for the selection and implementation of eCatalogues. Specifically the CWA 15045 comprises:

- Research on existing eCatalogues formats/standards that mainly concern domain-specific aspects of business communication services (e.g. web service standards like SOAP). It also introduces a logical structure of business messages and the hierarchical level model for the standardisation of business transactions and processes, covering data types, vocabulary, documents, processes, framework and meta-model.
- Analysis of existing eCatalogue formats (e.g. BMEcat, cXML, xCBL) and their use in eBusiness.
- Assessment of the relation of eCatalogue formats with existing product classification/ identification schemes (e.g. eCl@ss, CPV, eOTD), as well as identification of relevant factors for the selection of a standard, such as:
    - Current market penetration and the future potential to reach a wide spread
    - Quality of the standard itself in terms of its overall efficiency and adoption
    - Quality of the development process of a standard
- Detection of problems and submission of recommendations for the implementation of catalogues for SMEs (e.g. interoperability, multilingualism).
- Identification of concepts regarding technical issues within the standardisation strategy (e.g. investigates existing and required metadata registries).
- Preparation activities for the pan-European implementation of multilingual catalogue strategies (e.g. preparation of e-Learning material, support of standardisation efforts).

Furthermore, the e-Cataloguing project:

- Provides information on incorporating catalogue-based processes and activities in the post-awarding phase of the procurement life cycle (eContracting, eOrdering and eInvoicing).
- Analyses the wide diversity of buyer/supplier product classification systems providing recommendations on how to reduce the maintenance cost of the catalogue content (e.g. common data model, semantics, harmonised workflows, common multilingual terminology).

- Focuses on the need to specify eCatalogue requirements (e.g. catalogue items and prices) as well as on the semantic approach (e.g. product classification, attributes, data types, dictionaries, etc.) for the establishment, use, and update of a global marketplace. Thus, such a marketplace will support the integration between buyer and supplier systems as well as effective cooperation.
- Provides technical specifications in order to create an open framework based on ebXML, for the implementation of a single global electronic market which enables the global use of electronic business information in an interoperable, secure, and consistent manner by all parties.
- Identifies major obstacles and issues, such as data format, data validation and common multilingual terminology as well as assists suppliers on the use of catalogue standards (defining mandatory and optional data elements, data types, etc.) in order to establish and effectively exchange their catalogue documents.
- Provides guidelines for the harmonisation of terms and definitions based on the ISO 13584.
- Introduces a strategy for implementing multilingual eCatalogues and product classification schemes at European level, introducing in this way new opportunities to SMEs. eCatalogues will be based on common technologies and standards, in order to simplify their establishment. The strategy also involves the preparation of eLearning material and the introduction of training sessions (i.e. Computer Based Training, Web based Training, Web based virtual classrooms) for transferring existing knowledge and experience to SMEs for eCatalogue creation and effective use.

In general, the e-Cat workshop has brought together experts from different industry sectors, sharing their knowledge and expertise on issues relevant to the harmonisation of the electronic catalogues. It has also provided guidelines for implementing product classification and identification as well as data dictionairies. The results of the work completed during the e-Cat workshop were used by the Gen-EPDC (ePDC2) project, which focuses on the harmonisation of the existing classification schemes and their use within a multilingual eCatalogue environment. The results of the eCat Workshop and the Gen-EPDC2 have played an important role in the establishment of the c-Catalogue business requirements specifications.

The work undertaken by the eCat Workgroup covers also the promotional activities such as logo/CI, web platform, email newsletter, conferences, events, promotional material, to be scheduled for the effective dissemination and awarness of the eCat initiatives.

The **electronic Product Description and Classification (ePDC) project** was launched in 2004 for the development of interoperable and multilingual electronic standards for product classification and their application to electronic catalogue systems. The work of the ePDC project is divided into two parts.

"Global Multilingual Product Description and Classification for eCommerce and eBusiness" (ePDC-1) (October 2003 - March 2005):

- CWA 15294 "Dictionary of Terminology for Product Classification and Description" (May 2005) *[35]*: Provides a harmonised terminology for a common understanding of the different concepts and approaches used in the area of the product classification.
- CWA 15295 "Description of References and Data Models for Classification" (August 2005) *[36]*: Identifies product classification and product representation models for the description and identification of products. Furthermore, it provides business processes and implementation requirements for the development of an ideal classification model (e.g. flexible hierarchy, multilingualism, usable Keyword system etc.).

The first phase of the ePDC project (ePDC-1) provides a conceptual data model (ePDC) based on already existing standards (e.g. ISO 11179, ISO 13584, ISO 15926, etc). It describes in detail all entities and relationships required for product description and classification, as well as, all messages and formats for the exchange of products/catalogues. Translations of the product classification schemes are performed by:

- Members of the Classification scheme, free of charge (some translations are being financed by organisations, for instance eCl@ss)
- Local offices upon request, free of charge (e.g. GS1)
- Private catalogue companies are responsible for the translation, being paid by the organisation.

Furthermore, it provides detailed specifications for the establishment and administration of a data management system covering

- Storage, versioning, and classification of multilingual data
- Data access and data manipulation
- User management (i.e. create, edit, update, delete) of users
- Classification schemes
- Importing and exporting of data

The project identified several principles to be taken into account for the establishment of a good product classification system:

- Provide a flexible information model with entities and relations such as:
    - A dictionary or ontology of all available product classes, including for each product class a set of properties (list of characteristics) reflecting the standard product description. These classes may be hierarchically structured with multilingual support
    - A dictionary or ontology of all available properties
    - A hierarchical grouping scheme (often a numbered one) for building a product categorisation and a hierarchy of the product classes. The grouping scheme is composed by a certain number of levels (usually 4 levels)
- Provide an efficient, accurate and flexible hierarchal system (including a keyword system), usable for hierarchical search
- Support a standard set of properties usable for parametric search, by humans as well as by computer systems
- Support a standardised and secure communication interface for the exchange of messages

"Generic electronic Product Description and Classification" (Gen-ePDC or ePDC-2) (since March 2005):

- CWA 15556-1 "Part 1: New Property Library"(June 2006) *[37]*: Provides a conceptual description of a library structure for the collection and identification of interoperable product classes and properties using as a basis the ISO 13584 dictionary model.
- CWA 15556-2 "Product Classes with sets of Properties"(June 2006) *[38]*: Provides specifications for the use of the ISO 13584 and IEC61360 data dictionaries for the definition of properties, datatypes and units, as well as, relationships between the data dictionary components.
- CWA 15556-3 "Part 3:"Results of development in harmonisation of product classifications and in multilingual electronic catalogues and their respective data modelling"(June 2006) *[39]*: Addresses issues related to the harmonisation of three classification systems (aCl@ss, UNSPSC and GPC), which are widely used in Europe for product classification in sales and procurement. These three classification systems have been examined in three industry sectors (independent automotive aftermarket, oil and gas industry and domestic appliances) in order to identify best practices and develop organisational, technical and process-based recommendations to facilitate the harmonisation process. Furthermore, it describes the standardisation progress that has been made in the domestic appliances industry as well as, in the oil and gas industry standardisation by exploring available classifications and their gaps and differences.

The ePDC provides a sample product description and classification scheme for the harmonisation of eCatalogue content structure, as well as, specifications for the establishment and maintenance of a platform to support the classification of industry sector products. It also identifies the minimum requirements (data repository, data access and data manipulation, data import and export, workflow management and user management modules) that should be met in order for the establishment and maintenance of a product classification system to be realised. Furthermore, it provides sample classification system architecture based on a scalable and extensible infrastructure, as well as, commonly used programming paradigm and language for supporting the management of the business process of large enterprises and SMEs.

WS/e-CAT Key Characteristics

The following table provides a summary of the WS/eCAT key characteristics

Features	Description
Name of Standardisation Initiative	Workshop on multilingual electronic cataloguing & classification in eBusiness (**WS/eCAT**)
Responsible body	CEN/ISSS
Outline of E-CAT Workshop	- Focuses on the establishment of interoperable and multilingual standards for product classification and their further application to eCatalogues - Introduced e-Cataloguing project (use of eCatalogues in a multilingual environment) - Introduced ePDC project (development of interoperable standards for product classification, adoption of common architecture for classifications and technical dictionaries according to pertaining standards like ISO, harmonisation of terms and definitions) - Survey of existing eCatalogues/organisations supporting eCatalogues for eBusiness - Formulating problems and recommendations for a systematic approach to implement highly interoperable eCatalogues at SME level - Introduces plans and concepts for European implementation of multilingual catalogue strategies
Description / Main characteristics	Project started on November 2002 and closed on February 2006 Has developed two projects: - E-Cataloguing - Electronic Product Description and Classification (ePDC) project. The ePDC is divided into two parts: o Global Multilingual Product Description & Classification for eCommerce & eBusiness" (ePDC-1) o Generic electronic Product Description & Classification" (ePDC-2)
Deliverables	e-Cataloguing project has delivered: - CWA 15045 "Multilingual catalogue strategies for eCommerce and eBusiness" / July 2004 ePDC-1 has delivered: - CWA 15294 "Dictionary of Terminology for Product Classification and Description"/ May 2005 - CWA 15295 "Description of References and Data Models for Classification" / August 2005 ePDC-2 has delivered: - CWA 15556-1 "The New Properties Library" / June 2006 - CWA 15556-2 "Product Classes with sets of Properties" / June 2006 - CWA 15556-3 "Results of development in harmonisation of product classifications and in multilingual electronic catalogues and their respective data modelling " / June 2006
Ongoing & Planned Initiatives	The deliverables of the project have been submitted to ISO, in order to be utilised by the international standardisation initiative. This Workshop will be renewed if and when Commission financial support proposed for 2006 is received.

Table 15: e-CAT workshop key characteristics

3.4.2 eProcurement Workshop

In view of the forthcoming new legal framework for eProcurement and work on the 2004 eProcurement Action Plan, an eProcurement Workshop (WS/ePRO) was organized by CEN/ISSS (October 2003 – February 2005). Its purpose was to review the situation regarding standardisation needs in eProcurement and to assess which international standards the public as well as private sector might should use. In February 2005, the workshop produced a gap analysis included in the CWA 15236 'Analysis of standardisation requirements and standardisation gaps *[40]*, including:

- Analysis of differences between eProcurement implementations in the public and private sectors, as well as, analysis of implementation approaches between large companies and SMEs. Based on this analysis, an overview was provided on the legal, organisational, procedural, and technical requirements for the implementation of an eProcurement system (hardware and software building blocks) covering all the stages of the procurement cycle (eTendering, eAwading, eOrdering, eInvoicing and Payment).
- Analysis of existing standards and specifications required for implementing the different phases of a distributed eProcurement system. It identifies the use of portal-centric software distribution approach based on a client server approach and focuses on the architectural and implementation differences among the EU Member States regarding the use of standards and the difficulties in conducting cross-border eProcurement.
- Recommendations regarding future initiatives to be taken in specific fields regarding standardisation.
- Suggestions and action lists for raising awareness on standards and standardisation activities in the field of eProcurement.

The workshop identified similarities and differences between the procurement processes in the public and the private sector in all the different phases of the procurement life cycle.

The main differences in the pre-awarding phases are:

- The private sector does not have a legal framework covering the pre-awarding phases.
- The tendering procedures covered by the public sector are more complex than the tendering procedures covered by the private sector.
- For contracts above the EU thresholds, contracting authorities must submit procurement notices (e.g. contract notice) to the EU Official Journal (OJEU) for EU-wide publication on the electronic EU publication board TED, and respecting the official procedural time-limits. In private sector procurement, official thresholds or time limits do not exist.
- The first stages of the public procurement tendering process (i.e. exclusion, selection phases) must be objective and non-discriminatory following specific rules; for above-threshold contracts these are regulated at EU level. In the private sector each company has its own selection and / or 'pre-qualification' procedures, which are considered as requirements.
- The public sector has implemented regulated eTendering applications assisting contracting authorities (both at national and regional level) as well as private sector suppliers in performing procurement procedures. However, the use of such eTendering applications by the private sector is rather limited.

In addition, a number of important differences were observed in the post-awarding phases. In the area of eOrdering these are:

- The public procurement sector follows national implementations based on UBL (Universal Business Langauge) and BASDA (Business Application Software Developers Association) for the development and deployment of eOrdering. However, private sector procurement follows the UN/CEFACTEDIFACT, which is an international standard for e-Trade.
- The EU public procurement directives do not specifically regulate post-award phases. A lot of effort is still required in order to achieve cross-industry compatibility and interoperability of tools used for eOrdering in the public sector. In this area, the private sector with the assistance of large international industry players (e.g. the petroleum/chemical industry), have developed basic sectoral guidelines to assist companies operating in the same industry to communicate effectively with each other as well as with external trading partners.
- The level of centralisation is greater in the private sector so as to cover corporate needs in several regions or countries. The ordering functions of public purchasers are currently undergoing re-organisation processes, e.g. to accommodate the creation of Central Purchasing Body under the new EU public procurement directives, which may eventually lead towards a more centralised purchasing model.

The most important differences between the public and private sector in the area of e-Dispatching[7] are:

- eDispatching transactions, defined as alerts for the monitoring and submission of electronic information to buyers, based either upon predefined rules or add-hoc requests, are widely used in the private procurement sector (manufacturing, retail and distribution). eDispatching supports the establishment of long-term relationships between trading partners, which are essential in private sector procurement (buyers, suppliers, manufacturers, etc.) but are not allowed in public procurement.
- The activities and procedures followed for the monitoring and dispatching of information to the buyer (shipping/delivery information of the supplies/products) differ between the private and the public sectors. This has resulted in a wide diversity of electronic systems that are not interoperable with each other.

The most important differences between the public and private sector in the area of eInvoicing are:

- The “self-billing” process is widely used in private sector procurement, where buyers can generate their own invoices upon agreement with the suppliers, based on quantity receipts, and agreed conditions. In addition, they can correct the invoices based on established procedures. This concept is not available in the public procurement sector because there is no synchronisation between the application systems of the buyers and suppliers.

Furthermore, the workshop outlined standardisation requirements such as for the creation, submission, and evaluation of tenders, as well as, for quality assurance of electronic signatures, etc. It provided recommendations on technical standards (i.e. integrity, authentication, etc.) and best practices (i.e. time stamping, role attributes, etc.). It also identified different types of services needed for the development of a distributed eProcurement system:

- *First type*: Covers the basic set of services and processes required for the implementation of eProcurement phases concerning:
    - eTendering (creation and exchange of tender documents)
    - eAwarding (opening and evaluation of tenders)
    - eOrdering (ordering process)
    - eInvoicing (automatic generation of invoices)
    - ePayment (evaluation of invoices and payment) phases of eProcurement cycle.

Furthermore, it identified the need for Catalogue services, in order to support the Tendering and/or Ordering service.

- *Second type:* Supports the security services (eSignature – use of electronic certificates for signing and encrypting tender documents, eSecurity – network and system security) needed for the secure submission of tender documents and their storage. Covers also services such as eNotification (electronic submission of notices to national publication outlets and the OJEU) and eAuction.
- *Third type:* Supports additional necessary services for the integration and automation of the procurement process, such as audit trailing and monitoring service, time stamping service, etc.

The analysis of standardisation requirements and gaps covered organisational and procedural aspects related to the implementation and introduction of eProcurement in the public and private sector. It acknowledged that each individual MS had developed its own strategies, with only a few of them using open standards (e.g. Denmark – UBL). In addition, it listed specific standardisation initiatives relevant to cross-border transactions throughout the procurement cycle and provided recommendations on critical issues (e.g. transaction definitions – XML usage, naming conventions, etc.) with a focus on technical, semantic and organisational interoperability. The gap analysis produced the following recommendations.

- Standardisation of MS business processes throughout the eTendering and eAwarding phases of the procurement cycle based on UBL, UN/CEFACT or the IDA eProcurement models and schemes, and through the establishment of a common semantics vocabulary.
- Identification of XML DTDs for the exchange of procurement notices and XML schemes for the submission of tenders, and recommendations to incorporate the IDA eProcurement models and schemes into the standardisation practices defined by UN/CEFACT.
- Identification of the traditional EDI standards developed by UN/EDIFACT (covering Orders, Invoices, Dispatch Advice, etc.), along with Message implementation Guidelines covering different industry sectors (EANCOM – retail and distribution, EDIBUILD – construction industry, GHX-HL7 – medical, chemical, petroleum, steel, electronic and other sectors).
- Reference to XML based solutions and standards provided by the IDA eProcurement models and schemes (eOrdering, eInvoicing schemes), the CEN/ISSS (WS/eBES) and OASIS (UBL) and to classification schemes (e.g. UNSPSC, GPC,eCl@ss, etc.) in the establishment of an efficient eSourcing system.

The comparative assessment of the W3C Web Services Architecture Stack (SOAP) and the ebXML Web Services Architecture (ebXML) identified the advantages and the drawbacks of each individual model for the development of Web Services, and recommended the harmonisation of the two models.

WS/ePROC Characteristics

The following table provides a summary of the WS/eProcurement key characteristics

Features	Description
Name of Standardisation Initiative	eProcurement Workshop (**WS/ePROC**)
Responsible body	CEN/ISSS
Outline of ePROC Workshop	- Review of eProcurement standardisation needs and assessment of international standards used by the public and private sectors - Analysis of standardisation requirements and gaps and recommendations on standardisation - Analysis of differences between public and private sector eProcurement - Analysis of existing standards and specifications for implementing an eProcurement system
Description / Main characteristics	- Analysis of differences between public and private eProcurement implementations, as well as, analysis of implementation approaches of large companies and SMEs - Analysis of existing standards and specifications for implementing the different phases of a distributed eProcurement system. - Recommendations regarding specific future standardisation initiatives - Suggestions and action lists for raising awareness on standards and standardisation activities in the field of eProcurement.
Deliverables	CWA 15236 'Analysis of standardisation requirements and standardisation gaps

Table 16: ePROC workshop key characteristics

3.4.3 eInvoicing Workshop

The CEN Workshop on the "Interoperability of Electronic Invoices in the European Community"[41] deals with requirements for the standardisation of electronic invoicing within the Member States, as defined by the Value Added Tax (VAT) legal framework. This Workshop was launched in April 2006, in connection with an EU/EFTA standardisation mandate in support of the VAT Invoicing Directive 2001/115/EC. During the first phase of the WS (ended in June 2006)[8] a series of reports were published, namely CEN Workshop Agreements (CWA) 15574-82.

These reports propose modifications related to eInvoicing, encompassing e.g. the legal framework, security requirements, operational requirements and eInvoice content details. The reports also include recommendations concerning coded identifiers and coded textual descriptions. These should function as better alternatives to the current use of unstructured clear text identifications and descriptions of parties and goods/services. Additionally, guidelines and suggestions for the adoption of eInvoicing best practices by Member States and eInvoice service providers are presented. Special attention was given to eInvoicing requirements regarding the processes for VAT declaration and verification, as well as the use of codes for VAT Exemptions.

The contents of the CWA 15574-82 [42] reports are outlined in the following:

- *CWA 15574:* Proposes the modification of the Electronic Data Interchange (EDI) Recommendation of 1994/820/EC, which specifies the legal terms and conditions under which parties operate when conducting transactions using EDI. The provided recommendation addresses fundamental definitions and main issues for the validity and formation of contracts, admissibility in evidence of EDI messages, as well as, processing and acknowledgment of receipt of EDI messages. Furthermore, it covers issues related with the security (confidentiality, protection of personal data, recording and storage) of EDI messages and the protection of personal data, as well as, with operational requirements and technical specifications. The respective modifications are presented in the Annex to the document.

[8] A second phase of the eInvoicing Workshop is planned. Relevant information is not available yet.

- *CWA 15575:* Provides the list of attributes required for the practical implementation of the UN/CEFACT cross-industry invoice, based on the UN/CEFACT Core Components for the VAT data requirements. The work is based on the submission and the harmonisation work done by TBG17, the UN/CEFACT standardised structure and naming of the invoice content details. **Table 44** in Annex II provides an overview of the correspondence between the mandatory VAT elements identified in the VAT directive (2001/115/EC) (first column) and the VAT Core Components defined in the UN/CEFACT cross industry invoice (second and third column).
- *CWA 15576:* Provides recommendations on the use of coded identifiers (e.g. names, addresses, product description, etc.) as an alternative to the current unstructured clear text identifications of parties, goods and services, for the efficient and accurate processing of business transactions. It establishes the reasoning for the use of coded identifiers and gives guidance on how they may be implemented effectively in Member States where this concept may not have yet been introduced. The current CWA takes into account the responses generated and processed in the CWA Survey of VAT Data Element usage in the Member States and the use of codes for VAT Exemptions. A detailed list of the invoice content (attributes) is presented in Annex II.
- *CWA 15577:* Presents a standardised set of codes with definitions for the replacement of the current plain text clauses in eInvoice messages for VAT exemptions, which usually require manual intervention for the completion and processing of information. The workshop has developed a minimum list of codes, in order to identify generic reasons for exemptions, without however attempting to consolidate all existing national references into a single list. The list of the provided codes is in line with the requirements of the automotive industry; follow up and dissemination activities have been planned for the dissemination of the results and the extension (additional codes, multilingualism, etc.) of the list to other industry sectors.
- *CWA 15578:* Presents the responses received by EU Member States and the EFTA countries on the survey carried out for the eInvoicing Focus Group in 2003. It includes the analysis of the responses and recommendations for simplifications and a harmonised approach, where relevant, and finally, proposals to introduce the concept of codes to replace clauses used in electronic invoices for notifying Exemptions, Reverse Charges, Margin Schemes and New Means of Transport.
- *CWA 15579:* Presents an overview of the structure of the procedure of issuing and receiving electronically signed invoices. It includes the description of the legal environment, the basic invoicing workflow, basic requirements for electronic signatures for eInvoicing, major parts and parties in the workflow and finally facts and recommendations. The document proceeds with addressing issues on advanced electronic signature used for electronic invoices. Issues related to the verification and documentation of the integrity and authenticity of an electronic invoice are discussed and eInvoice signature profile requirements are presented. The document proposes that all Member States should accept digital signatures based on X.509v3 certificate. In addition, it is suggested that European Electronic Signature Standardisation Initiative (EESSI) standards should be adopted as common technical interpretation, instead of creating new standards, to foster interoperability.
- *CWA 15580:* Discusses fundamental issues regarding the electronic storage of invoices, such as the legal environment and problems arising in the procedure. The document then provides guidelines for the electronic storage of invoices. It also presents the results of the questionnaire on legislation information in Member States. The scope of the document is to prepare recommended archiving guidelines focused on rules and guidelines for inspection. It also includes rules on the kind of data used and the traceability of commercial operations.
- *CWA 15581:* Gives guidance on best practices for Service Providers offering value-added third-party services in relation to electronic invoicing. The target audience of this document comprises organisations offering third-party services in relation to the exchange of electronic business documents and organisations that may need guidance when employing providers of such third-party services.

- *CWA 15582:* Specifies the eInvoicing Reference model, which describes eInvoicing processes, namely the business functions between the parties involved in electronic invoicing, the processes of VAT declaration and verification, and the electronic business services to support eInvoicing. The document considers the process of electronic invoicing in the European Union, in line with Council Directive 2001/115/EC. The Reference Model includes and refers to the other tasks from the eInvoicing CEN Workshop.

The overall conclusion of the above reports is that there is a need to adopt a standard that will meet the requirements of both the public and private sectors in the area of eInvoicing and that will assist in achieving efficiency gains (e.g. reducing processing and document transmission costs). Although the EDI standard is currently in place for the formatted exchange of invoices, the wide diversity in Member States' implementation of the electronic signatures and the VAT Directives raises interoperability issues that hinder cross-border electronic Invoicing.

The standardisation process for electronic invoices is still in progress. The Workgroup provides detailed recommendations on the structure of an eInvoice, as well as, best practices on their introduction and standardisation. It covers the data content required in an invoice, as well as, fiscal practices (i.e. self-billing, batch invoicing, etc.) and procedures (i.e. prior notification, secured electronic Invoices, etc.). Furthermore, it identifies the need for further actions by the European Commission and standardisation bodies, in order to assist the modernisation of the relevant recommendations and the development of the appropriate required standard.

The work undertaken so far by the eInvoicing Workshop is relevant to the implementation of electronic catalogues as prospectuses. There is an interrelation between the content details (attributes) of the invoice line items and the attributes of the catalogue items, where the attributes of the first constitute a subset of the latter. Furthermore, the implementation of the relevant recommendations in the area of multilingualism, storage, archiving, and advanced/qualified electronic signatures can be applied to the content of the electronic catalogues.

Regarding the standardisation process by the relevant bodies, it is expected that the UN/CEFACT Core Components will be updated so that the Core Components for invoice attributes and catalogue attributes will be harmonised. This requires a gap analysis on the business requirement specifications defined by the eInvoicing and the eBES Workshop, which is expected to be completed within 2007.

The second phase of the workshop was initiated at the end of 2006 with the aim to provide further standardisation work in the domain of electronic invoices in Europe, with the view to supporting:

- Adoption of electronic invoicing business processes in Europe
- Conformity of electronic invoice implementations with the Council Directive 2001/115/EC and the national legislation as regards electronic invoices
- Cost-effective implementation of compliant electronic invoice systems in using emerging technologies and business processes
- Security (authentication and integrity) of electronic invoices independent of formats and technologies
- Emerging network infrastructure of invoice operators throughout Europe

WS/eINV Characteristics

The following table provides a summary of the WS/e-INV key characteristics

Features	Description
Name of Standardisation Initiative	eInvoicing Workshop (**WS/eINV**)
Responsible body	CEN/ISSS
Outline of eINV Workshop	- Focuses on the harmonisation of VAT-Invoicing implementations within the EU Member States - Provides requirements for the standardisation of electronic invoicing within the EU Member States - Promotes the establishment of high-level Business Requirements Specifications for electronic invoicing for further development and modelling of the business processes by other Groups and Working Groups within UN/CEFACT - Developed guiding principles for eInvoice exchange to support governmental, legal and regulatory bodies dealing with eInvoicing, tax and e-signature issues - Provided recommendations for the implementation of electronic invoicing, electronic signature, electronic sealing as well as electronic storage and archiving
Description / Main characteristics	
Deliverables	- CWA 15574 “Commission Recommendation 1994/820/EC,proposed revision with the requirements of Directive 2001/115/EC, present day eCommerce practices and revised definition of EDI” /July 2006 - CWA 15775 “The list of invoice content details identified in the directive 2001/115/EC expressed as UN/CEFACT Core Components” /July 2006 - CWA 15776: Recommendation to allow coded identifiers as an alternative to the current unstructured clear text identifications” /July 2006 - CWA 15577 “A standardised set of codes with definitions to replace plain text clauses in eInvoice messages for VAT exemptions ” /July 2006 - CWA 15578 ”Survey of VAT Data Element usage in the Member States and the use of codes for VAT Exemptions” /July 2006 - CWA 15579 “EInvoices and digital signatures” /July 2006 - CWA 15580 “Storage of Electronic Invoices” /July 2006 - CWA 15581 “Guidelines for eInvoicing Service Providers” /July 2006 - CWA 15582 “eInvoice Reference Model for EU VAT purposes specification” /July 2006
Ongoing & Planned Initiatives	The second phase (launched on 7 May 2007) will stimulate further standardisation work in the domain of electronic invoices in Europe,

Table 17: eINV workshop key characteristics

A second phase of activities on eInvoicing was launched on May 2007 and will last for 24 months. The objective of this phase is to assist the standardisation and practical use of the electronic invoicing processes mainly through the identification of various best practices for e-invoices in Member States and the integration of the emerging technical and practical solutions into effective best practices. This will be achieved in close coordination and cooperation between private industry, solution providers and public administration. In this direction, five CEN Workshops (CWA) will be established and progress in parallel with a view to enchance:

1. The adoption of electronic invoicing in business processes in Europe. This will include activities such as:
    a. Provision of a network of national e-invoice forums to promote the communication and exchange of national best practices in electronic invoices
    b. Description of cross-border exchange of electronic invoices in different Member State
    c. Coordination of national implementation guidelines in local language
    d. Collection and description of best practices in each individual country covering issues related with the accuracy of the invoices exchanged between the issuer and the receiver
    e. Preparation of guidelines describing the activities required in order to move towards one e-invoice address registry inside EU and bringing up best practice
2. The compliance of electronic invoice implementations (i.e. codes and identifiers, archiving and storage, service providers) with Council Directive 2001/115/EC and the national legislation as regards electronic invoices. This will include issues such as:
    a. Development of criteria for certification of service providers and e-invoice solutions
    b. Development of a framework for tax authorities to audit VAT invoice solutions
    c. Monitoring the legal requirements in member states as regards cross border exchange of electronic invoices
    d. Recommendation of changes in the legal environment for electronic invoicing
3. The cost-effective authentication and integrity of electronic invoices regardless of formats and technologies. This will include activities such as:
    a. Assessment of requirements for secure transmission of invoices and related business documents from content and transport level perspective
    b. Development of organisational and technical solutions aimed primarily at smaller organisations
    c. Development of a framework for the recognition of codes and identifiers, for the rules concerning the administration and look-up thereof in order to assert authenticity and to create a reconciled and workable system that can be used in multiple application environments
4. The effective implementation of compliant electronic invoice systems in using emerging technologies and business processes. This will include issues such as:
    a. Assessment of business processes (i.e. B-2-B trading platforms)
5. Identification of new and emerging technologies with potential impact on electronic invoices and related business processes. This will include issues such as:
    a. The emerging network infrastructure of invoice operators throughout Europe
    b. Development of criteria for inter-working of operators for electronic invoices in Europe
    c. Development of a registry and criteria for certification of operators

The above CWAs will be made available on the CEN/ISSS website for free-of-charge for downloading. Purchasing information will also be published in the CEN Members catalogues.

3.4.4 eGovernment Group

The e-Government Focus Group [43] is an initiative of CEN/ISSS, commenced in 2005, which focuses on addressing European needs on e-Government. It particularly studies the exchange of information amongst Member States on relevant activities, standardisation requirements, and the establishment of common goals and roadmaps.

The objective of the Focus Group is to determine the role standards should play in e-Government in order to achieve interoperability at all levels of public administration throughout the EU. The Group attempts to identify what measures are required to achieve this goal and to contribute to the establishment of a framework of e-Government standards at pan-European level, harmonised with ICT standards of general application.

The Focus Group prepares proposals and recommendations concerning standardisation issues in the field of e-Government to CEN/ISSS and other standardisation bodies, the European Commission and its agencies, national administrations and industry and other market players.

The Focus Group considers the role of standards in:

- the digital provision of e-Government services
- the “government” of e-Government, including how the digital provision of services is managed, quality criteria, conformance testing/certification, best practice, etc. and according to what standards and decided by whom

Particular attention is paid to the need of establishing standards, which meet policy requirements emerging from public administrations. The role of the Focus Group is to take these policy requirements and assess what implications these might have on the creation and/or selection of standards. This role is particularly important given the absence of an authority to address e-Government policy issues at EU level.

3.4.5 E-BIF Forum

The European eBusiness Interoperability Forum (FG/eBIF) *[44]* is a general forum. It deals with issues related to interoperability and provides recommendations and guidance on the standardisation activities to be followed by trading partners for the implementation of eBusiness solutions. It focuses on dissemination activities for promoting the deliverables on eBusiness standardisation activities performed by CEN/ISSS Workshops and Technical Committees.

Participation is open to all interested parties; a small participation fee is in some cases required. The eBusiness Roadmap addresses standardisation in Europe for the period 2005-2008 and sets the following targets:

- Enhancement of the deployment of interoperable and platform-independent services, considering technical, semantic, and business interoperability
- Improvement of eBusiness interactions security
- Facilitation of services accessibility and eBusiness solutions that are adaptable to user needs

3.5 Summary

The need for a common set of electronic business documents/messages has led to a number of standardisation initiatives, addressing mainly eBusiness (i.e. eOrdering, eInvoicing) requirements and interoperability issues for moving from traditional paper based to electronic commerce. The focus is on those standardisation initiatives that specify business process related activities and the use of generic eCatalogues, operating in a multilingual environment.

As a general framework dealing with interoperability issues the eBusiness Interoperability Workshop (eBIF) provides recommendations as well as general guidelines. These are taken into consideration by all current initiatives concerning eGovernment and eProcurement. In this

context, the eProcurement Workshop (ePro) and the e-Government Focus Group (eGov) specifically promote the use of electronic means in the public sector. The ePro Workshop in particular is concerned with the implementation of an interoperable eProcurement framework based on eCatalogues. The eCatalogue Workshop (eCAT) deals with eCatalogue specific issues (e.g. interoperability, multilingualism, product classification), while the eBusiness Board for European Standardisation Workshop (eBES) provides guidelines for the exchange of data elements and messages between different Information Systems. In addition, the eInvoicing Workshop (eINV) provides specific requirements for the standardisation of eInvoicing.

Additional initiatives on electronic document exchange have resulted in specific standards such as UBL and c-Catalogue. In general, it is recognised that the development of the latest and most advanced catalogue standards is based on the ebXML framework. It provides specifications for the exchange of XML-based documents, both as regards technical specifications (e.g. repositories, protocols, profiles, etc.) and business modelling (e.g. components entities, procedures, etc). OASIS deals with the technical aspects (Functional Service View), whereas UN/CEFACT is responsible for the business semantic content (Business Operational View).

In the area of eCatalogues the work of both standardisation bodies has resulted in particular specifications (UBL/OASIS and c-Catalogues/CEN) for the standardisation of the relevant business processes and documents/messages (i.e. information entities) that are necessary to support the order-to-invoice process. Between the two main standardisation activities, the UBL can be considered to have a competitive advantage compared to c-Catalogues, as it is a fully implemented, open standard, which can be easily extended according to the needs of each individual organisation, whereas the c-Catalogue specifications cannot be extended without the prior approval of UN/CEFACT. Furthermore, UBL focuses not only on the standardisation needs of large enterprises operating in specific industry sectors, but also on the standardisation of the business transactions performed by small and medium-sized enterprises. It provides SMEs with an interoperable set of guidelines, in order to become competitive in multinational, cross-border markets.

As discussed in more depth in section 6.4, the existence of so many eCatalogue/eBusiness standards, as well as, the several tailor-made solutions by various industries/companies have created a substantial interoperability gap, refraining both the public and private sectors to make better use of eCatalogues. This has also been recognised by the relevant standardisation bodies, which are currently converging UBL and c-Catalogue with an aim to define specifications for one unique standard. The activities for the convergence of UBL and c-Catalogue have commenced in 2007 and according to the action plan, results are expected to be published by November 2007.

The most active Member States in the area of standardisation are, at present, the Nordic countries (Denmark, Sweden, Norway, and Finland), the UK and Iceland. These countries are working on the development of a Northern European Subset (NES) of UBL 2.0 documents. The NES group also plays an active role in the harmonisation between UBL and c-Catalogue. The NES initiative is discussed in more detail in section 5.2.

Therefore, UBL (approved standard) and c-Catalogue (under development) are the two prevailing eCatalogue standardisation initiatives. They focus on business processes as well as data structures for the implementation of eCatalogues exchange and further support the effective collaboration of different partners using electronic means. For the time being, however, both standards focus mainly on processes and messages for the post-awarding phases of the procurement cycle and support eOrdering and eInvoicing procedures; pre-awarding functionalities are not (yet) addressed.

Moreover, neither of the two standards addresses the need of standardising eCatalogue content. Although both standards pose requirements on the data format and when/how eCatalogues should be exchanged, there are no precise specifications on how products/services contained in an eCatalogue should be described. In this respect, UBL and c-Catalogue must be used in conjunction with other standards that deal with the standardisation of eCatalogue content, in order to render eCatalogues interoperable and more efficient, in compliance with public procurement requirements. Standards related to the content of eCatalogues and the standardisation of product classification and description are discussed in chapter 4.

4 Standards for Product Classification and Description

Product description and classification are two of the most important standardisation aspects related to eCatalogues.

A **classification standard** allows the categorisation of products and services into groups, where all products/services characterised by similar features or functionality, belong to the same group. Similar objects/items are organised into classes and similar classes are grouped into more general classes or families and so on. For instance, “photographic film” would be categorised in the class “cinematographic film”, in the group “film products”, within the family of products under “rubber, plastic and film products”.

A **product description** scheme on the other hand provides more detailed information for products by representing specific characteristics or functions of the respective product. For instance, a computer printer would be described by the standardised set of attributes “pages per minutes” (e.g. a numerical value), “colour” (e.g. attribute value would be a “yes” or “no” answer), “technology” (e.g. attribute value would be for instance “inkjet”, “laser jet”, “dot matrix”, etc), and so on.

The immediate benefit of using product description and classification schemes is that two trading partners sharing the same understanding on how to classify and describe products, can achieve high semantic interoperability (i.e. one partner can “describe” a product to the other partner and be ensured that the other partner fully understands the description). As such, the use of Product Classification and Description schemes is critical to eCatalogues.

In order to achieve the benefits a standard product classification offers in an eProcurement environment, all involved market participants (buyers, suppliers, etc.) must describe their products using the same or interchangeable Product Classification and Description schemes. However, the existence of multiple classification schemes and competition amongst them constitute an obstacle to the establishment of a single standard or the harmonious coexistence of many standards. This may lead to confusion over classification issues and hinder semantic interoperability.

For this reason, convergence between the existing classification schemes may be considered or a framework may be established, whereby classification schemes can coexist through mapping tables from one scheme to another (see also analysis of chapter 6). It is identified that some product description and classification schemes are supplier-drived (such as eCl@ss) based on suppliers’ internal needs for the management of product description and classification, while others are buyer-driven (such as CPV) which depict the buyer’s view on products. This different viewpoint of product description and classification schemes may possibly prevent the creation and the use of one single nomenclature for all purposes and all products. Nevertheless, it is observed that buyer-driven classifications may be more conducive towards greater competition and thus more interesting for suppliers to adopt, in order not for them to be excluded from public procurement competitions.

This chapter presents standard classification initiatives that currently prevail in eBusiness applications. Specifically, the following standards are examined:

- *Common Procurement Vocabulary (CPV)*
- *United Nations Standard Products and Services Classification (UNSPSC)*
- *eCl@ss*
- *NATO Codification Code (NCS)*
- *Global Product Classification (GPC)*
- *Electronic Open Technical Dictionary (eOTD)*

In order to provide an objective view of the classification systems presented in this section of the report, a common item was selected to demonstrate the structure of each system. The item is “Photographic Film”.[9] This item is present in all classification systems but under different exact name and categorisation. This comparison helps to understand the philosophy behind each system and to identify good practices and possible limitations.

Table 18 provides an overview of the classification schemes, while the following sub-sections provide more in-depth information on their development, structure, and core characteristics.

[9] CPV: Photographic film, UNSPSC: Color film, e-Cl@ss: Film for photo camera, NCS: Photographic film, GPC: Photographic film, eOTD: Photographic film.

SYNOPSIS OF MAIN CLASSIFICATION SYSTEMS CHARACTERISTICS						
Classification System	CPV	UNSPSC	eCl@ss	NCS	eOTD	GPC
Responsible Organization	EU Commission, in cooperation with EU Member States	United Nations Development Programme (UNDP)	Cologne Institute for Business Research	NATO	Electronic Commerce Code Management Association (ECCMA)	Global Standards One (GS1)
Purpose/objective	Public procurement notification	Designed for commercial procurement purposes	Designed by the eCl@ss association, founded by enterprises within the fields of their research for the development of a classification system that could fully describe their products	Developed to support logistics information exchange, meeting the needs of NATO	Dictionary for the cataloguing of concepts, used to describe individuals, organizations, locations, goods and services	Designed within the fields of an agreement between the biggest multi-national manufacturers, retailers and service providers on the business rules for setting up a globally standardised and acceptable model/scheme for the identification of products
Open Source /Open Standard	No/ Available for free	Yes/ Available for free	Yes / Available for free	No	Yes/ Available for free	Available for free
Hierarchy Levels	4 Divisions, Groups, Classes, Categories	5 Segment, Family, Class, Commodity, Business Function	4 Segments, Main Groups, Groups, Commodity Classes	2 Groups, Classes	Assigned to several external class hierarchies (eCl@ss, CPV, UNSPSC)	4 Segment, Family, Class, Brick
Mapping/correspondence tables	Not Available	Not Available	Yes Mapping tables for all updates starting with eCl@ss version 4.0 are distributed using the classification tool w.e.b. eCl@ss Upgrade created by the company w.e.b. Wirth EDV Beratung. Available to ordinary member for internal usage	Not Available	Not Available	Not Available
Frequency of Updates	Less than once a year	Quarterly	Version every 2 years and release every 6 months	Bi-monthly	Monthly	Quarterly
Most recent update	2003	9.0501	5.1	Not Available	6 October 2006	1.0
Supported Languages (Multilingualism)	22 (All Official EU Languages)	11 (DA, DE, EN, ES, FR, IT, NL, PT, ZH, JA, KO) Further on demand	6 (DE, EN, ES,FR, IT, ZH) Further on demand	13 (BG, CZ, DE, EN, ES, FR, HU, IT, NL , PL, SK , SL KO)	7 (CS, DE, EN, ES, FR, NL, PL)	1 (EN)
Number of Supported Items	8.000	18.000	75.000 keywords	Not Available	60.000	Not Available
Integration of Attributes	No (New version will provide attributes)	No	Yes	Yes	Yes	Yes
Number of Attributes	Not Applicable	Not Applicable	Not Available	Not Available	30000	Not Available
Terminology & Synonyms	No	No	Synonyms	Synonyms	Synonyms	No

Users / Geographical focus	All MS	Global (USA)	Global (Europe)	Global Designed to meet the needs of NATO	Global (USA)	Global
Suited for use in eCatalogues	Only in combination with other nomenclatures	Only in combination with other nomenclatures	In combination with GPC	Not Available	Only in combination with other nomenclatures	In combination with eCl@ss

Table 18: Key characteristics of product classification and description schemes

4.1 CPV

The Common Procurement Vocabulary (CPV) [45] constitutes a neutral, buyer-driven sheme providing a single classification system used in public procurement. In relation to supplier-driven schemes, CPV is less detailed, including almost 8.000 product and service terms and is translated in the 22 EU official languages. Its purpose is to standardise the method by which contracting authorities and public entities in Europe describe the subject of their procurement contracts. The CPV is used by the EU electronic publication board SIMAP ("Système d'Information pour les Marchés Publiques") [46]. The CPV is used to classify products and services to be procured into a structured hierarchy, through the following vocabularies:

- Main vocabulary: It is tree-structured and contains up to nine-digits codes attributed to a description of the products, services or works reflecting the subject of the contract. Each one of the last three digits provides a more detailed description within the main category. The last digit validates all the previous as shown in **Figure 5**.

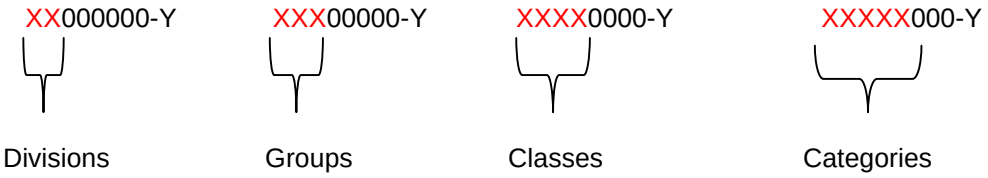

Figure 5: CPV structure

- Supplementary vocabulary: It is used in order to expand the description of a contract by entering extra qualitative information, such as the destination of the products. This is implemented with the use of a two level alphanumeric code. The first level contains a letter corresponding to a section. The second level contains four digits, three for the identification of a subdivision and the check digit.

Example: 'Photographic film'

'Photographic film' is a specific term of 'Cinematographic film', which in turn is a more specific term within the category 'Film products'. 'Film products' is part of the broader class 'Rubber, plastic and film products'. The entity 'Photographic film' can be found under CPV: 25321000-7.

Figure 6 presents the tree structure of the CPV classification scheme for the item "Photographic film". The tree snapshot is taken from the official web site of the CPV classification system (http://www.cpvclassification.com), access to which is free to everyone.

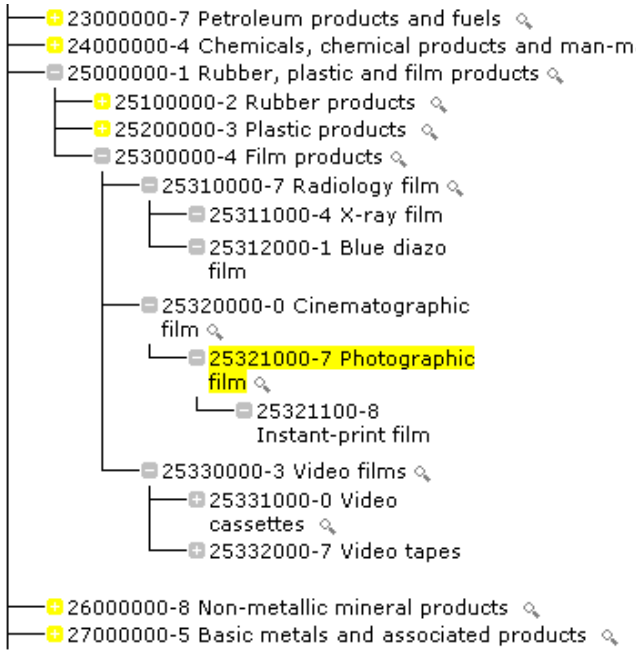

Figure 6: Example of CPV

Table 19 presents the structure, the CPV codes and the corresponding names for the division, group, class and category of the item "Photographic film".

Structure	CPV Code	Name
Divisions	25000000-1	Rubber, plastic and film products
Groups	25300000-4	Film products
Classes	25320000-0	Cinematographic film
Categories	25321000-7	Photographic film

Table 19: Example of CPV

The CPV was created by the European Commission in 1996. Its current version is laid down in the annexes to EC Regulation No 2151/2003. Use of the CPV was made mandatory as from February 1st 2006 at the latest according to the new EU public procurement directives, making part of the EU policy to enforce transparency and efficiency in eProcurement. CPV is geared towards helping suppliers to detect interesting contract opportunities through the Tenders Electronic Daily (TED)[10].

The supplement "S" of the OJEU (also referred to as OJS) contains invitations to tender for contracts of public and utilities sectors across Europe. Moreover, apart from assisting suppliers in detecting interesting contracts, CPV greatly simplifies the processes for the translation of procurement notices (e.g. contract notices). One of the great advantages of the CPV is its translation into all the 22 official EU languages (except Gaelic) which facilitates economic operators' search for business opportunities, and thus participation in a public procurement procedure, especially for SMEs. It appears that the CPV exists also in other languages, e.g. in Norvegian.

Since the CPV is intended to be used by public authorities to describe their purchases, its structure is essentially buyer-driven, i.e. it orders goods and services according to the needs of the purchaser and not according to suppliers' production processes, as is the case for some of the other classifications. Moreover, the CPV serves as the reference public procurement nomenclature and in particular, for advertising contracts electronically (eNotification) on the EU electronic publication board TED. For this reason, it provides the most neutral and broad approach to description, in respect of the principles of non-discrimination and equal treatment. Therefore, by definition, it does not provide the same level of detail as other nomenclatures.

[10] TED is the web-based electronic version of supplement "S" of the Official Journal of the European Union (OJEU)

In particular, CPV presents uneven granularity on the provided hierarchies and, in its 2003 version only supports a small array of attributes and properties. In order to use the CPV in parallel to another classification scheme, a mapping between them is required. Thus, while the CPV may be sometimes less suited to cover all needs arising in the use of eCatalogues, i.e. unambiguous and detailed description of catalogue products, its use is mandatory in public purchases. Most importantly it should be remembered that buyers' needs might be best served by using a classification that allows for competition between substitute goods and services. The buyer-driven and neutral character of CPV may render it more suitable for the buyer in comparison to supplier-driven standards as it may leave more room for competition.

The CPV is currently being revised by the Commission in close cooperation with the Member States and CPV users (a public consultation was organised in March-July 2006). The revised version of the CPV is planned to be released at the end of 2007; it will include new and revised CPV codes, as well as new descriptions for existing CPV codes. In particular, it will subtantially increase the number of available product attributes (which already exist in its current version), thus considerably enriching the vocabulary and making it more versatile.

Outline of CPV
▪ Classifies products and services to be procured into a structured hierarchy
▪ Mandatory use in public procurement notices
▪ 4-level hierarchical structure
▪ Available in 22 EU languages
▪ Buyer-driven and neutral

Table 20: Outline of CPV

4.2 UNSPSC

The United Nations Standard Products and Services Classification (UNSPSC) [47] is a coding system for the classification of products and services throughout the global eCommerce marketplace. The UNSPSC code is an open, global and cross-industry standard, publicly available for free with no use restrictions or licensing fees. It is a joint initiative of Dun & Bradstreet Corporation (D&B) and the United Nations Development Programme (UNDP). The cooperation between them concluded in 1998 with the development of an open international standard for the classification support in eBusiness sector. UNSPSC covers various applications including electronic catalogues, search engines, procurement and accounting systems. According to own estimates, its use has been expanded worldwide, with over 4,000 members in more than 80 countries.

UNSPSC is currently available in 11 languages and can be localised in any language upon request. The current version consists of more than 18000 terms. The code is often updated and adjusted to be in line with market evolution. Feedback from the user community is used to improve the UNSPSC code, as well as to keep it up-to-date, by the addition of new products. Codes for covering new requirements may also be added upon user request. UNSPSC does not support any attributes or synonyms.

Every UNSPSC code is represented by a controlled 8 digit numeric code, which can be extented up to 10 digits in order to also describe a business function. UNSPSC supports a five-level hierarchy, and each code is structured as follows:

- XX Segment: The logical aggregation of families for analytical purposes
- XX Family: A commonly recognized group of inter-related commodity categories
- XX Class: A group of commodities sharing common characteristics
- XX Commodity: A group of substitutable products or services
- XX Business Function: The function performed by an organisation in support of the commodity

Example: “Color film”

“Color film” is part of the broader class “Still picture film”. “Still picture film” is then a member of the “Photographic and recording media” family, which belongs to the “Printing and Photographic and Audio and Visual Equipment and Supplies” segment. “Color film” can be found under UNSPSC: 45131501. UNSPSC codes can be further extended by adding a ninth and tenth digit. The last digits (Business Function) indicate relationships to the supplier, such as rental/lease, wholesale, retail, manufacturer or repair.

Table 21 presents the classification structure of UNSPSC for the entity “Color film” as well as the codes and names for the respective class, family and segment.

Structure	UNSPSC Code	Name
Segment	45 000000	Printing and Photographic and Audio and Visual Equipment and Supplies
Family	4513 0000	Photographic and recording media
Class	451315 00	Still picture film
Commodity	451315 01	Color film

Table 21: Example of UNSPSC

In May 2003, UNDP selected the Uniform Code Council (UCC) as code manager, responsible for a series of activities. The code manager has to guarantee the compliance with the policy of UNDP and the integrity of the code structure. Additionally, UCC controls the requests for code modifications and the industry revision projects. It is responsible for the code updates, communications with members and the plans defined by UNDP and its members.

UNSPSC is funded through member fees. Membership is open to anybody and membership application may be completed online. Being a member includes the advantages of business-building benefits, including continued participation in UNSPSC maintenance, development and related activities, including the right to ask for code modifications. There are several membership categories (i.e. individual, corporate, public sector/government, educational, etc) to apply for with differing fees and rights. However, the latest version of the code is always available free of charge to the general public.

UNSPSC standard is an open and widely spread classification system, which is offered free of charge for use from everybody in the supply and demand chain. It provides a hierachical product classification scheme with a high level of detail (five-level hierarchical taxonomy), which can possibly allow contracting authorities to map them into their internal classification system and get customised views of their data. Its multilingual support assists on promoting cross border trading between contracting authorities and suppliers from different Member States.

Outline of UNSPSC
▪ Open, global and cross-industry standard
▪ Free and publicly available with no use restrictions or licensing fees
▪ Five-level hierarchical structure
▪ Available in 11 languages; can be localised in any language upon request
▪ The current version supports more than 18000 terms
▪ Lack of attributes and synonyms
▪ Neutral (open standard)

Table 22: Outline of UNSPSC

4.3 eCl@ss

The Standardised Material and Service Classification, the so-called eCl@ss [48], is a classification scheme for the information exchange between suppliers and customers. It was developed in Germany, since the late 1990s, by Cologne Institute for Business Research with the cooperation of enterprises from various industries (e.g. automotive, chemical, electronics, power generation and distribution, services, trade). As such, eCl@ss primarily covers the classification of products and services of heavy industries. eCl@ss association was founded by enterprises within the fields of their research for the development of a classification system that could fully describe their products. It is a system based on national and international standards and it is compliant to a data model described in ISO 13584-42 and IEC 61360-2. It can be freely used across industry domains and is supported by a strong industry community. In addition, the eCl@ss standard

- focuses on efficient support of all business processes throughout the entire product lifecycle
- provides a complete product description and classification system, including a well-designed class hierarchy for categorizing products and clear multi-lingual textual definitions for the classes
- comprises standard sets of properties allowing for a detailed description of the categorised products and services, and
- consists of three interlinked elements:
    - The Material Class Hierarchy (taxonomy)
    - The Standard Sets of Attributes
    - The Keyword system

The Material Class Hierarchy is a four level tree to which keywords and attribute sets are attached. The nodes of the tree are collectively called “Material Classes” and - depending on the different levels - they are categorised as follows:

- Level 1: Segment
- Level 2: Main Group
- Level 3: Group
- Level 4: Commodity Class

For each of the four levels, two digits are available. Characteristics and sets of attributes for many different material groups are stored in a database with reference to their eCl@ss numbers. A set of attributes is attached to each classification end point eight digit eCl@ss number. eCl@ss complies with and uses nationally or internationally standardised properties (e.g. from the International Standardisation Organization – ISO, from the International Electro-technical Commission – IEC, from European standards, CEN, or, from the German standardisation institute – DIN). eCl@ss supports approximately 11,000 standard sets of documents and 50,000 synonyms.

eCl@ss maps market structure for industrial buyers and supports engineers at development, planning and maintenance. An important feature of eCl@ss is the integration of attribute lists for the description of material and service specifications. Through the access either via the hierarchy or over the keywords, both the expert as well as the occasional user can navigate in the classification. It is a multilingual scheme and, in particular, supports German, English, French, Italian, Spanish, and Chinese. Further languages can be provided upon demand.

Example: “Film for photo camera”

The commodity class “Film for photo camera” belongs to the group “Photo material”. This group is in turn a member of the main group “Photo technology, video technology” which belongs to the segment “Information, communication and media technology”. “Film for photo camera” can be found under eCl@ss: 19100301.

The eCl@ss classification tree of the item “Film for photo camera” is presented in **Table 23**.

Structure	eCl@ss Code	Name
Segment	19	Information, communication and media technology
Main Group	19-10	Photo technology, video technology
Group	19-10-03	Photo material
Commodity Class	19-10-03-01	Film for photo camera

Table 23: Example of classification of eCl@ss

Classification	Description
19-10-03-01 [AKN89600201]	Film for photo camera
Keywords	Film (photo), Instant picture film, Photo film, Polaroid film
Attribute-Set	BAA059001 - Article number BAA271001 - EAN code BAA001001 - Manufacturer's name BAA316001 - Product name BAA002001 - Product type description

Table 24: Example I of product description (attributes) of Cl@ss

Change requests and extension proposals regarding eCl@ss content can be submitted online by anyone via the eCl@ss website. The eCl@ss expert groups undertake the maintenance and extension of classes and properties. Membership to the expert groups is open to anyone and is free of charge. The quality of eCl@ss content is assured through clearly defined discussion and voting procedures. eCl@ss properties are being standardised and will be made available for public use via the DIN-server and, when available, ISO-IECservers.

eCl@ss advantage is the support of property lists since it enables keyword search, as well as product comparison. eCl@ss supports the flow of products and information along the supply chain of an industrial enterprise. It is backed by a solid industrial basis in Germany and Europe. This basis will be extended to the US and Asia, thus getting a worldwide support from industry. Currently, eCl@ss is broadly used in Germany and other European countries by international companies and their suppliers. eCl@ss takes steps into extending its support to consumer goods. Recently, the eCl@ss association, in collaboration with GS1 (the organisation responsible for GPC, discussed in section 4.5) has created a hierarchy and attributes for products in the automobile after-market sector.

Table 24 displays the set of attributes and keywords used for the description of products or services.

Classification	Description
19-10-03-01 [AKN89600201]	Film for photo camera
Keywords	Film (photo), Instant picture film, Photo film, Polaroid film
Attribute-Set	BAA059001 - Article number BAA271001 - EAN code BAA001001 - Manufacturer's name BAA316001 - Product name BAA002001 - Product type description

Table 25: Example II of product description (attributes) of Cl@ss

Outline of eCl@ss
▪ Developed in Germany by Cologne Institute for Business Research with cooperation from various industries
▪ Used across industry domains and supported by industry community.
▪ Well-designed class hierarchy and supports standard sets of properties (product attributes)
▪ Four-level hierarchical structure
▪ Supports 6 languages (German, English, French, Italian, Spanish, and Chinese)
▪ Supports approximately 11,000 standard sets of documents and 50,000 synonyms
▪ Supplier-driven

Table 26: Outline of eCl@ss

4.4 NCS

The NATO Codification System (NCS) [49] is a standard for logistics information exchange. It is the common classification system adopted by the military forces of NATO for over 45 years. NCS is integrated in the supply operations of NATO nations and many non-NATO nations providing information to all participating nations on the features of millions of items. Its aim is the promotion of interoperability both at national and international level. It is a logistics language used by several systems including logistics, supply, and procurement systems.

NCS provides a hierarchical structure comprised of:

- Groups: Each Group incorporates a series of related Classes. It is indicated by a 2 digit code and is referred to as NATO Supply Group (NSG)
- Classes: Within each Group, Items of Supply (IoS) are further divided into Classes. Each Class contains IoS that share similar functional or physical attributes. Classes are indicated by an additional 2 digit code

Group and Class codes together form a 4-digit NATO Supply Classification Code (NSC). The NATO Classification structure of all groups and classes as well as their definitions, are published on behalf of the Group of National Directors on Codification (AC/135) by the U.S. as ACodP-3 (Allied Codification Publication No 3). It is also included on the NATO Master Catalogue of References for Logistics (NMCRL). The default language of NCS is English but it also supports the use of 15 additional languages (French, Czech, Dutch, German, Italian, Polish, Spanish, Hungarian, Bulgarian, Slovak, Slovenian, Korean, Greek, Ukrainian and Finnish).

NCS ensures consistency of code allocation by use of a unique stock number to identify all items held within the stores inventory of the Services. The NATO Stock Number (NSN) is used to identify items throughout the Supply Chain. NSN is made up of a 13 digit numerical code and is divided into three parts:

- The first 4 digits are the NSC.
- The next 2 digits indicate the National Codification Bureau (NCB) assigning the NSN. NCB code of the producing country codifies the items of supply produced by that country, regardless of which country the end user belongs to. This applies even if the producing country does not use the item.
- The final 7 digits are computer allocated and have no inherent significance other than to uniquely identify the IoS to which they are allocated.

The last nine digits (the 2 digits indicating NCB and the final 7) form the NATO Item Identification Number (NIIN). NSC and NIIN form the NATO Stock Number.

Example: “Photographic film”

The item “Photographic film” belongs to the class “Photographic Supplies”, which in turn belongs to the group “Photographic Equipment”. The Item of Supply “Photographic Film” in NCS can be found under the NATO Supply Classification Code 6750. The remaining 9 digits of the NATO Stock Number (2 for the producing country and 7 for identification purposes) are provided only for specific products that belong in this class.

Table 27 presents the classification structure of the NCS scheme for the item “Photographic Film”.

Levels	Structure	Number	Name
1	GROUP	67	”Photographic Equipment”
2	CLASS	6750	”Photographic Supplies”
	NCB Code	2 digits (product specific)	
	Non Significant number which, together with the NCB code, uniquely identifies the item	7 digits (product specific)	
	ItemName Definition		A flexible plastic material in roll or sheet form bearing a coating which, when exposed to a light source and then given a chemical treatment, produces a visible black and white or color image. The roll film may come with or without perforations, sound track, leader, and/or trailer. The sheet film may be cut in sizes that can be easily handled one sheet at a time, or prepared in pack form where a quantity of sheets are enclosed in a pocket so designed that individual exposures can be made by removing tabbed shields. Photographic film may be used for, but not be limited to aerial photography, motion picutre, microfilm, graphic arts, portrait, reproductions, and the like.

Table 27: Example of NCS

The NCS is governed by the NATO Group of National Directors on Codification (AC/135) and is implemented by the NCB of each user nation. AC/135 is under the authority of the Conference of National Armament Directors (CNAD). Its purpose is to enhance effectiveness and efficiency of national and international logistics management systems within NATO. It focuses on the provision of uniform codification in support of standardisation and interoperability within NATO with the purpose to enhance global military co-operation and industrial partnership. Furthermore, it aims at the harmonisation of the NCS with international product data standards. The AC/135 has signed a Memorandum of Understanding (MoU) with the NATO Maintenance and Supply Agency (NAMSA) [50] for the provision of specific technical and administrative support.

NCS demonstrates the same limitation of CPV and UNSPSC in that although it supports an efficient classification structure, it lacks product attributes. One possible way of overcoming this limitation is to integrate it with a system providing standardised sets attributes, such as the eOTD, which is based solely on attributes without having a classification hierarchy at all.

Outline of NCS
▪ It is the common classification system adopted by the military forces of NATO for over 45 years
▪ NCS provides a hierarchical structure consisting of groups and classes
▪ Uses the NATO Stock Number (NSN) which is a 13-digit numerical code number
▪ Supports 16 languages
▪ Supports 76,872 terms

Table 28: Outline of NCS

4.5 GPC

The Global Product Classification (GPC) is the result of an agreement between a number of large multi-national manufacturers, retailers and service providers. This agreement entails the business rules for setting up a globally standardised and acceptable model/scheme for the identification of products. The GPC provides a granular hierarchical structured scheme and rules for the consistent categorisation and identification of products and their consistent mapping between existing internal classification systems. The GPC scheme is owned by the GS1 US Technology Services (formerly known as Uniform Code Council) and covers the classification and description of consumer goods. ACNielsen is responsible for its management on behalf of the industry.

The GPC consists of a four-level classification hierarchy organised in Segments, Families, Classes and Bricks, where only the latter is mandatory. The Bricks represent category group of similar products. Each Brick is characterised by up to seven generic attributes/properties that can take a unique attribute value from a normalised and comprehensive code list.

The GPC scheme is currently available only in the English language. The need of localisation and multilingual support of the GPC scheme has been identified and the necessary localisations and translations are currently in process from the GS1 Member Organisations.

Access to the GPC standard is available at the GS1 website [51] to anyone without any fees, restrictions, or contractual arrangements. The information and the hierarchical sheets of the GPC standard can be downloaded in the form of an excel file, whereas the scheme files and the delta reports in XML format.

Example: “Photographic film”

The brick “Photographic film” belongs to the “Photography” class, which in turn belongs to the “Photography/Optics” family of products. Family “Photography/Optics” belongs to the “Audio Visual/Photography” segment. The brick “Photographic film” is found in the GPC classification system under code “10001490”.

Figure 7 presents the classification tree of the item “Photographic film” in GPC. The snapshot is taken from the official web site of the GPC classification scheme (http://gpcbrowser.gs1.org/).

Figure 7: Example of classification of GPC

Table 29 presents the classification structure; the numbers and names used by the GPC classification scheme for the example “Photographic film”.

Levels	Structure	Number	Name
1	Segment	68000000	Audio Visual/Photography
2	Family	68020000	Photography/Optics
3	Class	68020100	Photography
4	Brick	10001490	Photographic film

Table 29: Example I of product description (attributes) of GPC

Furthermore, the brick “Photographic film” is followed by a set of attributes. These attributes comprise the “Colour format” and the “Format of photographic film”. The attributes, their permissible values and the corresponding definitions are presented in **Figure 8.**

BRICK : 10001490 - Photographic Film
- DEFINITION : Includes any products that can be described/observed as a dark, transparent, plastic material coated in photographic emulsion, record images as photographs. Specifically excludes Digital Memory. Excludes products such as Disposable Cameras and Slides.
- ATTRIBUTE TYPE : 20001149 - Colour Format
  - DEFINITION : Indicates, with reference to the product branding, labelling or packaging, the descriptive term that is used by the product manufacturer to identify the colour format.
    - ATTRIBUTE VALUE : 30002515 - UNCLASSIFIED
    - ATTRIBUTE VALUE : 30002518 - UNIDENTIFIED
    - ATTRIBUTE VALUE : 30007879 - BLACK/WHITE
    - ATTRIBUTE VALUE : 30007880 - COLOUR
- ATTRIBUTE TYPE : 20001227 - Format of Photographic Film
  - DEFINITION : Indicates, with reference to the product branding, labelling or packaging, the descriptive term that is used by the product manufacturer to identify the format of photographic film.
    - ATTRIBUTE VALUE : 30002515 - UNCLASSIFIED
    - ATTRIBUTE VALUE : 30002518 - UNIDENTIFIED
    - ATTRIBUTE VALUE : 30008055 - 120MM
    - ATTRIBUTE VALUE : 30008056 - 127MM
    - ATTRIBUTE VALUE : 30008057 - 135MM
    - ATTRIBUTE VALUE : 30008058 - 240MM
    - ATTRIBUTE VALUE : 30008059 - DISC FILM
    - ATTRIBUTE VALUE : 30008061 - RAPID FILM

Figure 8: Example II of product description (attributes) of GPC

GPC has an efficient classification hierarchy and additionally supports a limited set of generic attributes. In order to be used for supporting eCatalogues in eProcurement systems, the set of attributes should be significantly extended. This would render GPC an efficient tool for both product description and classification. GS1 has taken steps towards expanding the current support of GPC. In collaboration with the eCl@ss association, GPC has been extended to cover the automobile after-market sector.

Outline of GPC
▪ Developed by the biggest multi-national manufacturers, retailers and service providers
▪ Owned by the GS1 US Technology Services
▪ ACNielsen is responsible for its hosting and management
▪ Access to the GPC standard is free of fees, restrictions, or contractual arrangements
▪ Four-level hierarchical structure
▪ Support of seven generic attributes/properties
▪ Currently available only in English

Table 30: Outline of GPC

4.6 eOTD

ECCMA Open Technical Dictionary (eOTD) *[52]* constitutes the commercial representation of the NATO Codification System (NCS). It is a dictionary for the cataloguing of concepts and is used to describe -independently of the language - individuals, organisations, locations, goods and services. It is "an open standard for encoding product data through the life cycle of a product – from design through disposal". eOTD is a collection of terminology for cataloguing that allows the creation of standard descriptions. It is an Open Standard that can be freely used, copied and distributed.

eOTD is developed and maintained by the Electronic Commerce Code Management Association (ECCMA) [53], a non-profit trade association for electronic commerce. Established in April 1999, ECCMA's purpose is to develop and maintain international open standard dictionaries for the consistent labelling of information. Specifically, regarding cataloguing, ECCMA supports the development of Open Source cataloguing tools and aims at the cataloguing quality improvement and cost reduction. Indeed, ECCMA has developed the following Open Source implementation tools: eOTD Open Source Catalog Builder; eOTD Open Source Query Builder; Open XML Catalog Syntax.

Any individual or organisation may contribute to the eOTD. However, voting rights on requests for extension or modifications to the eOTD content is limited to ECCMA members. ECCMA Members include public and private sector buyers, manufacturers, suppliers, application providers, consultants and industry associations from 42 countries. ECCMA plans to harmonise eOTD with ISO standards that contain terminology, which could be used for cataloguing. ISO has recognised eOTD as a draft standard and assigned it ISO Standard 22745.

eOTD is based on the NATO Codification System (NCS) and incorporates all the basic elements of the NCS. Specifically, eOTD includes:

- Table of ECCMA Noun Qualifiers: Naming items are not free choice but rather reflects assignment of particular properties to particular families of parts. On this basis, any product can only appear once in the hierarchy. It contains approximately 60,000 Standard Item Names.
- Table of Attributes: Provides the properties of characteristics of an item (e.g. dimensions, colour and materials, etc.). Approximately 30,000 Standard Attribute Names are available.
- Table of Response Codes: Used to validate attributes for a given noun qualifier. Over 150,000 codes are available for use. For instance, if the attribute is "colour" the response code explicitly defines the colour.

Most of the Item Names and attributes supported by eOTD are defined and translated in seven languages (English, Spanish, French, German, Dutch, Polish, and Czech). Unlike classification schemes, eOTD does not include a class hierarchy. However, eOTD concepts can be assigned to several external class hierarchies, including eCl@ss, CPV and UNSPSC. Therefore, eOTD could be integrated into a catalogue system whether an external classification scheme such as eCl@ss, UNSPSC or CPV is utilised. It is updated in a regular monthly cycle and is supported and endorsed by NATO AC/135 and National Governments.

The eOTD is a standard descriptive language that attempts to prevent duplication of products descriptions; hence to eliminate the uncertainty and ambiguity in the description of terms. The existence of the eOTD linked to the NATO codification system enables existing and potential suppliers to specify their goods and services. The eOTD standard table of attributes and definitions is expected to render creation of product specifications and catalogues easier, as data should be readable by any computer application. Its use should contribute to the simplification of global electronic commerce efforts by making it much easier to save money in the cataloguing of new equipment. It enables production of catalogues that can be searched over the Internet and imported into sourcing, procurement and Enterprise Resource Planning (ERP) systems with minimal data transformation costs.

Example: “Photographic film” - Concept Identifier: 0161-1-01-037493

Definition: *A flexible plastic material in roll or sheet form bearing a coating which, when exposed to a light source and then given a chemical treatment, produces a visible black and white or color image. The roll film may come with or without perforations, sound track, leader, and/or trailer. The sheet film may be cut in sizes that can be easily handled one sheet at a time, or prepared in pack form where a quantity of sheets are enclosed in a pocket so designed that individual exposures can be made by removing tabbed shields. Photographic film may be used for, but not be limited to aerial photography, motion picutre, microfilm, graphic arts, portrait, reproductions, and the like.*

eOTD is the only product description scheme that does not support a native hierarchical structure of products, but rather can use an external structure (e.g. CPV). Hence, the nature of eOTD is complementary to that of NCS or of other classification schemes without attributes, the integration of which could yield a new complete classification scheme capable of covering the needs of all the phases of eProcurement.

Outline of eOTD
▪ Is the commercial representation of the NATO Codification System (NCS)
▪ Is an open standard for encoding product data through the lifecycle of a product
▪ Can be freely used, copied and distributed
▪ Does not include a native hierarchical structure, but rather uses external schemes (e.g. CPV)
▪ Supports approximately 30,000 Standard Attribute Names
▪ Translated in seven languages (English, Spanish, French, German, Dutch, Polish, and Czech)
▪ eOTD concepts are assigned to several external class hierarchies, including eCl@ss, CPV and UNSPSC

Table 31: Outline of eOTD

4.7 Summary

Product description and classification schemes provide the means by which different organisations can describe and classify products/services in a common manner, ensuring semantic interoperability (i.e. using a common terminology, which is understood in the same way by all parties). Such schemes can constitute a suitable vehicle for assisting in the semantic interoperability of eCatalogues in the context of eProcurement. In this way, it can be understood that classification schemes are a core component of eCatalogues and in addition, they define the way content is presented in eProcurement procedures.

In the context of standardising the use of eCatalogues for eProcurement, the need for standardising their content also arises. As discussed in chapters 3 and 4, current standardisation activities mainly focus on standardising messages, processes and business documents for conducting eBusiness. According to these standards, the “eCatalogue” business document constitutes a cornerstone for most eBusiness transactions. Although there exist standards for forming eCatalogues business documents (e.g. in UBL 2.0 and c-Catalogue), there is no standardised way on how to describe products and services contained in such documents. Hence, to further utilise eCatalogues in public procurement using electronic means, effort should be dedicated to standardising the way products and services are described.

Two of the most important aspects of such schemes are their structure in terms of families, groups, classes, etc. (i.e. product classification), as well as their ability to describe specific products in detail through the use of respective attributes (i.e. product description).

A wide range of product classification and description schemes has been developed by various organisations and institutions to enable the exchange of product information between trading partners for supporting business transactions. Commonly, the existing schemes attempt to fulfil the needs of specific industries (e.g. the eCl@ss scheme for heavy industries) or specific business transactions (e.g. the CPV for eNotification in public procurement). Consequently, each scheme presents its own structure, characteristics, advantages and drawbacks as outlined below:

- CPV is a classification scheme mandated by the EU and designed for addressing the needs of procurement notices in Europe. Although it presents a series of benefits (i.e. multilingualism), its current version is not adequate for being used in eCataloguing.
- UNSPSC is an international, widely adopted and highly detailed classification scheme. However, its main drawback lies on the fact that it does not support any attributes or synonyms.
- eCl@ss is a product classification and description scheme for heavy industries, mainly adopted by the German industrial sector. It is a well-designed standard, integrating attributes and synonyms and allowing product description and search based on keywords.
- NATO Codification System (NCS) is a standard for logistics information exchange, designed to meet the needs of NATO. ECCMA Open Technical Dictionary (eOTD), the commercial representation of the NCS, is a global dictionary for the cataloguing of concepts, used to describe individuals, organisations, locations, goods and services. Although eOTD is lacking a classification structure, it provides a set of product attributes. The approach followed by ECCMA is to provide solely a product description scheme, which needs to be integrated with a classification scheme for also supporting hierarchies.
- Global Product Classification (GPC) is a global standard for the identification of products that provides a granular hierarchical structured scheme and supports attributes. It is primarily focused on addressing product classification and description of consumer goods.

The wide range of product classifications and description schemes has accommodated the immediate needs of specific industries or specific business transactions. Considering the growth of eBusiness needs however, the plethora of schemes has generated semantic interoperability issues between systems and/or individuals using different schemes. These issues could be addressed by standardising the use of product classification and description schemes through two possible scenarios:

1. The establishment of one common scheme for all industries and business transactions, both for buyers and supplier combining a powerful classification structure with a detailed attributes dictionary.
2. The development of appropriate mapping tools, ensuring interoperability between the most popular classification schemes.

The first approach, namely the development of a common classification and description scheme, would best serve all involved parties (buyers and suppliers) independently of their public or private profile in all eProcurement phases. This common classification could be implemented as a hybrid system featuring an advanced classification structure supplemented with detailed product attributes. The e-BES workshop of CEN/ISSS is moving towards the implementation of a scheme that would be a strong candidate for this solution; e-BES has attempted a preliminary harmonisation among GPC, UNSPSC and eCl@ss for various industry sectors (see section 3.2). However, several obstacles arise when considering the establishment and practical use of a common classification and description scheme across both the public and private sectors. These obstacles are mostly related to the effort and resources required for redesigning existing processes and systems in order to become compatible with this unique classification system. Apart from the effort required for establishing the ideal scheme for all industries and purposes, the practical adoption of the scheme by all parties would require significant effort, rendering this approach a long-distance goal.

The second approach, namely the development of mapping tools for the co-existence of schemes, seems to be more realistic, without however being an easy goal either. It is not always clear what is the mapping of one item in a classification scheme to another; hence the initial establishment of mapping tables between the different schemes requires significant analysis and work. Maintenance of schemes, their mappings, version control and synchronisation, as well as necessary tools for the practical use of standards can result in non-negligible costs and time-consuming procedures. On the other hand, the most important benefit of developing reference/mapping tables is that involved parties are allowed to keep their internal systems unaltered.

Most probably, any relevant activities for establishing a suitable environment for product classification and description schemes in eProcurement to resolve the current semantic interoperability issues should be instrumented by one or more standardisation bodies to ensure a future-proof solution. Further diccussion on the harmonisation of product classification and description schemes is available in section 6.3.

5 eCatalogue Standardisation activities in selected EU Member States and EEA countries

This section outlines the status of standardisation activities in selected EU Member States and EEA countries that have already significantly progressed in developing and adopting eProcurement systems and services making use of eCatalogues. The focus is on identifying the prevailing trends in the use and development of eCatalogue standards. Denmark, Germany, Norway, Spain, Sweden and the UK are individually analysed on the following aspects:

- activities, initiatives and status regarding public procurement
- eProcurement standardisation
- use of eCatalogues in the context of public procurement
- experience and achievements in terms of implementing eProcurement systems and adoption of relevant standards.

The most important activities of each selected country are summarised in an overview table in the following section. Apart from a detailed presentation of the activities performed in each individual country, this chapter also presents the activities performed by the Northern European UBL 2.0 Subset Working Group for extending the interoperability between their national systems.

It is identified that the standardisation activities in the selected EU countries are still sectorial and fragmented covering specific country needs and goals. In addition, the standarsisation initiatives presented within the current chapter are not generally geared towards supporting the use of eCatalogues for the submission of initial offers and focus rather on eProcurement standardisation in general. More details the current eCatalogue uses in various European public administrations are presented and further investigated in chapter 5 of [SoP] report.

5.1 Individual Countries

Table 32 presents an overview of standardisation activities in the selected EU Member States and EEA countries on public procurement initiatives and background, eProcurement standardisation, eCatalogues and overall experience in the use of eProcurement systems.

Country	Main activities
Denmark	**Public Procurement** - The Danish government promotes electronic business standards - The Ministry of Finance and the Danish Competition Authority (Danish Ministry of Economic and Business Affairs) are responsible for public procurement policy-making at national level **eProcurement Standardisation** - Development of OIOXML to support the exchange of electronic invoices between private suppliers/vendors and public authorities **eCatalogues** - The UNSPSC is the most widely adopted standard for the classification of catalogue products and services in Denmark. An official translation of the UNSPSC standard codes has been implemented - Denmark uses OIOUBL (subset of UBL 2.0 library) for the establishment of the business process for the description of Catalogue products and services (Items), as well as, for the creation and management of a supplier catalogue **Experience** - The use of eInvoicing at all government levels became mandatory in February 2005 - At the end of 2005 more than 90 per cent of invoices to public authorities were submitted fully electronically - The Danish Ministry of Finance expects 15 million UBL invoices in 2006, with savings estimated at 120 to 150 million € per year, due to elimination of keyboarding and postal handling.
Germany	**Public Procurement** - The Ministry of Economics and Labour (www.bmwa.de) and the Ministry of the Interior (www.bmi.de) act as the responsible authorities in the area of eProcurement **eProcurement Standardisation** - The Ministry of Economics and Labour (BMWA) together with the Ministry of the Interior (BMI) developed the “E-Vergabe” system **eCatalogues** - German federal authorities use mainly the BMEcat catalogue-exchange standard and the eCl@ss Classification scheme **Experience** - Every year, approximately 600 Federal contracting authorities buy products and services worth around € 63 billion - In 2006, 33 federal authorities as well as state and communal authorities and about 60 suppliers used the e-Vergabe system to complete notification, publication of tender, management of receipt/submission of tenders, evaluation of tenders, ordering and invoicing.
Norway	**Public Procurement** - The Norwegian government established the four-year 'Programme for Electronic Commerce in the Norwegian public sector' by means of the eHandel electronic marketplace for public procurement - “eHandel.no” has been in operation since June 2002 **eProcurement Standardisation** Norway has set the following goals: - all new ICT and information systems in the public sector shall use open standards (2009) - a set of administration standards for data and document exchange shall be established (2006) and data and document exchange in the public sector shall satisfy administration standards (2008) - all official forms shall be available electronically and built round a common user interface (2008) **eCatalogues** - Suppliers currently submit their eCatalogues in the form of spreadsheet files. - Same approach as UK and Sweden in the implementation of their business process model and messaging framework for eOrdering and eInvoicing, through the use of UBL 2.0.

	- Use a platform independent model (PIM) which functions as a basis for platform specific realisation. **Experience** - In September 2005, eHandel.no usage status was (Sept. 2004-Sept. 2005): o Throughput: € 60 million (total throughput since start up in June 2002: € 81 million) o Number of transactions: 52 500 (total of 77 000 since start up in June 2002) o 4 800 registered users of the web based eProcurement solution o 300 suppliers were connected to the portal
Spain	**Public Procurement** - The Ministry of Public Administration is in charge of managing the Ministry's responsibilities regarding the use of information and communication technologies in the public sector and the development of the government's information strategy **eProcurement Standardisation** - Current activities in Spain relate to the standardisation of procurement processes based on the UBL specifications **eCatalogues** - GS1, CCI, and UBL are the alternative standards used in Spain for the implementation of eCatalogues. - Spain has performed a gap analysis between the OASIS/UBL and UN/CEFACT/c-Catalogues initiatives **Experience** - An eTendering project has been initiated by the Spanish ministry of economics for the implementation of a supply management system based on UBL 2.0, covering the eBusiness requirements of the eTendering process
Sweden	**Public Procurement** - De-centralised model for eProcurement - Full autonomy of local authorities and municipalities **eProcurement Standardisation** - Most implementations utilise the EDI standard for ordering through framework agreements - Participation in the Northern European UBL 2.0 Subset Working Group - Svefaktura **eCatalogues** - Swedish translation of the UNSPSC scheme **Experience** - Standardisation on UBL Invoice is estimated to save the Swedish government more than 500 million dollars in the first five years of deployment
UK	**Public Procurement** - The Office of Government Commerce (OGC) acts as the main procurement organisation in the UK - The Improvement and Development Agency (IDeA) is responsible for technical solutions **eProcurement Standardisation** - The national interoperability framework e-GIF has adopted XML as a core standard for data integration between government and business. - OGC Buying Solutions created the Zanzibar marketplace. **eCatalogues** - OGC Buying Solutions aims to make UBL the standard for all electronic business in the UK. - Development of S-cat and G-Cat eCatalogue initiatives (only eOrdering from Framework contracts) **Experience** - S-cat and G-cAT are used by Government departments, agencies, local authorities, education establishments, police forces, NHS bodies, public and privatised utilities - S-CAT gives access to more than 170 service providers. S-Cat has 16 service categories covering both IT and Business Consultancy Services - GCAT is an online catalogue with more than 50.000 IT & Telecommunication products

Table 32: Overview of relevant activities in selected European countries

5.1.1 Denmark

The Danish government plays an active role in promoting electronic business standards. The Ministry of Finance and the Danish Competition Authority under the Danish Ministry of Economic and Business Affairs are the responsible institutions for public procurement policy-making at national level. Specifically, the Danish Competition Authority is in charge of interpreting and implementing the EU Directives on public procurement and the Danish Act on Tender Procedures for Public Work Contracts. Furthermore, the Danish Competition Authority ensures the implementation of EU procurement rules into Danish law. It also represents Denmark in the Northern European UBL 2.0 Subset Working Group. An essential task of the Danish Competition Authority is to ensure the proper understanding and interpreration of public procurement regulations and their practical application. In addition, it also plays an important role as body for appeal concerning complaints of violation of the national legislation and the EU rules.

In terms of eCatalogue relevant standardisation, Denmark has developed an XML scheme, called OIOXML [11], which supports the exchange of electronic invoices between private suppliers/vendors and public authorities. The OIOXML specifications describe the data models, interfaces and web services that should be respected in the implementation of governmental and private sector systems in order to support electronic invoicing. After the introduction of the OIOXML specifications, in 2006 the majority of vendors have adjusted their systems, in order to become compliant. This resulted into an increase of market competition and interoperability between different products and systems.

A variety of product classification schemes is used in Denmark; however, the UNSPSC is the most widely adopted standard for the classification of catalogue products and services. An official translation of the UNSPSC standard codes in Danish has also been implemented.

As already mentioned, Denmark is a member of the Northern European UBL 2.0 Subset Working Group. The initiatives and activities of NES are presented in detail in section 5.2.

A revised version of the OIOXML standard based on the international standard UBL 2.0 is expected at the beginning of 2007, which will cover all the documents involved in the post awarding phase of the procurement process (e.g. catalogue, order, order confirmation, invoice, reminder, etc).

The use of eInvoicing at all government levels became mandatory in Denmark in February 2005. At the end of 2005 (within 10 months) more than 90 per cent of the invoices to public authorities (approximately 10 million) were submitted fully electronically. The Danish Ministry of Finance has estimated that 15 million UBL invoices will have been received in 2006, with savings estimated at 120 to 150 million euros per year, which will arise mainly from the elimination of dublicate data entries and postal handling. The significant uptake of eInvoicing in Denmark is considered to be a result of the simplicity and openness of the OIOXML standard. In addition, the advanced ICT infrastructure of the country, and the existence of systems for the exchange and processing of the electronic invoices has played a major role in the adoption of eInvoicing. More savings are expected with the forthcoming inclusion of an eOrdering message based on UBL 2.0 in 2007 [54].

[11] Offentlig Information Online (OIP): Open public Information Online

5.1.2 Germany

The Federal Ministry of Economics (www.bmwi.de) and the Federal Ministry of the Interior (www.bmi.de) are the overall responsible authorities in the area of eProcurement. The Procurement Office of the Federal Ministry of the Interior (Beschaffungsamt, www.bescha.bund.de) manages purchases for different contracting authorities, foundations and research institutions at federal, state, and local level. In the context of BundOnline 2005 project (launched at Hanover in September 2000 and completed after five years at the end of 2005) more than 400 e-Government services were available online. One of the most important developments was the Öffentlicher Eink@uf Online programme, which comprised of the e-Tendering platform (e-Vergabe) and the one-stop eGovernment shop (Kaufhaus des Bundes), which is based on an electronic catalogue

The prevailing standard in Germany for the exchange of electronic data in electronic catalogues is the BMEcat [59]. BMEcat 1.2 was first published in 1999. BMEcat 2005 is the revised version and compatible to the previous one. It was released in November 2005 by the eBusiness Standardisation Committee and the German Federal Association of Procurement Managers (Bundesverband Materialwirtschaft, Einkauf und Logistik e.V., BME)). Many software companies support BMEcat market introduction and are partners of the BMEcat Work Group. BMEcat is a flexible XML-based standard, free of charge and supports a series of advantageous features, including:

- Supports many classification systems: an item may be allocated to one class in each classification scheme, while, within a catalogue document, items may be assigned to more than one classification scheme.
- Provides the possibility to include products description and pricing in a single document.
- Makes possible the incorporation of multi-media product data like graphics, photos, and video data.
- Encompasses advanced pricing features (e.g. based on quantity, validity in time and territory).
- Is extensible and consequently, more fields may be included depending on users needs.

Every year, the approximately 600 contracting authorities of the Federal Government buy products and services worth around € 63 billion. At state level, the public authorities allocate approximately EUR 4.5 million per year to introduce operational eProcurement. German federal authorities use an eCatalogue system run on behalf of the Federal Ministry of the Interior and its Procurement Office (e-Vergabe). This is based mainly on the BMEcat catalogue-exchange standard and the eCl@ss Classification scheme.

Since February 2004 it is possible to submit offers electronically (www.evergabe-online.de). In January 2004, nine (9) federal authorities, as well as state and communal authorities, used the e-Vergabe to complete notification, publication of tender, management of receipt/submission of tenders, evaluation of tenders, ordering and invoicing. In 2006, the number of federal authorities using the e-Vergabe increased to thirty three (33), whereas the number of suppliers to sixty (60).

5.1.3 Norway

The Norwegian government established a four-year 'Programme for Electronic Commerce in the Norwegian public sector' by means of an electronic marketplace for public procurement. The eHandel.no marketplace has been in operation since June 2002. It is a complete marketplace with an extensive use of electronic catalogues, which offers ordering functionality, supplier register services as well as third party integration services.

The Norwegian Government established the eProcurement portal www.ehandel.no in order to attain a critical user mass of electronic public procurement. The introduction of eProcurement has been embedded in different national and local/regional eGovernment strategies since 1999. Participation in ehandel.no [57] activities is open for central, regional, and local authorities as well as for suppliers. The total budget for centralised coordination, facilitation, and support activities has been €2,5M since 1999. The purpose of ehandel.no is to give public sector entities and their suppliers' easy access to a user friendly and affordable tool for operational eProcurement.

Within the fields of the Programme for Electronic Commerce in the Norwegian public sector (Ehandelsprogrammet), a document entitled "Platform independent model, Product catalogue establishment and maintenance" [58] was produced. This document describes semantically the business processes that Ehandelsprogrammet followed for the establishment and maintenance of catalogues on the Marketplace ehandel.no. Specifically, it includes:

- Description of user roles.
- Use cases with the main phases and the possible steps that may be initiated within each phase. The following phases are specified: 'Prepare Catalogue', 'Evaluate Catalogue', 'Approve Catalogue', and 'Make Catalogue accessible for trade'.
- Business processes and analytical description of their activities. Activity Diagrams are provided, illustrating business processes flows.
- Interfaces to the product catalogue business process area within the Marketplace ehandel.no.
- Definitions and descriptions of the attributes used in the product catalogue. Message models are illustrated and in particular 'ProductFile' message, 'PriceFile' message and 'Product Catalogue message'.

Administration standards have only been established to a limited extent, e.g. in archives. Regarding the use of open ICT standards and open source applications, Norway is in the process of establishing a set of administration standards for data and document exchange, based on the use of open standard service-oriented architecture as well as open source applications. Furthermore, it has set the following list of goals for the near future:

- By 2008, all official forms to be available electronically and built based on a common user interface.
- By 2009, all new ICT and information systems in the public sector to use open standards.
- By 2008, data and document exchange in the public sector to satisfy administration standards.

The Norwegian ICT eCatalogue system of the ehandel.no public eProcurement system constitutes an advanced eOrdering and eInvoicing system, following the "eCatalogue current practice" approach where eCatalogues form the basis for eOrdering, eInvoicing and ePayment.

The main use of eCatalogues in Norway is in the context of framework agreements. Under framework agreements, eCatalogues are used both in situations where agreements are concluded with a single Economic Operator and several Economic Operators, including the support for re-opening competitions. Furthermore, the Norwegian eCatalogue system supports “punch-out” operations; nevertheless this approach is not endorsed.

The Norwegian experiences with this approach are so far very positive, and it has been proved helpful to address both suppliers’ and buying organisations’ challenges in dealing with eCatalogues. The suppliers’ challenges are typically to create and distribute high quality eCatalogues that are user friendly, give the procurer relevant and updated information as a basis for their procurement decision, and to reuse these eCatalogues in as many markets as possible.

Based on the statistical information for 2005, the number of public administrations using the ehandel system for electronic ordering is small, only 34 (8 central government entities, 23 municipalities and 3 counties) out of the total of 433 municipalities and 18 counties. There are more than 9.000 registered users, 500 of which are suppliers.

Within the period of September 2004 and September 2005, the total number of public contracts awarded through the system was € 60 million, an increase by almost 390% (from € 21 million to € 81 million since the start up of the service). At the same period 52.500 transactions were performed on the system, an increase of approximately 315% (from 24.500 to 77.000 transcactions).

5.1.4 Spain

The Ministry of Public Administration (www.map.es) is responsible for the use of information and communication technologies in the public sector and the development of the information strategy of the government. It is also responsible for steering the development and implementation of e-government in Spain’s central state administration. These tasks are carried out by the Directorate General for Administrative Modernisation in the Ministry’s General Secretariat for Public Administrations.

The ongoing eBusiness activities and projects in Spain focus on the standardisation of processes and technical solutions in the public and private sector based on the UBL specifications. An ongoing project has been initiated by the Spanish localisation sub-committee for the adoption of the UBL as the electronic invoice format for the government of the Balearic Islands. The project aims to establish the mechanisms and tools for the creation, exchange and processing of electronic invoices in XML UBL format, in order to be recommended as a standard to suppliers.

In the area of eTendering and eAwarding, Spain has performed a gap analysis between the OASIS/UBL and UN/CEFACT/c-Catalogue initiatives (see sections 3.1 and 3.2 respectively). According to their findings, UBL is the more suitable standard to be used for eCatalogues. However, contracting authorities have to specify all the requirements in a standardised way when using electronic catalogues during the eTendering phase (pre-award). The standard to be used should allow the detailed description of any kind of procurement (products, services, or works), through the definition and assignment of attributes.

Another eTendering project has been initiated by the Spanish Ministry of Economics for the implementation of a supply management system based on UBL 2.0 for covering the eBusiness requirements of the eTendering process. Although eTendering is not within the current scope of UBL 2.0, it is possible that the products resulting from this project may form part of some future development of UBL. UN/CEFACT, following the advice of the Northern European UBL 2.0 Subset Working Group, is planning to use the eTendering project as a vehicle for bringing together the work of UBL 2.0, TBG1 (Supply Chain & eProcurement) and TBG6 (Architecture & Construction): eTendering, eCatalogue.

Furthermore, an eInvoicing project is currently in progress for the banking system. It is driven by the Spanish tax agency together with a group of Private and Public Banks, which currently have in place a proprietary XML invoice scheme for managing and exchanging invoices. The standards considered for implementation include UBL 2.0, GC1 and AEAT/CCI (an XML standard proposed by the Spanish Tax Agency and Bank Consortium).

Actual cost savings from the standardisation of eProcurement have not been announced yet.

5.1.5 Sweden

Sweden is operating under a de-centralised model (municipalities, county councils and government authorities) for eProcurement. This model provides full autonomy to local authorities and municipalities. The administration policy of the government agencies in Sweden are based on the principle that each agency must fulfil the goals set by the government. Each agency has its own budget and is responsible for appropriately managing internal processes and tasks provided that they fulfil the national goals and regulations. Therefore, each agency can handle its own electronic procurement activities (orders and invoices) independently.

Since 1994, several initiatives and activities have been completed at national level, in order to stimulate the development and use of electronic procurement in the public sector. Focus was given on the simplification and rationalisation of the purchasing processes between the contracting authorities and their suppliers. One of the major achievement in Sweden was the introduction of open standards available to all contracting authorities for the creation of service handling the exchange of their documentrs (i.e. orders and invoices) with all their supplier indpentently of their capacity.

There is no national eCatalogue application in Sweden. Instead, there are various eCatalogue systems, which function as “eCatalogue current practice” systems. Most implementations utilise the EDI standard for ordering through framework agreements.

Based on this de-centralised structure, with many different vendor- or third party-driven solutions, the use of industry-wide standards is understood to be of great importance. Sweden participates actively in the Northern European UBL 2.0 Subset Working Group.

The Swedish Association of Local Authorities and Regions has, together with about 20 other actors, developed a standard for eInvoicing called “Svefaktura" (“Swed-Invoice”), based on UBL 1.0. The Swedish National Financial Management Authority (Ekonomistryrningsverket – ESV) promotes “Svefaktura" to the Government Interoperability Board for forming a standard for eInvoicing in the government sector. This solution is also suggested by the Swedish Association of Local Authorities and the Confederation of Swedish Enterprise. The ESV recommends the use of “Svefaktura” in all governmental applications since October 2005. The Swed-Invoice can also be used for B-2-B transactions.

There exist no specific requirements for eCatalogues in the legal implementation of the EU Directives. UNSPSC is utilised by most public entities for classifying products in eCatalogues. Finally, there is no legal provision for active collection of tenders (“punch-out”).

Sweden is represented in the Northern European UBL 2.0 Subset Working Group (NES) by the Single Face To Industry (SFTI) initiative to promote eBusiness by the Swedish National Financial Management Authority (ESV), Swedish Association of Local Authorities and Regions (Sveriges Kommuner och Landsting), and Swedish Administrative Development Agency (Verva). In the context of SFTI, the Swedish industry standard was developed, which is an "all to all" standard. The provided specifications allow suppliers to exchange business documents (i.e orders, invoices) based on the same standard regardless of whether they are trading with one or more municipalities, county councils or other undertakings. Likewise, it is possible for a municipality trading with a number of undertakings to use the same standard with all of them. A number of commercial solutions have been developed based on the SFTI standard. In May 2007 a catalogue working group was established within SFTI, whereas the NES order will be released as part of the SFTI standard in autumn 2007. It is expected that the next version (within 2008) of SFTI will incorporate orders and catalogues. This will allow all contrating authorities in Sweden to implement services and tools compliant with the SFTI, which will be capable to make use of the whole order to invoice process.

Due to the fact that many agencies in Sweden use the UNSPSC product classification scheme, through cooperation between public and private stakeholders, there is now a Swedish translation of the UNSPSC scheme, in line with the translations made in other Nordic countries.

According to ESV, use of a standardised UBL Invoice is estimated to save the Swedish government SEK 4 billion in the first five years of deployment. According to a survey in 2004, almost 28% (80 out of 290) of municipalities have introduced systems for electronic orders and/or receipt of electronic invoices. A further 17% (50 municipalities) are planning to introduce eProcurement, out of which 35 have already undertaken a pilot study. The reason that some municipalities have not yet introduced electronic procedures is due to the lack of staff or financial resources.

5.1.6 UK

The Office of Government Commerce (OGC) [55] is an independent office of the Treasury department and responsible for public procurement policy and legal aspects. It provides public sector organisations with programme and project support on procurement regulations, with the objective to enhance the current legal and policy framework, as well as, to enforce the quality of new initiatives, in order to make Government organisations more effective and efficient. OGCbuying.solutions is an Executive Agency of the OGC, aiming at providing easy access to more than 500,000 products and services, through a range of framework contracts as well as to a number of managed services, including telecommunications, e-mail and web services, energy and eCommerce. The Improvement and Development Agency (IDeA) [56], established in April 1999 and owned by the Local Government Association belonging to local government, provides technical solutions and support for the improvement of local and regional government. The IDeA attempts to give local authorities in England and Wales the means to enhance traditional methods of procurement, through the IDeA marketplace.

The e-Government Interoperability Framework (e-GIF) is the product of the Interoperability Working Group (IWG) of the Cabinet Office. It comprises a set of technical policies and specifications governing information flows across government and the public sector. They cover interconnectivity, data integration, e-services access and content management. The e-GIF is constantly under review and new versions are published annually. Compliance with the e-GIF is mandatory for public sector IT projects and procurements. The scope of the e-GIF is to enhance Internet-based interoperability across the UK economy and society. The e-Government Interoperability Framework has adopted XML as a core standard for data integration between the public and private sectors. Furthermore, OGCbuying.solutions has created the Zanzibar marketplace; a system that went live in February 2006 and makes use of 14 UBL 2.0 documents. Zanzibar is a purchase-to-pay system and e-marketplace available to the whole of the UK public sector, extending to any organisation subject to EU procurement rules.

In March 2005, OGC developed the “eProcurement Functional Requirements Specification v.4.05”, indicating functional requirements (non-mandatory) for a set of eProcurement interoperability standards throughout the public sector in the UK. It covers the business processes and the information content of messages exchanged between public sector buyers and suppliers, through the procurement cycle from catalogue to remittance. It identifies the user roles (i.e Purchasing Manager, Originator, Customer Service, etc) for sending or receiving goods, services or information, using four main business processes: sourcing, ordering, fulfilment, and settlement. These requirements are not limited to any industry sector. The document suggests a common “language” for describing eProcurement documents that is modular and extensible to specialised business contexts.

The functional requirements describe the elements of each document, illustrated and described using UML class diagrams. The Business Applications Software Developers Association (BASDA) is currently working on the development of XML Schemes that conform to OGC's eProcurement Functional Requirements Specification. No assumptions are made (only good business practices are mentioned) about how the internal systems at the buyer and the suppliers are designed or work; these systems are treated as “black boxes”. **Table 33** indicate the types of documents required for the exchange of information between buyers and suppliers.

Business Process	Buyer Document	Supplier Document
Sourcing	Request for Quotation	Catalogue
		Quotation
Ordering	Purchase Order	Purchase Order Response
Fulfilment	Receipt Advice	Fulfilment Notification
		Rectification Advice
Settlement	Self Billed Invoice	Invoice
	Debit Note	Credit Note
	Remittance Advice	Statement

Table 33: UK - Documents produced in each business process

OGCbuying.solutions represents the UK in the Northern European UBL 2.0 Subset Working Group (NES). OCG intends to adopt the NES specifications when they become available.

OGC has stated that the UNSPSC is the recommended commodity coding structure for central civil government. In parallel, the National Healthcare System (NHS) purchasing and supply agency recommends the adoption of the eCl@ss classification system.

OGCbuying.solutions has also undertaken the S-Cat (IT services), and G-Cat (IT products) initiatives related to eCatalogues. S-Cat and G-Cat are catalogue based eProcurement systems to provide public sector organisations with a simplified electronic means of procuring and contracting for a wide range of IT related consultancy and specialist services from a range of service providers. Both systems are used by public buyers, e.g. Government departments, agencies, local authorities, education establishments, police forces, NHS bodies, public and privatised utilities. S-Cat is a web-catalogue giving access to more than 170 service providers. It has 16 service categories covering both IT and business consultancy services. Before registering at S-Cat, suppliers need to pass a tendering and evaluation process, during which public sector discounts are negotiated. G-Cat is an online catalogue with more than 50.000 IT & Telecommunication products. G-Cat provides also functionalities for online ordering and online payment.

Furthermore, the OGC is deploying their expertise for encouraging better supplier relations, sustainable procurement, the benefits of utilising smaller suppliers and the potential of eProcurement.

5.2 Northern European UBL 2.0 Subset Working Group

In December 2005, Sweden and Denmark established the 'Northern European subset of UBL 2.0 documents working group' to promote the development of UBL, especially for supporting eInvoices. The group was joined by Norway, Finland, the UK and Iceland with the purpose to develop and adopt interoperable B-2-B and B-2-G eCommerce and eProcurement documents. The working group works towards harmonising the different types of eProcurement documents used by the administrations including specifically:

- The development of a subset of UBL 2.0 (schemes, business rules and relevant scenarios of use) according to domestic and cross border trading needs and considering both B-2-B and B-2-G scenarios.
- The promotion of UBL 2.0 by integrating the deliverables of the working group into the international UBL 2.0 process.
- Support for the international expansion of UBL 2.0 and its adoption by UN/CEFACT.

The first phase of the project ended in 2006, to be followed by two further phases in 2006-2008 and 2008-2010. **Table 34** shows the participating partners from each country.

Countries	Representatives
Denmark	Danish Ministry of Science, Technology and Innovation (VTU)
	Danish IT and Telecom Agency (ITST)
England	OGC buying solutions under Office of Government Commerce
Finland	State Treasury
	Tieke Finnish Information Society Development Centre
Iceland	The Financial Management Authority (Fjársýsla Ríkisins)
	Iceland Committee on eBusiness and Trade Procedures" ICEPRO
Norway	Norwegian Ministry of Government Administration and Reform eProcurement Secretariat (www.ehandel.no)
	e2b Forum (an eInvoicing initiative in the private sector supported by the government - www.e2b.no)
Sweden	Single Face To Industry (SFTI)

Table 34: Northern European UBL 2.0 Subset Working Group

As described in detail in the previous individual country sections, NES Working Group members actively implement UBL 2.0 at national level. The most important implementation activities are summarised below:

- In February 2005, the Danish XML Committee made the UBL 0.7 Invoice mandatory for the Danish public sector. The inclusion of an eOrdering message based on UBL 2.0 is expected in 2007.
- The Danish Ministry of Science, Technology and Innovation hosted a series of international workshops on eCatalogues (during summer 2005). As an outcome, the workshops delivered a proposal (including use-cases, business requirements and functional requirements to be submitted for inclusion in UBL 2.0) to the UBL TC, which was further integrated in UBL 2.0.
- The use of "Swed-invoice" ("Svefaktura"), a subset of the UBL 1.0 Invoice, is recommended by the Swedish National Financial Management Authority (NFMA) in all governmental applications since October 2005.
- UK OGC Buying Solutions created the Zanzibar marketplace (it went live in February 2006), which uses 14 UBL 2.0 documents. OGC Buying Solutions' purpose is to make UBL the standard for all electronic business in the UK.
- Upon its release, UBL 2.0 is intended to be included in the e-Government Interoperability Framework (e-GIF) and become mandatory for the UK public sector.

NES is currently using the following list of UBL 2.0 Business Documents:

- Application Response
- Catalogue
- Catalogue Item Specification Update
- Catalogue Pricing Update
- Credit Note
- Invoice
- Order
- Order Response Simple

NES continues to support implementation and development, and the work-plans for the period 2007-2009 include such tasks as maintenance, convergence of UBL-UN/CEFACT, the creation of additional profiles and the incorporation of additional participants.

Apart from Europe, interest in using UBL has been shown in the United States, where UBL will be used in a pilot project by the Department of Transport and selected elements of UBL are being used by the US GSA (the federal procurement agency) and the US IRS (the federal taxation agency). In this respect, it is worth noticing that the chair of the OASIS UBL Procurement Subcommittee is funded by the U.K. OGC, and the chairs of the OASIS UBL Transportation Subcommittee are funded by the governments of Singapore and Hong Kong.

5.3 Summary

The status of the investigated countries indicates that there is some progress in the development of eProcurement projects and systems. However, eCatalogues do not share the same level of advancement as eProcurement generally, both in terms of standardisation initiatives and of the development of respective systems. Member States' focus is on the establishment of electronic systems and not on promoting interoperable eCatalogue prospectuses.

The reasons for this are related to the nature of eCatalogues, which are one of the most complex systems in the class of eProcurement tools and services. One additional difficulty arises from the fact that more than one product classification scheme is being used (see also chapter 6), since eCatalogue entities strongly rely on the selection operated by the underlying classification scheme.

More effort is needed by European countries in order to seize the advantages eCatalogues offer; this effort must focus on the establishment of well-defined and efficient standards. Since eCatalogues are eventually the backbone of eProcurement - being used in every phase - their standardisation will enable the desired automation of all eProcurement phases.

It is therefore important to emphasise at EU level the development of interoperable eCatalogue systems after converging existing suitable and prevailing standards to a suitable standard. For this task, it is essential to take into consideration the experience of those Member States that are most advanced in the development of eProcurement and eCatalogues.

The Northern European UBL 2.0 Subset Working Group is considered to be a very promising initiative in the area of eCatalogue standardisation, even though it is currently primarily focusing on eInvoicing. The participating countries work towards a common objective and have realised significant progress towards harmonising the different types of eProcurement documents.

As mentioned in chapters 3 and 4, the current standardisation work of OASIS, UN/CEFACT and CEN/ISSS primarily involves the definition of standardised processes and messages for the electronic collaboration of trading partners. Although the “eCatalogue” business document is crucial for supporting such collaborations, the current work does not focus on standardising the exact content of eCatalogues, and in particular how to describe and classify products. In line with this, all existing implementations (national / NES) focus on solutions supporting electronic data exchange between private and public sectors, without however attempting to standardise the information contained in eCatalogues, and here on processes, messages and content for eInvoices. Individual and joint Member States initiatives should investigate ways to standardise product descriptions in eCatalogues through attributes and product classifications. This work, in conjunction with the standardisation of processes and messages to a large degree already started, will prepare the ground for making further and better use of eCatalogue prospectuses in public procurement.

6 Analysis and assessment of the current standardisation environment

The objective of this chapter is to analyse and assess the current standardisation environment for eProcurement and eCatalogues in particular, based on the detailed descriptions provided in the previous chapters. In addition, this chapter discusses the ongoing work regarding the convergence of the two prominent standards for eCatalogue processes and messages, UBL and c-Catalogue, and the future plans for their adoption.

Currently, it is recognised that more and more industry segments adopt eBusiness procedures through the use of eCatalogues, completing transactions in an electronic manner. In this context, in order to establish an effective communication, it is important to exchange information in an unambiguous way, ensuring the common understanding amongst trading partners. Consequently, in parallel to standardising processes and messages, it is equally important to accurately describe products within eCatalogues. As a result, considering the standardisation of eCatalogues in the context of eProcurement, two aspects need to be addressed. The first relates to the standardisation of messages, processes and business documents in order to effectively exchange eCatalogues; the second relates to the standardisation of the description and classification of the eCatalogue content.

6.1 Role of standardisation and the existence of multiple catalogue standards

In the wake of the Internet, businesses have rushed into taking advantage of the new electronic means, implementing activities and processes using ICT systems. These systems enabled companies to interact with their trading partners in an electronic and more efficient manner. However, the lack of common standards also led to bespoke transaction practices and tailor-made technical communication methods, resulting to solutions for the bilateral collaboration of trading partners. It is now widely understood that standardising the mechanisms for interaction is necessary for moving from solutions for bilateral collaborations to interoperable multilateral ones.

The main purpose of standardisation is that all collaborating parties understand in the same manner and in all cases, data and information exchanged through business documents. By using the same standard, all parties are in a position to understand the specific conditions under which a business document is exchanged (i.e. when, why, who, how to be sent, what information it contains, what are the results etc). Various types of standards can be identified, the most important of which are presented below:

- Standards concerning terminology, conventions, dictionaries, etc.
- Standards concerning the definition of specifications, the definition of the characteristics of a product/service or of a process, as well as performance thresholds
- Standards concerning the description of the functions and relationships of a company, as well as, elements such as quality assurance, maintenance, or production management, etc.
- Standards on test methods, concerning the standardised measurement of specific characteristics, materials, substances, etc.

Therefore, the use of standards can significantly contribute to establishing systems that minimise manual work and achieve higher interoperability and re-usability. In this way, there are opportunities for increasing automation and the efficiency of transactions, as well as for increasing competition and reducing transactional costs. Standardisation can help to remove technical barriers, promote cross-border collaboration and enable new economic models, based on electronic means.

In particular for the use of eCatalogues to conduct business electronically, specifications of standards are applied in general and do not concern the standardisation of internal business processes. In general, the primary objective of all relevant standardisation efforts is to improve the environment for one specific issue; that of cross-business collaboration using electronic means. Nevertheless, despite the existence of one common objective, different organisations and standardisation bodies have created different standards.

In most of these efforts, standardisation is conducted following a number of identical process steps, but not the exact same process. In addition, different standardisation efforts do not always have the same specific objectives, i.e. they do not always produce the same type of output even if they work on similar initiatives. This is because different efforts focus on different types of specifications. For instance, one standardisation effort may pursue results oriented towards legislative purposes, e.g. emphasis on the thoroughness of their formal and public approval processes, while another may seek to produce guidelines and specifications addressing current market needs, e.g. through consensus amongst participants/trading partners.

As such, the standardisation environment for the use of eCatalogues in eBusiness is characterised by a large number of initiatives by standardisation bodies or public/private organisations. In most cases, such initiatives generate a number of deliverables. These deliverables can be categorised into:

- *"Formal standards"*: are normative documents and specifications, which have undergone open consensus processes, for implementing interoperable ICT systems regardless of specific industry orientations. Formal standards have a legal basis and can be rendered mandatory. Due to their nature, considerable time (up to 4 years) is usually required for completing their full approval process.
- *"Technical or industry specifications"*: are based on consensus amongst members of standardisation bodies or/and trade organisations, and constitute recommendations and specifications, which commonly build upon "workshop agreements" (discussed below). They do not have a formal character or legal basis as the "formal standards" (discussed above), and hence they commonly require less time to be produced (1-3 years). In practice, "technical or industry specifications", when widely accepted and used, can become "de facto" standards.
- *"Workshop Agreements"*: are recommendations on how to provide state-of-the-art solutions to specific industry issues. They are usually created through a short development process (6-12 months), and are the first step for creating "technical or industry specifications". Their creation can be achieved by the involvement of standardisation bodies. In general, workshop agreements concern mainly industrial consensus documents between participating individuals and organisations, and can be revised relatively easily.
- *"Conformance, test applications, reference implementations and guidelines*": are guidelines of informative character, produced by one or more organisations. They are usually produced in a relatively short time-period (6-12 months).
- *"Technical reports"*: are informative documents, used for providing input to all the above types of deliverables. Technical reports are the most informal types of deliverables in the activities performed for standardisation.

Considering the above, there is a substantial number of initiatives related to the standardisation of eProcurement and eCatalogues. These attempt to address different needs (e.g. public procurement and private procurement), having a slightly different focus (e.g. catalogue data for eInvoicing and catalogue data for eOrdering), and are created by different organisations (e.g. CEN/ISSS and OASIS). Naturally, each standard forms the ground for further enhancements and improvements, for producing more advanced and specialised ones to cover eBusiness needs. For instance, the two prevailing standards for the exchange of eCatalogues, namely UBL and c-Catalogue, present a parallel evolution as they are both based on EDI and XML standards, such as ebXML (see also **Figure 12**).

6.2 Standardisation levels for eCatalogues

The overall objective of the current study is to identify effective eProcurement processes using eCatalogues. The efficiency and effectiveness benefits gained from the interoperable use of eCatalogues are analysed and presented in the [SoP] report. To achieve these benefits, as discussed in [SoP], it is important to standardise the way eCatalogues are created and used. In this respect, this section considers the different conceptual levels for creating and using eCatalogues, and concludes with the two main aspects that need to be standardised: processes/messages and content. **Figure 9** depicts the various conceptual levels for achieving eBusiness through the use of eCatalogues.

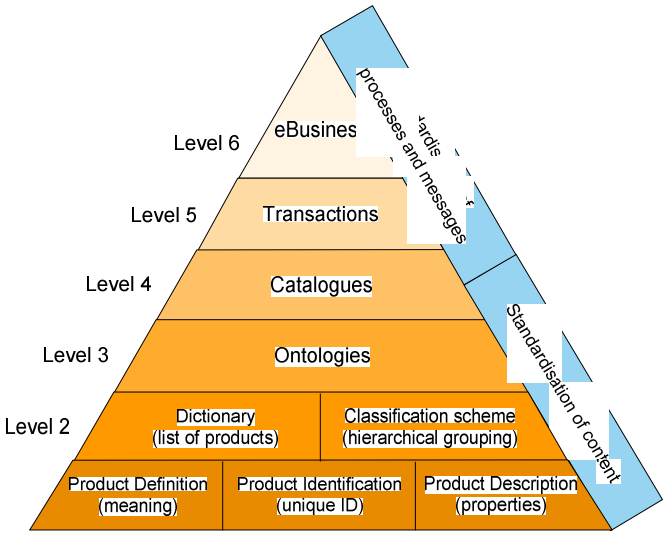

Figure 9: Levels of standardisation for the use of eCatalogues in public procurement

Level 1: Product definition, identification and description

The core element that describes the "meaning" of a product constitutes its definition. In order to fully define a product, along with its definition, a list of properties/attributes must also be defined. The product properties constitute a core part for describing a product, differentiating one product from another (e.g. a "wooden" door and an "iron" door). In order to precisely define a property/attribute, its name, standard measurement, unit and value are necessary (e.g. Name = Thickness, Value = 80, Unit = Millimetres and Measurement Standard = SI). In addition, properties can be grouped/classified in families. For instance, there can be properties that describe the general characteristics of a product, as well as, detailed properties for its manufacturing. In this context, two products are identical when their properties have all exactly the same values, while a single different property differentiates one product from another. Apart from a definition and a list of properties/attributes, a product is assigned a unique product identification code.

Level 2: Dictionaries and classification schemes

Dictionaries of products constitute lists of products, commonly created for the purposes of a specific organisation or industry. Dictionaries include information on product definitions, identification codes and property lists, as defined in Level 1. Hence, the dictionary contains list of properties for products but not values assigned to the properties. In conjunction with dictionaries, this level of standardisation relates to the classification of products into groups and families of products, using a hierarchical structure. These schemes are commonly referred to as classification schemes, offering a taxonomy for products and services.

Level 3: Ontologies

All aspects related to product definition, identification and description (Level 1) fully describe a product. In parallel, dictionaries (Level 2) define lists of products for specific industries, while classification schemes (Level 2) offer taxonomies for such dictionaries, simplifying their use. An ontology constitutes the combination of all the above. Ontologies support a flexible information model with entities and relations of all available product classes and their set of properties for a dictionary.

Level 4: Catalogues

Catalogues constitute electronic documents containing information on products and prices provided by a supplier, used for conducting business transactions. In an ideal world, catalogues to be exchanged between trading partners should be created based on the same ontologies, also using common formatting and exchanging standards. This would increase the interoperability of eCatalogues, allowing for their automated processing.

Level 5: Transactions

Transactions refer to the communication between ICT systems through the use of messages and documents when exchanging eCatalogues amongst trading partners. Effective transactions can be executed when the exchange of messages/documents containing eCatalogues is performed in such a manner that all trading partners have a common understanding.

Level 6: eBusiness

Effective eBusiness constitutes the end-goal of all levels of standardisation described in **Figure 9**. Levels 1 to 5 set the ground for standardising processes which may cover the full supply-chain needs, including ordering, manufacturing, selling, invoicing, paying, etc. The use of standardised catalogues and processes is a core component of effective eBusiness between trading partners.

As is depicted in **Figure 9**, Levels 1-3 relate to the standardisation of the description and classification of eCatalogue content, while Levels 4-6 relate to the standardisation of processes and messages for the exchange of eCatalogues. These two constitute the two main aspects for standardisation, and are discussed in section 6.3 and 6.4 respectively.

6.3 Standardisation of content

Considering **Figure 9**, the topics that relate to the standardisation of content regard mainly how products are described and included in eCatalogues. Specifically, the product definition, description and identification along with the creation of classifications schemes and ontologies form the core issues to be addressed as presented below:

- **Product definition, description and identification:** The commercial world has widely accepted the GTIN code (Global Trade Item Number) as a unique product identification code. In this number, product properties are also codified. Product definitions and properties have been widely studied in the last 4 years and are being under standardisation by international and national organisations. In particular, the ISO 13584 standard describes the definitions, properties, product description and dictionary of products structures (Data Model). In addition, the German institute for normalisation (DIN organisation) has issued standards equivalent to ISO 13584, under DIN 4002. Besides standardising the name of a property, it is also necessary to standardise the standard measurement being used for measuring the property as well as the unit of measurement. For this, DIN has proposed a list of standardised properties in order to define products.

  In this context, there is a need for the creation of an international list of standardised attributes that are universally accepted and widely used by all suppliers. Various activities have already been initiated on standardising properties worldwide in various sectors. For instance, industry sectors that have worked on attributes standardisation comprise:

  - Measuring instruments (part 501 – Japanese industries)
  - Fasteners (part 511 - China)
  - Electronic components (IEC 61360 - international)
  - Optical instruments (ISO TC172 – Germany - under preparation)
  - Electronic parts (ECALS – Japan)
  - Cutting tools (ISO 13399 – international)
  - Bearings (ISO 23768 – international)

  Sectors that have already been standardised could adopt a common structure for product properties. In parallel to the above initiatives, some classification schemes such as eCl@ss have also defined properties corresponding to products. In such cases, a convergence should be attempted in order to adopt common product/property lists for achieving interoperability. Sectors that will create dictionaries of properties in the future should follow a common standard such as ISO 13584. In addition an international body should be set up as a moderator for checking overlapping initiatives in order to avoid duplication of work.

- **Ontologies, dictionaries and classification schemes***:* A dictionary constitutes a collection of product descriptions and linked properties, usually created for a specific organisation or industry. Dictionaries can be used more effectively when complemented with hierarchies of products through a suitable classification scheme.

  The ePDC workshop of CEN/ISSS has analysed existing classification schemes on a worldwide basis, discussed in section 6.3.1. In summary, ePDC considers that the ideal scenario would be the creation of one unique dictionary/ontology dealing with all types of products/services for all industry sectors and all purposes. There are many vertical classification schemes designed by professional associations or domain specific organisations, for instance in the medical, shoes and textile sectors. Only three organisations cover a large number of industrial or consumer goods. These are UNSPSC, eCl@ss and GPC.

According to ePDC, the UNSPSC system can not be used as the complete and universal ontology, as it does not support product properties. Furthermore, the organisation that manages UNSPSC has strategically decided not to develop property structures, Therefore ePDC considers that the most viable solution is to integrate eCl@ss with GPC to generate a unique all-purpose ontology. This recommendation of ePDC is further discussed in section 6.3.1.

- **eCatalogues:** In order to describe products in eCatalogues in an effective manner, it is necessary to use a common agreed ontology. Based on this ontology, products can have unique classification codes, feature a standardised set of attributes, and permit to set values for those attributes based on a standardised pool of possible values. In this respect, creating an eCatalogue of products would require its creator to define the classification codes to be included in the eCatalogue, and the actual values in the associated attributes. In the following, the procurement department can then make a proper choice of the right product to be procured by comparing products having the same classification code, and similar properties. Otherwise, if a product does not have a classification code according to the ontology used, no valid comparison can be made.

  At present eCatalogues are used for many different purposes worldwide and their use, particularly in Europe, has been analysed by the eCAT workshop of CEN. In summary, more than 400 different eCatalogue formats have been identified. In addition, it was observed that all companies promote and use a different catalogue model, tailor-made according to their specific needs. The results of this study are included in [33], and its main conclusions are discussed in section 3.4.1.

  Currently there are two prevailing eCatalogue exchange standards, UBL and c-Catalogue, as discussed in detail in sections 3.1 and 3.2 respectively. These two standards meet only partially the needs for implementing eCatalogues, as they focus mainly on processes and messages for exchanging eCatalogues, without however defining standards for their format, structure and description of their content. Greater emphasis should thus also be put on establishing suitable standards for a unique ontology, as discussed above, through the adoption of an adequate product description and classification scheme. In particular, it is anticipated that the converged standard will be able to handle and cover all needs for eCatalogue exchange and format. Considering the content related to supplier information, financial, handling and invoicing data, it should be accommodated by the converged standard or extensions in order to cover also additional information needed. As far as it concerns the content relating to products, it can be accommodated by product classification and description schemes in line with specific needs in the public sector in the EU. Focus should be given on using the converged standard with a unique product ontology in order to effectively achieve high level of interoperability. ePDC suggests that EU Member States should take initiatives to promote the idea of creating a global de-facto standard. This standard could then be proposed to ISO for worldwide acceptance.

6.3.1 Interoperability of product classifications and descriptions

The objective of a classification scehem is to enable trading partners to “talk about things” in a uniform and unambiguous way. As a result, there is a need for using a common product description and classification language. Currently there are a number of schemes, the majority of which represent only one single view of the product space and hence it is recognised that currently no single classification scheme can serve effectively all purposes.

In general, two scenarios are being envisaged; the creation and establishment of a unique product classification and description scheme and the use of multiple schemes entailing the establishment of mapping mechanisms amongst them. Consequently, there is still a lot of work to be done for the development and implementation of effective and accepted schemes. In the following, the two alternative scenarios are presented:

Scenario 1: Establishment of a unique product classification and description scheme

Considering an ideal scenario, the use of a common ontology (product classification scheme and description scheme) by all market participants would of course significantly increase the interoperability and usability of eCatalogue prospectuses. The establishment of one common scheme is a long term goal. ePDC of CEN/ISSS is in favour of this scenario.

In particular, according to ePDC, there are many different kinds of classification ontologies currently used by various industry sectors. The majority of the existing ontologies are vertical, addressing the needs of a specific industry, being supplier-driven as they cover the internal needs of specific industries. Some other ontologies are horizontal, covering many (or all) industries. The latter are more suitable for forming the basis upon which a "unique all-purposel ontology" may be constructed. To this end, it is identified that the solution, in order to be widely accepted, should not only be oriented in covering the needs of all indutries, but also cover and integrate buyers' needs (e.g. public sector buyers). Considering the classification and description schemes discussed in chapter 4, the three most adequate schemes currently used are eCl@ss, GPC and UNSPSC. eCl@ss has been implemented for describing heavy industry products and services (for instance healthcare, agro, chemical, oil, electrical and auto industry), while GPC addresses consumer goods (for instance general merchandise and food service). UNSPSC covers all industry products, but does not constitute a complete ontology as it does not support attributes. For that same reason, CPV, NCS and eOTD do not constitute ontologies.

ePDC considers that one viable solution for establishing a unique ontology to be used for all purposes, entails the use of eCl@ss which must be further evolved and combined with GPC.

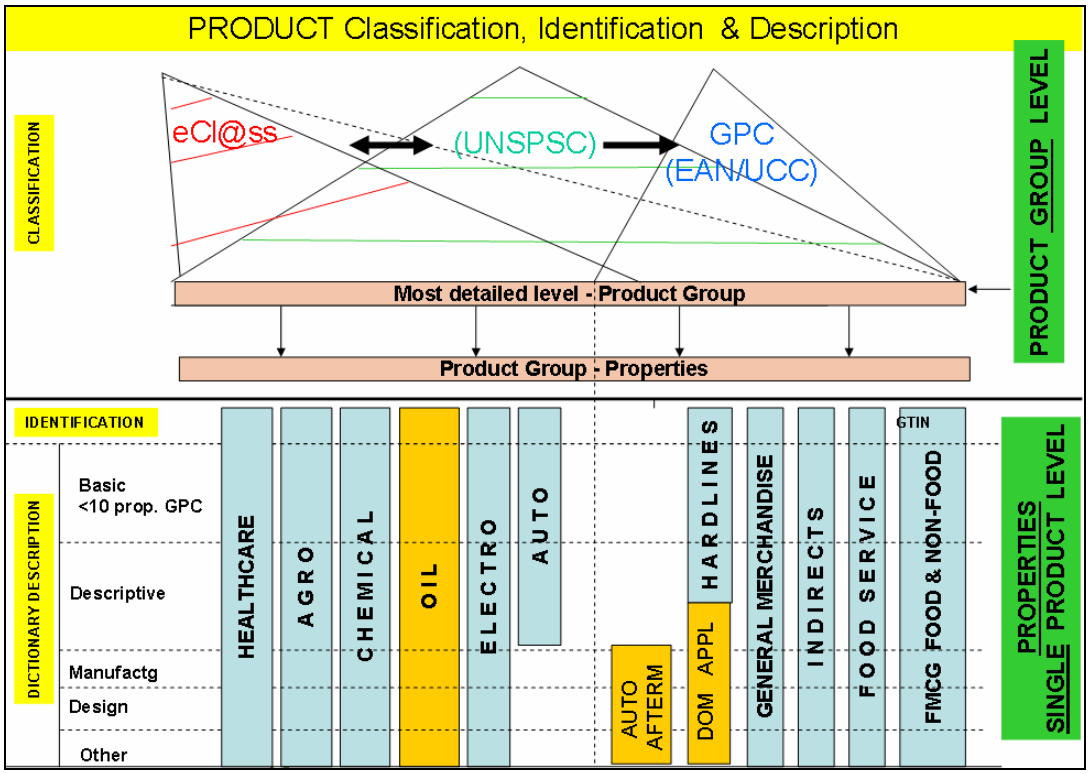

Figure 10: Product classifications, identification and description schemes – current status as evaluated by ePDC of CEN/ISSS

In light of the above, in the future ePDC intends to integrate GPC into eCl@ss, in order to create an ontology covering all industry sectors. It is estimated that through the collaboration of the two relevant organisations, a unique scheme for all purposes could be be launched in roughly 2 years from the kick-off date of such collaboration. This integration seems feasible as both standards are complementary to the type of products they currently cover (one for heavy industries and the other for consumer goods), while both comprise four levels of hierarchy. In addition, both support the same product identification system.

An added benefit of the integration of GPC with eCl@ss is that the use of eCl@ss already automatically ensures that all properties conform to ISO 13584/DIN 4002. Hence, the appropriate integration of these two ontologies would inherit this conformity to standards. Furthermore, in terms of product properties, both standards have standardised sets of attributes per each product family featuring a good level of granularity, unlike eOTD where the properties are not standardised but rather proposed. Specifically, it is considered by ePDC that an adequate product description scheme should support at least 15 product properties for each product. Both eCl@ss and GPC meet this principle. In practice, to fully describe a product covering all needs (e.g. design, manufacturing, sales, etc.) many more product properties are necessary. For instance, in order to adequately describe a refrigerator using the eCl@ss scheme, about 75 properties are necessary only for its identification, basic characteristics and description. In general, considering properties' granularity, eCl@ss is relatively more complex than GPC as by default eCl@ss covers heavy industry products, which require a considerable level of detail.

In general, it is recognised that automation can be achieved only through standardised sets of attributes. In order to create an adequate product description scheme covering all industries and all purposes throughout a product's lifecycle, it is required to define many properties. Therefore significant work is presently dedicated to the grouping of product properties. Some main subgroups comprise the basic properties (descriptive, manufacturing and design). Recently, eCl@ss and GPC have cooperated to define a hierarchy and properties for the automobile after-market sector.

Scenario 2: Existence of multiple schemes and establishment of mapping mechanisms

Another solution in order to achieve the required interoperability between eCatalogues is to consider the harmonious co-existence of a selected group of the most efficient and widely used ontologies. In this case, there is a need to establish mechanisms for such co-existence. This can be achieved through reference/mapping tables from one scheme to another, providing a way of achieving alignment and allowing buyers and suppliers to preserve their internal classification schemes. However, there are significant obstacles in achieving such a mapping, since mapping the semantics between the different classification schemes is a very complex task.

Figure 11 provides a graphical representation of typical problems encountered when mapping classes/commodities of one classification scheme into another, considering the example of transportation vehicles. For simplicity, “Classification Scheme 1” is referred to as “CS1” and “Classification Scheme 2” is referred to as “CS2”:

- Class “Prisoner Transport” of CS2 maps to class “Jailor” of CS1, and “Patient Transport” of CS2 maps to “Ambulance” of CS1.
- The parent nodes of the mapped classes above do not map. In particular, the parent of “Jailor” of CS1 is “Jail and Prison System”, and the parent of “Prisoner Transport” of CS2 is “Restricted Transport”. These two parents obviously do not map. Likewise, the same problem is apparent for “Patient Transport” and “Ambulance”.
- For the same initial mappings of “Prisoner Transport” and “Patient Transport” of CS2 to “Jailor” and “Ambulance” of CS1 respectively, in CS2 both classes have the same parent, while in CS1 the two classes have different parents.
- There is no direct mapping of “School bus” for CS2 to CS1. The closest possibilities in CS1 are “Scheduled Bus” or “Chartered Bus”, but it is not clear which one is the most appropriate one.
- In the case of CS2, all four “School bus”, “Prisoner Transport”, “Patient Transport” and “Handicapped Transport” are under the parent “Restricted Transport”, which falls in the category of “Passenger Land Transport”. In the case of CS1, the “Ambulance” and “Jailor” classes are not within the category related to transport, but rather under the category related to “Public Order and Safety”.

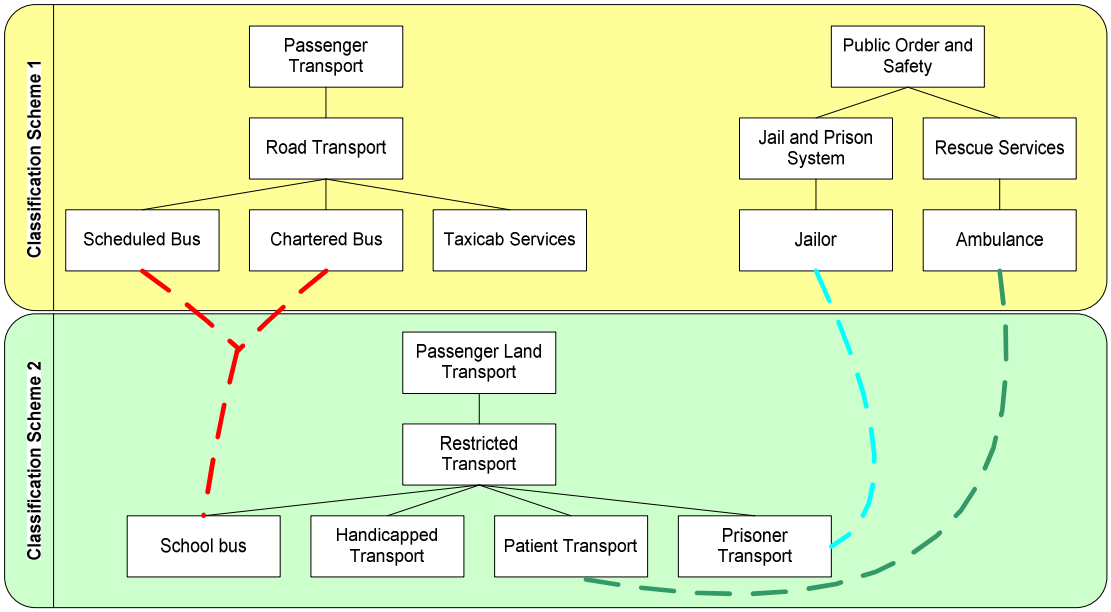

Figure 11: Mapping of classification schemes[12]

Another consideration for all existing product classification schemes is their versioning. Each standard is issued and is functional for a few years, but then a new release and/or version of the same standard is issued with more granular/updated categories. The mapping between old and new releases/versions of the same standard can in most cases be done automatically. However, all parties exchanging catalogue information must be using the same version, otherwise interoperability problems may occur. Typically, a new release of a scheme involves the addition of new elements and changes that do not affect its structure, while a new version introduces changes to its structure. New releases of schemes occur more frequently than new versions.

6.3.2 Experiences made by public purchasers in the EU

As discussed in detail in [SoP], eCatalogue prospectuses in EU Member States' investigated systems also generally include a common set of core data. The buyer-defined structures of prospectuses present similarities, for instance, common data concerning Trading Partner ID, Product Identification, Product Description, Product Categorisation/Classification, etc. (see also chapter 3 and chapter 7 of [SoP]). **Table 35** depicts the core information included in eCatalogue prospectuses in both, the investigated EU systems, as well as, the equivalent attributes of standardised catalogue documents according to UBL and c-Catalogue standards.

[12] Based on [60]

Core catalogue information used in practice in the investigated EU systems	Corresponding attributes in the catalogue document of the existing standards
Trading partner identification code	Seller supplier party
Product identification	Catalogue Line
Product description	Catalogue Line - Item.Description.Text
Product manufacturer	Catalogue Line - Item.Manufacturers_Item Identification
Product categorisation	Catalogue Line - Item.CommodityClassification
Pricing details	Catalogue Line - Item.BasePrice
Delivery details	Catalogue Line – Delivery, DeliveryTerms, Destination_ Party
Product handling and packaging terms	Catalogue Line - Item.HazardousItem, Item.Pack Size.Numeric
Warranty and contracting information	Referenced Contract
Catalogue validity start and end dates	Issue date/time, Validity period
Ordering quantity terms	Catalogue Line - Item.PackQuantity.Quantity
Invoicing terms	Trading terms

Table 35: Core content of eCatalogues

The information included in the investigated eCatalogue prospectuses primarily focuses on the description of the available products/services and prices, as well as, associated terms (such as handling and invoicing information). However, in none of the investigated cases, the set of attributes for describing products (i.e. the content on how to describe products) is standardised. As is apparent in Table 35, the set of attributes for describing products within an eCatalogue is also not standardised by UBL or c-Catalogue. These two standards define catalogue documents/messages, but not the exact way of how suppliers should describe their product, which is accommodated through the use of standardised product description and classification schemes (see also section 6.3)

In conclusion, the content of eCatalogues should be viewed as two distinct sets of content:

- **Content related to product/service descriptions**, which should be standardised by the use of product descriptions and classification schemes
- **Other eCatalogue content, not related to product/service descriptions,** which should be standardised by the use of UBL or c-Catalogue. As demonstrated in **Table 35**, already some core catalogue information is addressed by UBL and c-Catalogue, while additional needs for content not related to product/service descriptions should be accommodated by future extensions of the UBL and c-Catalogue standards. A number of such types of content is already concuded in the preliminary analysis on eCatalogue content, presented in chapter 7 of [SoP].

6.4 Standardisation of processes and messages

It is recognised that Member States' public sector implementations focus more on electronic systems for the storage and management of eCatalogues in post-awarding processes (i.e. ordering and invoicing) and less on the submission of catalogue prospectuses as initial tenders (see chapter 5 of [SoP]). In general, the use of eCatalogues as tenders is overlooked, mainly because it is still at a conceptual stage and requires further clarifications. This is reflected in the national eCatalogue initiatives analysed in [SoP], all of which are primarily concerned with electronic systems that make some use of eCatalogues.

To differentiate between systems and electronic offers in the form of eCatalogues, chapter 3 of [SoP] identifies the following two conceptual models of eCatalogues:

- "*eCatalogue prospectuses*" constitute structured electronic documents exclusively created by suppliers and submitted to contracting authorities, forming tenders or parts of them, in reply to specific calls for competition. eCatalogue prospectuses constitute legal documents, which must accurately and completely describe the technical and financial aspects of the products/services a supplier offers. In addition they can offer many operating and efficiency gains, in both pre and post-awarding phases of the eProcurement lifecycle.
- "*eCatalogue stock management systems*" refer to ICT systems of contracting authorities for the storage of eCatalogue prospectuses. In general, these systems can contribute to the effective management of the whole eProcurement cycle, since they support the proper handling and evaluation of eCatalogues submitted as tenders.

Overall, the current use of eCatalogues in the Member States is limited to the collection of information required for populating marketplaces and placing orders. Moreover, the eCatalogue prospectuses support primarily post-awarding processes (i.e viewing/browsing, ordering, invoicing and payment), while limited focus is given to pre-awarding functionality (eNotification, eTendering and eAwarding). As a result it is recognised that there are inefficiencies in the way eCatalogues are used in practice. The [SoP] document discusses in detail a number of inefficiencies, the majority of which are linked to the same problem: namely, the fact that there are no capable and widely-acceptable standards for the creation and exchange of eCatalogues.

Current eCatalogue exchange practices demonstrate that in each industry segment tailor-made standardisation solutions are followed for the description and exchange of catalogue items between trading partners (buyers and suppliers). The lack of a commonly accepted standard for the description of the catalogue processes and messages across all industries has resulted in a wide diversity of standards for the structure, layout, and exchange of eCatalogue prospectuses.

On the one hand, there are specialised eCatalogue exchange standards created by specific industry segments according to their needs for business data communication and effective exchange (see also chapter 8 of [SoP]). For instance, in the automobile industry the EDIFACT, ODETTE and VDA standards are widely used. The technology industry, comprising Information Technology (IT), Electronic Components (EC) and Semiconductor Manufacturing (SM), has developed and uses the Rosetta standard. The use of the Rosetta standard established a common language for the electronic sharing of business information. In addition, the chemical industry makes use of the CIDX standard (Chemical Industry Data eXchange). All the above mentioned standards mainly focus on eOrdering, eInvoicing and ePayment processes, covering thus the post-awarding phases of the whole eProcurement cycle.

On the other hand, as discussed above, OASIS and UN/CEFACT work on standards providing specific sets of business processes, messages and documents. Both standardisation initiatives offer equivalent business processes and data structures for the creation, management, and exchange of product information covering mainly eOrdering and eInvoicing needs. In addition, they provide the ability to accommodate to a great extent the needs of any trading partner regardless of specific industry segments.

Currently, both standardisation bodies work on the harmonisation between the two initiatives. Harmonisation is expected to provide interoperable, simple, transparent, and effective processes for the close collaboration between the public and private sectors. The alignment of UBL with c-Catalogue may provide valuable input from trade and business groups cooperating with UN/CEFACT.

Since the introduction of ad-hoc extensions is explicitly forbidden in UN/CEFACT standards, and in order to ensure that all the UN/CEFACT standards are fully capable of supporting the whole set of underlying business needs, the UN/CEFACT standardisation process is complex and time consuming. Input is sought from as many enterprises and bodies as possible, as well as, from public sector organisations. Hence, the c-Catalogue standard of UN/CEFACT attempts to cover all needs for the electronic collaboration of any two trading partners. In contrast, UBL does not try to provide specifications for all such needs but, according to its own statement, rather focuses on the 20% of specifications that will accommodate 80% of the needs.

In July 2005, the UN/CEFACT and the OASIS UBL Technical Committee experts agreed to co-operate and collaborate on the delivery of a common set of eBusiness document standards based on the convergence and alignment of UBL and the UN/CEFACT Core Component Library. According to the action plan, this work is expected to be finished by November 2007 (see **Table 36**)

Project	Coordinator	TBG1 **Proposal**	TBG1 **BRS**	TBG1/TBG17 **RSM**	TBG1/ATG2 **Schema**	TBG1 **Verification**	TBG1/ICG **Publication**
CI Scheduling	Samy Scemama	ready	Q2	Q3	Q4	2008	2008
CI Despatch & Receipt Advice	Rob Exell	ready	Q2	Q3	Q4	2008	2008
CI Supply and Order Status	Samy Scemama	ready	Q2	Q3	Q4	2008	2008
CI Invoice	Pat Toufar	ready	ready	ready	ready	Q2	Q3
CI Remittance Advice	Pat Toufar	ready	ready	ready	Q3	Q4	2008
CI Ordering	Martin Forsberg	ready	reopen, Q3	Q4	2008	2008	2008
e-Catalogue	Karina Duvinger	ready	Q3	Q4	2008	2008	2008
CI Quotation	Gilles Brandel	Q2	Q3	Q4	2008	2008	2008
Simple Invoice	Gilles Brandel	ready	Q2	Q3	Q3	Q4	2008
Marketing Research	Helge Jacobsen	ready	2008	2008	2008	2008	2009
Material Safety Data Sheet	Kim Lambert	ready	ready	Q2	Q3	Q4	2008
CI Statement	tba	Q2					
	UBL Convergence (maintenance only, rest is integrated in above projects)						
- Invoice	tba	ready	Q4	2008	2008	2008	2008
- Remittance Advice	tba	ready	Q4	2008	2008	2008	2008

Table 36: Convergence of UBL and c-Catalogue

In short, today there are two standards relevant to the exchange of eCatalogues, which could be used in the context of public procurement. However, these two standards demonstrate two limitations:

- They focus on standardising processes and messages concerning the post-awarding phases of public procurement, implementing eOrdering, eInvoicing, and ePayment processes. Limited support is currently available for pre-awarding.
- These standards do not address the need for standardising the way products and services should be described and classified within an eCatalogue prospectus. In this respect, the use of UBL and c-Catalogue (or a future unified standard) must be complemented with other standards which address the need of standardising eCatalogue content.

A preliminary comparative analysis of both standards is presented below.

6.4.1 Preliminary comparative analysis of UBL and c-Catalogue

Within the context of this study, a preliminary gap analysis was performed between the two prevailing standardisation initiatives in the area of eCatalogues (OASIS/UBL and CEN/c-Catalogue). In **Figure 12**, the evolution and interrelation of these two standards is presented. Both standards are based on common EDI and XML standards and core components such as ebXML, hence demonstrate similarities. The preliminary comparison between the two was mainly based on the specifications and material available on the web sites of the responsible standardisation bodies (OASIS and CEN).

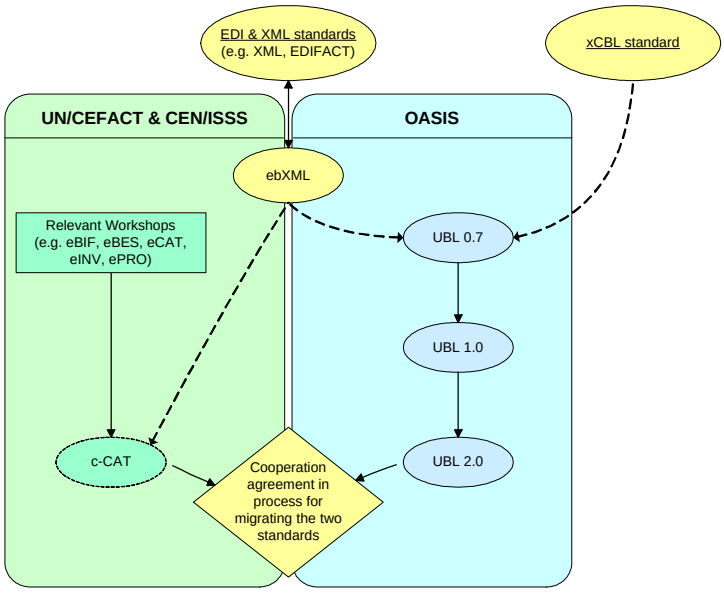

Figure 12: UBL and c-Catalogue evolution and interrelation

General aspects

The two standards feature specific advantages and limitations. UBL 2.0 is strongly promoted and quickly spread in European countries (see chapter 3). In contrast, c-Catalogue supports specific attributes which are not currently addressed in UBL 2.0. Both standardisation initiatives leave open the choice of the classification scheme to be used and provide business processes and messages for the post-awarding phase of the procurement. Furthermore, UBL currently supports the submission of tenders for the complete contract or a set of lots. This feature is also expected to be covered by the standard to be created following the convergence of UBL and c-Catalogue.

However, only UBL is used in practice by some Member States. On the other hand, the c-Catalogue project is still under development and thus there is limited implementation experience.

In order to conduct the technical comparison of the two standards, an abstract mapping was performed between the primary attributes of UBL and c-Catalogue messages. This covered mainly their attributes without taking into consideration all secondary attributes and their relationships with other messages. The comparison focused on providing an overview of the business processes, documents/messages, activity diagrams, and information entities supported by each standard, as well as, on identifying possible similarities and differences in their implementation at an abstract level.

Business processes

The preliminary comparison of UBL and c-Catalogue commenced with the assessment of their business processes, documents, and messages, focusing on the level of similarity between the documents and messages supported by each standard. In this preliminary comparison, the attributes of UBL and c-Catalogue messages have been mapped using the name and the description of their business terms as the primary selection indicators. Furthermore, the Relation, Multiplicity/Cardinality, and Associated Object Class have been used as the secondary indicators. The association between the UBL 2.0 and the c-Catalogue business processes is presented in the table below.

Business Processes	UBL 2.0 Business Processes	c-Catalogue Business Processes
Create Catalogue	- Create Catalogue	- New Catalogue on request
Update Catalogue	- Update Catalogue Item Specification	- Update Catalogue on request
	- Update Catalogue Pricing	- Update Catalogue on request
Delete Catalogue	- Delete Catalogue	- Update Catalogue
Publish Catalogue	- Create Catalogue	- New Catalogue Publication
Subscribe Catalogue	- Create Catalogue	- New Catalogue Subscription
Remote Catalogue data exchange / Punch-out	- Sourcing Punchout	- Remote Catalogue data exchange

Table 37: Comparison of the business processes of UBL and c-Catalogue

The c-Catalogue supports six distinct business processes related to the creation and management of electronic catalogues, whereas the UBL supports only five such processes. However, a single UBL 2.0 business process (e.g. Create Catalogue) may be associated with more than one business process of c-Catalogue. The table above provides an association between the business processes of UBL 2.0 and c-Catalogue. An overview of the activities involved in each individual business processes, is presented below.

- *Create Catalogue*: Covers the creation of a new catalogue for the exchange of catalogue information on pricing and product details for goods and services offered by a supplier/seller to a buyer upon request. Both initiatives handle the creation of a new catalogue following four distinct sub-processes (catalogue request, remove catalogue content, catalogue accept and catalogue reject).
- *Update Catalogue*: Describes the update of existing catalogue items (either price or specifications/details). Both initiatives handle the creation of a new catalogue following four distinct sub-processes (update catalogue request rejection, review catalogue content, catalogue update rejection, and catalogue update acceptance). The update of catalogue item specifications and price indicates the replacement of the catalogue information stored in the catalogue system. Replaced or updated information are archived, in order to provide reference to already completed transcactions.
- *Delete Catalogue*: Describes the deletion of existing catalogue item specifications. Both initiatives handle the deletion of a new catalogue following three distinct sub-processes (catalogue deletion request, catalogue update rejection and catalogue update acceptance). This process cancels an entire catalogue (catalogue item). The Buyer is responsible for the acceptance or rejection of the catalogue deletion request. Upon acceptance, all previous catalogue information is archived and becomes obsolete.
- *Publish Catalogue*: Details the publication of a new/updated catalogue after the acceptance of the catalogue data by the catalogue receiver. After the publication of the data, the catalogue receiver can use the provided data to perform its business processes (e.g. place a request for quotation or an order). Both initiatives handle the publication of a new or an updated catalogue following three distinct sub-processes (review catalogue content, reject catalogue publication, and accept catalogue publication).

- *Subscribe Catalogue:* Details the process of the response on the catalogue subscription request received from the catalogue receiver by providing a catalogue subscription acceptance or a catalogue subscription rejection. Both initiatives handle the publication of a new or an updated catalogue following three distinct sub-processes (catalogue subscription rejection, and catalogue subscription acceptance).
- *Remote Catalogue data exchange/Punch out:* Details the exchange of remote catalogue data to address specific information from a supplier's catalogue. It provides an interface with the catalogue provider's web site for the search, retrieval and display of catalogue item specifications and price details.

While both UBL 2.0 and c-Catalogue base their libraries on the ebXML Core Component Technical Specification, there are some minor differences in the approach followed in the implementation of their business processes.

Annex I provides a detailed presentation and assessment of the preliminary gap analysis between the two initiatives. The activity diagrams illustrating the business processes described above involve similar sub-processes and activities, as well as similar set of actors (Recipients/Buyer and Providers/Supplier) for their execution. Furthermore, in both initiatives, the Buyers are requesting the catalogue information, and the Suppliers are creating and submitting their catalogue item specifications and price details. Suppliers and Buyers have the option to accept or reject a request and to inform the relevant trading party accordingly. Overall, there is a high level of approximation between the two initiatives.

Business messages

The following table enlists the documents/messages supported by UBL and c-Catalogue. It is followed by an explanation of each one of these documents/messages.

Document Message	UBL 2.0 Document/Message	c-Catalogue Document/Message
Catalogue Request	Catalogue Request	Request for Catalogue
		Catalogue Subscription Request
Catalogue	Catalogue	Catalogue
Catalogue Request Response	Application Response	Catalogue Request Rejection
Catalogue Response	Application Response	Catalogue Acceptance
		Catalogue Rejection
Catalogue Subscription Response	Application Response	Catalogue Subscription Acceptance
		Catalogue Subscription Rejection
Catalogue Update		Catalogue Update Request
	Catalogue Item Specification Update	Catalogue Update
	Catalogue Pricing Update	
Catalogue Update Request Response	Application Response	Catalogue Update Request Rejection
Catalogue Update Response	Application Response	Catalogue Update Acceptance
		Catalogue Update Rejection
Catalogue Deletion	Catalogue Deletion	Catalogue Update
Quotation	Quotation	Catalogue Data Request
		Catalogue Data
Quotation Response	Application Response	Catalogue Data Request Rejection

Table 38: Comparison of documents of UBL 2.0 and c-Catalogue

- *Catalogue request:* Defines the request of a Buyer to a Supplier for a new catalogue as well as, the request for the creation of a new catalogue subscription between a catalogue provider (Supplier) and a catalogue receiver (Buyer), covering the establishment and the future updates of the catalogue. The UBL is using a single message for the establishment of the catalogue and the catalogue subscription, whereas the c-Catalogue is using two almost identical messages (the catalogue subscription request message contains three additional fields "Subscription Start Date","Subscription End Date" and "Subscription Frequency"). Furthermore, in UBL it is at the discretion of the Supplier to select whether an entire new catalogue or an updated version of an existing catalogue will be submitted as a reply to the submitted request.

- *Catalogue:* Describes the exchange of catalogue item specification and price details.
- *Catalogue Request Response:* Defines the message that declines the request for new catalogue.
- *Catalogue Response:* Accepts or rejects the catalogue information submitted by the Supplier. The UBL standard is using a single document/message, whereas the c-Catalogue is using two different messages for handling the rejection and the acceptance of the catalogue information.
- *Catalogue Subscription Response:* Accepts or rejects the catalogue subscription request submitted by the Supplier. The UBL is using a single document/message, whereas the c-Catalogue is using two different messages for handling the acceptance rejection of the catalogue subscription request.
- *Catalogue Update:* Handles the request for a catalogue update and the update of the catalogue information related to an existing catalogue subscription. The c-Catalogue is using a catalogue update request and a catalogue update document/message, whereas the UBL is using two similar documents/messages one for the update of item specifications and another one for the update of prices on an existing catalogue.
- *Catalogue Update Request Response:* Defines the message that declines the catalogue update request of an existing catalogue.
- *Catalogue Update Response:* Accepts or rejects the updated catalogue information submitted by the Supplier. The UBL is using a single document/message, whereas the c-Catalogue is using two different messages for handling the acceptance rejection of the catalogue update.
- *Catalogue Deletion:* Deals with the cancellation process of an entire catalogue. The catalogue information becomes redundant after the acceptance of its deletion by the buyer. The UBL has a distinct message for the deletion of the catalogue information, whereas the c-Catalogue is using the catalogue update document/message with a “catalogue action code” indicating the catalogue deletion process.
- *Quotation:* Defines the request submitted by a buyer to the supplier for catalogue data on the pricing and availability information about goods or services.
- *Quotation Response:* Defines the message that declines the request for catalogue update request of an existing catalogue.

Although the c-Catalogue has twice as many documents/messages compared to UBL 2.0, the structure (e.g. fields, data types, etc.) of the c-Catalogue documents/messages is not as comprehensive as the structure of UBL 2.0. The UBL 2.0 and c-Catalogue are following a different implementation approach for structuring and presenting their documents/messages. However, the assessment performed in Annex I has indicated a high level of approximation between their documents/messages.

The need for alignment of UBL 2.0 and c-Catalogue has been identified and agreed by the Standardisation Bodies, since the existence of a unique standard is determinant for promoting the efficient and non-discriminatory use of eCatalogues in eProcurement. Therefore, with the approval of UBL 2.0, OASIS has transfered all technical material to UN/CEFACT, which uses the results of UBL for further development of CCTS V3. The gap analysis on the catalogue messages was completed in March 2007, whereas the integration planning for the convergence between UBL and UN/CEFACT Core Components is expected by September 2007. However, the estimated man-effort for completing this task is not currently announced.

Although UBL and c-Catalogues use different terminology, a high level of approximation seems to exist between the business processes of UBL and c-Catalogue. This is because both standards are based on the guidelines provided by the ebXML framework. Equivalent business processes are offered for the creation (publish and subscribe) and management (update and deletion) of catalogues, as well as, for the remote catalogue data exchange/Punch-out.

It is expected that the harmonisation of UBL and c-Catalogue will be completed by the end of 2007, and it will define a common set of catalogue processes, documents and messages for the use of eCatalogues. This harmonisation will essentially focus on post-awarding phases of eProcurement (eOrdering and eInvoicing). In this context, existing messages and business processes can to the largest extent be re-used in order to cover pre-awarding needs as well. Nevertheless, the use of UBL and c-Catalogue must be complemented by product classification and description schemes, standardising the content of eCatalogues. This aspect is discussed in section 6.3.

6.5 Summary

It is recognised that the adoption of eCatalogues can offer a major boost to the effective and efficient use of eProcurement systems. Therefore, many EU Member States have initiated projects and established systems using eCatalogues. However, the current use of eCatalogue systems does not fully exploit the opportunities eCatalogues can offer. This is primarily due to the fact that there is not yet a common framework for standardising the exchange of eCatalogue prospectuses as well as their content and format.

Therefore, standardisation of eCatalogues' content and exchange processes plays a significant role in establishing interoperable eCatalogue prospectuses as it provides a common way and framework in order to achieve effective communication and semantic interoperability. Furthermore, the use of standards provides the ability of efficient and effective use of eProcurement processes.

The current environment on product classification and description comprises many different schemes worldwide. Effort should be dedicated in order to endorse and promote one common scheme across Europe, which could offer the advantages in each industry segment that current specialised schemes demonstrate. In this respect, the integration of GPC into eCl@ss is considered by ePDC as a promising scenario. On the other hand, the introduction of appropriate mappings (i.e. translation tables) appears to be another possible approach. Nevertheless, mapping and co-existence of different classification schemes is no simple task, and requires significant effort by all stakeholders. Most probably, any relevant activities should be instrumented by one or more standardisation bodies to ensure a suitable and future-proof solution.

Considering the standardisation of eCatalogue exchange, two prevailing standards exist, UBL 2.0 and c-Catalogue, which are currently being harmonised. Nevertheless, these standards do not provide the necessary resources and specifications for the pre-awarding phases of public procurement, nor do they specify how to describe products in an eCatalogue. Further work should take place to cover these additional aspects.

Figure 13 outlines graphically the topics discussed in this chapter.

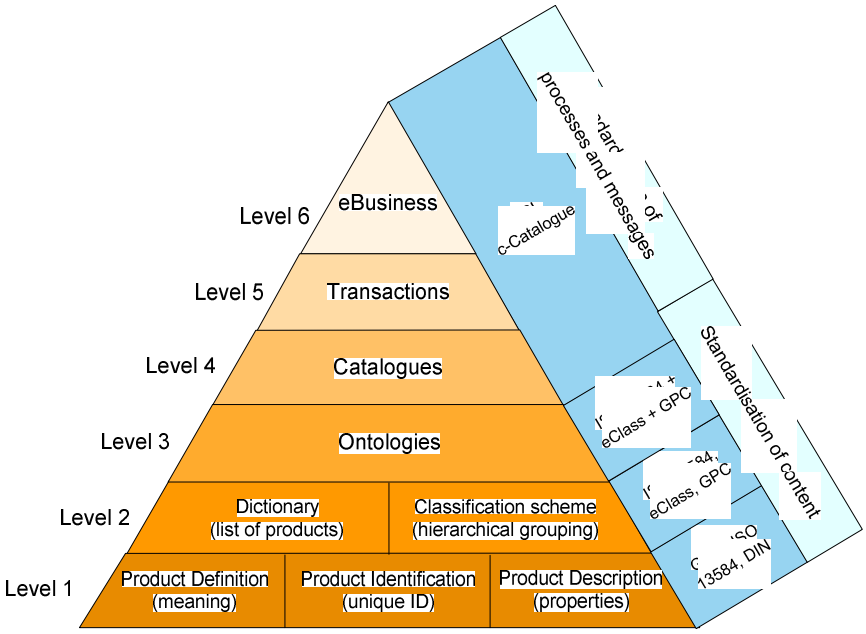

Figure 13: Levels of standardisation for the use of eCatalogues in public procurement and corresponding standards

7 Conclusions

Electronic catalogues are widely used by public administrations across Europe to electronically support post-awarding needs for eOrdering and eInvoicing in eProcurement, mainly for repetitive contracts. Although the use of eCatalogues in post-awarding phases already provides benefits for both suppliers and buyers, their use in the complete eProcurement lifecycle (including pre-awarding phases) can offer additional benefits, including increased competition, cost-efficiency, automated processing, cutting “red-tape” and reducing time-limits in procurement processes.

The introduction of eCatalogues in the complete eProcurement lifecycle presents a range of organisational and technical challenges. The lack of a specific definition of eCatalogues in the EU Directives, as well as, the limited use of existing eCatalogue standards in public procurement, has led to different processes and tailor-made approaches in eCatalogues. This in turn has created barriers for a more wide-spread adoption of eCatalogues. These barriers now need to be overcome.

Electronic catalogues can be understood as electronic documents, describing the offered products/services of a supplier for a specific call for competition (e.g. prospectuses). Therefore, the content and format of eCatalogues must enable suppliers to easily and unambiguously present/describe their offered products, including pricing details. In order to fully benefit from the use of eCatalogues, it is desirable that their content and format, as well as the way eCatalogue data is exchanged between parties, be standardised, so as to enable their automated processing. Therefore, cross-border interoperability of eCatalogues is fundamental.

Interoperability, as defined under the European Interoperability Framework, relates to organisational, semantic, and technical aspects. Specifically for eCatalogues, interoperability at all three levels can be ensured only through the adoption of common standards for the exchange and management of catalogue data.

Currently, a number of standardisation bodies work for the development of common standards for the interoperable use of eCatalogues in eProcurement. The main standardisation initiatives in the area of forming and exchanging eCatalogues comprise the OASIS UBL standard and the UN/CEFACT c-Catalogue initiative. Both UBL and c-Catalogue are based on the core components of the ebXML framework. UBL and c-Catalogue implementations provide the specifications for handling the sourcing of goods and services through the use of eCatalogues (i.e. catalogue creation, catalogue update). Both standards primarily focus on standardising processes, messages and documents for accommodating post-awarding needs for repetitive contracts.

The initiative that is more widely used at this point is UBL 2.0, mainly because it is a finalised standard. It is currently used by the countries forming the “Northern European UBL 2.0 Subset Working Group”, in order to fulfil their eInvoicing needs using eCatalogues. On the other hand, the c-Catalogue initiative has developed a model of business processes and business transactions in neutral form syntax, along with a list of candidate Core Components. However, the standardisation process for c-Catalogue is expected to take at least two to three years before reaching its final stage and being approved as a UN/CEFACT standard.

The existence of UBL, c-Catalogue and numerous other standards/initiatives has created the need for a single and uniform standard in the field of eCatalogues. This has been identified both by the Standardisation Bodies and the European Member States. In this context, OASIS and UN/CEFACT have agreed to undertake the required actions towards the convergence of UBL 2.0 and c-Catalogue to a single standard; a process that is expected to be significantly progressed within 2007.

In order to provide for a comprehensive use of eCatalogues in public procurement, the current standardisation initiatives should be adapted and extended to all phases of the procurement lifecycle, including the initial submission of offers, as well as use of eCatalogues in one-off procurement procedures. In Annex IV, a preliminary assessment is performed to identify the processes and messages of c-Catalogue and UBL 2.0 which form candidates for further customisation in order to support pre-awarding needs.

In parallel, several standards for product classification and description have been developed, referred to as “classification schemes”. These schemes attempt to standardise the way in which products are classified and described, which can significantly improve the semantic interoperability of eCatalogues. The compatibility of the different schemes should be improved, to address the interoperability gap created by the existence of multiple product classification and description schemes. Interoperability of classification schemes is a critical topic, since it directly affects the overall interoperability of eCatalogues.

The establishment of a common classification scheme for the description of the technical characteristics of products/items in eCatalogues could resolve the issue of interoperability. In practice however, all existing schemes offer advantages and limitations, and it may not be feasible to use a single classification scheme across all public and private sectors in Europe. Therefore, another objective for increasing the semantic interoperability of eCatalogues across Europe could be to establish mapping/reference tables between the different classification schemes.

Furthermore, it is recognised that the standardisation of mechanisms for describing products/services in eCatalogues through product description and classification schemes is not adequate to cover all content requirements for eCatalogues. Tenders created in the pre-award phases of public procurement contain a lot more information than just describing offered products/services. These content requirements should be further analysed and necessary extensions should be introduced in UBL and c-Catalogue (or the one unified standard) to also cover for these needs.

Table 39 enlists the main open issues to be addressed by the various stakeholders, as well as relevant recommendations for improving the current situation in using eCatalogues in public procurement.

	#	Open issues & Recommendations	Actors
Technical	**1.**	**UBL 2.0 and c-Catalogue convergence to one unified eCatalogue standard for messages and processes** Support the convergence efforts for the two existing standards initiated by OASIS and UN/CEFACT, with the intention of establishing one common standard that benefits from the advantages of both UBL and c-Catalogue.	Standardisation Bodies
	2.	**Enhance the future unified standard with eCatalogue messages and processes in pre-awarding phases** Both UBL 2.0 and c-Catalogue standardise eCatalogue messages and processes for “post-awarding” phases of procurement. The existing specifications can to a large extent re-use messages and processes covering the pre-awarding phases and taking into account specific requirements for public procurement. Such messages and processes should be reviewed and established to be forwarded to the standardisation bodies and interested Member States. Particularly UBL 2.0 and c-Catalogue should be enhanced to standardisation eCatalogue content, which is necessary in the pre-award phases of public procurement, which is not relevant to product/service descriptions.	Standardisation bodies Member States European Commission
	3.	**Promote and harmonise the use of product classification and description schemes** A framework for the co-existence and interoperability of product classification and description schemes can enhance the interoperability of eCatalogues. Standardisation bodies should act as the driving force for establishing such a suitable framework, with the cooperation of EU Member States (i.e. public sector) and private companies from different industry segments. Alternatively, the use of one common product classification and description scheme may be supported, as suggested by ePDC of CEN.	Standardisation bodies Member States Private sector

	4.	**Establish specifications for describing products/services within an eCatalogue** The ePDC initiative of CEN/ISSS seems to be attempting to address this gap, by recommending the use of eCl@ss together with GPC for forming a single product description and classification scheme to accommodate the needs of all industries and purposes (including procurement). Such development could form the ideal basis upon which products/services are described within eCatalogues. This initiative and possibly other initiatives in this field should be supported by EU Member States and Standardisation bodies, as well as, promoted by the EC. Standardised specifications for describing products and services within an eCatalogue can significantly increase the desired automation in creating and processing eCatalogues.	Standardisation bodies Member States European Commission Private sector
	5.	**Consider the use of existing standards before creating tailor-made specifications** EU Member States are recommended to assess existing standards and/or initiatives to identify whether any of these can be used for the implementation of eCatalogue messages and processes in the “post” and “pre” awarding phase of procurement. Priority should be given to the work of the Standardisation Bodies (UBL 2.0 and c-Catalogue) Member States could also contribute to the further development of industry-wide standards by making information on their current activities in the area of eCatalogues available to Standardisation Bodies and other stakeholders.	European Commission Member States
	6.	**Review existing systems with a view to establishing ”eCatalogue prospectuses” and ”eCatalogue stock management systems” which support all phases of the procurement cycle, including submission of tenders** Member States should consider the legal, functional and non-functional requirements for the use of eCatalogues in public procurement, as defined in the context of this Study (see [FReq]) and review their existing systems in order enhance / adjust their functionality accordingly.	Member States

Table 39: Open issues and recommendations

Considering the above, the introduction of eCatalogues may yield significant benefits for the whole spectrum of eProcurement phases. The return on investment of developing eProcurement systems that achieve the interoperable and extended use of eCatalogue prospectuses is anticipated to be high. Measures in this direction should therefore be supported at both the national and European levels. Throughout this report it has been identified that the most important step in order to meet this goal is the efficient standardisation of eCatalogues for use in pre-awarding, as well as, the standardisation of eCatalogue content. This requires close and effective collaboration of all involved Standardisation Bodies, the European Commission as well as national procurement authorities in EU Member States.

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[SoP] State of Play, presenting an overview of the current state of play of eCatalogues in Europe. This report is created within the context of same project as the current report.

[FReq] Functional requirements, presenting legal, functional and non-functional requirements for the use of eCatalogues in public procurement. This report is created within the context of the same project as the current report.

Acronyms

Acronym	Description
ABIEs	Aggregate Business Information Entities
ATG	Applied Technologies Group. Permanent Group of the UN/CEFACT organisation body
BASDA	Business Application Software Developers Association
B-2-B	Business-to-business
B-2-G	Business-to-government
BIE	Business Information Entity, type of core component (Aggregate BIE, Basic BIE)
BME	German Federal Association of Procurement Managers / Bundesverband Materialwirtschaft, Einkauf und Logistik e.V.
BMEcat	Electronic catalogue data exchange format based on XML [BMEcat]
BOV	Business Operational View
BPSS	Business Process Specification Scheme
BRS	Business Requirement Specification
CCs	Core Components, (Aggregate CC, Basic CC)
CCTS	Core Components Technical Specifications
CEFACT	Centre for Trade Facilitation and Electronic Business
CEN	European Committee for Standardisation / Comité Européen de Normalisation
CEN/ISSS	CEN Information Society Standardisation System
CNAD	Conference of National Armament Directors
CPPA	Collaboration - Protocol Profile and Agreement
CPV	Common Procurement Vocabulary
CWA	CEN Workshop Agreement
cXML	Commerce XML
D&B	Dun & Bradstreet Corporation
DIN	Deutsches Institut für Normung (DIN, the German Institute for Standardisation)
EAN	European Assistance Network
eBES WS	eBusiness Board for European Standardisation (eBES) Workshop
eBIF	eBusiness Interoperability Forum
ebMS	ebXML Messaging Services
ebXML	electronic business XML
eCAT	eCataloguing
ECCMA	Electronic Commerce Code Management Association
ECOSOC	UN Economic and Social Council
EDI	Electronic Data Interchange

EDIFACT	EDI for administration, commerce and transportation
EEG	European Expert Group
EESSI	European Electronic Signature Standardisation Initiative
EFTA	European Free Trade Association
eGOV	eGovernment
eINV	eInvoicing
eOTD	ECCMA Open Technical Dictionary
ePDC	electronic Product Description and Classification
ePRO	eProcurement
ERP	Enterprise Resource Planning
EWG	UN/EDIFACT Working Group
FG	Focus Group
FMG	Forum Management Group
FSV	Functional Service View
GPC	Global Product Classification
GS1	Global Standard 1
HTML	HyperText Markup Language
ICG	Information Content Management Group
IDD	International Data Dictionary
IDeA	Improvement and Development Agency
IoS	Items of Supply
ISO	International Organisation for Standards
JCC	Joint Coordination Committee
JMT	Joint Marketing Team
LG	Legal Group
MoU	Memorandum of Understanding
NAMSA	NATO Maintenance and Supply Agency
NCB	National Codification Bureau
NCS	NATO Codification System
NDR	Naming and Design Rules
NHS	National Healthcare System
NIIN	NATO Item Identification Number
NMCRL	NATO Master Catalogue of References for Logistics
NSC	NATO Supply Classification Code
NSG	NATO Supply Group
NSN	NATO Stock Number
OASIS	Organisation for the Advancement of Structured Information Standards
OASIS TAB	OASIS Technical Advisory Board

OASIS TC	OASIS Technical Committee
ODF	OpenDocument Format
ODP	Open Development Process
OGC	Office of Government Commerce
PCS	Product Classification Scheme
PG	Permanent Group
PRICAT	Price/Sales Catalogues
PRODAT	Product Data
PT	Project Team
RR	Registries and Repositories
RSM	Requirement Specification Mapping
SAML	Security Assertion Markup Language
SBS	Small Business Subset
SFTI	Single Face To Industry
SGML	Standard Generalized Markup Language [ISO 8879]
SIMAP	Système D'Information des Marchés Publiques
SMEs	Small and Medium-sized Enterprises
SMTP	Simple Mail Transfer Protocol
SOAP	Simple Object Access Protocol
TBG	International Trade & Business processes Group. Permanent group of the UN/CEFACT organisation body
TC	Technical Commitee
TMG	Techniques & Methodologies Group
TSs	Technical Specifications
UBL	Universal Business Language
UBL TC	Universal Business Language Technical Committee
UCC	Uniform Code Council
UDDI	Universal Description Discovery and Integration
UML	Unified Modelling Language
UMM	UN/CEFACT Modelling Methodology
UNDP	United Nations Development Programme
UN/ECE	United Nations Economic Commission for Europe
UN/EDIFACT	United Nations rules for EDI For Administration, Commerce and Transport
UNSPSC	United Nations Standard Products and Services Code
VAT	Value Added Tax
WG	Working Group
WS	Workshop
xCBL	XML Common Business Library
XML	eXtensible Markup Language

Glossary

Term	Description
Aggregate Business Information Entity (ABIE)	ebXML standardised pieces of information. BIE is composed of Basic Information Entities and/or other Aggregate Business Information Entities.
Building Block	XML elements and attributes
Business Document	A unit of business information exchanged in a business transaction
Business Information Entity	Core Component with Business Content. Business Information Entities form the basis upon which UBL library is created
Business Message	"An ordered series of characters intended to convey information" [ISO 2382/16]
Business Requirements Specification (BRS)	A document produced by UN/CEFACT TBG1, in order to define globally consistent processes for worldwide supply chains and eProcurement, using the UMM approach and UML to describe and detail the business processes and transactions involved
Business Transaction	Each business transaction is realised by an exchange of business documents (also called messages)
Catalogue Message	Electronic document established by the supplier which describes products and prices
CEN Workshop	Ongoing short-term working groups established by CEN/ISSS and accessible to anyone interested, providing a direct method for standardisation in various fields (e.g. eProcurement, e-Government etc.)
Class Diagram	A graphical notation used by UML to describe the static structure of a system, including object classes and their attributes and associations
Core Component	A building block for the creation of a semantically correct and meaningful information exchange package. It contains only the information pieces necessary to describe a specific concept
CWA	The results of the CEN Workshops approved by consensus
EDI	EDI is the Pre-Internet standard format for the computer-to-computer transmission of (business) data. In EDI, information is structured in a format predefined by the trading partners and computer transactions are carried out without the need for human intervention. Representing United Nations rules, EDI has standardised a set of message formats for the electronic exchange of documents between businesses. EDI has been for many years the only technology for electronic document interchange
eHandel	Norwegian Marketplace established by the Norwegian Government as a fully operational tool for electronic public procurement
ERP	A suite of applications including financials, manufacturing, human resources and other modules, that together automate the back-office business administration functions of an enterprise.
Invoice	The commercial invoice is an important document exchanged between trading partners. In addition to its prime function as a request for payment, from the customer to the supplier, the invoice is an important accounting document and has potential legal implications for both trading partners
Message Type	An identified and structured set of data elements covering the requirements for a specified type of transaction, e.g. invoice
National Codification Bureau	In each NATO member, a National Codification Bureau (NCB) is responsible for the maintenance of the Total Item Records (TIR) and support files (manufacturers, item names, Item Identification Guides, classification). Each NCB is the sole responsible authority for the other nations as far as data

	exchange and codification services are concerned
NDRs	Specification that conveys a normative set of XML scheme design rules and naming conventions for the creation of business based XML scheme for business documents being exchanged between two parties using XML constructs defined in accordance with the ebXML Core Components Technical Specification
Product Classification	The task of product classification is to assign each product to a product group (called 'classification group' or short 'class') corresponding to common attributes or application areas.
Reusable Component	Information component that, although it does not correspond to a business document as such, it is (or is likely to be) used in different business documents
SOAP	A way for program running in one kind of operating system to communicate with a program in the same or another kind of an operating system by using HTTP and XML for information exchange
UML	A non-proprietary, object modelling and specification language used in software engineering. UML includes a standardised graphical notation that may be used to create an abstract model of a system: the UML model
UMM	A methodology developed by the UN/CEFACT and based on the UML for business process and information modelling
xCBL	A document framework for the production of robust and reusable XML documents to facilitate global trading. xCBL has its origins in EDI semantics and is a product of the cooperation between Commerce One and several companies. xCBL 3.0 is used in the market place of the French Ministry of Defence, and as working basis for eHandel – Norway. The latest version of xCBL (xCBL 4.0) is available as W3C XML Scheme. It covers 44 business documents in eight categories. xCBL has been the base for the development of UBL; in turn, xCBL 4.0 has further adopted some of the UBL recommendations
XForms	A W3C vocabulary that provides a mapping from a user interface to XML
XML	Specification that allows designers to create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organisations. XML is a World Wide Web Consortium (W3C) initiative
XML Scheme	Defines the structure, content and semantics of XML documents. In particular, an XML Scheme defines: elements and attributes that can appear in a document; which elements are child elements; the number and order of child elements; whether an element is empty or can include text; the data types for elements and attributes and default and fixed values for elements and attributes

Annex I Standardisation Bodies Teams' Description

Annex I.1 OASIS

Table 40 presents the different OASIS Technical Committees involved in the development of eProcurement standards, together with a brief description.

Name of Technical Committee	Description / Objectives	ebXML Technical Specifications	Contact Name	Contact e-Mail
ebXML Joint Committee	Coordinates OASIS ebXML TCs work		Kathryn Breininger, Chair	Kathryn.r.Breininger@boeing.com
			Jacques Durand, Secretary	jdurand@us.fujitsu.com
ebXML Business Process TC	Promotes the automated exchange of business collaboration definitions using XML		Dale Moberg, Chair	dmoberg@axway.com
			Monica J. Martin, Chair	monica.martin@sun.com
ebXML Collaboration Protocol Profile & Agreement (CPPA) TC	Provides definitions for the sets of information used in business collaborations	Collaboration Protocol Profile and Agreement (CPPA) v1.0 & v2.0	Dale Moberg, Chair	dmoberg@axway.com
ebXML Implementation Interoperability, & Conformance (IIC) TC	Provides a means for software vendors to create infrastructure and applications which adhere to the ebXML specifications and are able to interoperate		Jacques Durand, Chair	jdurand@us.fujitsu.com
			Michael Kass, Secretary	michael.kass@nist.gov
ebXML Registry TC	Develops specifications to achieve interoperable registries & repositories, with an interface that enables submission, query & retrieval on the contents of the registry &repository	ebXML Registry Information Model (RIM) v1.0, v2.0, v3.0 & ebXML Registry Services and Protocols (RS) v1.0, v2.0, v3.0	Kathryn Breininger, Chair	Kathryn.r.Breininger@boeing.com
ebXML Messaging Services (MSG) TC	Deals with the technology for the transport, routing & packaging of business transactions	ebXML Messaging v1.0, v2.0, v3.0	Ian Jones, Chair	ian.c.jones@bt.com
			Pete Wenzel, Secretary	pete.wenzel@sun.com
Universal Business Language (UBL) TC	Defines a common XML library of business documents (purchase orders, invoices, etc.)		Jon Bosak , Chair	
			Tim McGrath, Chair	tmcgrath@portcomm.com.au
			Zarella Rendon, Secretary	zrendon@ptc.com

Table 40: OASIS technical committees

Annex I.2 UN/CEFACT

Table 41 presents the different UN/CEFACT Permanent Groups involved in the development of eProcurement standards, together with a brief description.

Name of Permanent Group	Description / Objectives	Working Groups	Contact Name	Contact e-Mail
Applied Technologies Group (ATG)	Creation & maintenance of business document structures to be used by specific technologies or standards, like XML or EDIFACT	ATG1 - EDIFACT Syntax Structures, ATG2 - XML Assembly Documents/ Production Rules	Mark Crawford, ATG Chair	mark.crawford@sap.com
			Mr Jostein Fromyr, ATG Vice Chair	jostein.fromyr@edisys.no
			Gait Boxman, ATG Vice Chair and Secretary	gait.boxman@tie.nl
Information Content Management Group (ICG)	Management & definition of reusable information blocks maintained in a series of libraries	ICG-WG1 Audit Working Group, ICG-WG2 UNECE Code Recommendations Working Group	Michael Conroy, ICG Chair	michael.conroy@wanadoo.fr
			David Dobbing, ICG Vice Chair	ddobbing@attglobal.net
Legal Group (LG)	Analyse current legal processes and issues within the mission & objectives of UN/CEFACT		Usva KUUSIHOLMA, Chair	usva.kuusiholma@hut.fi
			Bart W. SCHERMER, Vice-Chair	bart.schermer@ecp.nl
			Azhar JAIMURZINA, Secretariat	azhar.jaimurzina@unece.org
Techniques & Methodologies Group (TMG)	Provides all UN/CEFACT Groups with Meta (base) Business Process, Information & Communications Technology specifications & evaluates new ICT	Core Components Working Group, Business Process Working Group, EBusiness Architecture Working Group	Gunther Stuhec, TMG Chair	gunther.stuhec@sap.com
			Christian Huemer, TMG Vice Chair	christian.huemer@univie.ac.at
International Trade & Business Process Group (TBG)	Deals with business and governmental business requirements & content	Includes 19 WGs. Table 3 provides an overview of some of them (catalogue-related)	Jean-Luc Champion, TBG Chair	Jean_Luc_Champion@yahoo.com
			Pat Toufar, TBG Vice-Chair	cepatoufar@sbcglobal.net

Table 41: UN/CEFACT permanent groups

Table 42 presents the different UN/CEFACT TBG Working Groups involved in the development of eProcurement standards, together with a brief description

Name of TBG[13]	Description/Objectives	Contact Names	Contact e-Mail
TBG Steering Committee	Controls and allocates the work to the different groups / Decision making body	Jean-Luc Champion, Chair	Jean_luc_champion@yahoo.com
		Pat Toufar, Vice-Chair	cepatoufar@sbcglobal.net
TBG 1 - Supply Chain Domain	Development & maintenance of Business Process & Business Transaction Models. Has issued: "Business Requirements Specification (BRS) of the c-Catalogue"	Coen Janssen, Chair	Coen.Janassa@gs1.nl
		Pat Toufar, Vice Chair	Pat.Toufar@infor.com
		Kim Lambert, Secretary	klambert@lmi.org
TBG 6 - Architecture, Engineering & Construction Domain	Maintains EDIFACT construction messages & develops new ebXML messages	Bernard Longhi, Chair	bernard.longhi@blc-consultants.com
		Chris Hassler, Vice-chair	chris.hassler.ctr@dcma.mil
TBG 14 - Business Process Analysis	Works on Business Processes & Core Components	Ian Watt, Chair	Ian.watt@aecommerce.com.au
		Colin Clark, Vice-chair	colinclark2@tiscali.co.uk
TBG 17 - Harmonisation	Responsible for the cross-sector harmonisation of business process models & core components	Mary Kay Blantz, Chair	mblantz@sbcglobal.net
		Marion Royal, Vice Chair	marion.royal@gsa.gov
		Kim Lambert, Secretary	klambert@lmi.org

Table 42: UN/CEFACT TBGs

[13] International Trade & Business Processes Group

Annex I.3 *CEN/ISSS*

Table 43 presents the different CEN/ISSS initiatives ('Workshops') for the development of eProcurement standards, together with a brief description.

Name of Workshop / Focus Group	Description/Objectives	Contact Person	Contact e-Mail
e-BES (ebXML) Workshop	A focal point within Europe for the standardisation of technologies to exchange electronic business data	Kevin Ginty, Chair	Kevin.Ginty@sunderland.ac.uk
		Bernard Longhi, Vice chair	bernard.longhi@blc-consultants.com
		Alain Dechamps, Secretary	alain.dechamps@cen.eu
e-CAT Workshop	Undertakes the development of interoperable & multilingual electronic standards for product classification & their further application to electronic catalogue systems	Klaus-Dirk Schmitz, Chair (Germany)	Klaus.Schmitz@fh-koeln.de
		Raymond Betz, Vice Chair (Belgium)	raymond.betz@tvcablenet.be
		Eva Lindquist, Techn. Secretariat (Austria)	elindquist@termnet.org
		Barbara Gatti, WS Manager (Belgium)	barbara.gatti@cenorm.be
eProcurement Workshop	Focus on the promotion of interoperable eProcurement solutions based on international standards	Rémy Marchand, Chair	api-edi@wanadoo.fr
		Gertjan van den Akker, Secretariat	gertjan.vandenakker@nen.nl
eInvoicing Workshop	Deals with the harmonisation in the implementation of electronic Invoicing within the Member States	Stefan Engel-Flechsig, Co-Chair	stefan@engel-flechsig.de
		Anders Grangard, Co-Chair	anders.grangard@gs1fr.org
		Mr Gertjan Van Den Akker, Secretary	gertjan.vandenakker@NEN.NL
e-Government Focus Group	Its goal is to map the various activities in the field of e-Governmnent standardisation and to discuss a roadmap for the future	Mr Gertjan van den Akker	Gertjan.vandenakker@nen.nl
e-BIF Focus Group	Deals with interoperability issues within eBusiness environment	Mr Peter Potgieser, Chair	peter.potgieser@nl.abnamro.com
		Mr Remy Marchand, Vice Chair	remy.marchand@afnet.fr
		Mr Freek Posthumus, Vice Chair	f.posthumus@normapme.com
		Mrs Barbara Gatti, Secretary	barbara.gatti@cen.eu

Table 43: CEN/ISSS workshops

Annex II Invoice content details/attributes

The second column of the following table depicts the list of VAT elements (attributes) that should be present in an EU invoice, according to EU Directive for VAT Invoices. The third and fourth columns of the table present Business Information Entitities, defined by the CEN/ISSS eInvoicing Workshop, to support the VAT elements of the Directive. This content allows for the identification of the trading parties (Invoice Header), as well as for the description of the invoiced items (Invoice Line).

	VAT elements in an EU invoice	Approved Basic Business Information Entity by TBG17 not yet published	Candidate Basic Business Information Entity
Invoice Header			
1.	The date of issue		Invoice. Issue. Date Time
2.	A sequential number that uniquely identifies the invoice		Invoice. Identification. Identifier
3.	The supplier's VAT identification number	Invoice. Supplier_ Party. Supply Chain_ Party. Tax_ Identification. Identifier	
4.	The customer's VAT identification number (only when the customer is liable to pay the tax on the supply)	Invoice. Customer_ Party. Supply Chain_ Party. Tax_ Identification. Identifier	
5.	The supplier's full name and address	Invoice. Supplier_ Party. Supply Chain_ Party. Name. Text Invoice. Supplier_ Party. Supply Chain_ Party. Postal. Supply Chain Structured_ Address or Invoice. Supplier_ Party. Supply Chain_ Party. Postal. Supply Chain Structured_ Address	
5.a	The supplier's identification number	Invoice. Supplier_ Party. Supply_ Chain_ Party. Identification. Identifier	
6.	The customer's full name and address	Invoice. Customer_ Party. Supply Chain_ Party. Name. Text Invoice. Customer_ Party. Supply Chain_ Party. Postal. Supply Chain Structured_ Address or Invoice. Customer_ Party. Supply Chain_ Party. Postal. Supply Chain Structured_ Address	
6.a	The customer's identification number	Invoice. Customer_ Party. Supply_ Chain_ Party. Identification. Identifier	
7.	Where the person liable to pay the tax is a tax representative, his VAT identification number, full name and address (Conditional)	Invoice. Tax Representative_ Party. Supply Chain_ Party. Tax_ Identification. Identifier Invoice. Tax Representative_ Party. Supply Chain_ Party. Name. Text Invoice. Tax Representative_ Party. Supply Chain_ Party. Postal. Supply Chain Structured_ Address or Invoice. Tax Representative_ Party. Supply Chain_ Party. Postal. Supply Chain Structured_ Address	
7.a	The tax representative identification number	Invoice. Tax Representative_ Party. Supply_ Chain_ Party. Identification. Identifier	
8.	The VAT amount payable (Total)		Invoice. Total Tax. Amount
9.	A break-down of the taxable amount per VAT rate or exemption	Invoice. Tax. Invoice_ Tax Calculated. Rate (Tax rate) . Calculated. Amount (Amount Payable). Exemption Reason. Text (Exemption)	

Invoice Line			
10.	Description of the goods supplied or services rendered	Invoice Line. Product Identification. Supply Chain_ Product Identification. Description. Text	
10.a	The goods identification or code	Invoice Line. Product Identification. Supply Chain_ Product Identification. Supplier Assigned_ Identification. Identifier or Invoice Line. Product Identification. Supply Chain_ Product Identification. Customer Assigned_ Identification. Identifier or Invoice Line. Product Identification. Supply Chain_ Product Identification. Manufacturer Assigned_ Identification. Identifier	
11.	Quantity or extent of the goods or services provided		Invoice Line. Invoice Quantity. Quantity
12.	The date of the supply or payment (if different from the date of invoice		Invoice Line. Delivery. Date Time or Invoice Line. Despatch. Date Time
13.	A break-down of the taxable amount per VAT rate or exemption	Invoice Line. Tax. Invoice_ Tax . Calculated. Rate (Tax rate) . Calculated. Amount (Amount Payable) . Exemption Reason. Text (Exemption)	
14.	The VAT rate applied	see above	
15.	The VAT amount payable		Invoice Line. Tax. Amount
16.	The unit price of the goods or services exclusive of tax, discounts or rebates (unless included in the unit price)		Invoice Line. Supply Chain_ Price. Charge. Amount

Table 44: List of the invoice content details (attributes)

Annex III Comparison between UBL 2.0 and c-Catalogue

This annex presents a preliminary comparison between the catalogue documents/messages of the two prevailing standards in eCatalogues (OASIS/UBL and TBG1/c-Catalogues). The comparison relies on the information provided in the Universal Business Language 2.0 Public Review Draft and the BSR on the Cross Industry c-Catalogue Process.

This preliminary comparison provides an overview on the business processes, documents/messages, activity diagrams, information entities supported by each individual standard, and identifies possible similarities and differences in their implementation at an abstract level.

Annex III.1 *Business Processes and Documents*

Table 45 presents the c-Catalogue business processes and their corresponding business documents. (A Business process elaboration along with a detailed use case description is provided in “BRS Cross Industry Catalogue-20060511.doc”, pages 8-19).

Business Process	**Business Documents**
New catalogue on request	Request for Catalogue
	Catalogue
	Catalogue Request Rejection
	Catalogue Acceptance
	Catalogue Rejection
New Catalogue Publication	Catalogue
	Catalogue Acceptance
	Catalogue Rejection
New Catalogue Subscription	Catalogue Subscription Request
	Catalogue Subscription Acceptance
	Catalogue Subscription Rejection
Update Catalogue on request	Catalogue Update Request
	Catalogue Update
	Catalogue Update Request Rejection
	Catalogue Update Acceptance
	Catalogue Update Rejection
Update Catalogue	Catalogue Update
	Catalogue Update Acceptance
	Catalogue Update Rejection
Remote Catalogue data exchange	Catalogue Data Request
	Catalogue Data
	Catalogue Data Request Rejection

Table 45: c-Catalogue business processes & business documents

Table 46 presents the UBL 2.0 defined business processes along with their corresponding business documents.

Business Process	Business Documents
Create Catalogue	Catalogue Request
	Application Response Negative (reject request)
	Application Response Positive (accept request)
	Catalogue
	Application Response Negative (query catalogue content)
	Application Response Positive (accept content)
Update Catalogue Item Specification	Catalogue Request
	Application Response Negative (reject request)
	Application Response Positive (accept request)
	Catalogue Item Specification Update
	Application Response Negative (query changes)
	Application Response Positive (accept changes)
Update Catalogue Pricing	Catalogue Request
	Application Response Negative (reject request)
	Application Response Positive (accept request)
	Catalogue Pricing Update
	Application Response Negative (query changes)
	Application Response Positive (accept changes)
Delete Catalogue	Catalogue Deletion
	Application Response Negative (query catalogue deletion)
	Application Response Positive (accept catalogue deletion)
Punch-Out	(Transaction accessing Seller's Catalogue application)
	Quotation

Table 46: UBL 2.0 eCatalogue business processes & business transactions

Table 47 presents the defined c-Catalogue business document types along with a brief description (see "BRS Cross Industry Catalogue-20060511.doc", pages 65-72).

Messages	Description
Request for Catalogue	Request from a Catalogue Receiver to a Catalogue Provider to receive a new Catalogue
Catalogue Message	A message to transmit a Catalogue
Catalogue Request Rejection	Rejection of a request for a Catalogue
Catalogue Acceptance	A message from a Catalogue Receiver to a Catalogue Provider of acceptance of previously received Catalogue
Catalogue Rejection	Rejection of a previously received Catalogue
Catalogue Subscription Request	A request for subscription to (updates of) a Catalogue
Catalogue Subscription Acceptance	Acceptance of a Catalogue Subscription request
Catalogue Subscription Rejection	Rejection of a Catalogue Subscription request
Catalogue Update	A message to convey a Catalogue update
Catalogue Update Acceptance	A message to accept updated Catalogue information
Catalogue Update Rejection	Rejection of a previously received Catalogue Update
Catalogue Update Request	A request for updated catalogue information
Catalogue Update Request Rejection	A rejection of a previously received request for Catalogue update
Catalogue Information Request	Request for information on selected catalogue items
Catalogue Information	Information on items in a Catalogue
Catalogue Information Request Rejection	Rejection of a request for Catalogue Information

Table 47: c-Catalogue messages

Table 48 presents the defined UBL 2.0 catalogue-related business document types along with a brief description (see "UBL 2.0 Public Review Draft", pages 59-63).

Business Documents	Description
Catalogue Request	A document to request a Catalogue from a seller. May be either an entire new Catalogue or an update (at the discretion of the Seller)
Catalogue	A document produced by a party in the procurement chain that describes items and prices
Catalogue Deletion	A document to cancel an entire Catalogue. All previous Catalogue information becomes obsolete
Catalogue Item Specification Update	A document to update information about Items in an existing Catalogue
Catalogue Pricing Update	A document to update information about Prices in an existing Catalogue
Application Response	A document to indicate the application's response to a Transaction
Request for Quotation	A document to request pricing and availability information about goods or services
Quotation	A document to specify pricing and availability information about goods or services

Table 48: UBL 2.0 catalogue business documents

Annex III.2 *Activity Diagrams*

A comparison of c-Catalogue and UBL 2.0 activity diagrams is attempted in the following pages. For this purpose, the activity diagrams of the common business process are compared and similar activities or documents are highlighted with the same colour indicating their similarity.

The c-Catalogue activity diagrams (depicting business processes) are provided in "BRS Cross Industry Catalogue-20060511.doc", pages 20-39.

The UBL 2.0 activity diagrams are provided in "UBL 2.0 Public Review Draft", pages 32-40.

Table 50 provides a harmonised terminology (description of actors) for the presentation of the gap analysis between the activity diagrams of c-Catalogue and UBL 2.0

UBL 2.0	c-Catalogue	Gap Analysis Terms	Clarifications
Catalogue Managing Party	Catalogue Receiver	*Buyer*	Procurement Officers/Contracting authorities responsible for the purchasing of supplies and services
Seller Party	Catalogue Provider	*Supplier*	SMEs and large enterprises supplying services and/or commodities

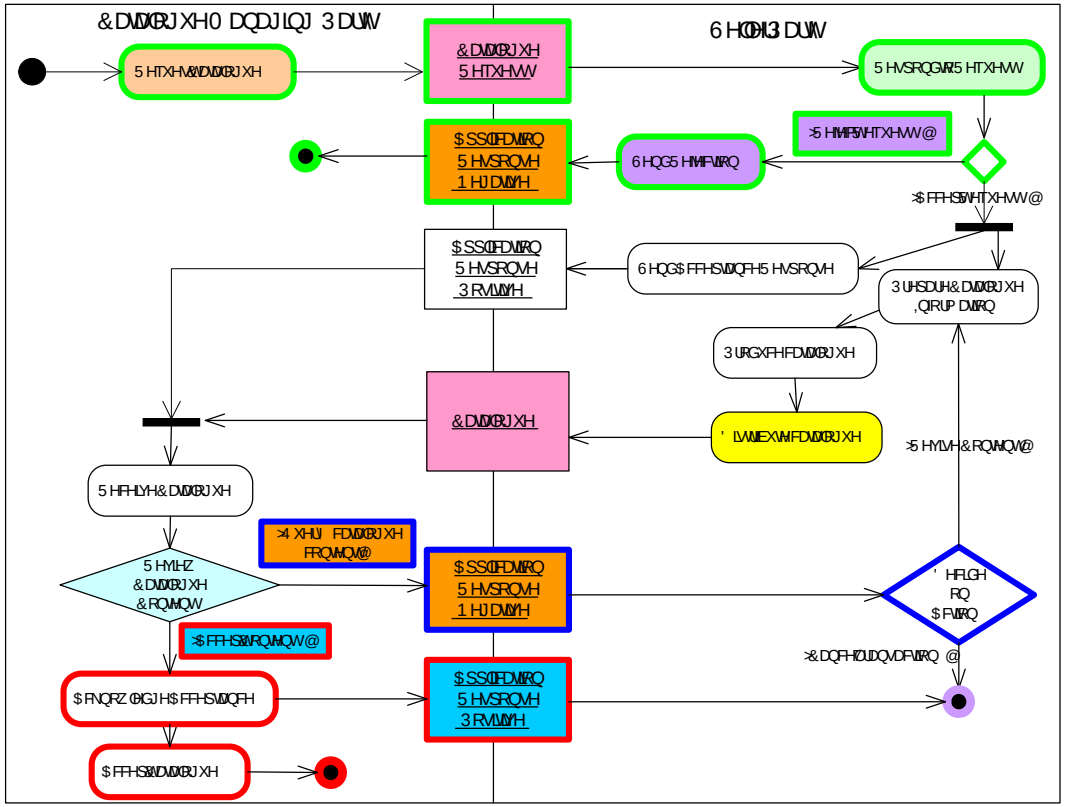
Table 49: Terminology for conducting gap analysis of activity diagrams

The preliminary assessment of the activity diagrams indicated a high level of approximation between the c-Catalogue and the UBL. The UBL appears to be more concrete in structure with supplementary activities that provide a better explanation of the events involved in each particular process. Furthermore, UBL follows an interactive and iterative approach for the creation and management (edit, update, and delete) of catalogues. It is expected that the harmonisation between the two standards will develop an updated set of activity diagrams that will represent the best practices from each standard.

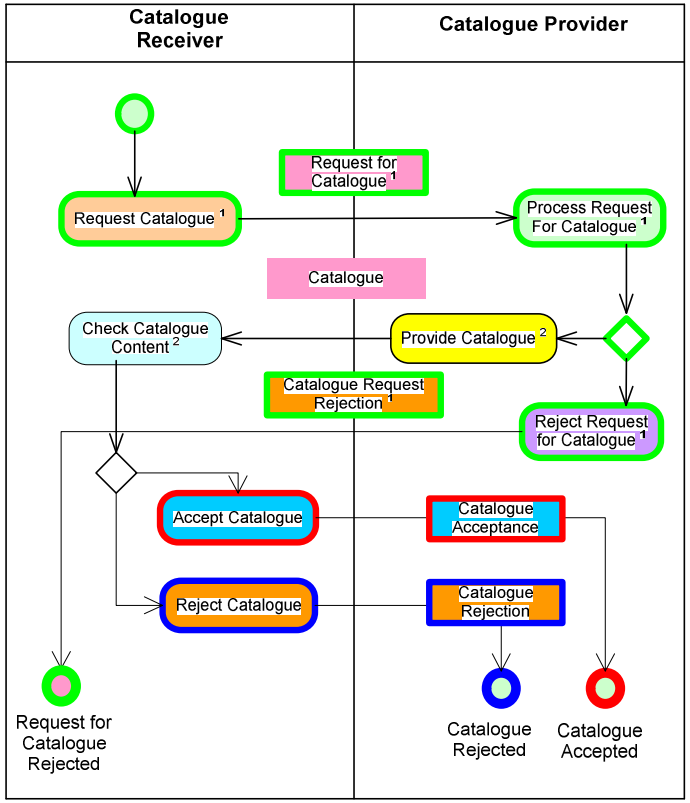
Comparison between "UBL 2.0 Create Catalogue" & "c-Catalogue New Catalogue on Request" Activity Diagrams

Supports the processes involved in the submission of a new catalogue on request between a catalogue managing/catalogue receiver (Recipient) and a seller/catalogue provider (Provider).

UBL 2.0 – Create Catalogue



c-Catalogue – New Catalogue on Request



The analysis of the above activity diagrams indicates that the overall process for both the UBL 2.0 – Create Catalogue/c-Catalogue – New Catalogue on Request consists of four sub-processes:

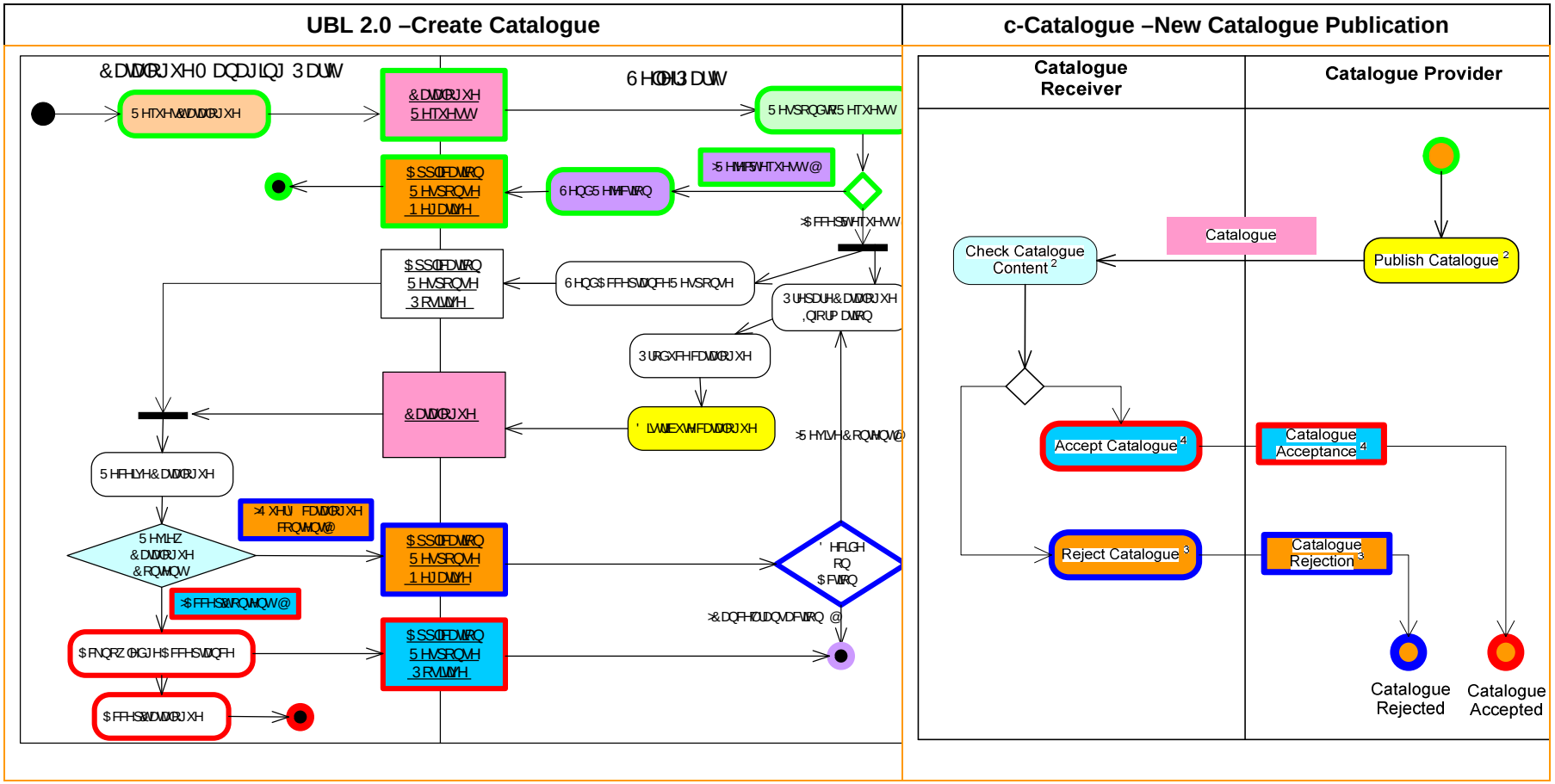
1. **Catalogue Request Rejection** (*High level of approximation*): The number and the sequence of activities involved in the rejection of a new catalogue request are almost identical. Only the name of the first process is identical for both messages.
2. **Review Catalogue Content** *(Low level of approximation)*: The number and the sequence of activities involved in the review of the catalogue content are different between the two messages. The review of the catalogue is an iterative process for UBL, where suppliers can revise/update the content of their catalogues based on comments and recommendation provided during the review process.
3. **Reject Catalogue** (*High level of approximation*): The activities involved in the rejection of a new catalogue are almost identical for both messages. In c-Catalogues the process is automatically terminated immediately after the catalogue rejection, whereas in UBL suppliers may either cancel their transaction by withdrawing their catalogue or proceed with necessary corrections and resubmission of their catalogues.
4. **Accept Catalogue** (*Medium level of approximation*): The number and the sequence of activities involved in the acceptance of a new catalogue request are different. The c-Catalogues is covering the creation of a new catalogue whereas the UBL is covering both the creation and the management (update, append and delete) of a catalogue.

Activities are performed by similar actors (Recipients and Providers) in both cases. A catalogues is created by a Provider based on specific request and specifications submitted by the Recipient. The Provider may accept the request and submit a new catalogue or decline and submit a catalogue request rejection. Upon receipt of the catalogue information, the Recipient is responsible for informing the Provider about the acceptance or the rejection of the catalogue.

Overall there is a high level of approximation between the two activity diagrams. However, UBL 2.0 is more comprehensive and more flexible in structure, since it allows not only the creation of a new catalogue but also the management (update, append and delete) of a existing catalogue. Additional activities such as *Prepare catalogue* information, *Produce catalogue*, and *Acknowledge acceptance* are also present in UBL 2.0 for supporting the management of exiting catalogues

Comparison between "UBL 2.0 – Create Catalogue" & "c-Catalogue – New Catalogue Publication" Activity Diagrams

Supports the processes involved in the exchange of catalogue information between a buyer and supplier based on a previous catalogue subscription.



The “c-Catalogue – New Catalogue Publication” is a subset of the “c-Catalogue – New Catalogue on Request”. The overall process for both the UBL 2.0 – Create Catalogue/c-Catalogue – New Catalogue Publication is similar to the overall process described above, except of the “Catalogue Request Rejection” sub-process. Therefore, the involved sub-process are the following:

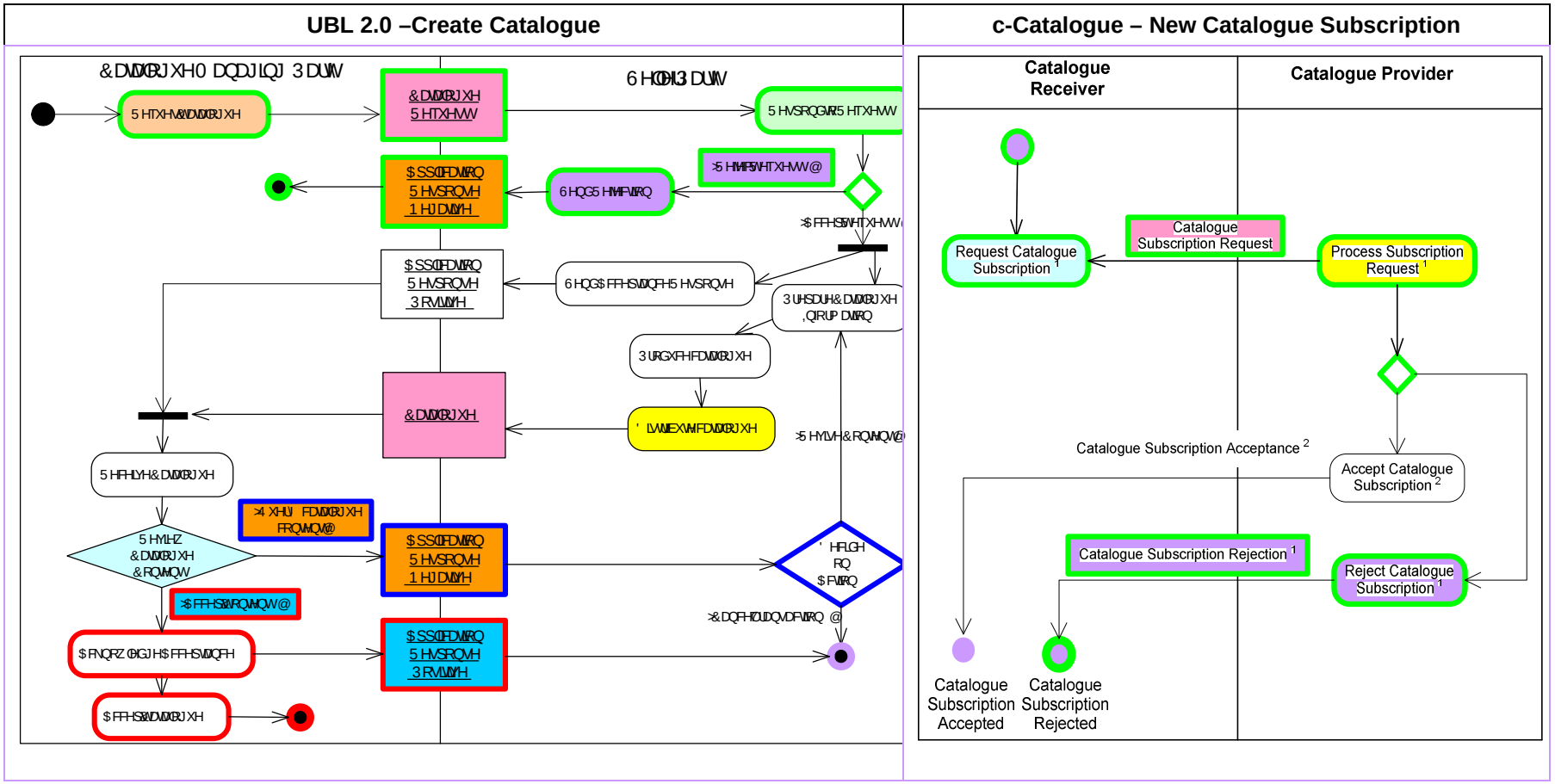
1. **Review Catalogue Content** *(Low level of approximation)*: For UBL the validation, acceptance and publication of a new catalogue is an iterative process, where suppliers can revise/update the content of their catalogues based on comments and recommendation provided during the review process, while for c-Catalogue is a single step operation.
2. **Reject Catalogue Publication** (*High level of approximation*): The activities involved in the rejection of a new catalogue are almost identical for both messages. In c-Catalogues the process is automatically terminated immediately after the catalogue rejection, whereas in UBL suppliers may either cancel their transaction by withdrawing their catalogue or proceed with necessary corrections and resubmission of their catalogues. In both cases the buyer submits a catalogue rejection (justification is also provided) to supplier.
3. **Accept Catalogue Publication** (*Medium level of approximation*): The number and the sequence of activities involved in the acceptance of a new catalogue request are different. The c-Catalogues is covering the creation of a new catalogue whereas the UBL is covering both the creation and the management (update, append and delete) of a catalogue.

Activities are performed by similar actors (Recipients and Providers) in both cases. However, the process is usually initiated by different users. In case of UBL, the Buyer initiates the process by sending a request to the Supplier for a catalogue, whereas for c-Catalogues the Supplier initiates the process by sending a catalogue to the Buyer. In both cases is up to the buyer to decide on whether to accept or reject the publication of a new catalogue. In case of UBL it also up to the Supplier to accept or reject the request for catalogue information/data.

Overall there is a medium level of approximation between the two activity diagrams UBL 2.0 is more comprehensive and more flexible in structure, since it allows not only the publication of a new catalogue but also the creation of the new catalogue and the management (update, append and delete) of a existing one.

Comparison between "UBL 2.0 – Create Catalogue" & "c-Catalogue – New Catalogue Subscription" Activity Diagrams

Supports the processes involved in the exchange of a new catalogue subscription request for the creation of a new catalogue, including details on catalogue future updates



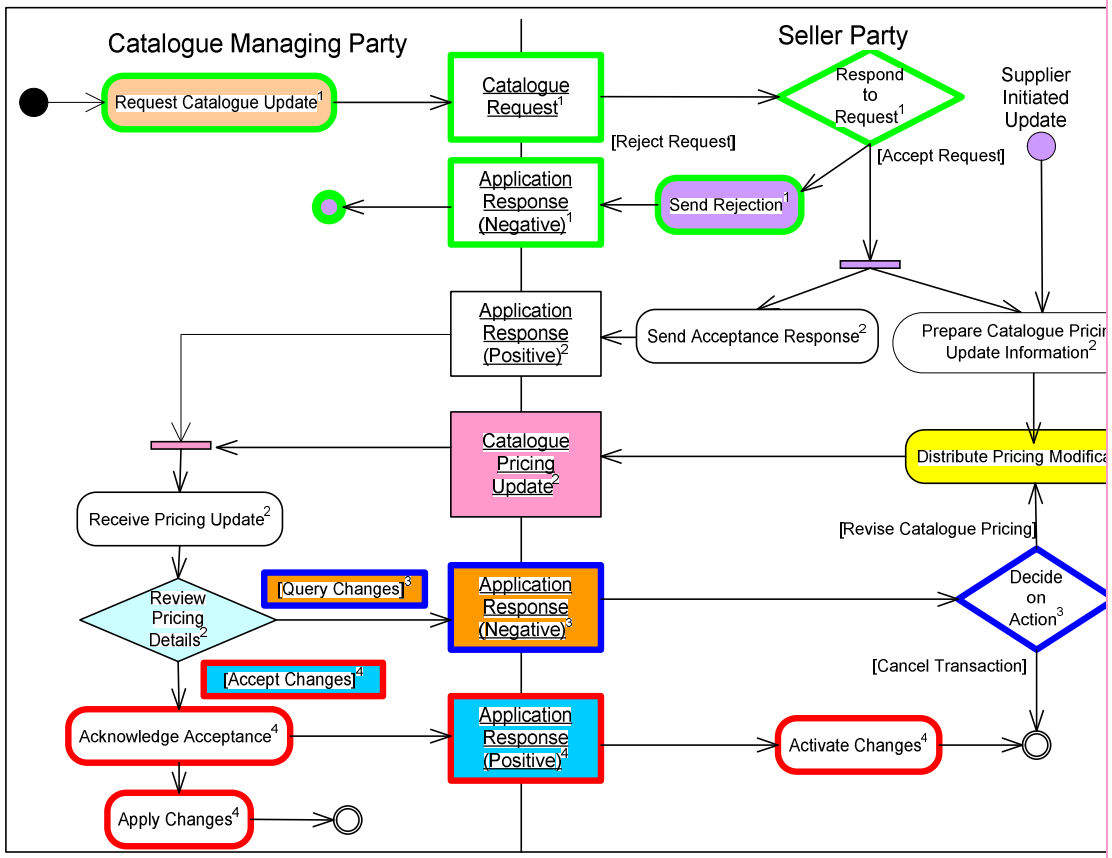
The “c-Catalogue – New Catalogue Publication” is a subset of the “c-Catalogue – New Catalogue on Request”. The overall process for both the UBL 2.0 – Create Catalogue/c-Catalogue – New Catalogue Publication is similar to the overall process described above, except of the “Catalogue Request Rejection” sub-process. Therefore, the involved sub-processes are the following:

1. **Catalogue Subscription Rejection** (*High level of approximation*): The number and the sequence of activities involved in the rejection of a new catalogue request are almost identical. The catalogue subscription request is initiated by the buyer, and rejected after review by the supplier. The supplier also submits a catalogue submission rejection notice to the buyer.
2. **Catalogue Subscription Acceptance** (*Low level of approximation*): The number and the sequence of activities involved in the acceptance of a new catalogue subscription request are different. In case of c-Catalogue the supplier receives the catalogue, reviews the catalogue subscription request and upon acceptance the transaction process is terminated, whereas the UBL activity diagram provides additional sub-processes covering the buyer catalogue acceptance and rejection activities.

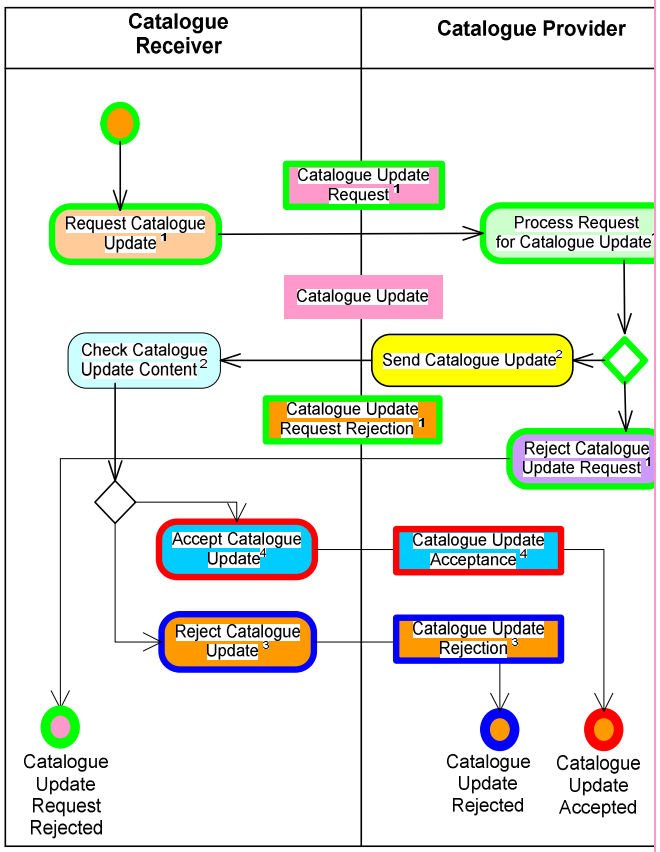
Comparison between "UBL 2.0 – Update Catalogue Pricing" & "c-Catalogue – Update Catalogue on Request" Activity Diagrams

Supports the processes involved in the submission of a catalogue pricing update on request between a catalogue managing/catalogue receiver (Recipient) and a seller/catalogue provider (Provider).

UBL 2.0 – Update Catalogue Pricing



c-Catalogue – Update Catalogue on Request



The analysis of the above activity diagrams indicates that the overall process for both the UBL 2.0 – Update Catalogue Pricing/c-Catalogue – Update Catalogue on Request consists of four sub-processes:

1. **Catalogue Update Request Rejection** (*High level of approximation*): The number and the sequence of activities involved in the rejection of a catalogue pricing update request are almost identical. It starts with a request for a catalogue price update issued by the Buyer and it is rejected after evaluation by the Supplier.
2. **Review Catalogue Content** *(Low level of approximation)*: The number and the sequence of the activities involved in the review of the catalogue content are different between the two messages. The Catalogue preparation is an iterative process for UBL, where suppliers can revise/update the content of their catalogues based on comments and recommendation provided during the review process.
3. **Catalogue Update Rejection** (*High level of approximation*): The activities involved in the rejection of a catalogue update are almost identical for both messages. In c-Catalogues the process is automatically terminated immediately after the catalogue rejection, whereas in UBL suppliers may either cancel their transaction by withdrawing their catalogue update or proceed with necessary corrections and resubmission of their catalogue update.
4. **Catalogue Update Acceptance** (*Medium level of approximation*): The number and the sequence of activities involved in the rejection of a catalogue update request are different. In UBL 2.0 there are additional activities involved in the Catalogue Update Acceptance process.

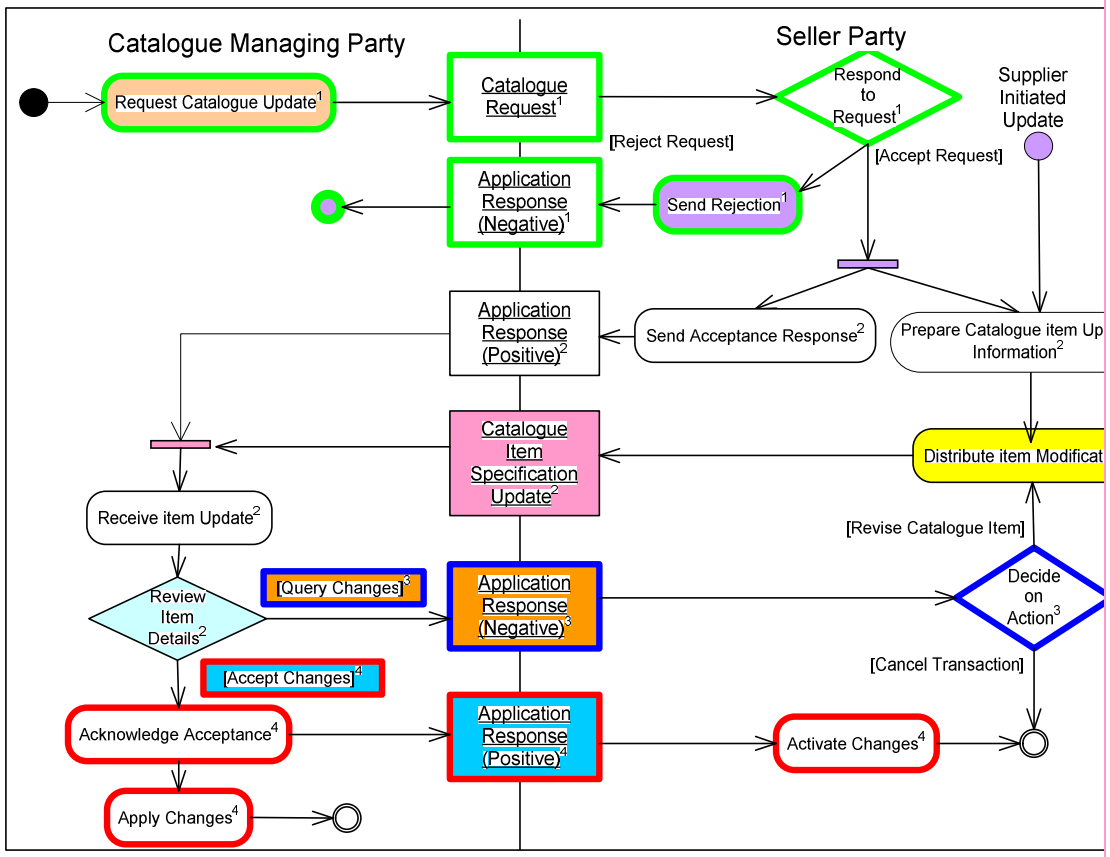
Activities are performed by similar actors (Recipients and Providers) in both cases. A catalogue update is created by a Provider based on Recipient request. Upon receipt of the catalogue update information, the Recipient is responsible for informing the Provider about the acceptance or the rejection of the catalogue update information.

Overall there is a high level of approximation between the two activity diagrams. However, UBL 2.0 activity diagram describes additional activities for almost all the involved processes. In UBL 2.0 the Catalogue Update Rejection process is an iterative process where receivers may select to interact in the catalogue update process (negotiations). Providers may receive comments and proceed with the update of their catalogue without re-initiating the complete catalogue process. Furthermore, UBL 2.0 describes additional activities for the application and activation of the catalogue update process, after the acceptance of the catalogue update request.

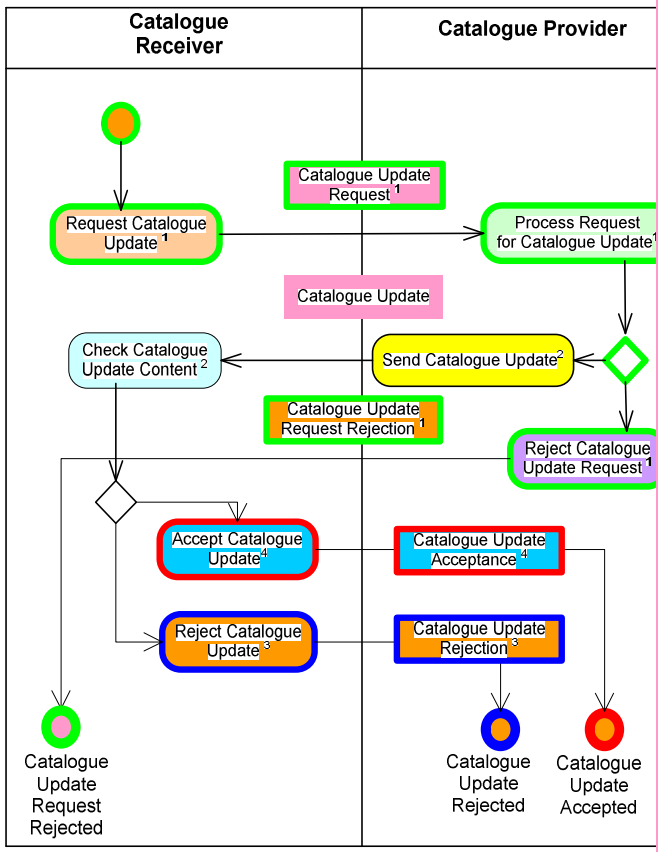
Comparison between "UBL 2.0 –Update Catalogue Item Specification" & "c-Catalogue – Update Catalogue on Request" Activity Diagrams

Supports the processes involved in the submission of a catalogue item update on request between a catalogue managing/catalogue receiver (Recipient) and a seller/catalogue provider (Provider).

UBL 2.0 – Update Catalogue Item Specification



c-Catalogue – Update Catalogue on Request



The analysis of the above activity diagrams indicates that the overall process for both the UBL 2.0 – Update Catalogue Item Specifications/c-Catalogue – Update Catalogue on Request consists of four sub-processes:

1. **Catalogue Update Request Rejection** (*High level of approximation*): The number and the sequence of the activities involved in the rejection of a catalogue item specifications update request are almost identical. It starts with a request for a catalogue item specification update issued by the Buyer and it is rejected after evaluation by the Supplier.
2. **Review Catalogue Content** *(Low level of approximation)*: The number and the sequence of activities involved in the review of the catalogue content are different between the two messages. The Catalogue preparation is an iterative process for UBL, where suppliers can revise/update the content of their catalogues based on comments and recommendation provided during the review process.
3. **Catalogue Update Rejection** (*High level of approximation*): The activities involved in the rejection of a catalogue update are almost identical for both messages. In c-Catalogues the process is automatically terminated immediately after the catalogue rejection, whereas in UBL suppliers may either cancel their transaction by withdrawing their catalogue update or proceed with necessary corrections and resubmission of their catalogue update.
4. **Catalogue Update Acceptance** (*Medium level of approximation*): The number and the sequence of activities involved in the rejection of a catalogue update request are different. In UBL 2.0 there are additional activities involved in the Catalogue Update Acceptance process.

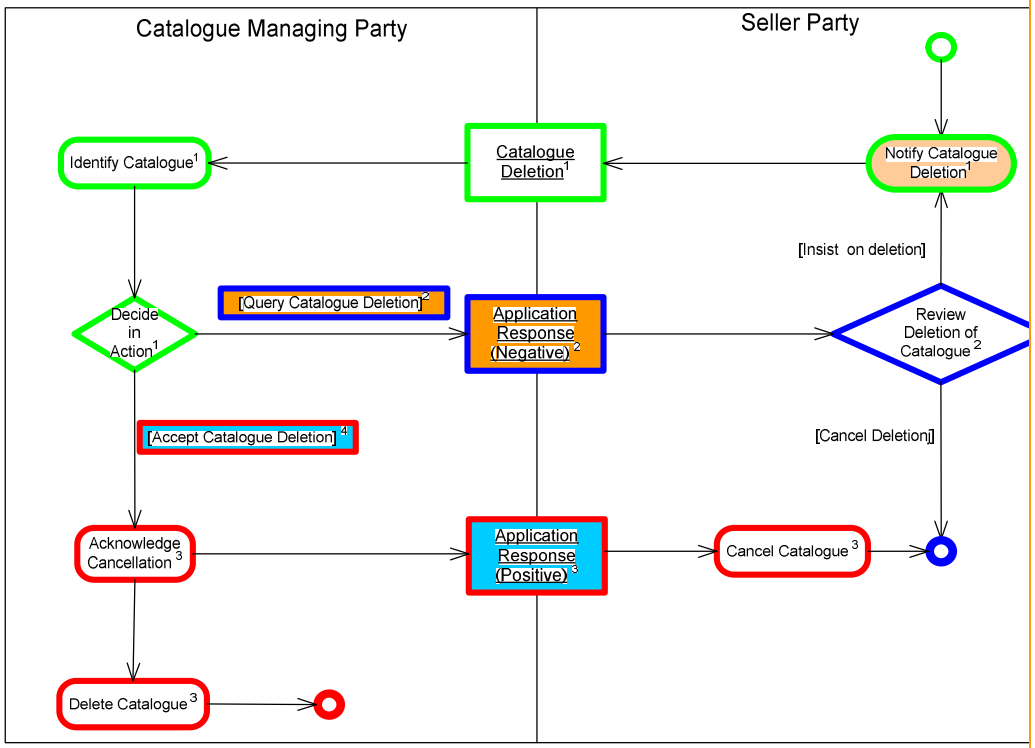
Activities are performed by similar actors (Recipients and Providers) in both cases. A catalogue update is created by a Provider based on Recipient request. Upon receipt of the catalogue update information, the Recipient is responsible for informing the Provider about the acceptance or the rejection of the catalogue update information.

Overall there is a high level of approximation between the two activity diagrams. However, UBL 2.0 activity diagram describes additional activities for almost all the involved processes. In UBL 2.0 the Catalogue Update Rejection process is an iterative process where receivers may select to interact in the catalogue update process (negotiations). Providers may receive comments and proceed with the update of their catalogue without re-initiating the complete catalogue process. Furthermore, UBL 2.0 describes additional activities for the application and activation of the catalogue update process, after the acceptance of the catalogue item specification update request.

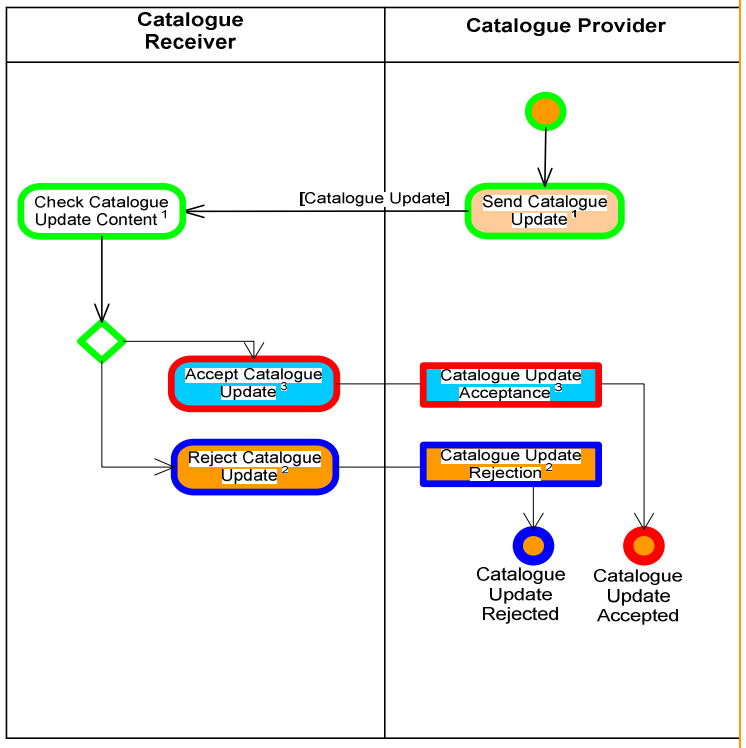
Comparison between "UBL 2.0 –Delete Catalogue" & "c-Catalogue – Update Catalogue" Activity Diagrams

Supports the processes involved in the deletion/cancellation of an existing catalogue. The deletion/cancellation makes the information of an entire catalogue obsolete.

UBL 2.0 –Delete Catalogue



c-Catalogue – Update Catalogue



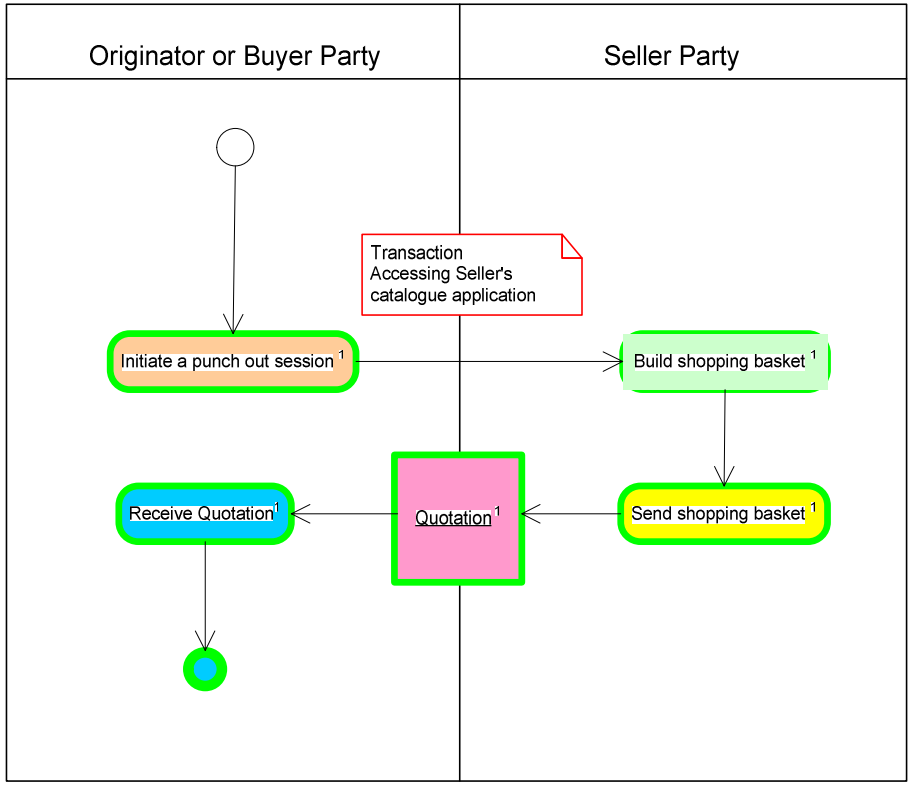
The analysis of the above activity diagrams indicates that the overall process for both the UBL 2.0 – Delete Catalogue /c-Catalogue – Update Catalogue consists of three sub-processes:

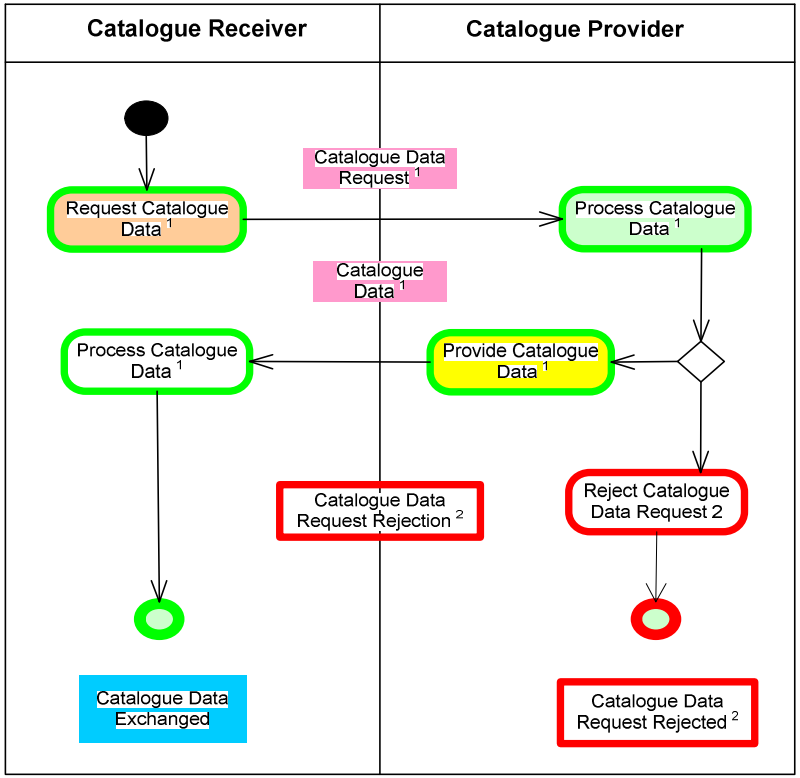
1. **Catalogue Deletion Request** (*High level of approximation*): The sequence of the activities involved in the deletion of a catalogue item specifications update request are almost identical. It starts with a request for a catalogue deletion (update process with an action code indicating a "catalogue deletion"), and proceeds with the identification and review of the catalogue. The Buyer is responsible for the acceptance or rejection of the catalogue deletion request.
2. **Catalogue Update Rejection** (*High level of approximation*): The activities involved in the rejection of a catalogue update are almost identical for both messages. In c-Catalogues the process is automatically terminated immediately after the rejection of the catalogue deletion, whereas in UBL suppliers may either cancel their transaction by cancelling their catalogue deletion request or insist and proceed with necessary corrections and resubmission of an updated catalogue request for deletion.
3. **Catalogue Update Acceptance** (*Medium level of approximation*): The number and the sequence of activities involved in the rejection of a catalogue deletion request are different. In UBL 2.0 there are additional activities involved in the Catalogue Update Acceptance process.

Comparison between UBL 2.0 "Punch-Out" & c-Catalogue "Remote Catalogue Data Exchange" Activity Diagrams

Supports the processes involved for the direct access of the Seller application from within the procurement application of the Buyer.

UBL 2.0 – Punch Out	c-Catalogue – Remote Catalogue Data Exchange





The analysis of the above activity diagrams indicates that the overall process for both the UBL 2.0 – Punch Out /c-Catalogue – Remote Catalogue Data Exchange consists of two sub-processes:

1. **Receipt of Quotation** (*Medium level of approximation*): The number and the sequence of activities involved in the remote exchange of catalogue data are slightly different. The UBL activities are mainly refer to the creation of a shopping basket that incorporates information of catalogue items along with other dynamic content (e.g. billing, shipping, handling, and payment information)
2. **Catalogue Data Request Rejection** *(No level of approximation)*: The number and the sequence of activities involved in the rejection of a catalogue data exchange request applies only to the case of c-Catalogue.

A low level of approximation exist between the UBL 2.0 – Punch Out /c-Catalogue – Remote Catalogue Data Exchange. The UBL focus on requirements and precondition for the initiation and establishment of a punch out session, whereas the c-Catalogue is treating the punch out as a regular request fro catalogue data. Furthermore, the UBL covers extensively the existence of different communication interfaces and security constraints for the data exchange between Buyers and Suppliers

Annex III.3 *Information Entities*

This annex compares the Information Entities of c-Catalogue and UBL 2.0 against their common messages.

Considering the abstract level of the preliminary comparison and in order to avoid possible mismatches between the attributes of the UBL and c-Catalogues messages an abstract mapping of their primary attributes has been performed. The mapping does not take into consideration any secondary attributes and their relationships with other messages.

Table 50 provides a harmonised terminology (description of fields) for the presentation of the gap analysis between the Information entities of c-Catalogue and UBL 2.0

c-Catalogue	**UBL 2.0**	**Gap Analysis Terms**	**Clarifications**
Business Term	UBL Name	*Field Name (Name)*	
Relation: - Attributes are abbreviated as Att. and - Associations are abbreviated as Ass.	Use of different colours to specify the distinction between attributes (white colour) and associations (Green colour)	*Relation (Rel.)*	- Attribute: A data field or property that represents information about a Classifier - Association: A kind of relationship or link between classes / A reference to another element or a collection of elements
Multiplicity	Cardinality	*Multiplicity (Mult.)*	
Representation Term / Associated Object Class	Representation Term	*Representation Term / Associated Object Class*	A component of a data element name which describes the form of representation of the data element.
	Associated Object Class		
Property Term	Property Term	*Property Term*	A component of the data element name which expresses a property of an object class. (A component of the name of a data element which expresses the category to which the data element belongs
Description	Definition	*Description*	

Table 50: Terminology for conducting gap analysis of information entities

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

The class diagrams (presenting the contents of the business documents and the BIEs) are provided in “BRS Cross Industry Catalogue-20060511.doc”, pages 40-63.

The class diagrams (presenting the contents of the business documents and the BIEs) are provided in “prd-UBL-2.0”.

Annex III.3.1 *Request Catalogue Document*

The following table compares the c-Catalogue "request for catalogue" document with the UBL 2.0 "catalogue request" document. The **UBL 2.0 - Catalogue Request** document has 19 attributes whereas the **c-Catalogue – Request for catalogue** document only 16.

The definition of the two documents is as follows

- **UBL 2.0 - CATALOGUE REQUEST**: "A document to request a Catalogue from a seller. May be either an entire new Catalogue or an update (at the discretion of supplier)"
- **c-Catalogue - REQUEST FOR CATALOGUE**: "Request from a Catalogue Receiver to a Catalogue Provider to receive a new Catalogue".

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - CATALOGUE REQUEST Document						c-Catalogue - REQUEST FOR CATALOGUE Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	*Att.*	*1*	*Identifier*	*Identifier*	*Identifier for the Catalogue Request assigned by the Catalogue Managing Party*	*Catalogue Request Identifier*	*Att.*	*1*	*Identifier*	*Identifier*	*The identifier of the Request for Catalogue*
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated universally unique identifier (GUID) for the catalogue request document instance	Currency	Att.	0..n	Currency	Code	Currency or currencies of the prices, allowances and charges in the Catalogue

Name	Att.	0..1	Name	Name	A name given to the Catalogue Request	Language Code	Att.	0..n	Language	Code	Language(s) of the Catalogue information
Issue Date	*Att.*	*1*	*Date*	*Issue Date*	*The date assigned by the Catalogue Managing Party at which the Catalogue was requested*	*Catalogue Request date time*	*Att.*	*1*	*Date Time*	*Issue*	*The date/time when the Catalogue Request is issued*
Issue Time	*Att.*	*0..1*	*Time*	*Issue Time*	*The time assigned by the Catalogue Managing Party at which the Catalogue was requested*						
Validity Period	*Ass*	*0..n*	*Period*	*Period*	*The period assigned by the Catalogue Managing Party during which the information in the Catalogue requested is to be effective. This may be given as start and end dates or a duration*	*Validity Start Date*	*Att.*	*0..1*	*Date*	*Validity Start*	*Start date of the Catalogue validity*
						Validity End Date	*Att.*	*0..1*	*Date*	*Validity End*	*End date of the Catalogue validity*
Pricing Update Request Indicator	Att.	0..1	Indicator	Update Request Indicator	Request a pricing update	Availability Start Date	Att.	0..1	Date	Availability Start	Start date of the availability of Catalogue Items

Item Update Request Indicator	Att.	0..1	Indicator	Update Request Indicator	Request an update of the item specifications	Availability End Date	Att.	0..1	Date	Availability End	End date of the Availability of Catalogue Items
Requested Classification Scheme	*Ass.*	*0..n*	*Classification Scheme*	*Classification Scheme*	*An association to classification categories for the Catalogue requested*	*Product Classification Code*	*Att.*	*0..n*	*Code*	*Product Classification*	*Product groups that are to be included in the Catalogue*
Catalogue Managing Party	*Ass.*	*1*	*Party*	*Party*	*An association to the Catalogue Managing Party*	*Catalogue Receiver*	*Ass.*	*0..1*	*Party*	*Catalogue Receiver*	*Receiver of the Catalogue Information*
Seller Supplier Party	*Ass.*	*1*	*Supplier Party*	*Supplier Party*	*An association to the Seller*	*Catalogue Provider*	*Ass.*	*1*	*Party*	*Catalogue Provider*	*Provider of the Catalogue*
Referenced Contract	*Ass.*	*0..n*	*Contract*	*Contract*	*An association to a framework agreement or contract*	*Contract Reference*	*Ass.*	*0..n*	*Document Reference*	*Contract*	*Reference to the Contract(s) the Catalogue Items are subject of*
Requested Catalogue Reference	Ass.	0..1	Catalogue Reference	Catalogue Reference	An association to a specific Catalogue; used if the Catalogue Request is for an update	Price	Ass.	0..n	Price	Price	Price type(s) to include in the Catalogue
Trading Terms	Ass.	0..1	Trading Terms	Trading Terms	An association to trading terms	Supplier	Ass.	0..n	Party	Supplier	Suppliers of whom Catalogues are to be provided
Document Reference	Ass.	0..n	Document Reference	Document Reference	An association to other documents	Target Market	Ass.	0..n	Location	Target Market	The target market(s) of the Catalogue Items

Applicable Territory Address	*Ass.*	*0..n*	*Address*	*Address*	*An association to the territory (regions, country, city, etc.) to which the requested Catalogue will apply. Expressed as an Address*	*Delivery Region*	*Ass.*	*0..n*	*Location*	*Delivery*	*The delivery regions or areas of the Catalogue Items*
						Applicable Party	*Ass.*	*0..n*	*Party*	*Applicable*	*Party for whom the Catalogue is applicable*
Requested Catalogue Line	Ass.	0..n	Catalogue Line	Catalogue Line	An association to specific Catalogue Lines for the catalogue requested						
Note	Att.	0..n	Text	Note	Free form text applying to the Catalogue Request. This element may contain notes or any other similar information that is not contained explicitly in another structure						
Description	Att.	0..n	Text	Description	A description of the Catalogue Request						

Table 51: Request Catalogue Document

More than 50% of the attributes are common in both tables. The following list indicates the fields that are almost identical.

- *ID – Catalogue Request Identifier*: A unique code (alphanumeric) for the identification of a catalogue request. It is provided manually by the catalogue managing party. This attribute is mandatory in both cases.

- *Issue Date & Issue Time - Catalogue Request date time*: Identifies the date and time which the catalogue was requested. In UBL the catalogue managing party has the option to provide only the date, whereas in c-Catalogue both date and time should be present. This attribute is mandatory in both cases.
- *Validity Period - Validity Start Date & Validity End Date*: Identifies the period (start and end date) during which the information in the catalogue requested will be in effect. The catalogue managing party can also define in UBL the period as a duration of days. Furthermore, in UBL a catalogue request may be associated with multiple validity periods whereas in c-Catalogues only with a single validity start and ending date. This makes the UBL message more flexible in structure, since the same request can be repeatedly initiated without any resubmission. In both cases the validity period is optional.
- *Requested Classification Scheme - Product Classification Code*: In UBL, it associates the catalogue request with different categories within an existing classification scheme, whereas in c-Catalogues it defines the different codes representing the product groups to be included in the catalogue. Identifies the categories/product groups involved in the catalogue request. This attribute is optional in both cases.
- *Catalogue Managing Part - Catalogue Receiver:* Provides an association to the catalogue managing party responsible for receiving the catalogue. This attribute is mandatory in both cases.
- *Seller Supplier Party - Catalogue Provider:* Provides an association to the supplier/provider of the catalogue. This attribute is mandatory in both cases.
- *Referenced Contract – Contract Reference:* Provides an association to one or more existing framework agreement or individual contract. This attribute is optional in both cases.
- *Applicable Territory Address - Delivery Region & Applicable Party:* Provides an association to the territory (regions, country, city, etc.) and the applicable party to which the requested catalogue will apply/delivered. In UBL, the “Applicable Party” is part of the “Address” data type. This attribute is optional in both cases.

UBL provides some additional optional attributes such as GUID (a computer-generated universally unique identifier for the catalogue request document), Name (name of the catalogue request), pricing update request indicator (request a pricing update), item update request indicator (request update of the item specifications) and description (additional information on the catalogue request). Furthermore, it provides some additional associations such as requested catalogue reference (association to a specific Catalogue; used if the catalogue request is for an update), trading terms (association to predefined trading terms), requested catalogue line (association to specific catalogue lines for the catalogue requested), note (free form text applying to the catalogue request - this element may contain notes or any other similar information that is not contained explicitly in another structure) and document reference (association to other documents).

c-Catalogue also provides some additional optional attributes such as currency (currency codes of the prices, allowances and charges in the catalogue) language code (languages the catalogue information will be exchanged), availability start date (start date of the catalogue Items availability) availability end date (end date of the catalogue Items availability). Furthermore, it provides associations with other optional information such as price (catalogue price types) supplier (suppliers of whom catalogues are to be provided) and target market (target markets of the catalogue items).

Annex III.3.2 *"Catalogue" document*

The following table compares the c-Catalogue "Catalogue" document with the UBL 2.0 "Catalogue" document. The **UBL 2.0 - Catalogue** document has 17 attributes whereas the **c-catalogue – Request for catalogue** document only 5.

The definition of the two documents is as follows

- **UBL 2.0 - Catalogue**: "A document produced by a party in the procurement chain that describes items and prices"
- **c-Catalogue - Catalogue**: "A message to convey a catalogue".

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - CATALOGUE Document						c-Catalogue - CATALOGUE Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	*Att.*	*1*	*Identifier*	*Identifier*	*An identifier for the Catalogue assigned by the Seller*	*Catalogue Message Identifier*	*Att.*	*1*	*Identifier*	*Identifier*	*The identifier of the Catalogue Message*
Name	Att.	0..1	Name	Name	A name given to a catalogue	Catalogue Subscription Acceptance Reference	Ass.	0..1	Document Reference	Catalogue Subscription Acceptance	Reference to the Catalogue Subscription Acceptance
Version ID	Att.	0..1	Identifier	Version	To indicate the current version of the catalogue	Catalogue Request Reference	Ass.	0..1	Document Reference	Catalogue Request	Reference to the Catalogue Request
Issue Date	*Att.*	*1*	*Date*	*Issue Date*	*The date when the catalogue was issued*	*Catalogue Message issue date time*	*Att.*	*1*	*Date Time*	*Issue*	*The date/time when the Catalogue*

Issue Time	*Att.*	*0..1*	*Time*	*Issue Time*	*The time when the catalogue was issued*						
Catalogue Line	Ass.	1..n	Catalogue Line	Catalogue Line	An association to one or more Catalogue Lines	Catalogue	Ass.	1	Catalogue	Catalogue	The Catalogue information
Revision Date Time	Att.	0..1	Date Time	Revision Date Time	The date/time (assigned by the Seller Party) at which the information in the catalogue was revised						
Validity Period	Ass.	0..n	Period	Period	The period assigned by the Seller during which the information in the Catalogue is effective. This may be given as start and end dates or a duration						
Description	Att.	0..n	Text	Description	A description of the catalogue						

Note	Att.	0..n	Text	Note	Free form text applying to the Catalogue. This element may contain notes or any other similar information that is not contained explicitly in another structure						
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Catalogue instance						
Previous Version ID	Att.	0..1	Identifier	Version	Identifies the previous version of the Catalogue which is superceded by this version						
Referenced Contract	Ass.	0..n	Contract	Contract	An association to a framework agreement or contract						
Signature	Ass.	0..n	Signature	Signature	An association to one or more signatures applied to the document						

Seller Supplier Party	Ass.	1	Supplier Party	Supplier Party	An association to the Seller							
Catalogue Managing Party	Ass.	1	Party	Party	An association to the Catalogue Managing Party							
Trading Terms	Ass.	0..n	Trading Terms	Trading Terms	An association to trading terms							

Table 52: Catalogue Document

According to the Catalogue Information Model the Catalogue Class associated with the catalogue message contains the following attributes.

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - CATALOGUE Document						c-Catalogue - CATALOGUE Information Model					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	*Att.*	*1*	*Identifier*	*Identifier*	*An identifier for the Catalogue assigned by the Seller*						
Name	Att.	0..1	Name	Name	A name given to a catalogue	Catalogue name	0..1	Att	Name	Text	The name assigned by the Catalogue Provider to the catalogue.
Version ID	Att.	0..1	Identifier	Version	To indicate the current version of the catalogue	Catalogue version	0..1	Att	Version	Text	The version number of the catalogue.
Issue Date	*Att.*	*1*	*Date*	*Issue Date*	*The date when the catalogue was issued*						
Issue Time	*Att.*	*0..1*	*Time*	*Issue Time*	*The time when the catalogue was issued*						
Catalogue Line	Ass.	1..n	Catalogue Line	Catalogue Line	An association to one or more Catalogue Lines	Supplier catalogue	0..n	Ass.	Supplier Catalogue	Supplier Catalogue	A catalogue of a Supplier, contained in this catalogue

Revision Date Time	Att.	0..1	Date Time	Revision Date Time	The date/time (assigned by the Seller Party) at which the information in the catalogue was revised							
Validity Period	Ass.	0..n	Period	Period	The period assigned by the Seller during which the information in the Catalogue is effective. This may be given as start and end dates or a duration	Validity period	0..1	Ass.	Validity period	Period	The period in which the catalogue is valid
Description	Att.	0..n	Text	Description	A description of the catalogue							
Note	Att.	0..n	Text	Note	Free form text applying to the Catalogue. This element may contain notes or any other similar information that is not contained explicitly in another structure	Note	0..n	Ass	Note	Note	A coded or textual description relevant for the catalogue

GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Catalogue instance							
Previous Version ID	Att.	0..1	Identifier	Version	Identifies the previous version of the Catalogue which is superceded by this version							
Referenced Contract	Ass.	0..n	Contract	Contract	An association to a framework agreement or contract							
Signature	Ass.	0..n	Signature	Signature	An association to one or more signatures applied to the document							
Seller Supplier Party	Ass.	1	Supplier Party	Supplier Party	An association to the Seller	Catalogue Provider	1	Ass.	Catalogue Provider	Party	The Provider of the catalogue
Catalogue Managing Party	Ass.	1	Party	Party	An association to the Catalogue Managing Party	Catalogue Receiver	0..1	Ass.	Catalogue Receiver	Party	The Receiver of the Catalogue Information
Trading Terms	Ass.	0..n	Trading Terms	Trading Terms	An association to trading terms							

Table 53: Catalogue Document/Catalogue Information Model

In this case 10 out of the 17 attributes of the UBL 2.0 catalogue document can be mapped to the attributes of the c-Catalogue catalogue document (**Table 52**) and the Catalogue Class of the Catalogue Information Model (**Table 53**). The following list indicates the fields that are almost identical:

- *ID – Catalogue Message Identifier*: A unique code (alphanumeric) for the identification of the catalogue. It is provided manually by the catalogue provider/seller. This attribute is mandatory in both cases.
- *Issue Date & Issue Time - Catalogue Message Issue date time*: Identifies the date and time which the catalogue was issued. In UBL the catalogue managing party has the option to provide only the date, whereas in c-Catalogue both date and time should be present. This attribute is mandatory in both cases.
- *Name – Catalogue Name:* Indicates the name assigned by the catalogue provider to the catalogue. This attribute is optional in both cases
- *Version ID – Catalogue Version:* Indicates the current/latest version of the catalogue. This attribute is optional in both cases
- *Validity Period – Validity Period:* Identifies the period (start and end date) during which the information in the catalogue requested will be in effect. The catalogue managing party can also define in UBL the period as a duration of days. Furthermore, in UBL a catalogue request may be associated with multiple validity periods whereas in c-Catalogues only with a single validity start and ending date. In both cases the validity period is optional.
- *Note – Note:* Provides additional information in a free form text format that is not contained explicitly in any other attribute of the catalogue document.

The following three attributes have lower level of similarity:

- *Catalogue Line - Supplier catalogue:* Provides an association between the current catalogue with other catalogue items that can be referenced by the system.
- *Seller Supplier Party – Catalogue provider:* Associates the catalogue with the seller, which is also the provider of the catalogue. This attribute is mandatory in both cases
- *Catalogue Managing Party – Catalogue receiver:* Associates the catalogue with the catalogue managing party, which is also the receiver of the catalogue Information. This attribute is mandatory for UBL and optional for c-Catalogues

The preliminary analysis indicates that UBL catalogue message is providing additional attributes such as referenced contract (reference to an existing framework agreement or contract) and signature (association to one or more signatures applied to the catalogue), which are related to the establishment of the framework agreements and the e-Identification of the submitted catalogue documents. UBL guarantee the uniqueness of each catalogue instance/version in the system by associating each individual one with an automatically generated code

Furthermore, there is a direct association with the trading terms applied on the catalogue items with the issuing of an order/invoice. These terms are extracted from the terms of reference of the corresponding contact and imported in the catalogue system during the establishment of a contract (e-Contracting phase).

Annex III.3.3 *"Catalogue" update*

The following table compares the UBL 2.0 "Catalogue Item Specification Update" and "Catalogue Pricing Update" document with the c-Catalogue "Catalogue Update" document.

The definition of the two documents is as follows

- **UBL 2.0 - Catalogue Item Specification Update**: "A document to update information about Items in an existing Catalogue"
- **UBL 2.0 - Catalogue Price Update**: "A document to update information about Prices in an existing Catalogue"
- **c-Catalogue – Catalogue Update**: "A message to convey a catalogue update"

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - CATALOGUE ITEMS SPECIFICATIONS UPDATE Document & UBL2.0 - CATALOGUE PRICING UPDATE Document						c-Catalogue - CATALOGUE UPDATE Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	Att.	1	Identifier	Identifier	An identifier for the Catalogue Revision assigned by the Seller	Identifier	Att.	1	Identifier	Identifier	The identifier of the Catalogue
Related Catalogue Reference	Ass.	0..n	Catalogue Reference	Catalogue Reference	An association to the Catalogue containing the revised Items	Previous Catalogue Reference	Ass.	0..1	Document Reference	Catalogue Message	Reference to the Catalogue to be updated
Name	Att.	0..1	Name	Name	A name given to the Catalogue Revision	Catalogue Update Request Reference	Ass.	0..1	Document Reference	Catalogue Update Request	Reference to the Catalogue Request
Issue Date	Att.	1	Date	Issue Date	The date when the Catalogue Revision was issued	Catalogue Update date time	Att.	1	Date Time	Issue	The date/time when the Catalogue Update is

Issue Time	Att.	0..1	Time	Issue Time	The time when the Catalogue Revision was issued						
Catalogue Line	Ass.	1..n	Catalogue Line	Catalogue Line	An association to one or more Catalogue Lines	Catalogue	Ass.	1	Catalogue	Catalogue	Catalogue Information
Note	Att.	0..n	Text	Note	Free form text applying to the Catalogue Revision. This element may contain notes or any other similar information that is not contained explicitly in another structure	Catalogue Subscription Acceptance Reference	Ass.	0..1	Document Reference	Catalogue Subscription Acceptance	Reference to the Catalogue Subscription Acceptance
Description	Att.	0..n	Text	Description	A description of the Catalogue Revision						
Version ID	Att.	0..1	Identifier	Version	To indicate the current version of the Catalogue Revision						

Validity Period	Ass.	0..n	Period	Period	The period assigned by the Seller during which the information in the Catalogue Revision is effective. This may be given as start and end dates or a duration						
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Catalogue Revision instance						
Referenced Contract	Ass.	0..n	Reference Contract	Reference Contract	An association to a framework agreement or contract						
Signature	Ass.	0..n	Signature	Signature	One or more signatures applied to the document						
Seller Supplier Party	Ass.	1	Supplier Party	Supplier Party	An association to the Seller						
Catalogue Managing Party	Ass.	1	Party	Party	An association to the Catalogue Managing Party						

Trading Terms	Ass.	0..1	Trading Terms	Trading Terms	An association to trading terms						
Revision Date Time	Att.	0..1	Date time	Revision Date	The date or date/time assigned by the Seller at which the Catalogue was revised						

Table 54: Catalogue update document

In this case 11 out of the 17 attributes of the UBL 2.0 catalogue items specifications update/catalogue pricing update document can be mapped to the attributes of the c-Catalogue catalogue document (**Table 54**) and the Catalogue Class of the Catalogue Information Model (**Table 53**). The following list indicates the fields that are almost identical:

- *ID –Identifier*: A unique code (alphanumeric) for the identification of the catalogue to be updated/revised. It is provided manually by the catalogue provider/seller. This attribute is mandatory in both cases.
- *Related Catalogue Reference – Previous Catalogue Reference:* Provides an association with the catalogue to be revised/updated. This attribute is optional in both cases.
- *Issue Date & Issue Time - Catalogue Update date time*: Identifies the date and time which the catalogue revision/update was issued. In UBL the catalogue managing party has the option to provide only the date, whereas in c-Catalogue both date and time should be present. This attribute is mandatory in both cases.
- *Name – Catalogue Name:* Indicates the name assigned by the catalogue provider to the catalogue revision. This attribute is optional in both cases
- *Version ID – Catalogue Version:* Indicates the current/latest version of the catalogue revision/update. This attribute is optional in both cases
- *Validity Period – Validity Period:* Identifies the period (start and end date) during which the information in the catalogue revision will be in effect. The catalogue managing party can also define in UBL the period as a duration of days. Furthermore, in UBL a catalogue request may be associated with multiple validity periods whereas in c-Catalogues only with a single validity start and ending date. In both cases the validity period is optional.
- *Note – Note:* Provides additional information in a free form text format that is not contained explicitly in any other attribute of the catalogue document.

The following three attributes have lower level of similarity:

- *Catalogue Line - Supplier catalogue:* Provides an association between the current catalogue revision/update with other catalogue items that can be referenced by the system.
- *Seller Supplier Party – Catalogue provider:* Associates the catalogue revision/update with the seller, which is also the provider of the catalogue. This attribute is mandatory in both cases
- *Catalogue Managing Party – Catalogue receiver:* Associates the catalogue revision/update with the catalogue managing party, which is also the receiver of the catalogue Information. This attribute is mandatory for UBL and optional for c-Catalogues

Both the UBL 2.0 - catalogue items specifications update document and the UBL 2.0 - catalogue pricing update document are identical with the UBL 2.0 catalogue document. The UBL 2.0 has additional optional fields (e.g. validity period) that can be used for better defining the update process

Annex III.3.4 *Rejection of Catalogue Request*

The following table compares the UBL 2.0 "Application Response" document with the c-Catalogue "Catalogue Request Rejection" document.

The definition of the two documents is as follows

- **UBL 2.0 – Application Response**: "A document to indicate the application's response to a transaction"
- **c-Catalogue – Catalogue Request Rejection**: "Rejection of a request for a Catalogue"

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - APPLICATION RESPONSE Document						c-Catalogue - CATALOGUE REQUEST REJECTION Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	Att.	1	Identifier	Identifier	An identifier for the Application Response assigned by the sender	Catalogue Request Rejection Identifier	Att.	1	Identifier	Identifier	The identifier of the Catalogue Request Rejection
Issue Date	Att.	1	Date	Issue Date	The date assigned by the sender's application at which the Application Response was created						
Issue Time	Att.	0..1	Time	Issue Time	The time assigned by the sender's application at which the Application Response was created						
Note	Att.	0..n	Text	Note	Free form text applying to the Application Response. This element may contain notes or any other similar information that is not contained explicitly in another structure	Coded Reason for rejection	Att.	0..n	Code	Reason	Coded reason for Catalogue request rejection
						Textual Reason for rejection	Att.	0..n	Text	Reason	Reason for Catalogue request rejection in free text
Version ID	Att.	0..1	Identifier	Version	Identifies the current version of this document						
Signature	Ass.	0..n	Signature	Signature	One or more signatures applied to the document						
Sender Party	Ass.	1	Party	Party	An association to the Party sending this document.						

Receiver Party	Ass.	1	Party	Party	An association to the Party receiving this document.						
Document Response	Ass.	1..n	Document Response	Document Response	A response to one or more documents	Catalogue Request Reference	Att.	0..1	Document Reason	Catalogue Reason	Reference to the Catalogue Request
Response Date Time	Att.	0..1	Response Date Time	Date Time	The date or date/time at which the information in the response was created	Catalogue Request Rejection date time	Att.	1	Date Time	Issue	The date/time when the Catalogue Request Rejection is issued
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Application Response instance						

Table 55: Catalogue request rejection

In this case 4 out of the 11 attributes of the UBL 2.0 application response document can be mapped to the attributes of the c-Catalogue catalogue request rejection document (**Table 55**). The following list indicates the fields that are almost identical:

- *ID – Catalogue Request Rejection Identifier*: A unique code (alphanumeric) for the identification of the rejected applications. It is provided manually by the sender. This attribute is mandatory in both cases.
- *Response Date Time - Catalogue Request Rejection date time*: Identifies the date and time which the catalogue rejection was issued. In UBL this attribute is optional whereas in c-Catalogue mandatory.

The following three attributes have lower level of similarity:

- *Note - Coded Reason for rejection & Textual Reason for rejection:* Identifies the reason for the Catalogue request rejection either in free text or in a coded format.
- *Document Response & Catalogue Request Reference:* Provides a response/reference to the catalogue request. In UBL this attribute is mandatory whereas in c-Catalogue optional.

The UBL 2.0 provides additional information (Sender Party, Receiver Party) in the area of the information exchange. It supports a better validation and identification through the use of electronic signatures associated with the catalogue documents.

Annex III.3.5 *Rejection of Catalogue*

The following table compares the UBL 2.0 “Application Response” document with the c-Catalogue “Catalogue Rejection” document.

The definition of the two documents is as follows

- **UBL 2.0 – Application Response**: “A document to indicate the application’s response to a transaction”
- **c-Catalogue – Catalogue Rejection**: “Rejection of a previously received Catalogue”

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - APPLICATION RESPONSE Document						c-Catalogue - CATALOGUE REJECTION Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	Att.	1	Identifier	Identifier	An identifier for the Application Response assigned by the sender	Catalogue Rejection Identifier	Att.	1	Identifier	Identifier	The identifier of the Catalogue Rejection
Issue Date	Att.	1	Date	Issue Date	The date assigned by the sender's application at which the Application Response was created						
Issue Time	Att.	0..1	Time	Issue Time	The time assigned by the sender's application at which the Application Response was created						

Note	Att.	0..n	Text	Note	Free form text applying to the Application Response. This element may contain notes or any other similar information that is not contained explicitly in another structure	Coded Reason for rejection	Att.	0..n	Code	Reason	Coded reason for Catalogue rejection
						Textual Reason for rejection	Att.	0..n	Text	Reason	Reason for Catalogue request rejection in free text
Version ID	Att.	0..1	Identifier	Version	Identifies the current version of this document						
Signature	Ass.	0..n	Signature	Signature	One or more signatures applied to the document						
Sender Party	Ass.	1	Party	Party	An association to the Party sending this document.						
Receiver Party	Ass.	1	Party	Party	An association to the Party receiving this document.						
Document Response	Ass.	1..n	Document Response	Document Response	A response to one or more documents	Catalogue Message Reference	Att.	0..1	Document Reason	Catalogue Reason	Reference to the rejected Catalogue Message

Response Date Time	Att.	0..1	Response Date Time	Date Time	The date or date/time at which the information in the response was created		Catalogue Rejection date time	Att.	1	Date Time	Issue	The date/time when the Catalogue Rejection is issued
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Application Response instance							

Table 56: Catalogue rejection

In this case 4 out of the 11 attributes of the UBL 2.0 application response document can be mapped to the attributes of the c-Catalogue catalogue rejection document (**Table 56**). The following list indicates the fields that are almost identical:

- *ID – Catalogue Request Rejection Identifier*: A unique code (alphanumeric) for the identification of the rejected applications. It is provided manually by the sender. This attribute is mandatory in both cases.
- *Response Date Time - Catalogue Request Rejection date time*: Identifies the date and time which the catalogue rejection was issued. In UBL this attribute is optional whereas in c-Catalogue mandatory.

The following three attributes have lower level of similarity:

- *Note - Coded Reason for rejection & Textual Reason for rejection:* Identifies the reason for the catalogue rejection either in free text or in a coded format.
- *Document Response & Catalogue Request Reference:* Provides a response/reference to the rejected catalogue message. In UBL this attribute is mandatory whereas in c-Catalogue optional.

The UBL 2.0 provides additional information (Sender Party, Receiver Party) in the area of the information exchange. It supports a better validation and identification through the use of electronic signatures associated with the catalogue documents.

Annex III.3.6 *Catalogue Acceptance*

The following two tables compares the UBL 2.0 “Application Response” with the c-Catalogue “Catalogue Acceptance” document and the c-Catalogue “Catalogue Subscription Request” document (External reference to Catalogue Message).

The definition of the two documents is as follows

- **UBL 2.0 – Application Response**: “A document to indicate the application’s response to a transaction”
- **c-Catalogue – Catalogue Acceptance:** “A message from a Catalogue Receiver to a Catalogue Provider of acceptance of previously received Catalogue”

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - APPLICATION RESPONSE Document						c-Catalogue CATALOGUE ACCEPTANCE Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	*Att.*	*1*	*Identifier*	*Identifier*	*An identifier for the Application Response assigned by the sender*	*Catalogue Acceptance Identifier*	*Att.*	*1*	*Identifier*	*Identifier*	*The identifier of the Catalogue Acceptance*
Issue Date	Att.	1	Date	Issue Date	The date assigned by the sender's application at which the Application Response was created	Catalogue Activation date time	Att.	0..1	Date Time	Activation	The date/time when the Catalogue Receiver will start to use the catalogue

Issue Time	*Att.*	*0..1*	*Time*	*Issue Time*	*The time assigned by the sender's application at which the Application Response was created*						
Response Date Time	*Att.*	*0..1*	*Date Time*	*Response Date Time*	*The date or date/time at which the information in the response was created*	*Catalogue Acceptance date time*	*Att.*	*1*	*Date Time*	*Issue*	*The date/time when the Catalogue Acceptance is issued*
Version ID	Att.	0..1	Identifier	Version	Identifies the current version of this document	Catalogue Message Reference	Ass.	0..1	Document Reference	Catalogue Message	Reference to the Catalogue Message
Note	Att.	0..n	Text	Note	Free form text applying to the Application Response. This element may contain notes or any other similar information that is not contained explicitly in another structure						
Signature	Ass.	0..n	Signature	Signature	One or more signatures applied to the document						
Sender Party	Ass.	1	Party	Party	An association to the Party sending this document						

Receiver Party	Ass.	1	Party	Party	An association to the Party receiving this document						
Document Response	Ass.	1..n	Document	Document	A response to one or more documents						
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Application Response instance						

Table 57: Catalogue acceptance document

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - APPLICATION RESPONSE Document						c-Catalogue CATALOGUE SUBSCRIPTION REQUEST Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	Att.	1	Identifier	Identifier	An identifier for the Application Response assigned by the sender	Catalogue Subscription Request Identifier	Att	1	Identifier	Identifier	The identifier of the Request for Catalogue subscription

Issue Date	Att.	1	Date	Issue Date	The date assigned by the sender's application at which the Application Response was created	Catalogue Subscription Request date time	Att.	1	Date Time	Issue	The date/time when the Catalogue Subscription Request is issued.
Issue Time	Att.	0..1	Time	Issue Time	The time assigned by the sender's application at which the Application Response was created						
Response Date Time	Att.	0..1	Date Time	Response Date Time	The date or date/time at which the information in the response was created	Subscription Frequency	Att.	0..1	Code	Frequency	Frequency of subscribed Catalogue updates.
Version ID	Att.	0..1	Identifier	Version	Identifies the current version of this document	Subscription Start Date	Att.	0..1	Date	Subscription Start	Start date of the Catalogue subscription
Note	Att.	0..n	Text	Note	Free form text applying to the Application Response. This element may contain notes or any other similar information that is not contained explicitly in another structure	Subscription End Date	Att.	0..1	Date	Subscription End	End date of the Catalogue subscription

Signature	Ass.	0..n	Signature	Signature	One or more signatures applied to the document	Language Code	Att.	0..n	Language	Code	Language(s) of the Catalogue information
Sender Party	Ass.	1	Party	Party	An association to the Party sending this document	Catalogue Provider	Ass.	1	Party	Catalogue Provider	Provider of the catalogue
Receiver Party	Ass.	1	Party	Party	An association to the Party receiving this document	Catalogue Receiver	Ass.	0..1	Party	Catalogue Receiver	Receiver of the Catalogue Information
Document Response	Ass.	1..n	Document	Document	A response to one or more documents	Contract Reference	Ass.	0..n	Document Reference	Contract	Reference to the Contract(s) the Catalogue Items are subject of.
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Application Response instance	Validity Start Date	Att.	0..1	Date	Validity Start	Start date of the Catalogue validity
						Validity End Date	Att.	0..1	Date	Validity End	End date of the Catalogue validity
						Availability Start Date	Att.	0..1	Date	Availability Start	Start date of the availability of Catalogue Items

						Availability End Date	Att.	0..1	Date	Availability End	End date of the Availability of Catalogue Items
						Product Classification Code	Att.	0..n	Code	Product Classification	Product groups that are to be included in the Catalogue
						Price	Ass.	0..n	Price	Price	Price type(s) to include in the Catalogue
						Currency	Att.	0..n	Currency	Code	Currency or currencies of the prices, allowances and charges in the Catalogue
						Applicable Party	Ass.	0..n	Party	Applicable	Party the Catalogue is applicable to
						Supplier	Ass.	0..n	Party	Supplier	Suppliers of whom Catalogues are to be provided
						Target Market	Ass.	0..n	Location	Target Market	The target market(s) of the Catalogue Items
						Catalogue Update Indicator	Att	0..1	Indicator	Catalogue Update	Indicator whether only updates of the catalogue must be provided

						Delivery Location	Ass.	0..n	Location	Delivery	The delivery locations or areas of the Catalogue Items.

Table 58: Catalogue subscription request document

In this case 7 out of the 11 attributes of the UBL 2.0 application response document can be mapped to the attributes of the c-Catalogue catalogue acceptance document (**Table 57**). The following list indicates the fields that are almost identical:

- *ID – Catalogue Acceptance Identifier:* A unique code (alphanumeric) for the identification of the catalogue acceptance. It is provided manually by the sender. This attribute is mandatory in both cases.
- *Response Date Time - Catalogue Request Rejection date time*: Identifies the date and time which the catalogue response/acceptance was issued. In UBL this attribute is optional whereas in c-Catalogue mandatory.

The following four attributes have lower level of similarity:

- *Issue Date & Issue Time - Catalogue Subscription Request date time*: Identifies the date and time which the catalogue subscription request was issued. In UBL the document may have only the date, whereas in c-Catalogue both date and time should be present. This attribute is mandatory in both cases.
- *Sender Party - Catalogue Provider:* Associates the document with the seller, which is also the provider of the catalogue. This attribute is mandatory in both cases
- *Receiver Party - Catalogue Receiver:* Associates the document with the catalogue managing party, which is also the receiver of the catalogue Information. This attribute is mandatory for UBL and optional for c-Catalogues
- *Document Response - Contract Reference:* Provides a response/reference to the catalogue request. In UBL this attribute is mandatory whereas in c-Catalogue optional.

Annex III.3.7 *Catalogue Update Acceptance*

The following table compares the UBL 2.0 “Application Response” document with the c-Catalogue “Catalogue Update Acceptance” document.

The definition of the two documents is as follows

- **UBL 2.0 – Application Response**: “A document to indicate the application’s response to a transaction”
- **c-Catalogue – Catalogue Update Acceptance:** “A message to accept updated Catalogue information”

In this case 7 out of the 11 attributes of the UBL 2.0 application response document can be mapped to the attributes of the c-Catalogue catalogue acceptance document.

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - APPLICATION RESPONSE Document						c-Catalogue CATALOGUE UPDATE ACCEPTANCE Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	Att.	1	Identifier	Identifier	An identifier for the Application Response assigned by the sender	Identifier	Att.	1	Identifier	Identifier	The identifier of the Catalogue Acceptance
Issue Date	Att.	1	Date	Issue Date	The date assigned by the sender's application at which the Application Response was created	Catalogue Update Reference	Ass.	0..1	Document Reference	Catalogue Update	Reference to the Catalogue Update

Issue Time	Att.	0..1	Time	Issue Time	The time assigned by the sender's application at which the Application Response was created						
Version ID	Att.	0..1	Identifier	Version	Identifies the current version of this document						
Response Date Time	Att.	0..1	Date Time	Response Date Time	The date or date/time at which the information in the response was created	Catalogue Update Acceptance date time	Att.	1	Date Time	Issue	The date/time when the Catalogue Update Acceptance is issued
Note	Att.	0..n	Text	Note	Free form text applying to the Application Response. This element may contain notes or any other similar information that is not contained explicitly in another structure						
Signature	Ass.	0..n	Signature	Signature	One or more signatures applied to the document						
Sender Party	Ass.	1	Party	Party	An association to the Party sending this document.						

Receiver Party	Ass.	1	Party	Party	An association to the Party receiving this document.						
Document Response	Ass.	1..n	Document	Document	A response to one or more documents						
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Application Response instance						

Table 59: Catalogue update acceptance document

Annex III.3.8 *Rejection of Catalogue Update*

The following table compares the UBL 2.0 “Application Response” document with the c-Catalogue “Catalogue Update Rejection” document.

The definition of the two documents is as follows

- **UBL 2.0 – Application Response**: “A document to indicate the application’s response to a transaction”
- **c-Catalogue – Catalogue Update Rejection**: “Rejection of a previously received Catalogue Update”

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - APPLICATION RESPONSE Document						c-Catalogue - CATALOGUE UPDATE REJECTION Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	Att.	1	Identifier	Identifier	An identifier for the Application Response assigned by the sender	Identifier	Att.	1	Identifier	Identifier	The identifier of the Catalogue Update Rejection
Issue Date	Att.	1	Date	Issue Date	The date assigned by the sender's application at which the Application Response was created						
Issue Time	Att.	0..1	Time	Issue Time	The time assigned by the sender's application at which the Application Response was created						

					Free form text applying to the Application Response. This element may contain notes or any other similar information that is not contained explicitly in another structure	Coded Reason for rejection	Att.	0..n	Code	Reason	Coded reason for Catalogue rejection
Note	Att.	0..n	Text	Note		Textual Reason for rejection	Att.	0..n	Text	Reason	Reason for Catalogue request rejection in free text
Version ID	Att.	0..1	Identifier	Version	Identifies the current version of this document						
Signature	Ass.	0..n	Signature	Signature	One or more signatures applied to the document						
Sender Party	Ass.	1	Party	Party	An association to the Party sending this document.						
Receiver Party	Ass.	1	Party	Party	An association to the Party receiving this document.						
Document Response	Ass.	1..n	Document Response	Document Response	A response to one or more documents	Catalogue Update Reference	Ass.	0..1	Document Reference	Catalogue Update	Reference to the rejected Catalogue Update

Response Date Time	Att.	0..1	Response Date Time	Date Time	The date or date/time at which the information in the response was created	Catalogue Update Rejection date time	Att.	1	Date Time	Issue	The date/time when the Catalogue Update Rejection is issued
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Application Response instance						

Table 60: Catalogue Update Rejection

In this case 4 out of the 11 attributes of the UBL 2.0 application response document can be mapped to the attributes of the c-Catalogue catalogue rejection documents. The following list indicates the fields that are almost identical:

- *ID –Identifier*: A unique code (alphanumeric) for the identification of the catalogue rejection update. It is provided manually by the sender. This attribute is mandatory in both cases.
- *Response Date Time - Catalogue Update Rejection date time*: Identifies the date and time which the catalogue rejection update was issued. In UBL this attribute is optional whereas in c-Catalogue mandatory.

The following three attributes have lower level of similarity:

- *Note - Coded Reason for rejection & Textual Reason for rejection:* Identifies the reason for the catalogue rejection update either in free text or in a coded format.
- *Document Response & Catalogue Update Reference:* Provides a response/reference to the rejected catalogue update message. In UBL this attribute is mandatory whereas in c-Catalogue optional.

The UBL 2.0 provides additional information (Sender Party, Receiver Party) in the area of the information exchange. It supports a better validation and identification through the use of electronic signatures associated with the catalogue documents.

Annex III.3.9 *Catalogue Information*

The following table compares the UBL 2.0 “Quotation” document with the c-Catalogue “Catalogue Information” document.

The definition of the two documents is as follows

- **UBL 2.0 – Quotation**: “A document to specify pricing and availability information about goods or services”
- **c-Catalogue – Catalogue Information**: “Information on items in a Catalogue”

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - QUOTATION Document						c-Catalogue - CATALOGUE INFORMATION Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	Att.	0..1	Identifier	Identifier	An identifier for the Quotation assigned by the Seller	Identifier	Att.	1	Identifier	Identifier	The identifier of the Catalogue Information
Issue Date	Att.	1	Date	Issue Date	The date assigned by the seller at which the Quotation was issued	Catalogue Information date time	Att.	1	Date Time	Issue	The date/time when the Catalogue Information is issued
Issue Time	Att.	0..1	Time	Issue Time	The time assigned by the seller at which the Quotation was issued						
Request For Quotation Document Reference	Ass.	0..1	Document Reference	Document Reference	An association to a Request For Quotation	Catalogue Information Request Reference	Ass.	1	Document Reference	Catalogue Information Request	Reference to the Catalogue Information Request

Transaction Currency Code	Att.	0..1	Code	Currency	The default currency for the transaction, to be used for Invoicing	Catalogue	Ass.	1	Catalogue	Catalogue	The Catalogue Information
Delivery	Ass.	0..n	Delivery	Delivery	An association to Delivery	Delivery Period	Ass.	0..1	Period	Delivery	The period in which requested items may be delivered
Delivery Terms	Ass.	0..1	Delivery Terms	Delivery Terms	An association to Delivery Terms						
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Application Response instance	Ship to Party	Ass.	0..1	Party	Ship to	The party to whom the requested items should physically be delivered
Copy Indicator	Att.	1	Indicator	Copy Indicator	Indicates whether the Quotation is a copy (true) or not (false)						
Note	Att.	0..1	Text	Note	Free form text applying to the Quotation. This element may contain notes or any other similar information that is not contained explicitly in another structure						
Additional Document Reference	Ass.	0..n	Document Reference	Document Reference	An association to other documents						

Contract	Ass.	0..n	Contract	Contract	An association to a framework agreement or contract							
Signature	Ass.	0..n	Signature	Signature	Associates the Quotation with zero or more signatures							
Seller Supplier Party	Ass.	1	Supplier Party	Supplier Party	An association to the Seller							
Originator Customer Party	Ass.	0..1	Customer Party	Customer Party	An association to the Originator							
Pricing Currency Code	Att.	1	Code	Currency	The currency that is used for all prices in the Quotation							
Validity Period	Ass.	0..1	Period	Period	The period for which the Quotation is valid							
Payment Means	Ass.	0..1	Payment Means	Payment Means	An association to potential Payment Means for Orders related to this Quotation							

Transaction Conditions	Ass.	0..1	Transaction Conditions	Transaction Conditions	An association with any sales or purchasing conditions applying to Orders related to this Quotation						
Allowance Charge	Ass.	0..n	Allowance Charge	Allowance Charge	An association to Allowances and Charges that apply to the Quotation as a whole						
Destination Country	Ass.	0..1	Country	Country	An association to the country of destination (for customs purposes for potential orders)						
Tax Total	Ass.	0..n	Tax Total	Tax Total	An association to the total tax amount of the Order (as estimated by the Seller)						

Legal Total	Ass.	1	Legal Total	Legal Total	An association to the total amounts for the Order net of allowances and taxes (as quoted by the Seller)						
Quotation Line	Ass.	1..n	Quotation Line	Quotation Line	An association to one or more Quotation Lines						

Table 61: Catalogue Information

According to the Catalogue Information Model the Catalogue Class associated with the catalogue message contains the following attributes.

Fields with a high level of similarity are highlighted whereas fields with lower level of similarity are highlighted in

Fields that are not highlighted are different

UBL 2.0 - QUOTATION Document						c-Catalogue - CATALOGUE INFORMATION Document					
Name	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**	**Name**	**Rel.**	**Mult.**	**Represent. Term / Associated Object Class**	**Property Term**	**Description**
ID	Att.	0..1	Identifier	Identifier	An identifier for the Quotation assigned by the Seller	Catalogue name	Att.	0..1	Name	Text	The name assigned by the Catalogue Provider to the catalogu
Issue Date	Att.	1	Date	Issue Date	The date assigned by the seller at which the Quotation was issued						

Issue Time	Att.	0..1	Time	Issue Time	The time assigned by the seller at which the Quotation was issued							
Request For Quotation Document Reference	Ass.	0..1	Document Reference	Document Reference	An association to a Request For Quotation	Catalogue version	Att.	0..1	Version	Text	The version number of the catalogue.
Transaction Currency Code	Att.	0..1	Code	Currency	The default currency for the transaction, to be used for Invoicing							
Delivery	Ass.	0..n	Delivery	Delivery	An association to Delivery	Supplier catalogue	Ass.	0..n	Supplier Catalogue	Supplier Catalogue	A catalogue of a Supplier, contained in this catalogue
Delivery Terms	Ass.	0..1	Delivery Terms	Delivery Terms	An association to Delivery Terms							
GUID	Att.	0..1	Identifier	Globally Unique Identifier	A computer-generated globally unique identifier (GUID) for the Application Response instance							
Copy Indicator	Att.	1	Indicator	Copy Indicator	Indicates whether the Quotation is a copy (true) or not (false)							

Note	Att.	0..1	Text	Note	Free form text applying to the Quotation. This element may contain notes or any other similar information that is not contained explicitly in another structure	Note	Ass.	0..n	Note	Note	A coded or textual description relevant for the catalogue
Additional Document Reference	Ass.	0..n	Document Reference	Document Reference	An association to other documents						
Contract	Ass.	0..n	Contract	Contract	An association to a framework agreement or contract						
Signature	Ass.	0..n	Signature	Signature	Associates the Quotation with zero or more signatures						
Seller Supplier Party	Ass.	1	Supplier Party	Supplier Party	An association to the Seller	Catalogue Provider	1	Ass.	Catalogue Provider	Party	The Provider of the catalogue
Originator Customer Party	Ass.	0..1	Customer Party	Customer Party	An association to the Originator	Catalogue Receiver	0..1	Ass.	Catalogue Receiver	Party	The Receiver of the Catalogue Information
Pricing Currency Code	Att.	1	Code	Currency	The currency that is used for all prices in the Quotation						

Validity Period	Ass.	0..1	Period	Period	The period for which the Quotation is valid	Validity period	Ass.	0..1	Validity period	Period	The period in which the catalogue is valid
Payment Means	Ass.	0..1	Payment Means	Payment Means	An association to potential Payment Means for Orders related to this Quotation						
Transaction Conditions	Ass.	0..1	Transaction Conditions	Transaction Conditions	An association with any sales or purchasing conditions applying to Orders related to this Quotation						
Allowance Charge	Ass.	0..n	Allowance Charge	Allowance Charge	An association to Allowances and Charges that apply to the Quotation as a whole						
Destination Country	Ass.	0..1	Country	Country	An association to the country of destination (for customs purposes for potential orders)						

Tax Total	Ass.	0..n	Tax Total	Tax Total	An association to the total tax amount of the Order (as estimated by the Seller)						
Legal Total	Ass.	1	Legal Total	Legal Total	An association to the total amounts for the Order net of allowances and taxes (as quoted by the Seller)						
Quotation Line	Ass.	1..n	Quotation Line	Quotation Line	An association to one or more Quotation Lines						

Table 62: Catalogue Information/Catalogue Information Model

In this case 10 out of the 24 attributes of the UBL 2.0 catalogue document can be mapped to the attributes of the c-Catalogue catalogue document and the Catalogue Class of the Catalogue Information Model. The following list indicates the fields that are almost identical:

- *ID – Catalogue Message Identifier*: A unique code (alphanumeric) for the identification of the catalogue. It is provided manually by the catalogue provider/seller. This attribute is mandatory in both cases.
- *Issue Date & Issue Time - Catalogue Message Issue date time*: Identifies the date and time which the catalogue was issued. In UBL the catalogue managing party has the option to provide only the date, whereas in c-Catalogue both date and time should be present. This attribute is mandatory in both cases.
- *Validity Period – Validity Period:* Identifies the period (start and end date) during which the information in the catalogue requested will be in effect. The catalogue managing party can also define in UBL the period as a duration of days. Furthermore, in UBL a catalogue request may be associated with multiple validity periods whereas in c-Catalogues only with a single validity start and ending date. In both cases the validity period is optional.
- *Note – Note:* Provides additional information in a free form text format that is not contained explicitly in any other attribute of the catalogue document.

The following three attributes have lower level of similarity:

- *Request For Quotation Document Reference - Catalogue Information Request Reference*
- *Seller Supplier Party – Catalogue provider:* Associates the catalogue with the seller, which is also the provider of the catalogue. This attribute is mandatory in both cases
- *Catalogue Managing Party – Catalogue receiver:* Associates the catalogue with the catalogue managing party, which is also the receiver of the catalogue Information. This attribute is mandatory for UBL and optional for c-Catalogues

The preliminary analysis indicates that UBL catalogue message is providing additional attributes such as referenced contract (reference to an existing framework agreement or contract) and signature (association to one or more signatures applied to the catalogue), which are related with the establishment of the framework agreements and the e-Identification and validation of the submitted catalogue documents. UBL guarantee the uniqueness of each catalogue instance/version in the system by associating each individual one with an automatically generated code

Furthermore, there is a direct association with the trading terms applied on the catalogue items with the issuing of an order/invoice. These terms are extracted from the terms of reference of the corresponding contact and imported in the catalogue system during the establishment of a contract (e-Contracting phase).

Annex IV Use of UBL 2.0 and c-Catalogue in pre-awarding phases

In most European countries today, suppliers use eCatalogues after they have been awarded, mainly for ordering activities and develop them according to buyer requirements (post-awarding phase). However, the use of eCatalogues in eProcurement cycle is applicable and suggested in both pre-awarding and post-awarding phases. In post-awarding phase an eCatalogue is usually considered as a management system for eOrdering and eInvoicing activities while the current focus is on the future and proper use of eCatalogues in pre-awarding phase as well. In this case, the eCatalogue has the meaning of an electronic prospectus covering effectively and efficiently eTendering purposes (forming a tender or part of it). In addition, this perspective is mentioned in the EU Directives [2004/18/EC] and [2004/17/EC], setting that under specific conditions eCatalogues could also form valid tenders.

Consequently, there is a need to extend the use of eCatalogues in pre-awarding phase. In order to achieve the transition of eCatalogues use, there is a need to form the appropriate set of messages and documents required in this phase referring to each process respectively. The processes in pre-awarding phase consider mainly eNotification (Catalogue template definition), eTendering (Catalogue submission, verification, update) and eAwarding (evaluation).

Various standardisation bodies have proceeded doing considerable work on standardising eCatalogue content/format, exchange methods (messages/business processes) as well as product categorization and classification schemes. UBL 2.0 and c-Catalogue are two main eCatalogue standards comprising technical specifications as well as business processes and messages. In order to implement the new messages in pre-awarding phase a primary analysis of existing messages and processes in post-awarding phase is needed, tracking in this way the possibility of re-using equivalent or complementary messages. In fact, there is a high level of interrelation between pre-awarding and post-awarding messages, estimating that over 75% of existing messages developed in both standards can be used in identical way or can be customized in order to fit best in pre-awarding processes. The only gap is identified in eAwarding and evaluation processes where new messages must be developed.

In **Table 63**, all messages used for the pre-awarding phase are listed, associated to their respective processes.

	eNotification	**eTendering**			**eAwarding**
Messages	**Catalogue template definition**	**Catalogue submission**	**Catalogue Verification**	**Update**	**Evaluation**
Request for Catalogue	**v**				
Catalogue		**v**			
Catalogue Rejection			**v**		
Catalogue Acceptance			**v**		
Catalogue Information Request		**v**		**v**	
Catalogue Information		**v**		**v**	
Catalogue Information Request Rejection		**v**		**v**	
Catalogue Subscription Request	**v**			**v**	
Catalogue Subscription Acceptance	**v**			**v**	
Catalogue Subscription Rejection	**v**			**v**	

Catalogue Update Request				**v**	
Catalogue Update Request Rejection				**v**	
Catalogue Update Request Acceptance				**v**	
Catalogue Update Catalogue Item Specification Update				**v**	
Catalogue Update Acceptance / Application Response				**v**	
Catalogue Update Rejection / Application Response				**v**	
Catalogue Update / Catalogue Item Specification Update & Catalogue Pricing Update				**v**	
Awarding notification (acceptance or rejection)					**v**
Competition results report					**v**

Table 63: Messages required in the pre-awarding phase.

Comparing the messages required in pre-awarding to the ones in the post-awarding phase, there is a high level of interrelation between them. More specifically, the messages required for realizing the eNotification and eTendering processes are already developed for the needs of post-awarding processes. The only addition is regarding the eEvaluation process where two new messages must be provided concerning the Awarding notification and the Competition results report. Consequently, in order to develop the messages of the pre-awarding phase, a limited adaptation of existing messages is required.

Messages required in the pre-awarding phase	**Messages in c-Catalogue and UBL 2.0 which could be used or adapted to meet the pre-awarding needs**
Request for Catalogue	Request for Catalogue (c-Catalogue) / Catalogue Request (UBL 2.0)
Catalogue	Catalogue (UBL 2.0) & (c-Catalogue)
Catalogue Rejection	Catalogue Rejection (c-Catalogue) / Application Response (UBL 2.0)
Catalogue Acceptance	Catalogue Acceptance (c-Catalogue) / Application Response (UBL 2.0)
Catalogue Information Request	Catalogue Information Request (c-Catalogue)
Catalogue Information	Catalogue Information (c-Catalogue) / Quotation (UBL 2.0)
Catalogue Information Request Rejection	Catalogue Information Request Rejection (c-Catalogue)
Catalogue Subscription Request	Catalogue Subscription Request (c-Catalogue)
Catalogue Subscription Acceptance	Catalogue Subscription Acceptance (c-Catalogue)
Catalogue Subscription Rejection	Catalogue Subscription Rejection (c-Catalogue)
Catalogue Update Request	Catalogue Update Request (c-Catalogue)
Catalogue Update Request Rejection	Catalogue Update Request Rejection (c-Catalogue) / Application Response (UBL 2.0)

Catalogue Update Request Acceptance	Catalogue Update (c-Catalogue) / Catalogue Item Specification Update (UBL 2.0) & Catalogue Pricing Update (UBL 2.0)
Catalogue Update Catalogue Item Specification Update	Catalogue Update Acceptance (c-Catalogue) / Application Response (UBL 2.0)
Catalogue Update Acceptance / Application Response	Catalogue Update Rejection (c-Catalogue) / Application Response (UBL 2.0)
Catalogue Update Rejection / Application Response	Catalogue Update (c-Catalogue) / Catalogue Item Specification Update (UBL 2.0) & Catalogue Pricing Update (UBL 2.0)
Catalogue Update / Catalogue Item Specification Update & Catalogue Pricing Update	Request for Catalogue (c-Catalogue) / Catalogue Request (UBL 2.0)
Awarding notification (acceptance or rejection)	NEW MESSAGE REQUIRED
Competition results report	NEW MESSAGE REQUIRED

Table 64: Mapping of pre-awarding messages to existing messages.