



Introduction to the Universal Business Language

Crane Softwrights Ltd.
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Introduction to the Universal Business Language

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Notes:

Introduction to the Universal Business Language



-
- Introduction - G. Ken Holman
 - Module 1 - Universal Business Language (UBL)
 - Module 2 - Parties and document types
 - Module 3 - Information items
 - Module 4 - Naming and design rules
 - Module 5 - Document models
 - Module 6 - Model semantics
 - Module 7 - XPath enumerations
 - Module 8 - Code list value validation methodology
 - Module 9 - UBL customization
 - Conclusion - Where to go from here?

Series: Introduction to the Universal Business Language

Reference: Electronic commerce

Outcomes:

- introduce the components of the Universal Business Language deliverables and supplementary packages

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Notes:

G. Ken Holman

Introduction - Introduction to the Universal Business Language



Member 1996 XML W3C Working Group

- <http://www.w3.org/TR/WD-xml-961114#secC>.

Founding chairman XML Conformance Committee

Founding chairman XSLT Conformance Committee

Current International Secretariat Manager ISO/IEC JTC 1/SC 34

- SGML
- Open Document Format
- XML Document Schema Definition Languages

Produced first commercial training course in XSLT

Produced first commercial training course in XSL-FO

Published two books by Prentice Hall on XSLT and XSL-FO

- Definitive XSLT and XPath
- Definitive XSL-FO

Self-published electronic PDF books on XSLT and XSL-FO

- produced using XML

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Notes:

G. Ken Holman (cont.)

Introduction - Introduction to the Universal Business Language



Member of OASIS UBL Technical Committee

Co-editor UBL 2.0

Chairman UBL Human Interface Subcommittee (UBL HISC)

- formerly Forms Presentation Subcommittee (UBL FPSC)

Chairman UBL Small Business Subcommittee (UBL SBSC)

Technical lead - UBL methodology for code list and value validation

Produced first commercial training course in UBL

Self-published electronic PDF book on UBL (for release December 2006)

Chairman OASIS Code List Representation Technical Committee

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Notes:

Module 1 - Universal Business Language (UBL)



-
- Lesson 1 - Universal Business Language (UBL)
 - Lesson 2 - ebXML context
 - Lesson 3 - UBL applicability

Outcomes:

- gain an overview of the UBL specification
- be aware of the standardization committee structure
- understand the role of UBL in the ebXML context
- understand the expectations of applicability for UBL and what it tries to accomplish
- be aware of some existing deployments of UBL and thoughts for the future of UBL

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Notes:

Universal Business Language (UBL)

Module 1 - Universal Business Language (UBL)

Lesson 1 - Universal Business Language (UBL)



UBL is an international effort to develop open standards for the machine-processing of business information

- the UBL committee has worldwide committee membership
 - vendor members
 - consultant and trainer members
 - business expert and user members
- there are worldwide deployments active or in the works
- **the intellectual property is made publicly available through the Organization for the Advancement of Structured Information System (OASIS)**
 - the intellectual property is not tied up by any one vendor or user
 - as a requirement of membership all developers and participants in the technical committees transfer the intellectual property of their contributions to the organization

Entry point for e-commerce for small- and medium-sized businesses

- inevitably to be used by large businesses as well due to mandated requirements by large users and governments

Supplants the need to use existing or develop one's own proprietary electronic format

- proprietary software is under the control of a vendor or the software developer
- proprietary formats have limited (if any) interoperability with systems created by other vendors

Just using the Extensible Markup Language (XML) is not a panacea

- using markup to label information in and of itself is platform independent
- labeling the information in markup using a particular vocabulary (set of labels) enables applications to access the information so labeled
- without an agreed-upon vocabulary, applications do not know under which labels particular information items can be identified
- an arbitrary, vendor-defined vocabulary is as proprietary as a non-markup-based system for labeling information

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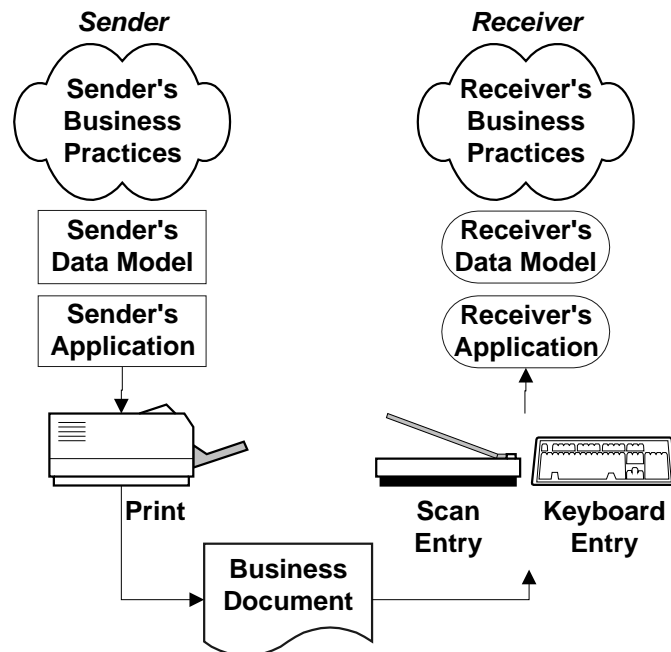
Universal Business Language (UBL) (cont.)

Module 1 - Universal Business Language (UBL)
Lesson 1 - Universal Business Language (UBL)



Designed to eliminate re-keying of data

- supplant existing fax- and paper-based supply chains



The sender prepares a business document for sending:

- the information components of the sender's business practices are expressed in a data model
- the sender's applications access the information through the data model and print off the business document in hard copy

The receiver receives a business document:

- the document information components are scanned or manually entered into the receiver's application
- the receiver's application stores the information components in the receiver's data model
- the receiver's business practices act on the presence of expected information found in the data model

The sender's and receiver's business practices are probably very similar, though they do not have to be

- the data models could be quite different in structure, but probably have similar components
- the applications could be very different, on different platforms and obtained from different vendors

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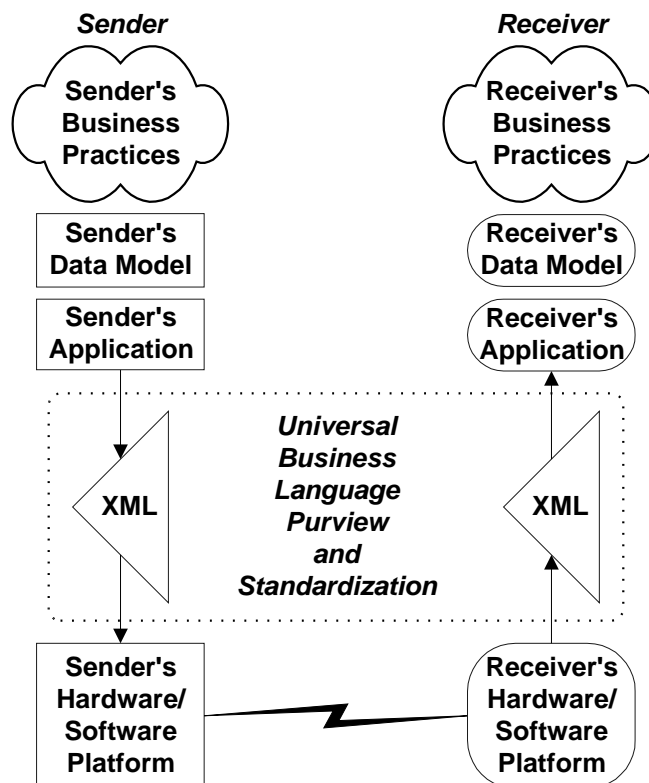
Universal Business Language (UBL) (cont.)

Module 1 - Universal Business Language (UBL)
Lesson 1 - Universal Business Language (UBL)



Objective to enable interoperability between dissimilar systems using open standards

- using XML for all of the benefits of platform, vendor and application independence
- using an agreed-upon vocabulary ensures that all users of the XML can identify the same information items using the agreed-upon labels
- the XML document of a known vocabulary can then be understood by different applications on different platforms
- free tools are available to work with the documents
 - document creation, vocabulary validation, web and print formatting, etc.



UBL does not attempt to redefine anyone's business practices

- UBL is only addressing the representation of business information in a standardized format for the purposes of interchange
- business may wish to modify their expectations for information transfer in order to take advantage of UBL formats

UBL does not attempt to redefine anyone's back-end data models

- the interchange of information is distinct from anyone's internal storage representation
- UBL only describes the document model of the interchange

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Universal Business Language (UBL) (cont.)

Module 1 - Universal Business Language (UBL)

Lesson 1 - Universal Business Language (UBL)



UBL is a royalty-free library of standard electronic XML business documents

- e.g. documents for the transaction of business: purchase order, invoice, etc.
- intellectual property owned by OASIS
 - <http://www.oasis-open.org/who/intellectualproperty.php>
 - UBL is licensed under "RF on Limited Terms"
 - limiting the contributors' IP obligations, not the users' ability to use
 - <http://lists.oasis-open.org/archives/ubl/200610/msg00047.html>

XML instances express all of the information of the business document

- all calculations represented in the numbers in the XML instance
- no stylesheet or processing required by the receiving application
 - a receiving application may choose to do consistency checking

Developed under an open and accountable process

- governed by OASIS Technical Committee procedures
 - <http://www.oasis-open.org/committees/process.php>
 - includes use of Roberts Rules of Order for committee process
- all committee mail lists and work products publicly available
 - <http://lists.oasis-open.org/archives/ubl/>

Vendors can compete on product differentiation around a standardized interchange

- standardization opens up a market for vendors to compete with their own innovations
 - features of implementation
 - e.g. ease of use, documentation, etc.
- undesirable to be innovative with the document format
 - e.g. no need to reinvent an invoice that already works

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UBL history

Module 1 - Universal Business Language (UBL)

Lesson 1 - Universal Business Language (UBL)



Long history of development:

- distinguishes UBL from other standards by not starting from scratch with only a set of requirements
- **1997 - Veo Systems builds Common Business Language (CBL) 1.0**
 - funding from NIST
 - first release in public domain (no licensing ownership)
- **1998 - Commerce One acquired Veo and builds CBL 2.0**
 - for Commerce One electronic marketplaces
- **2000 - Commerce One partners with SAP to build xCBL 3.0**
 - based on review of EDIFACT and X.12 to support EDI-type functionality
- **April 2001 - UBL started with contribution of xCBL 3.0**
- **January 2003 - UBL 0.7 released for public review**
 - 7 document types for procurement
 - utilized by some early-adopters
- **September/November 2004 - UBL 1.0 released as Committee Specification and OASIS standard**
 - 8 document types for procurement
- **October 12, 2006 - UBL 2.0 finalized as a Committee Specification**
 - <http://docs.oasis-open.org/ubl/cs-UBL-2.0>
 - 31 document types for procurement and for transport
- **December 2006 (anticipated) - UBL 2.0 standardized as an OASIS Standard**
 - <http://docs.oasis-open.org/ubl/os-UBL-2.0>
 - zero technical differences from the committee specification of the materials
 - instances and implementations based on committee specification need not change to support the standard

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ebXML - Electronic business using XML

Module 1 - Universal Business Language (UBL)

Lesson 2 - ebXML context



Modular suite of specifications of infrastructure that enables electronic commerce

- <http://www.ebxml.org>
- for enterprises of any size
- for enterprises in any geographical location
- **designed for use over the Internet**
 - "builds on the experience and strengths of existing EDI knowledge"

Globally-developed and open XML-based standards

- provides for plug-and-play shrink-wrapped solutions

Collaborative project

- **OASIS**
 - Organization for the Advancement of Structured Information Standards
- **United Nations/ECE agency CEFACT**
 - ECE - Economic Commission for Europe
 - CEFACT - Centre for Trade Facilitation and Electronic Business

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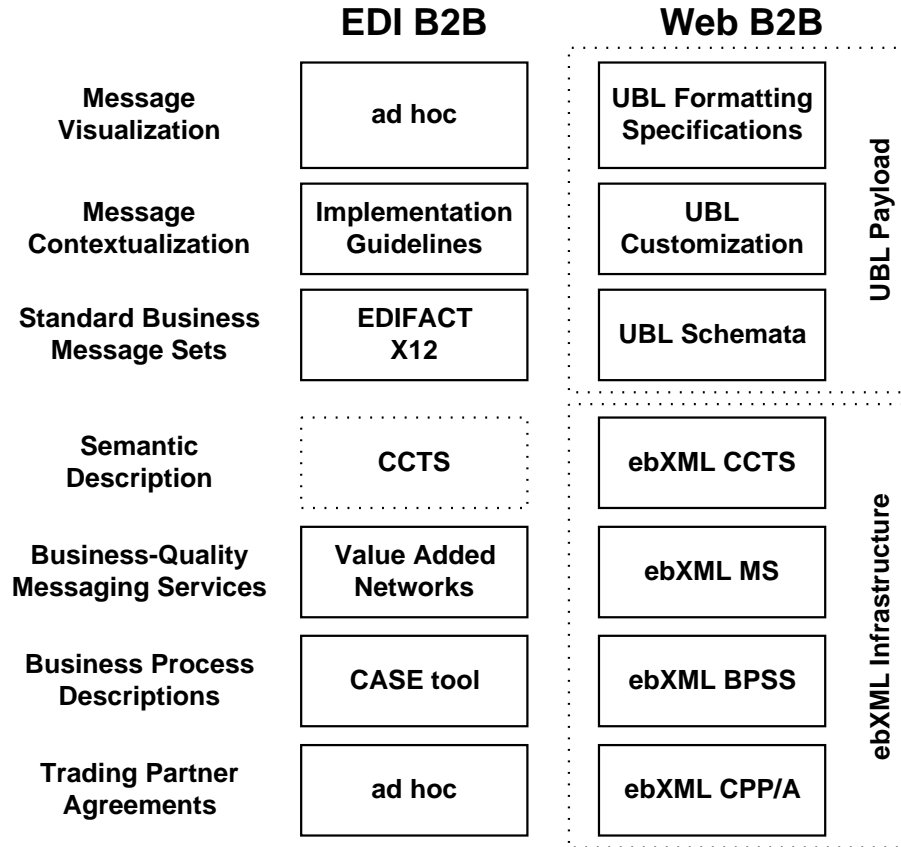
Notes:

ebXML - Electronic business using XML (cont.)

Module 1 - Universal Business Language (UBL)
Lesson 2 - ebXML context



Comparing the EDI and UBL standards stacks:



Opportunity for semantic interoperability

- the information items in the EDI messages will be based on the same semantic concepts as the information items in the UBL schemata

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Notes:

The role of UBL in e-commerce

Module 1 - Universal Business Language (UBL)
Lesson 3 - UBL applicability



UBL does not try to address every electronic business interchange problem

- business needs are as unique as the entities doing business
- a wide range of candidate uses of UBL documents is described

UBL is only defining the structure and vocabulary of electronic business documents for interchange

- **only normative deliverable is the set of W3C Schema (XSD) expressions of the interchange document models**
 - defines the nesting of information in XML constructs
 - defines the labels for the XML constructs
- UBL does not force any constraints on back-end processing, data models, database schemata, etc.

UBL provides a framework for trading partners to declare controlled vocabularies (code lists) in use

- defines a supplemental methodology and approach to layer code list validation on top of schema validation

UBL attempts to address the 80/20 rule as applied to information interchange

- basic requirements based on business experience of committee members
- **UBL 2 addresses 80% of more documents than UBL 1**
 - UBL 2 does not attempt to flesh out the 20% of business information not implemented in UBL 1

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The role of UBL in e-commerce (cont.)

Module 1 - Universal Business Language (UBL)

Lesson 3 - UBL applicability



UBL scenarios are only documentary support of decisions made for document structures

- there is no obligation to match the business document flows or workflows described by UBL
- a plausible scenario was required by the committee with which to frame the directions undertaken and the decisions made

Users need only use those documents of UBL that they require

- no obligation to implement all UBL document types

Users need only use those optional portions of UBL documents that they require

- no obligation to implement all UBL information items

Extensibility provides for addressing those parts of the missing 20% needed by two trading partners

- custom extensions are allowed to be added to standardized UBL documents

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The role of UBL in e-commerce (cont.)

Module 1 - Universal Business Language (UBL)
Lesson 3 - UBL applicability



Key economic result to end user through standardization

- benefits possible through off-the-shelf inexpensive business software to handle the functions
- risk of investment to developers mitigated by wider community of users adopting the technology

Possible stimulus for a major economic shift in the area of electronic commerce software

- same shift as has happened in the past
 - initial "cottage industry" of vendors crating expensive custom systems for specific applications
 - through standardization it becomes possible to address most (though not all) requirements
 - sufficient functionality that people will adopt because the implementation is inexpensive to use
 - sufficient customer pull to create demand for wide variety of software vendors to meet the need
 - vendors can still compete on aspects of differentiation (usability, performance, etc.)
- **operating systems (1960's)**
 - bespoke systems to portable machine-independent systems
- **programming languages (1970's)**
 - specific-purpose languages to general-purpose languages
- **publishing systems (1980's)**
 - typesetting and typography to desktop publishing and generalized markup
- **hypertext systems (1990's)**
 - custom applications (e.g. Ted Nelson's Xanadu, Bill Atkinson's Hypercard, etc.) to all-purpose web browsers (Tim Berners-Lee's HTML)

Standardization creates a marketplace for inexpensive products

- potential big savings for small companies
- **software, training, books can all be developed for a larger customer base than with a proprietary technology**

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Document standardization business areas for UBL



Module 1 - Universal Business Language (UBL)
Lesson 3 - UBL applicability

Groups of UBL documents are being defined for two major areas of electronic business

Sourcing-to-payment procurement cycle

- cataloguing
- ordering
- invoicing
- payment

Transportation

- fulfillment
- shipping

Some overlapping roles between scenarios

- actual roles of parties in UBL transactions is dependent on the context of use
- e.g. despatch party and delivery party as applied to the procurement process may differ in the transportation process
 - i.e. whether the consignor in transportation process is actually equal to the despatch party or seller in procurement depends on different business cases

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Module 2 - Parties and document types



- Introduction - Participants and document flows

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Notes:

Participants and document flows

Module 2 - Parties and document types



Typically two or more trading partners agree to engage in a business transaction

- initial UBL scope is in two areas
 - **procurement of goods or services**
 - **transport of goods**

A given business transaction may involve a number of participants (parties)

- **individual, a group, or a body having a role in a business function**
- a single party may play a number of different roles in a given business transaction
- **all of the roles in the UBL scenarios are representative and need not actually be realized as real people or parties**

Contexts defined for 21 roles exchanging 31 document types

- most document exchanges involve two parties
- some document exchanges involve multiple parties

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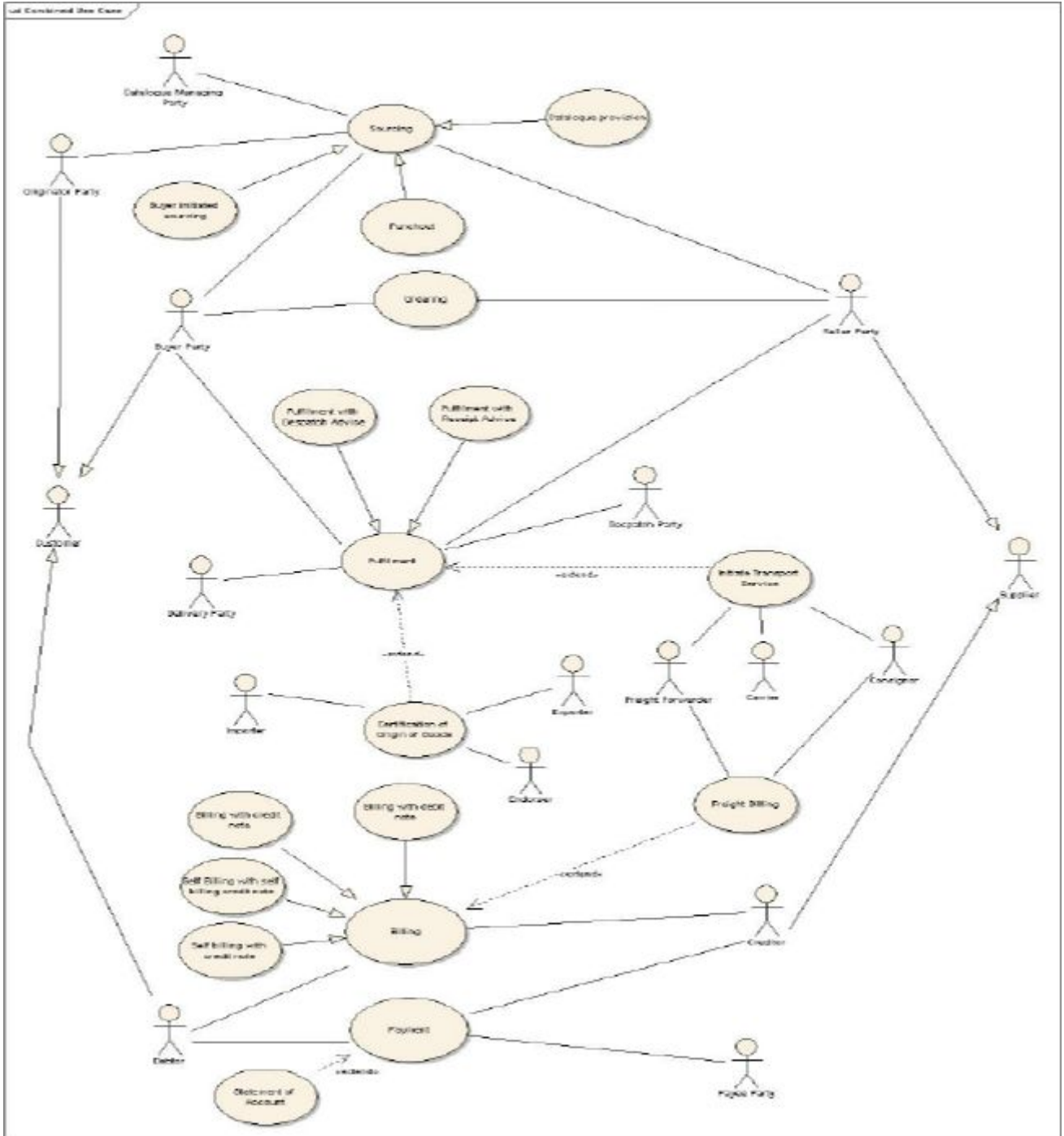
Participants and document flows (cont.)

Module 2 - Parties and document types



Documentary scenario outlines the roles of the many possible participants:

- the following image is a compressed version of the image found in the specification



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Participants and document flows (cont.)

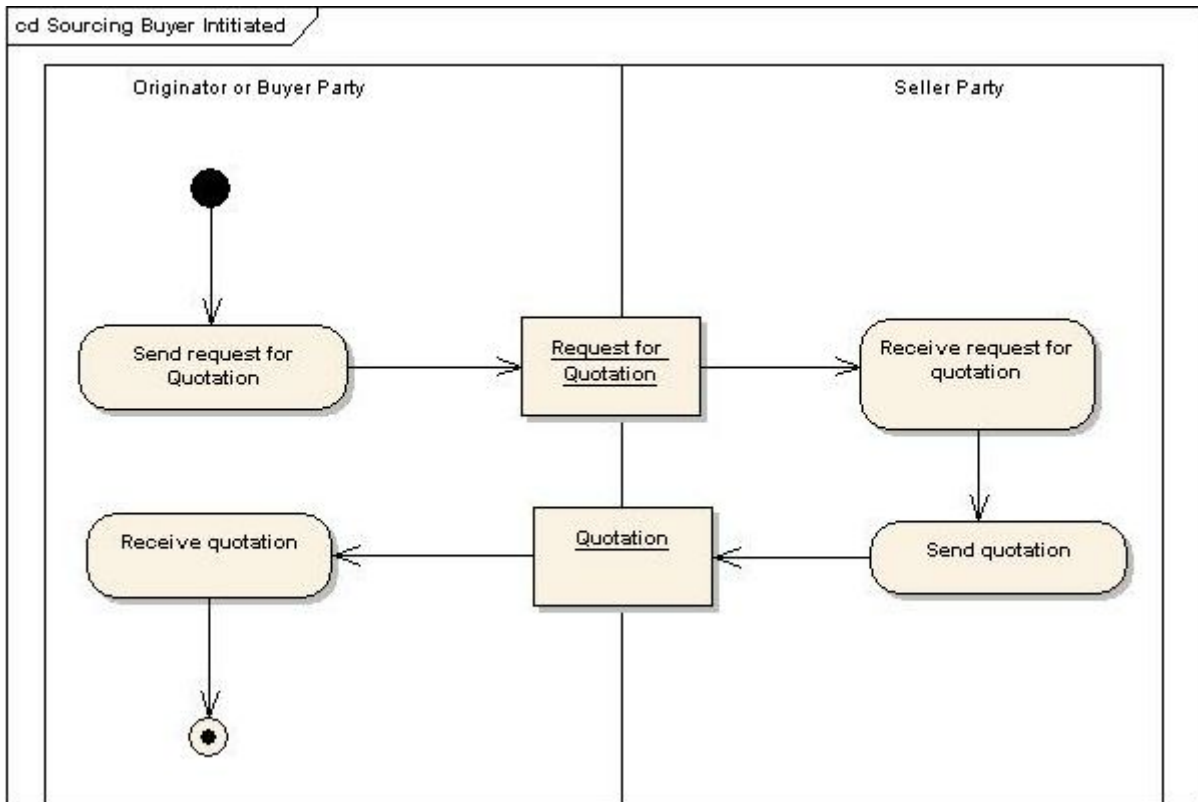
Module 2 - Parties and document types



Each document exchange is documented with sample workflow:

- document types in square-cornered boxes with underscored labels
- actions in round-cornered boxes

Example workflow for quotations excerpted from UBL documentation:



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Module 3 - Information items



- Introduction - Information found in UBL documents

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Notes:

Information found in UBL documents

Module 3 - Information items



Committee members are responsible for information modeling of UBL document types

- the XML document modeling is not the direct responsibility of members
- XML document models are synthesized from the collaborative information models
- **office software spreadsheets used for collaboratively developing the information models**
- **UML models used for confirming the spreadsheet models**
 - some members start with the UML and add to the spreadsheets from their work

Started with the xCBL 3.0 information items

- along the way refined the concepts based on reviews and feedback from the public and from committee members
- applied the principles of CCTS to the definition of an XML vocabulary
 - **UBL is the first publicly-available royalty-free library of XML components defined using CCTS**

Kept the innovative concept of a library of common shared information items

- document types are not developed in isolation
- individual document types are built from components in a single library
- ensures semantic equivalence of constructs between document types because the constructs are the same (not just similar)

Introduced CCTS distinction between basic (atomic) and aggregate (molecular) constructs

- XML structures are syntactic representations of semantic building blocks of CCTS

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Collaboration spreadsheets

Module 3 - Information items



Two spreadsheet documents capture information regarding single shared or specific library collection:

- same information in both spreadsheets, only different file formats for different tools
- **.ods - Open Document Format (ODF) Spreadsheet**
- **.xls - Microsoft Excel Spreadsheet**

Row color conventions

- white - BBIE
- cyan - ASBIE
- magenta - ABIE

Example from UBL-CommonLibrary:

- row 10 has AdditionalStreetName

	A	B	C	D	E	F	G
1	UBL Name	Dictionary Entry Name	Object Class Qualifier	Object Class	Property Term Qualifier	Property Term Possessive Noun	Property Term Primary Noun
2	Address	Address. Details		Address			
3	ID	Address. Identifier		Address			Identifier
4	AddressTypeCode	Address. Address Type Code. Code		Address		Address Type	Code
5	AddressFormatCode	Address. Address Format Code. Code		Address		Address Format	Code
6	Postbox	Address. Postbox. Text		Address			Postbox
7	Floor	Address. Floor. Text		Address			Floor
8	Room	Address. Room. Text		Address			Room
9	StreetName	Address. Street Name. Name		Address		Street	Name
10	AdditionalStreetName	Address. Additional Street Name. Name		Address	Additional	Street	Name
11	BlockName	Address. Block Name. Name		Address		Block	Name
12	BuildingName	Address. Building Name. Name		Address		Building	Name
13	BuildingNumber	Address. Building Number. Text		Address		Building	Number
14	InhouseMail	Address. Inhouse Mail. Text		Address	Inhouse		Mail
15	Department	Address. Department. Text		Address			Department
16	MarkAttention	Address. Mark Attention. Text		Address			Mark Attention
17	MarkCare	Address. Mark Care. Text		Address			Mark Care
18	PlotIdentification	Address. Plot Identification. Text		Address		Plot	Identification
19	CitySubdivisionName	Address. City Subdivision Name. Name		Address		City Subdivision	Name
20	CityName	Address. City Name. Name		Address		City	Name
21	PostalZone	Address. Postal Zone. Text		Address	Postal		Zone
22	CountrySubentity	Address. Country Subentity. Text		Address		Country	Subentity
23	CountrySubentityCode	Address. Country Subentity Code. Code		Address		Country Subentity	Code
24	Region	Address. Region. Text		Address			Region
25	District	Address. District. Text		Address			District
26	TimezoneOffset	Address. Timezone Offset. Text		Address		Timezone	Offset
27	AddressLine	Address. Address Line		Address			
28	Country	Address. Country		Address			
29	LocationCoordinate	Address. Location Coordinate		Address			
30	AddressLine	Address Line. Details		Address			
31	Line	Address Line. Line. Text		Address Line			Line
32	AirTransport	Air Transport. Details		Air			
33	AircraftID	Air Transport. Aircraft Identifier. Identifier		Air Transport		Aircraft	Identifier
34	AllowanceCharge	Allowance Charge. Details		Allowance			
35	ID	Allowance Charge. Identifier		Allowance Charge			Identifier
36	ChargeIndicator	Allowance Charge. Charge Indicator		Allowance Charge			Indicator

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Notes:

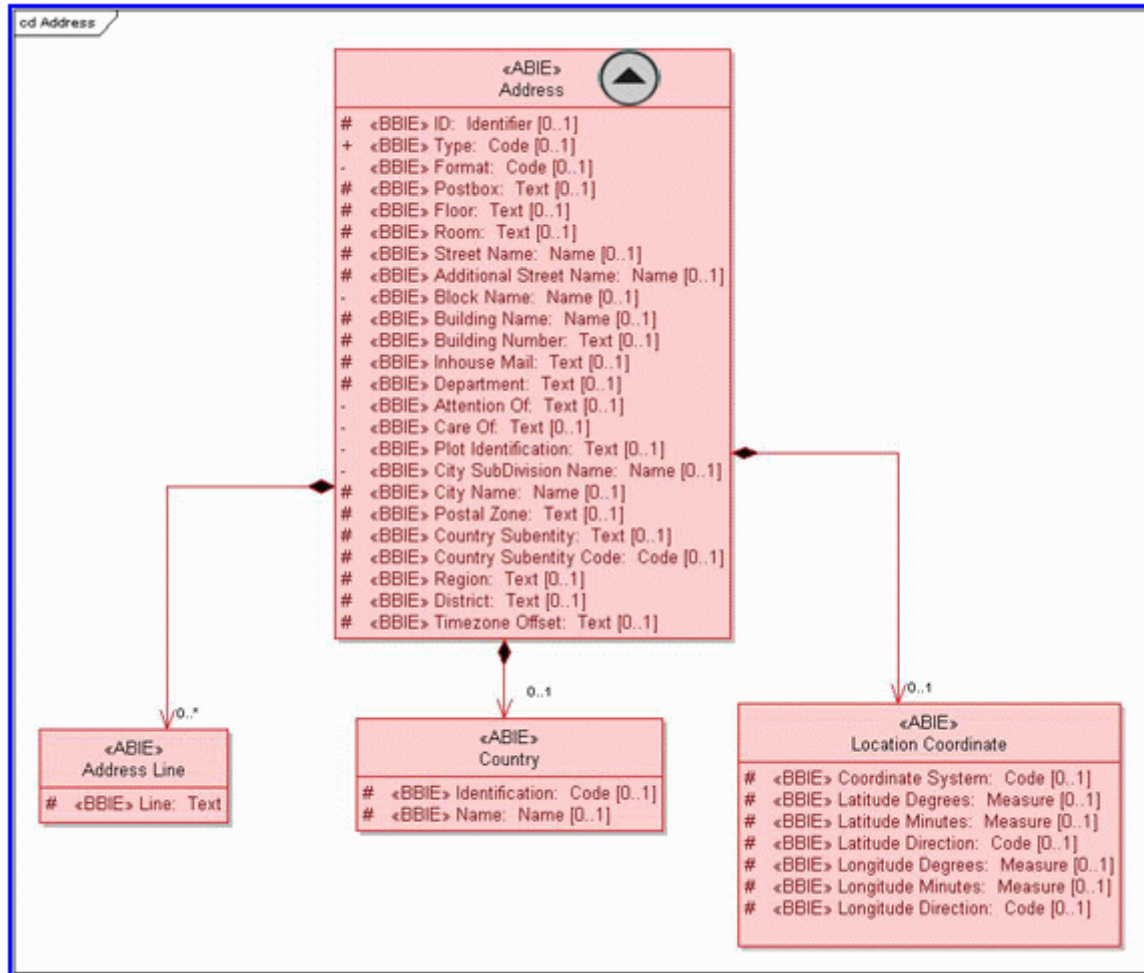
UBL UML models

Module 3 - Information items



Unified Modeling Language (UML) expressions of the information models are found in
c:\publd\artefacts\cs-UBL-2.0\uml

- standalone JPEG files
- interlinked HTML files that reference the JPG files



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Notes:

Module 4 - Naming and design rules



- Introduction - Formal naming and design rules

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Notes:

Formal naming and design rules

Module 4 - Naming and design rules



UBL model development is only in the information models, not document models

- using spreadsheets and UML models as the basis for collaboration
- common library of components
- different document types

Document models need to be created corresponding to document types in the information models

- XML documents are constrained by formal model expressions of constraints
 - a given expression of constraints is a schema
 - a schema is written in a schema language expressing the semantics of a given schema validation process
- information models in spreadsheet form are translated into document models in a schema language

NDR expressed as rules for XSD schema generation that can be automated

- does not oblige the rules to be applied using automation

Downstream customization processes can rely on schema expressions to follow UBL NDR

- straightforward processing of expressions can be accomplished because of particular choice of rules
- breaking the rules prevents the downstream processes from being able to extract the required information out of the models

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Notes:

Module 5 - Document models



- Introduction - Document model formal expressions

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Notes:

Document model formal expressions

Module 5 - Document models



A document model is a formalism for machine processing of the constraints of information model components in a physical expression

- two different expressions of the document model based on the nature of the documents being expressed
- **compact binary-encoded documents**
 - ASN.1 ISO 8825
- **marked-up text-based documents**
 - XSD W3C Schema

The only normative component of UBL is the W3C Schema XSD expression of XML document constraints

- all other committee work products are in support of the normative schemata

The document model constrains the interchange of information, not the application data model

- a popular misconception in XML-based system design is to equate the document model with the application data model
- XML provides independence between the two data models of the applications performing an interchange
- an application translates information from its data model to and from the interchange model

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Document model formal expressions (cont.)

Module 5 - Document models

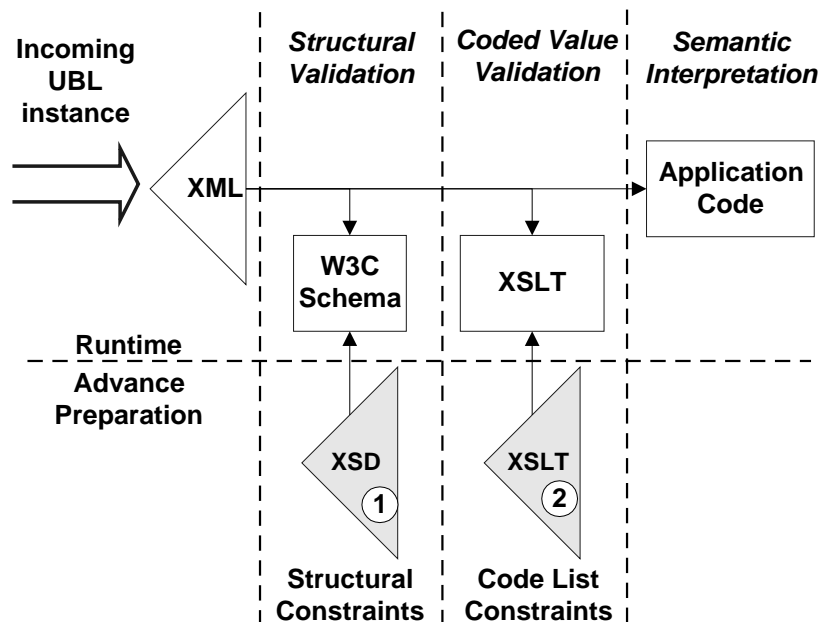


In UBL 1 all document constraints were described by XSD schema

- structural constraints using complex types
- coded values using enumerations
- no accommodation of business rules

Validating a UBL 2 document involves two distinct steps:

- **first-pass structural (includes well-formed and lexical) validation using XSD**
 - ensures that all information items are correctly labeled and correctly positioned
- **second-pass coded-value validation using XSLT**
 - ensures the values used for coded-value information items are as expected by the UBL TC



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Notes:

Module 6 - Model semantics



- Introduction - Model semantics

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Notes:

Model semantics

Module 6 - Model semantics



Semantics is about the meaning of things

- by definition
- by association

Information item "UBL name", i.e. element type name, is mnemonic

- **label of the information item in the XML document structure**
- the mnemonic is meant to be a useful reminder of the semantic behind the term
- the mnemonic is not meant to define the term
- NDR rule GNR1 requires information item names to be in Oxford English

Information item "Definition" and "Alternate Business Terms" are descriptive and meant to convey the semantic meaning

- inappropriate for other languages
- would need language-specific versions of these to convey meaning in languages other than English

Only the schemas are normative, thus mandating the mnemonics used for element names be unchangeable in all uses of UBL

- the descriptions associated with the mnemonics are informative
- transliteration of the element types does not maintain the "UBL-ness" of the document

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Notes:

Model semantics (cont.)

Module 6 - Model semantics



The UBL International Data Dictionary (IDD) documents the translations of the descriptions and business terms in a spreadsheet:

	C	E	F	G	H
2	UBL Name	<u>Cardi- nality</u>	Component Type	<i>Traditional Chinese</i>	
3				Business Terms	Definition
4	Reusable				
5	Address		ABIE	地址	對個人居住地或組織位於某地的詳細定位和標識。
6	ID	0..1	BBIE	地址標識符	在登記地址的方案中給予特定地址的唯一標識符。
7	Postbox	0..1	BBIE	郵政信箱	地址的一部分，由郵局分配給個人或組織的郵政信箱號或已編號的郵箱以便信件在送到收件人之前保存在其中。
8	Floor	0..1	BBIE	分處所編號	地址的一部分，標識建築物中樓層的名稱或編號。
9	Room	0..1	BBIE	分處所編號	地址的一部分，標識房間、套房或單元住宅。
10	<u>StreetName</u>	0..1	BBIE	街道	地址的一部分，街道的名稱。
11	<u>AdditionalStreetName</u>	0..1	BBIE	街道	在地址中關於街道的附加文本信息。
12	<u>BuildingName</u>	0..1	BBIE	建築物名稱	地址的一部分，標識房屋或建築物所在位置的名稱，通常位於一個街道。
13	<u>BuildingNumber</u>	0..1	BBIE	處所編號	地址的一部分，標識房屋、建築物或場所的門牌號或描述，通常位於一個街道。
14	<u>InhouseMail</u>	0..1	BBIE	內部郵件地址	地址的一部分，標識部郵件的位置。
15	Department	0..1	BBIE	部門	地址的一部分，標識組織中的部門。
16	<u>CityName</u>	0..1	BBIE	地方名稱	地址的一部分，城市、鎮、村莊或已建設區的名稱。
17	<u>PostalZone</u>	0..1	BBIE	郵政編碼	標識國家中郵政服務的一個或多個屬性，一組字母加上（或單獨是）一組數字加在郵政地址中以便於對郵件進行分類和分揀。

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Notes:

Module 7 - XPath enumerations



- Introduction - Exhaustive enumeration of information items

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Exhaustive enumeration of information items

Module 7 - XPath enumerations



Constraint expressions (as used in the UBL schemas) reveal only the parent/child relationship between information items

- one cannot readily tell the impact of the added number of descendents being added to an element when choosing to include a particular child for the element

The complete ancestry of possible information items is only available through an analysis of the parent/child constraints at every possible level of the document tree

- the UBL TC has performed the analysis and summarized all of the elements and attributes in all contexts of all document types

The information is made available in four forms of what the committee has termed "XPath files"

- a normative description in XML that can be processed for analysis
- a simple text report of the absolute minimum set mandatory items required to satisfy the model
- a simple text report of all items defined by the document model
- an exhaustive sample XML instance that can be processed by non-validating applications

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XPath text reports

Module 7 - XPath enumerations



The XPath text report is a human-legible summary for each information item:

- ordinal information item position
 - ordinal element position
 - ordinal separator "."
 - this is not to be interpreted as a decimal point
 - alphabetical ordinal attribute position within each element
 - without zero fill
 - the ordinal pair "2.10" will follow "2.9" and be distinct from "2.1"
- cardinality
- absolute XPath location path address

```

01 1    1..1 /in:Invoice/
02 2    1..1 /in:Invoice/cbc:ID
03 2.1 0..1 /in:Invoice/cbc:ID/@schemeAgencyID
04 2.2 0..1 /in:Invoice/cbc:ID/@schemeAgencyName
05 2.3 0..1 /in:Invoice/cbc:ID/@schemeDataURI
06 2.4 0..1 /in:Invoice/cbc:ID/@schemeID
07 2.5 0..1 /in:Invoice/cbc:ID/@schemeName
08 2.6 0..1 /in:Invoice/cbc:ID/@schemeURI
09 2.7 0..1 /in:Invoice/cbc:ID/@schemeVersionID
10 3    1..1 /in:Invoice/cbc:CopyIndicator
11 4    0..1 /in:Invoice/cbc:GUID
12 4.1 0..1 /in:Invoice/cbc:GUID/@schemeAgencyID
13 4.2 0..1 /in:Invoice/cbc:GUID/@schemeAgencyName
14 4.3 0..1 /in:Invoice/cbc:GUID/@schemeDataURI
15 4.4 0..1 /in:Invoice/cbc:GUID/@schemeID
16 4.5 0..1 /in:Invoice/cbc:GUID/@schemeName
17 4.6 0..1 /in:Invoice/cbc:GUID/@schemeURI
18 4.7 0..1 /in:Invoice/cbc:GUID/@schemeVersionID
19 5    1..1 /in:Invoice/cbc:IssueDate
20 6    0..1 /in:Invoice/cbc:IssueTime
21 7    0..1 /in:Invoice/cbc:InvoiceTypeCode
22 7.1 0..1 /in:Invoice/cbc:InvoiceTypeCode/@languageID
23 7.2 0..1 /in:Invoice/cbc:InvoiceTypeCode/@listAgencyID
24 ...

```

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XPath exhaustive instances

Module 7 - XPath enumerations



Sample stylesheet rendering from UBL 1.0 stylesheets using UBL 1.0 XPath instance file:

PURCHASE ORDER			
Seller !174! !180! !186!, !188! !187! !197!		Purchase order number !2!	
		Date !6!	Seller's reference (Quote no.) !29!
		Buyer's reference !39!	Other reference (Contract no.) !24!
Consignee !48! !54! !60!, !62! !61! !71!		Buyer !48! !54! !60!, !62! !61! !71!	
		Buyer bank	
		Country of origin	Country of destination !1100!
Mode of transport	Date of despatch	Terms of delivery !643!	Location !644!
Means of transport	Place of despatch	Special terms !645!	
Vessel/flight no.	Port of loading	Terms of payment	Currency of payment !9!
Port of discharge	Place of delivery		
Shipping marks; container number	No. and kind of packages; description of goods	Total gross weight (kg) !17!	Total cube (m3) !20!

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Notes:

Module 8 - Code list value validation methodology



- Introduction - Controlled vocabularies and code lists

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Controlled vocabularies and code lists

Module 8 - Code list value validation methodology



Business documents have many information items whose values are controlled

- **codes, identifiers, any information item with a predetermined value set**
- the information's value is limited to one or more of a set of fixed values
- each value represents a particular semantic understood between trading partners
- values outside of the allowed set are considered invalid as trading partners would not necessarily know what they represent

UBL provides a starter kit of sets of codes for only a few coded values

- no starter sets for identifiers are provided
- trading partner code lists can use or build on the UBL code lists
- UBL also supplies values that are not yet engaged in case they are of interest to certain trading partners
 - e.g. shipping container sizes
- many lists are defined by UBL as empty
 - trading partners can use the empty shells to create their own agreed-upon set of values

Standards are in development for the non-schema-based representation of a list of coded values

- trading partners may wish to trim or augment the list of coded values acceptable to the business documents they exchange
- the representation includes documentary information and metadata for long-term maintenance
- **genericode**
 - an XML representation being standardized by the OASIS Code List Representation Technical Committee
 - http://www.oasis-open.org/committees/tc_home.php?wg_abbrev=codelist
 - "Defining an XML format for interchange, documentation and management of code lists (a.k.a. controlled vocabularies or coded value enumerations) in any processing context"

Could use schema enumerations but too inflexible

- cannot have different sets of values in different contexts
- modifying the schemas means using non-UBL schema expressions
 - not bad in and of itself but requires extra assurances for compatibility
- for three UBL code lists in particular, schema enumerations are provided for UN/CEFACT compatibility

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Notes:

Controlled vocabularies and code lists (cont.)

Module 8 - Code list value validation methodology



Decision in UBL to separate structural validation from enumerated-value validation

- recall Document model formal expressions (page 29)
 - a UBL document is checked using a two-step process
- the first pass for structural and lexical validation passes
 - the second pass reports that a coded value used for a currency is unexpected
- the document structure and lexical content is constrained by standardization
 - the UBL committee publishes normative schemas
- the document coded value content is constrained by business requirements between trading partners
 - the UBL committee publishes default coded value checks
 - trading partners can use the code list value validation methodology to create their own value checking

The UBL code list value validation methodology uses ISO/IEC 19757-3 Schematron

- an information item is asserted to have one of an allowed set of coded values
 - a failed assertion is a value validation error
- an assertion is expressed using an XPath expression addressing information items in contexts

Schematron is usually implemented using the Extensible Stylesheet Language (XSLT)

- other non-XSLT implementations of Schematron exist
- the supplied Schematron stylesheet for stylesheets is an incomplete implementation
 - sufficient for the purposes of UBL
 - will be replaced by a conforming XSLT-based implementation when available

The XSLT generated to implement the Schematron assertions is used as the second pass of validation to test UBL instances for having correct coded values

- the testing relies on the first-pass structural validation having already confirmed the structure and lexical values used in the instance
- without the first pass confirming the accurate presence of information items, the second pass is meaningless

The methodology supports the incorporation of any number of sets of Schematron assertions

- ISO Schematron supports the inclusion of multiple schema fragments into a single schema expression
- business rules related or unrelated to code lists may be expressed as Schematron assertions
 - the trading partner schema can then include business rules in addition to coded value rules

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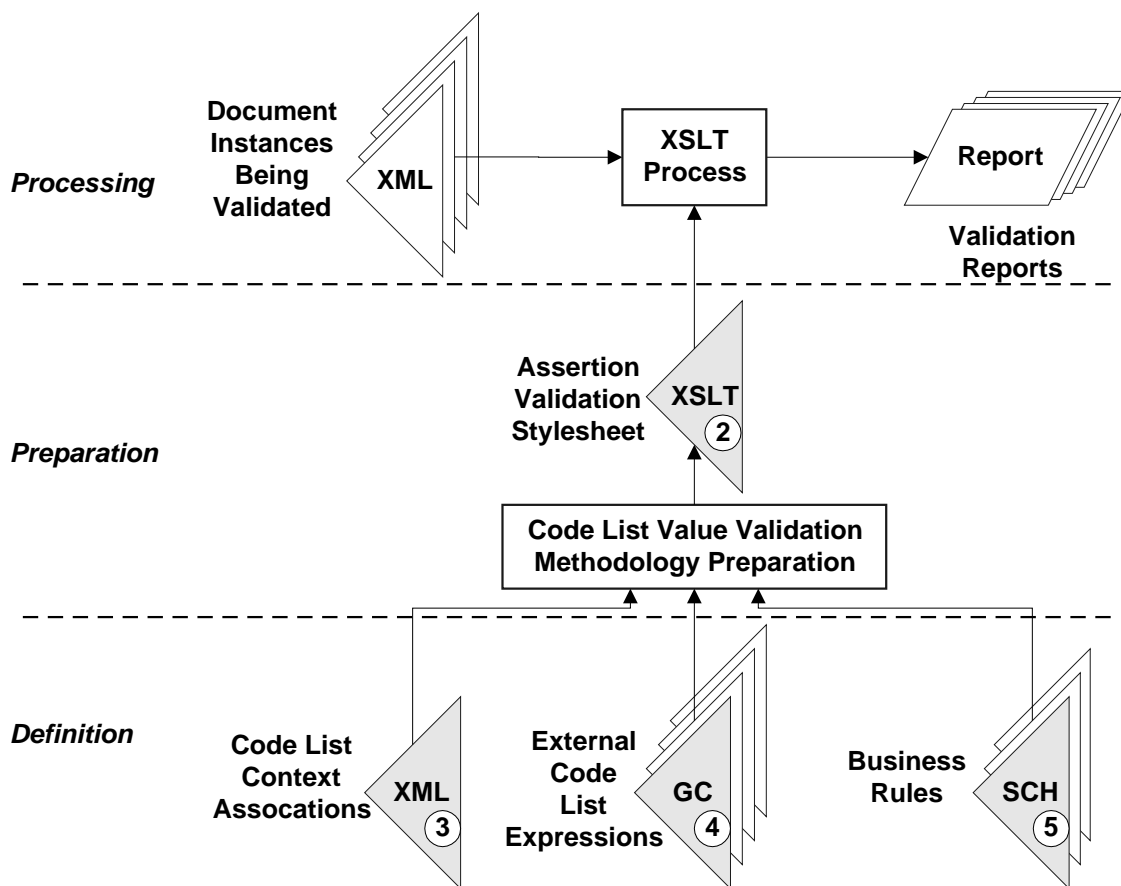
Controlled vocabularies and code lists (cont.)

Module 8 - Code list value validation methodology



Overview of the process to create the second pass coded value validation XSLT stylesheet:

- the inputs:
 - (3) the specification of contexts uses an XML vocabulary defined by the OASIS UBL TC
 - (4) the specification of coded values uses the genericode vocabulary defined by another OASIS TC
 - (5) supplemental business rules are specified using ISO/IEC 19757 Schematron
- the output:
 - (2) an XSLT stylesheet (or some other implementation of Schematron assertion checking)



Recall Document model formal expressions (page 29)

- the "Assertion Validation Stylesheet" above is the "Code List Constraints" file on page 29, as it combines the code list assertions and business rule assertions into a single set of assertions

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Notes:

Module 9 - UBL customization



-
- Introduction - Enabling UBL for a community of users
 - Lesson 1 - Specializing UBL

Outcomes:

- understand the roles of specializations of the UBL document model

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Notes:

Enabling UBL for a community of users

Module 9 - UBL customization



Standardized UBL is defined to accommodate general accounting principles for business documents

- committee of experts included constructs necessary to communicate the essence of the business documents
- the documentary scenarios frame the choices made in the semantic concepts and expression of granularity and labels for markup

If all e-commerce systems implemented full UBL and UBL met everyone's requirements then there would be no need for customizations

- but UBL only implements an 80/20 solution of a general-purpose scenario
- the general-purpose solution may be so large as to be too costly to implement all of UBL
- special requirements and legacy needs may dictate going beyond UBL

A UBL customization is an implementation of UBL for a particular user community

- UBL defines a baseline implementation without extensions or business rules
- **UBL constructs defined as mandatory remain mandatory for all user communities**
 - ensures basic interoperability between all users of UBL
 - conveys essential information that follows general accounting principles
- **subset UBL**
 - "which of the existing UBL constructs makes sense for our user community?"
- **extend UBL**
 - the user community defines an extension of custom constructs on top of the UBL subset
- **e.g. the aerospace industry may wish to adopt an industry-wide invoice format**
 - the core accounting functions are satisfied by the mandatory and standardized UBL constructs
 - invoice line items need to be specialized to accommodate the expression of semantic concepts specific to the industry
 - an industry association group adopts a
- other examples where customization may make sense for specialization:
 - automotive, pharmaceutical, foodstuffs, etc.
 - government - e.g. Denmark

There is no set processing model for handling customized UBL instances

- just as there is no set processing model for handling standard UBL instances
- the information in this module is but an example for consideration

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Notes:

Enabling UBL for a community of users (cont.)

Module 9 - UBL customization

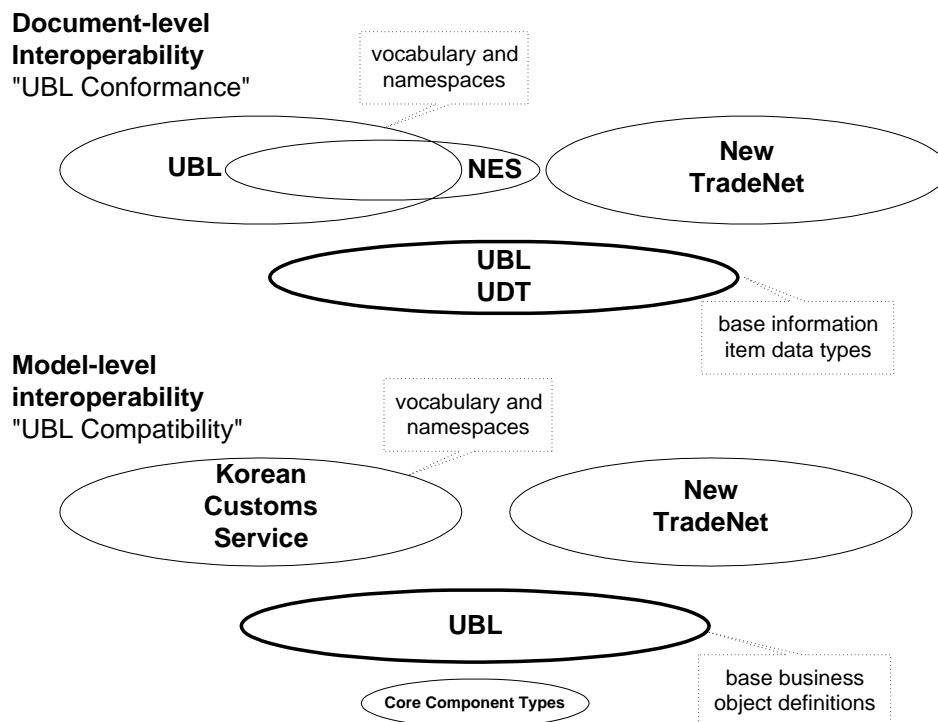


At least two ways to view interoperability when customizing UBL for one's own purposes

- document-level interoperability
 - objective to be able to interchange UBL messages
- model-level interoperability
 - objective to be create new information items and messages based on UBL library of constructs

In these two diagrams, the ovals represent the set of vocabulary information items (names and namespaces) for an implementation of UBL

- the top diagram illustrates how there is a big overlap of vocabulary between UBL and the North European Subset (NES), but not between UBL and New TradeNet
 - the NES uses a subset of the UBL vocabulary and adds a number of constructs as extensions
 - the New TradeNet vocabulary doesn't overlap with the UBL vocabulary
 - all three vocabularies are based on the unqualified data types of UBL, thus the XSD module is utilized in the declaration of the constructs
- the bottom diagram illustrates how there is no overlap of vocabulary between the Korean Customs Service implementation of UBL and the New TradeNet implementation of UBL
 - the business objects in both vocabularies are derived from UBL business objects, which themselves are derived from the UN/CEFACT Core Component Types (CCT)



Notes:

Enabling UBL for a community of users (cont.)

Module 9 - UBL customization



The "Serendipity Factor" of document-level interoperability

- system implementations are, by their conformance to UBL, compatible at a base level between all trading partners using UBL without the need to reconfigure software
- requires receiving systems to be flexible
 - **ignore what has arrived which is not what is expected**
 - **accept only baseline information when expected extensions are absent**
- requires sending systems to be flexible
 - accommodate situation when supplied extension information is ignored after send

Both sender and receiver benefit by not changing their UBL system implementations

- the baseline UBL constructs convey the minimum required to support general accounting principles
- trading partners are able to engage in electronic commerce immediately without having to change or reconfigure their software

Does not remove the need for trading partners to first negotiate to do business

- an open system is not meant to imply an insecure system
- an open system is not meant to imply any prior agreement to send and receive XML documents
- an open system only enables trading partners to exchange unmodified business documents once they have chosen to do business

Does not supplant a business requirement that mandates extension information

- though such a system cannot be open to serendipitous exchanges
- e.g. a UBL customization that mandates UBL or extension constructs that are not mandatory in standardized UBL cannot be guaranteed to accept a UBL document from a trading partner
 - but a UBL customization

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Notes:

Refining the processing model

Module 9 - UBL customization

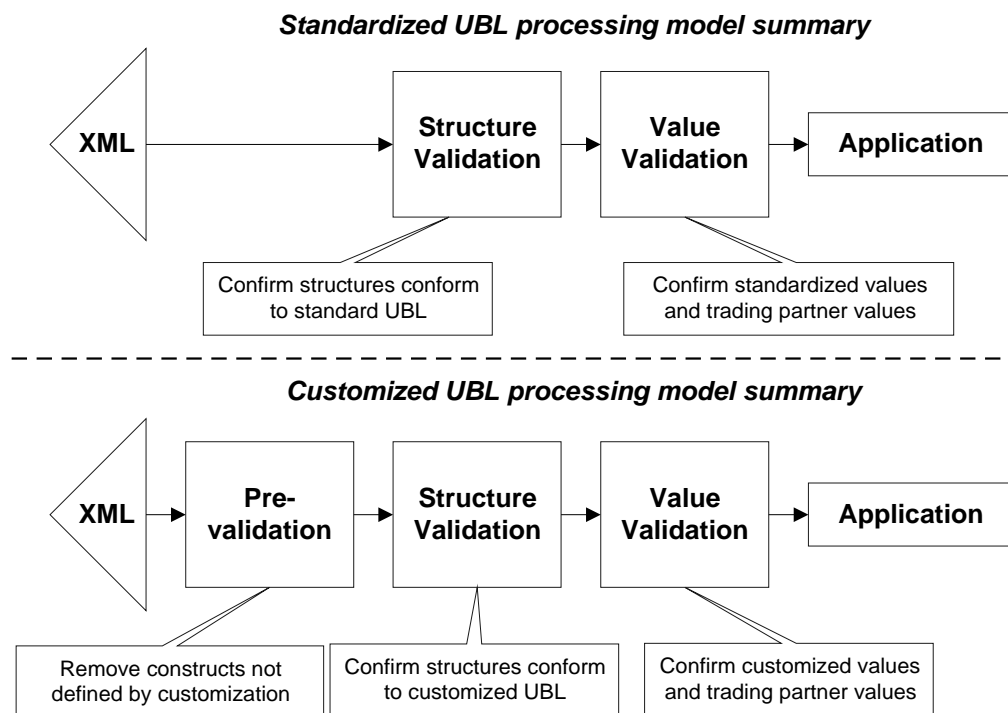


Recall the candidate processing model (there is no standardized processing model)

- see Document model formal expressions (page 29)
- first step confirms the structural and lexical constraints on the instance
- second step confirms the standardized and trading partner values used in the instance

Customization suggests the pre-validation requirement to filter out unexpected constructs

- the remainder of the process remains the same
- the files in use for the remainder of the process are defined for the customization



Documented process modeled as two steps:

- confirm that the structures in the document conform to UBL constraints
- confirm the values in the document items conform to UBL and trading partner expectations

Customized process modeled as three steps:

- filter from the incoming instance those constructs not defined by a customization
- confirm that the structures in the document conform to customization constraints
- confirm the values in the document items conform to customization and trading partner expectations

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Where to go from here?

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The work on UBL continues:

- OASIS UBL 2.0 Committee Specification
 - <http://docs.oasis-open.org/ubl/cs-UBL-2.0>
- OASIS UBL 2.0 Standard (December 2006)
 - <http://docs.oasis-open.org/ubl/os-UBL-2.0>
- focus now shifts to support, deployment, awareness and evangelism
- committee mail list - UBL TC:
 - <http://lists.oasis-open.org/archives/ubl/>
- community mail list - UBL-Dev
 - <http://lists.oasis-open.org/archives/ubl-dev/>
 - <http://www.oasis-open.org/mlmanage/>

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Colophon

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These materials were produced using structured information technologies as follows:

- **authored source materials**
 - content in numerous XML files maintained as external general entities for a complete prose book that can be made into a subset for training
 - specification of applicability of constructs for each configuration
 - 45- and 90-minute lecture, half-, full-, two- and three-day lecture and hands-on instruction, and book (prose) configurations
 - an XSLT transformation creates the subset of effective constructs from applying applicability to the complete file
 - content from other presentations/tutorials included semantically (not syntactically) during construct assembly
 - customized appearance engaged with marked sections and both parameter and general entities
 - different host company logos and venue and date marginalia
 - changing a single external parameter entity to a key file includes suite of files for given appearance
- **electronic projection deliverables**
 - an XSLT stylesheet produces a collection of HTML files using Saxon for multiple file output
 - two renditions: one for bullets only and the other mimicking the handouts
- **printed handout deliverables**
 - an XSLT stylesheet produces an instance of XSL formatting objects (XSL-FO) for rendering
 - XPDF <http://www.foolabs.com/xpdf> extracts raw text from PDF files for the back-of-the-book index methodology published as a free resource by Crane Softwrights Ltd.
 - XSL Formatter by Antenna House, Inc. <http://www.AntennaHouse.com> produces PDF from XSL-FO
 - the iText <http://itext.sf.net> PDF manipulation library for Java is used for page imposition by a custom Python <http://www.python.org> program running under the Jython <http://www.jython.org> environment

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Obtaining a copy of this material

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The complete book on UBL, from which this material is derived, is available for subscription purchase and free preview download:

- **"Practical Universal Business Language Deployment" First Edition - 2006-12-?? - ISBN 978-1-894049-16-0**
 - the comprehensive publication includes many details that are not in these condensed overviews
 - the free download preview excerpt of the publication indicates the number of pages for each topic
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- feedback from customers is important to improve or repair the content for future editions
- **please send suggestions or comments (positive or negative) to info@CraneSoftwrights.com**

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