Overview of electronic Business Document Standards

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Introduction

- ***Interoperability:*** *"Ability of a system or a product to work with other systems or products without special effort on the part of the customer. Interoperability is made possible by the implementation of standards."* **IEEE definition**

- ***Customization*** and ***Extensibility:*** *"Ability to adapt and customize the document business in relation to the context and business entities to represent."*

- 3 Layers:
  - Communication Layer
  - Business Process Layer
  - ***Document Layer***

EDI - Electronic Data Interchange

- ***UN/EDIFACT*** standard ISO 9735 from 1987
- Different viewpoint from ***CCTS***
- ***EDI Adapter*** required within business system for a correct interaction between partner A and partner B

EDI Example

UNB+UNOB:1+PARTNER ID:ZZ+0038977332:01:MFGB+020331:1230+00000000000001++INVOIC++++1'

UNH+0001+INVOIC:S:93A:UN'

BGM+380+I-999+9'

DTM+137:YYYYMMDD:102'

RFF+ON:888'

NAD+RE+ ::92++FGH MANUFACTURER'

RFF+VA:FGH-5302'

CTA+AR+:JANE SMITH'

COM+333 88 99 777:TE'

NAD+ST+ ::92++ABC TEST CO.'

.....

UNS+S'

MOA+77:12019.78:USD'

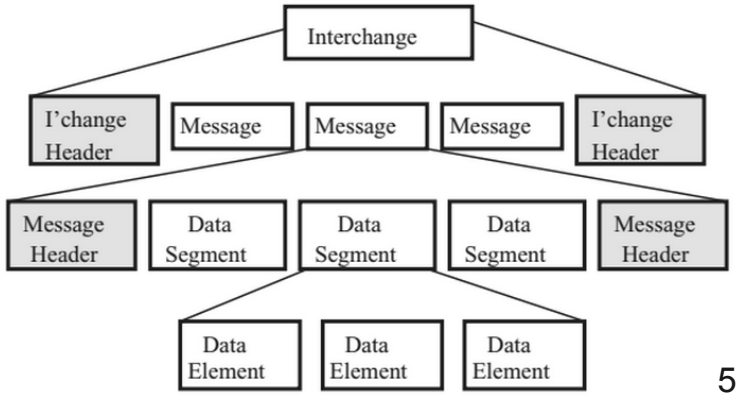
TAX+7+VAT+++:::15+S'

MOA+176:1567.80:USD'

UNT+23+0001'

UNZ+1+00000000000001'

	Service String Advice	UNA Conditional
_____	Interchange Header	UNB Mandatory
| ___	Functional Group Header	UNG Conditional
| | _	Message Header	UNH Mandatory
| | |	**User Data Segments**	**As required**
| | |_	Message Trailer	UNT Mandatory
| |___	Functional Group Trailer	UNE Conditional
|_____	Interchange Trailer	UNZ Mandatory



UN/CEFACT CCTS

- ***UN/CEFACT - United Nations Centre for Trade Facilitation and Electronic Business***
  - United States Organization for Business document Standards
  - *EDIFACT, CCTS(XML)*

- Business Document Goals :
  - different contexts
  - extensibility
  - customization

- ***Core Components Technical Specification - CCTS***
  - 2005 - ISO 15000-5 and Part 8 of ebXML Framework
  - ***Core Components - CCs*** → reusable building blocks
  - Multiple and Different CCs in a single Business Document

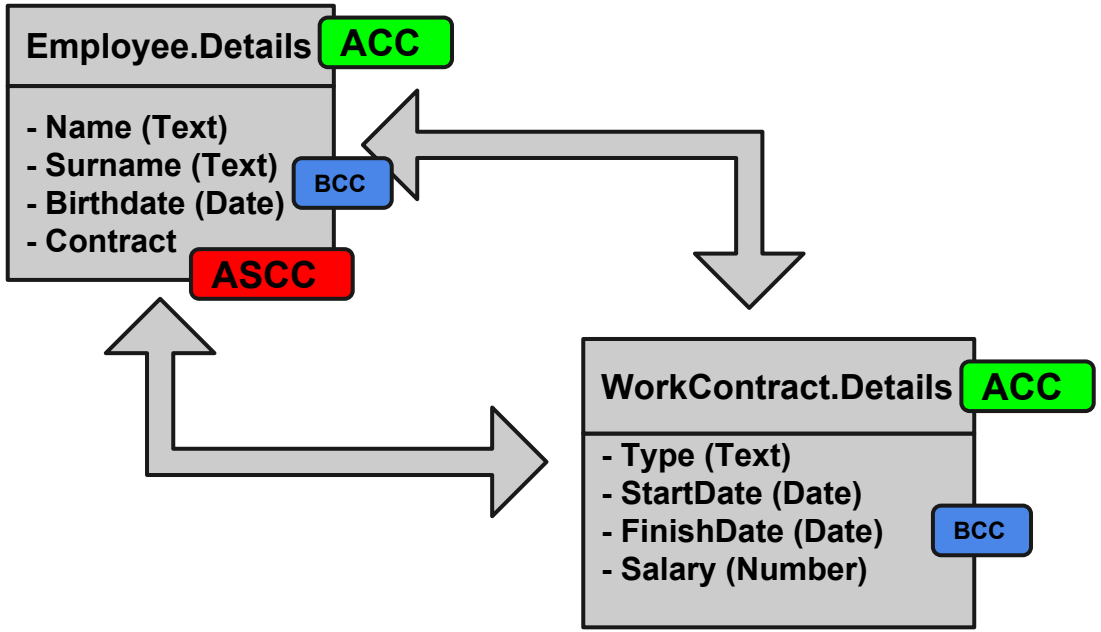
CCTS Elementary objects

- Business Information Entities are available from ***CCL*** - ***Core Component Library*** - Common repository for business components
- Elementary Objects:
  - ***Core Components Types - CCTs :*** Abstract Business Object composed by *Content Component* and n *Supplementary Components*
  - ***Data Types - DTs :*** Specification of general CCTs and they are divided into *UDTs* and *QDTs*

CCTS Core Components

- Elementary objects of previous slide are used to build more complex components:
  - ***Aggregate Core Components - ACCs***
    - Real business objects, composed by BCCs
    - e.g. “Invoice”, “Inventory”, “Order”, “Employee”
  - ***Basic Core Components - BCCs***
    - Property of a ACC, they are represented by DTs
    - e.g. “Employee.Details.Name” → “Text” Data Type
  - ***Association Core Components - ASCCs***
    - Association between different ACCs
    - e.g. “Emplyee.Details.Contract” → “WorkContract.Details”

Example and Specification



- When a Core Component is used in a specific business context, it becomes ***Business Information Entity (BIE)***

- Conseguences:
  - BCCs → **BBIEs**
  - ACCs → **ABIEs**
  - ASCCs → **ASBIEs**

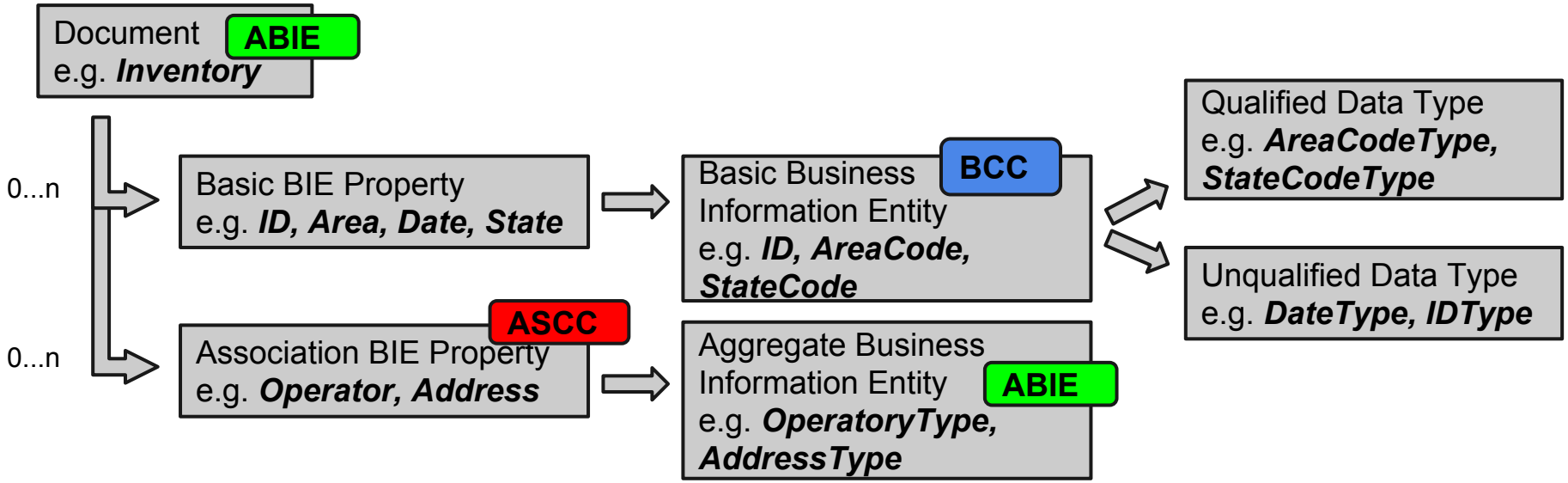
Universal Business Language - UBL 2.x

- **Organization for the Advancement of Structured Information Standards** - **OASIS**
- ***Universal Business language*** - 2006
- ***CCTS*** approach
- UBL 2.0 → 2006 with about 30 XML Schema
- UBL 2.1 → 2013 with about 80 XML Schema

- Validation Process:
  - XSD Schemas
  - XSLT Processor → get out Business Entities ready for Business App

- Importance of ***Qualified Data Types - QDTs,*** where a Unqualified data Types - UDTs is imported to UBL (from CCTS Library) and restricted to a range of values. UDTs must not be changed, QDTs are the specification for a particular model/context.

UBL 2.1 Organization



UBL Customization and Extensibility

- ***Conformat Customization***
  - *UBLExtensionElement*
    - xml tag <UBLExtension>
  - *Sunset UBL doc*
  - *Constraints*
    - XSD Schema (first phase) or XSL validation (second phase)
- ***Compatible Customization***
  - New custom component, document or ABIE
  - The new object must follow ***UBL Naming and Design Rules*** (***UBL-NDR***)
- ***Use of Code List***
  - Different business partner can personalize code list files for their personal goals

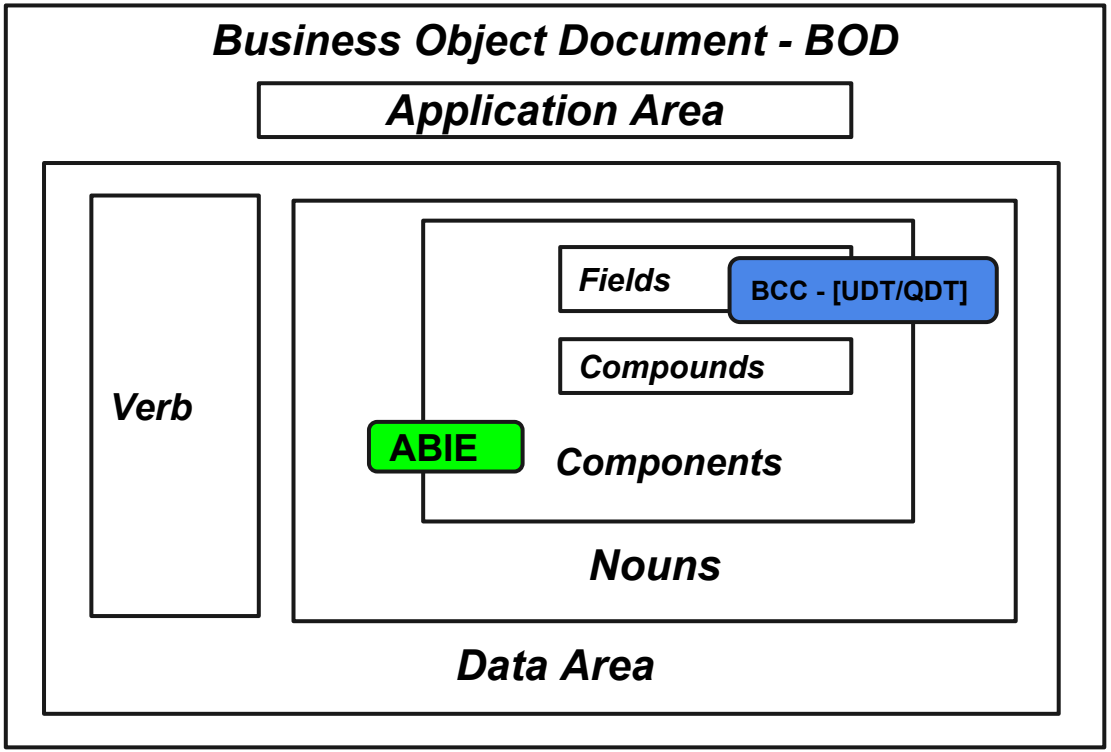
UBLExtension Example XML

```
<Invoice
      xmlns="urn:oasis:names:specification:ubl:schema:xsd:Invoice-2"
      xmlns:cbc="urn:oasis:names:specification:ubl:schema:xsd:CommonBasicComponents-2"
      xmlns:cac="urn:oasis:names:specification:ubl:schema:xsd:CommonAggregateComponents-2"
      xmlns:ext="urn:oasis:names:specification:ubl:schema:xsd:CommonExtensionComponents-2">
  <ext:UBLExtensions xmlns="namespaceExtension">
    <ext:UBLExtension>
      <ext:ExtensionContent>
        <TwitterAccountExtension>
          <senderTwitter>@senderA</senderTwitter>>
          <receiverTwitter>@receiverB</receiverTwitter>>
        </TwitterAccountExtension>
      </ext:ExtensionContent>
    </ext:UBLExtension>
  </ext:UBLExtensions>
  <cac:AccountingSupplierParty> ... </cac:AccountingSupplierParty>
  <cac:AccountingCustomerParty> … </cac:AccountingCustomerParty>
  <cac:Delivery> … </cac:Delivery>
  <cac:Price> ... </cac:Price>
  <cac:TaxTotal> … </cac:TaxTotal>
</Invoice>
```

OAGIS BODs 9.0

- ***Open Application Group Integration Specification - Business Object Documents - OAGIS BOD***
- First BOD Standard was in 1995, before CCTS methodologies
- Concepts:
  - Nouns
    - Business Object, Document
    - e.g. *“Invoice”*, *“Order”*
  - Verbs
    - Action to be applied to the Noun
    - e.g. “Cancel”, “Process”, “Get”, “Sync”
- The final Business Document is the integration between Nouns and Verb
  - e.g. *“CancelOrder”*, *“ProcessInvoice”*

OAGIS BOD 9.0 Organization



- ***Application Area:***
  - Transport information
- ***Data Area:***
  - One single *Verb*
  - n *Nouns*

Extension and Customization

- ***UserArea extension*** :
  - It can be used when few fields are missing to complete the business informations/document
  - Add information between xml tag <UserArea>
  - OAGIS XSD schema doesn’t change
  - XML level, not XSD level
- ***Overlay extension*** :
  - Creation of new BODs or new component (Noun)
  - It can be seen like an extension/specialization of low OAGIS Core layer
  - XSD level, complete control over XML Schema
- ***Code List extension :***
  - Extension is possible due to particular constraints over Code Lists, in XML Schema

Example OAGIS BOD 9.0 XML

```
<?xml version="1.0" encoding="UTF-8"?>
<AddEmployee xmlns:oa="http://www.openapplications.org/oagis/9" >
  <oa:ApplicationArea>
    <oa:CreationDateTime>2015-06-10</oa:CreationDateTime>
    <oa:BODID>ID999</oa:BODID>
    <oa:sender>ApplicationX</oa:sender>
    <oa:receiver>ApplicationY</oa:receiver>
  </oa:ApplicationArea>
  <DataArea>
    <oa:Add>
      ...
    </oa:Add>
    <Employee languageCode="en">
      <DocumentID>Document1</DocumentID>
      <FormattedName>Marco Rossi</FormattedName>
      <oa:GivenName>Marco</oa:GivenName>
      <FamilyName>Rossi</FamilyName>
    </Employee>
  </DataArea>
</AddEmployee>
```

AddEmployee (Verb Name+Nouns Name)

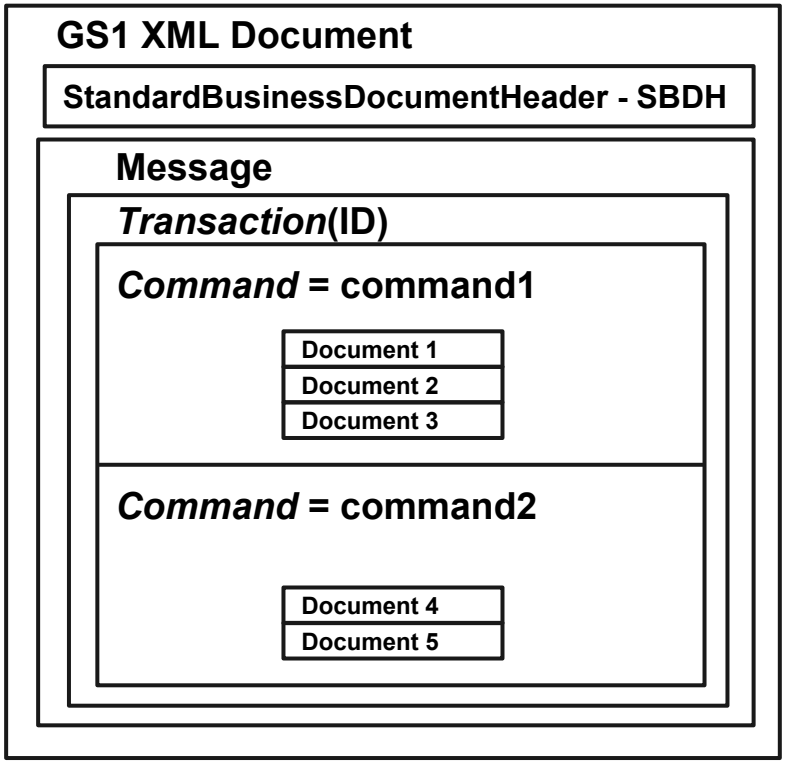
Add (Verb)

Employee(Noun)

GS1 XML

- ***Global Standard One - GS1***
- 2005, EAN and UCC Association
- Business document standards
  - GS1 eCom
  - GS1 XML
- GS1 XML doesn’t use CCTS objects, it has own business component and XML Schemas in a common repository called ***GS1 Global Data Dictionary - GS1 GDD***

GS1 XML Organization



- **SBDH** : transport, routing and processing information [ApplicationArea - standard Oagis Bod]
- ***Command*** **:** Business action which refers to a set of business document.
  - e.g. “Add”, “Delete”, “Process”...
- ***Transaction*** **:** Multiple commands in transaction logic execution, if one command doesn’t work → all other commands fails [*Rollback*]

GS1 Extension and Customization

- 3 principal namespace for GS1 document customization:
  - ***Business Process Context - BP***
  - ***Industry Sector Context - IC***
  - ***Geopolitical Context - GP***

- The syntax for namespace has the ***URN (Uniform Resource Names)*** format:
  - <***URN***> ::= "urn:" <***NID***> ":" <***NSS***>
    - NID → Namespace ID (*ean.ucc* for GS1 namespaces)
    - NSS → Namespace Specific String

urn:ean.ucc:_____:_____:_____:_____
[BP] [IC] [GP] [major version]

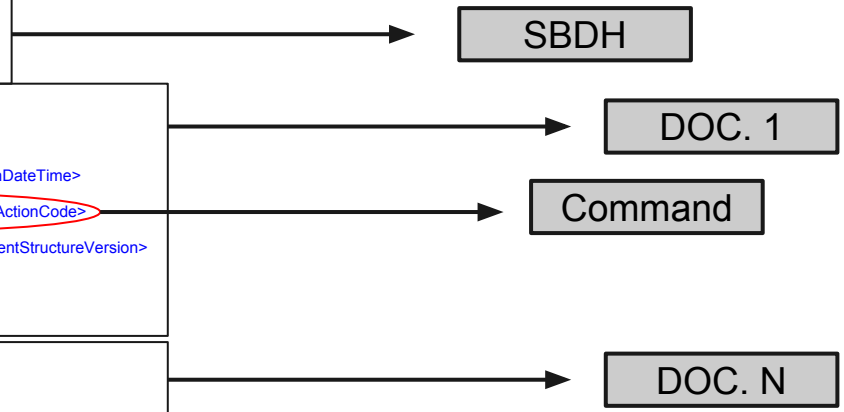
Example:
order="urn:ean.ucc:order:2**"**
Business Process Context → “Order”

GS1 Extension and Customization

- The document extensibility is possible due to tag ***<extension>***
  - Type <xsd:any>
  - The extension is placed at the end of GS1 document
  - A company should communicate the extensions to its partners → GDD Web Site
- Use of Code Lists:
  - ***External***
    - Import of external business element
    - Code Lists are manteined by third-party associations
  - ***Internal***
    - <xsd:enumeration> type and imported in XML Schemas

Example GS1 XML

```
<?xml version="1.0" encoding="UTF-8"?>
<order:orderMessage>
  <sh:StandardBusinessDocumentHeader>
  ...
  </sh:StandardBusinessDocumentHeader>
  <order>
    <idOrder>KK213</idOrder>
    <creationDateTime>2015-06-07</creationDateTime>
    <documentActionCode>ADD</documentActionCode>
    <documentStructureVersion>1.0</documentStructureVersion>
    ...
  </order>
  <order>
    <idOrder>JJ398</idOrder>
    <creationDateTime>2015-07-07</creationDateTime>
    <documentActionCode>CANCEL</documentActionCode>
    <documentStructureVersion>3.0</documentStructureVersion>
    ...
  </order>
  ...
</order:orderMessage>
```



Conclusions

- The interoperability, in business document, is a fundamental aspect for a competitive enterprise
- UN/CEFACT CCTS methodologies are important guidelines in this direction
- These standards are continually under development but some of these are still very different
- XSL transformations and Scheletron are not enough for a good semantic interoperability
- The hardest task will be to increase the harmonization of standards and allow the semantic understanding in any context

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