Real and Effective Use of Business Vocabularies

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UN/CEFACT ATG2 Editor
ISO TC 154 Member
DIN NBue Chair
General Aspects

Semantics & Core Components

SAP NetWeaver & Core Components

Implementation Example
Vision: Enable Cross-Industry Collaboration

Unlock value across industries by implementing open standards

intensive collaboration between partners
But There is Still an Inter-Enterprise Nightmare

**Best-of-breed solutions**
- Many different vendors
- Custom made solutions
- Proprietary technologies
- Point-to-point Integration

**Risking future success**
- Complex business environment
- Maintenance nightmare
- Multiple dependencies
- Many different business applications

Customer value is lost
One Key-Part of this Nightmare is the Different Expression of Semantics by..

... currently over 1000 different dialects!!!
Same Semantics Expressed in Many Different Ways

Differences in informational content
Differences in tags & meanings
Differences in positions
Different information elements

Always an ineffective and expensive semantic mapping is required !!!
Required Mappings in a Real Scenario

- Partner bank
- Company
- Cash Center in Foreign Country
- Foreign In-House Bank
- In-House Bank
- Cash Center of Company
- Account management
- Partner in Foreign Country
- Payment
- Bank statement

Incompatible document types

Implementation ~ 80 PD per Interface

Mapping ~ 10 PD per Interface
Multiple structures and naming conventions for the same semantic meaning

- Costly and time-intensive mapping efforts required
- Cost of integration for additional partners almost unpredictable
How To Overcome B2B Inefficiencies

Demand for guidelines of semantic:
- Human and machine readable naming and design rules for structure and meaning
- Independent of any implementation syntax
- Reusable, modular e-business building blocks
- Context-specific extension mechanisms

Benefits:
- Applicable to all vertical industries and horizontal applications
- Can be used in any implementation syntax
- Greater international acceptance
What is necessary to make B2B more efficient?

UN/CEFACT CCTS (ISO 15000-5) is the methodology for developing a common set of semantic building blocks.

It is a way to:

- identify, capture and maximize the re-use of business information
- to support and enhance information interoperability across multiple business situations
- by direct implementations of interfaces and
- with minimized mapping efforts.
Local Payments With Final Posting (Future)

- Company
  - In-House Bank
    - Account management
  - Partner bank
- Partner in Foreign Country
  - Foreign In-House Bank
  - House bank
- Cash Center of Company
  - Account management
  - Foreign In-House Bank
- Cash Center in Foreign Country
  - Account management

Context-specific Parts
Reusable Parts

Payment
Bank statement
Implementation < 75% less effort
Almost no mapping required

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Harmonization and Maintenance of Repository Content

Content of Repository can be enriched step by step with extensions done in industry initiatives and customer projects.

Extensions are classified using the specific context categories.

Process to recognize new requirements and harmonize them if needed by different industry solutions or customers.

Process can re-use UN/CEFACT harmonization experience.
A syntax-independent **methodology** for developing a common set of semantic building blocks.

A way to identify, capture and **maximize the re-use** of business information to support and enhance information interoperability across multiple business situations.

UN/CEFACT Core Components Technical Specification (CCTS) was developed by the ebXML Project, now **organized by UN/CEFACT** and ratified as ISO 15000 standard.
Key Features

Core Data Types
- Fixed set (text, identifier, code, etc.)
- Fixed and unambiguous representation of values based on international standards

Naming Rules
- Based on ISO 11179
- Comparable with a grammar of a natural language

Design Rules
- Aggregation and assembling of business information
- Based on Codd's rules and normalization forms
- Follows consequently the OO-approach

Context-Driven Principle
- Categorization of common and context-specific parts
- Used harmonization and consolidation
- Rules for selection of context specific parts (subsets)

Extensibility Mechanisms
- To address real business requirements
Syntax & Semantic with XML Naming and Design

XML Naming and Design Rules
- UN/CEFACT CCTS for semantic & structure
- W3C-Recommendation for syntax and representation

Makes the Core Components reusable by using all necessary XML based languages. It could be used for:
- building business documents
- defining application interfaces
- creating database tables
- as basis for data modelling
- creating user interfaces
- business objects in internal workflows
- defining partner profiles, catalogue structures etc.
Rules for Creation of Core Components

1.) Determination of type
   - Aggregation (ABIE)
   - Basic (BBIE)
   - Data Type

2.) Writing of the semantic description in one or two sentences.
   These descriptions should include the terms of ISO 11179,
   which are comparable to the parts (subject, predicate, object) of a sentence:
   - Object Class Term
   - Property Term
   - Representation Term

3.) Generation of the Dictionary Entry Names according to CCTS rules

4.) Automatic generation of...

JAVA Code

public void WriteOutToPS(PrintWriter ps, boolean fullDoc) {
    String s, sa;
    if (ps == null) return;
    if (fullDoc == true) {
        /* Output XML node */
        ps.print("<ValidityPeriod>
        " + s + "</ValidityPeriod>
        " + s + "</ValidityPeriod>
        " + s + "</ValidityPeriod>
    }
    s = tf_StartDate.getText(); if (s.equals("") == false) {
        ps.print("<StartDate>"); ps.print("" + s + "</StartDate>
        " + s + "</ValidityPeriod>
    }
    s = tf_EndDate.getText(); if (s.equals("") == false) {
        ps.print("<EndDate>"); ps.print("" + s + "</EndDate>
    }
    s = tf_Duration.getText(); if (s.equals("") == false) {
        ps.print("<Duration>"); ps.print("" + s + "</Duration>
    }
    s = tf_TypeCode.getText(); if (s.equals("") == false) {
        ps.print("<TypeCode>"); ps.print("" + s + "</TypeCode>
    }
    s = tf_IssueDate.getText(); if (s.equals("") == false) {
        ps.print("<IssueDate>"); ps.print("" + s + "</IssueDate>
    }
    s = tf_InternalID.getText(); if (s.equals("") == false) {
        ps.print("<InternalID>"); ps.print("" + s + "</InternalID>
    }
    s = tf_ExternalID.getText(); if (s.equals("") == false) {
        ps.print("<ExternalID>"); ps.print("" + s + "</ExternalID>
    }
    s = tf_Description.getText(); if (s.equals("") == false) {
        ps.print("<Description>"); ps.print("" + s + "</Description>
    }
    }
    }
    }
    }
}
### Context of Core Components

<table>
<thead>
<tr>
<th>Vertical Business</th>
<th>Business Procurement &amp; Collaboration</th>
<th>Business Intelligence, Process &amp; Workflow</th>
<th>Customer Relationship Management</th>
<th>Financials</th>
<th>Human Resources</th>
<th>Product Lifecycle Management</th>
<th>Supply Chain Management</th>
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<tbody>
<tr>
<td>Consumer Industries</td>
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**Horizontal Business**

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The Advantage of Common and Context Specific Semantic

Same and unambiguous understanding of business information in all industry areas (semantic) and applications (technique) → Therefore: high reusability in semantic and technique

Same usage of business information internally (applications) and externally (between business partners)

Less effort for internal and external interoperability in long term: Because of massive reducing of internal or external mapping
Industry Standards Enable New Scenarios

Order to Cash
Procure to pay
Make to Stock
Data Harmonization

Design Collaboration
Plan to Performance
Product Registration
Supply / Demand Mgt

Batch Management
Recipe Management
Production Supply & Execution
Quality Management & Compliance
CRM, SCM, FIN, HCM, ERP

UN/CEFACT CCTS + XML NDR, and Other Standards
Business Process Management
Internet Portal
Knowledge mgt, Business Intelligence
Integration platform
Cyber Security
Open, heterogeneous computing
Solution Manager for SAP Infrastructure

Platform Interaction / Validation
Reliable Architecture
Scalable Transactions
High volume capabilities
SAP NetWeaver™
The integration and application platform for lower TCO

An open integration and application platform that enables change!

Unifies and aligns people, information and business processes
- Integrates across technologies and organizational boundaries
- A safe choice with full .NET and J2EE interoperability

The business foundation for SAP and partners
- Powers business-ready solutions that reduce custom integration
- Its Enterprise Service Architecture increases business process flexibility

Process Integration is provided by SAP Exchange Infrastructure
- Open and heterogeneous
- For SAP and non-SAP applications
- For A2A and B2B scenarios
- For synchronous and asynchronous communication
- For cross-component Business Process Management
- Based on Web Service and industry standards
SAP XI in A2A and B2B Landscapes

Integration Builder

- SAP GDTs
- BPM
- Mapping
- Routing
- Technical Channels
- File, DB, JMS
- IDoc RFC
- Other Channels

Security

- Industry Standard Protocols
- Native XI B2B Messaging
- XI Partner Connectivity Kit
- Different Channels
- SOAP
- Others
- RNIF

Document & Process standards

* Additional channels also provided by partners

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Support of UN/CEFACT Standards by SAP XI

- Business Package
  - Definition by BPEL/WSDL
  - Mapping to other XML based Standards
  - CCTS based libraries (called SAP GDTs)
  - Representation of CCs in ABAP and/or Java via proxies

- SAP Industry Solution (e.g. High Tech)
  - IDoc/Proxy

- 3rd Party Application

- Integration Repository
  - Business Scenarios
  - Business Processes
  - Mappings
  - Message Interfaces

- Integration Directory
  - Routing Rules
  - Collaboration Agreements
  - Collaboration Profiles

- Integration Server
  - Business Process Engine
  - Integration Engine
  - Adapter Engine
    - Resource Adapter
    - Messaging Queuing
    - Security Handling
  - Industry Protocol Adapter

- Implementation
  - Routing Logic
  - Business Partners

- Execution of BPEL/WSDL
  - to Business Partner

- Support of UN/CEFACT Standards by SAP XI
  - Message Interfaces
  - Business Processes
  - Business Scenarios
  - Mappings
Interfaces and Global Data Types in the Integration Repository

Interfaces in the Integration Repository

- Scenario-driven development of interfaces
- Outside-in development of interfaces with reference to Global Data Types and standards

Interface Types

- B2B interfaces (B2B) – for external exchange between business partners
- A2A interfaces (A2A) – for internal exchange between SAP and non-SAP applications

B2B/A2A interfaces consist of Global Data Types only

Global Data Types in the Integration Repository

- Global Data Types are SAP-wide defined data types with business content, as found in standards, or should be found in standards, or which are structured in accordance with standards.
Meta Structure in SAP XI

- **B2B / A2A - Message Data Type**
  - Context Data Types (CDT)
    - **Generic Data Types (GDT)**
      - Core Component Types (CCT)
        - W3C Data Types
          - **Example:**
            - PurchaseOrderMessage
            - InvoiceMessage
            - ShipToLocationAddress
            - ProductBuyerID
            - Address
            - ProductID
            - Description
            - Quantity
            - Identifier
            - Text
            - float
            - string

- Has Context
- Has no Context

Business semantics

No Business semantics
Uniform structure and typing

Top-Down:
- Uniform structure via Interface Templates
- Identical build-up structure for all interfaces

Bottom-up:
- Uniform typing of SAP GDTs be CCTS conventions
- A Message Interface is a hierarchical structure.

In B2B and A2A Interfaces the same subject matter is always described with the same data type
Closed Loop Process Vision

- UN/CEFACT Standard - Methodology
- Standards - Content
  - Purchase Order

Generic Applications
  - Purchase Order

Industry Solutions
  - Purchase Order

Customers
  - Purchase Order

Context specific extensions
Re-usable parts
Enterprise Services Architecture

Extended Order-to-Cash Process

SAP Net Weaver
- Sourcing
- Order Management
- Fulfillment Coordination
- Settlement

Enterprise Services

SAP Net Weaver
- Sourcing
- Order Management
- Fulfillment Coordination
- Settlement

SRM (Services) Internal

ERP (Services) Internal

CRM (Services) Internal

Collaborative Business Data based on UN/CEFACT CCTS

Business Process (BPEL)
- WSDL

Web services

Context
- Purchase Order

Central Reference Repository

Web services

Business Process (BPEL)
- WSDL

Context
- Order Confirmation
Message Interface: ProductActivityNotification_In

Context specific subset for SCM

Direction and type of exchange

Message Data Types
Message & Data Type: ProductActivityNotification

Structure of Message Data Type based on Core Components
Example: CashDiscountTerms in the Integration Repository

- Structure of SAP GDT based on CCTS
- XML Schema based on UN/CEFACT XML Naming and Design Rules
- Detailed documentation of each SAP GDTs
XSLT Mapping Content: R/3 IDoc to SAP GDTs (CCs)

SAP Global Data Types based on CCTS

Assigned to specific IDoc elements
Mapping and Routing in XI

Display XML Message Versions

- <xml version="1.0" encoding="UTF-8" ?>
  - <PROACT01>
    - <IDOC BEGIN="1">
      - <EDI_DC40 SEGMENT="1">
        <MANDT>100</MANDT>
        <DOCNUM>000000000499845</DOCNUM>
        <DOCREL>46C</DOCREL>
        <STATUS>30</STATUS>
        <DIRECT>1</DIRECT>
        <OUTMOD>2</OUTMOD>
        <IDOCTYP>PROACT01</IDOCTYP>
        <MESTYP>PROACT</MESTYP>
  
- <xml version="1.0" encoding="utf-8" ?>
  - <ns1:ProductActivityNotification
    xmlns:ns1="http://sap.com/xi/SCMBasis/Global"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <ID>0000000000499845</ID>
    <CreationDateTime>2003-08-18T17:32:11Z</CreationDateTime>
  - <ReceiverParty>
    <ReceiverID>SMI_VN01</ReceiverID>
  </ReceiverParty>
  - <Item>
    - <ShipToLocation>
Conclusion

**SAP NetWeaver** is SAP’s integrated platform for application development and cross-platform integration

**SAP XI Adapter Framework** provides a rich and extensible means for connectivity to

**Web Services Standards** provide adapter-less cross-platform interoperability due to broad industry support

**UN/CEFACT CCTS (ISO 15000-5)** addresses the need for semantic interoperability

**SAP** actively participates in the development of open standards for maximized interoperability and minimized TCO
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