

Information—Integration—Intelligence Solutions



The Netherlands
Ministry of Justice



Webinar – May 13, 2010

Netherlands Ministry of Justice Metadata Workbench

Supporting the Complete Semantic Application Lifecycle



Webinar Agenda and Logistics

Agenda

- | | |
|------------------------------------------------------|--------|
| <input type="checkbox"/> Welcome | 5 min |
| <input type="checkbox"/> Brief Overview Presentation | 15 min |
| <input type="checkbox"/> Demo | 20 min |
| <input type="checkbox"/> Q&A | 10 min |
| <input type="checkbox"/> Close | |

Logistics

- ☐ Total Time for Webinar – 50 min
- ☐ Q&A: please type in questions during the webinar
 - ❖ We will be monitoring
 - ❖ Some selected questions will be read and answered during Q&A
 - ❖ All questions will be answered in writing and posted on TQ web site
- ☐ Recording? - Yes, it will be made available on TQ web site

Presenters



Ralph Hodgson

- *co-founder and CTO of TopQuadrant, Inc., a US-headquartered company that specializes in semantic technology consulting, training, tools and platforms;*
- *Lead Ontologist for the NASA NEXIOM Ontologies.*
- *Prior to starting TopQuadrant in 2001, Executive Consultant at IBM Global Services and founding member of the Portal and Object Technology Practices;*
- *Co-authored \Adaptive Information, published by John Wiley in 2004, and Capability Cases: A Solution Envisioning Approach, published by Addison-Wesley in July 2005.*
- *Member of INCOSE, and participates in the Model-Based Systems Engineering Initiative.*



Daniel Mekonnen

- *Semantic Solution Architect of TopQuadrant, Inc. since the fall of 2006.*
- *Semantic integration consultant for the Kennedy Space Center's Launch Control Systems group.*
- *Netherlands Ministry of Justice Metadata Workbench Application Developer.*
- *Ontologist for the NASA NEXIOM Ontologies.*
- *Prior to working at TopQuadrant, Aerospace and Missile Systems Engineer at General Dynamics.*

Goals of this presentation

❑ Explain:

- ❖ The Problem of XML Message Exchange
- ❖ The Solution: an Ontology-Based Solution for the design of CCTS-compliant XML Message Exchanges

❑ Demonstrate:

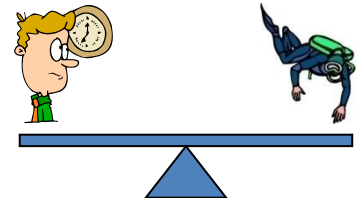
- ❖ The Netherlands Ministry of Justice Workbench for CCTS-compliant XML Schema Generation

❑ Provide some insight into how this was built using:

- ❖ Semantic Web Technologies RDF, OWL and SPARQL
- ❖ TopQuadrant's TopBraid Suite, SPIN and SPARQLMotion
- ❖ Adobe FLEX

❑ Finish in Time for Questions:

- ❖ Balance desire to do deep dives with attention to the time

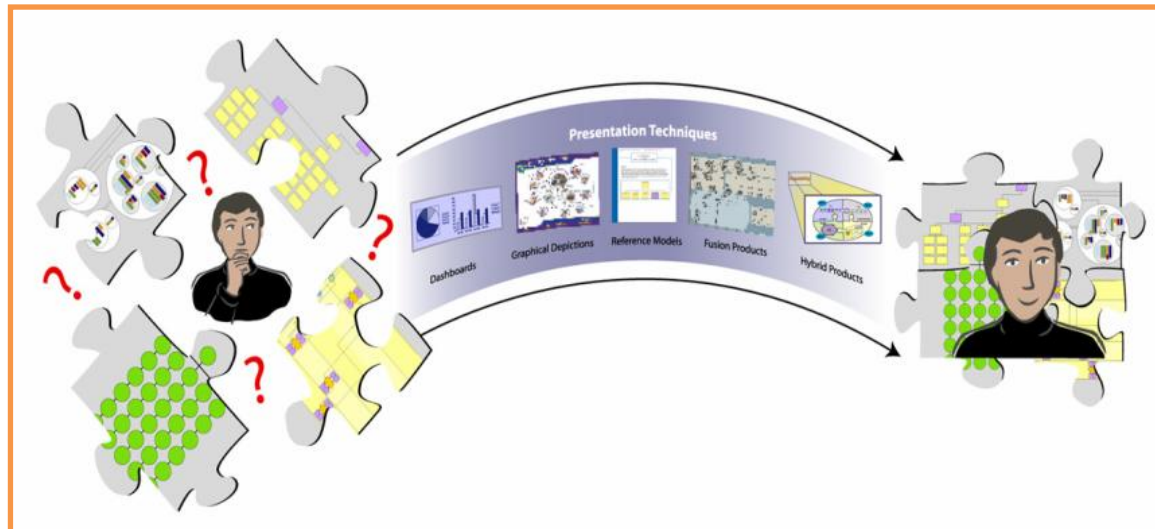


What Business Problem are we solving?

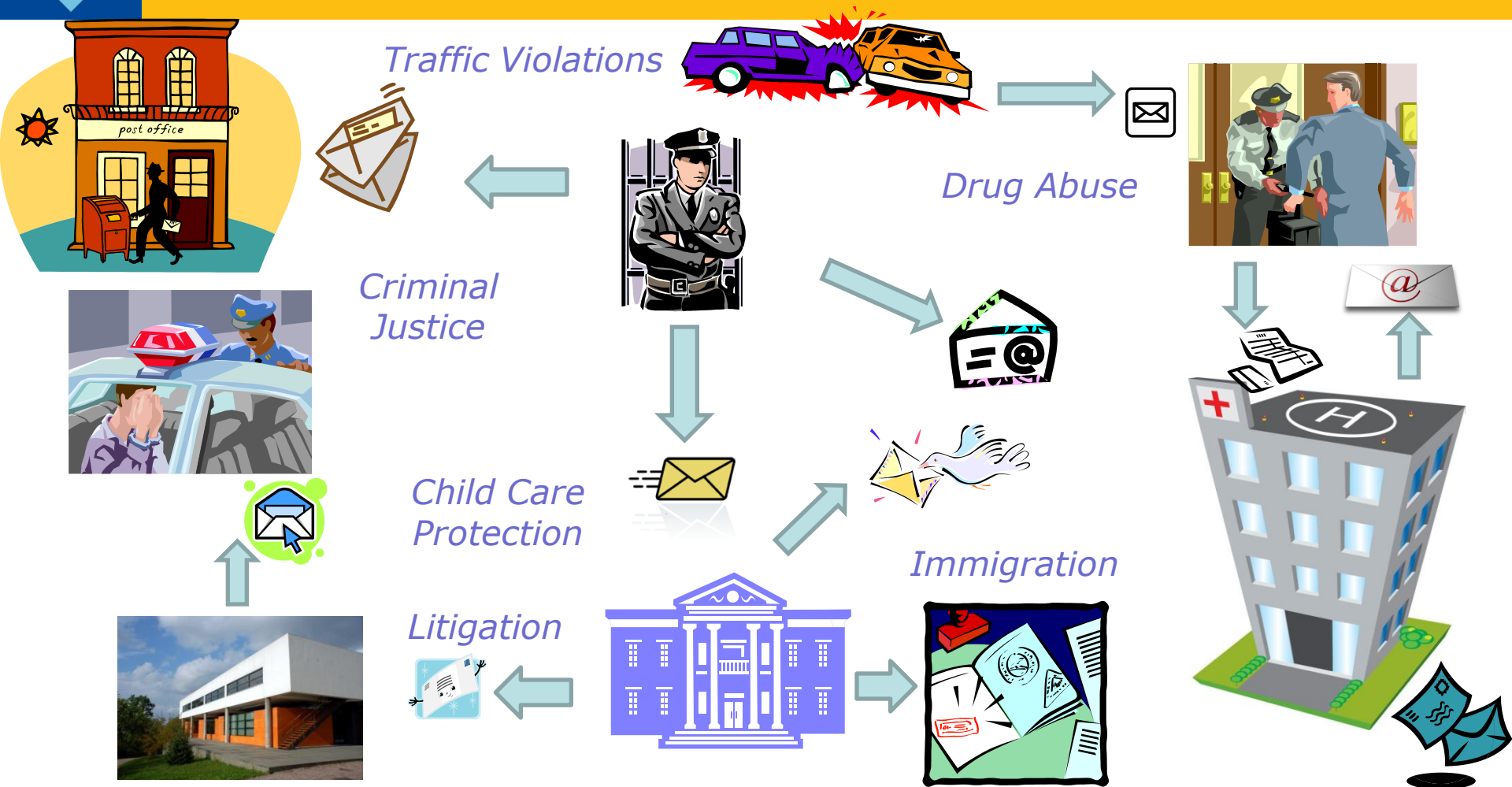
Systems that communicate effectively across company boundaries require common business semantics.

❑ Forces

- ❖ Data is in many different systems often not designed with sharing in mind
- ❖ Increasing need for a common standard across organizations
- ❖ Business documents/messages need to be tailored for local use



Justice Data Exchange covers many Domains of Law

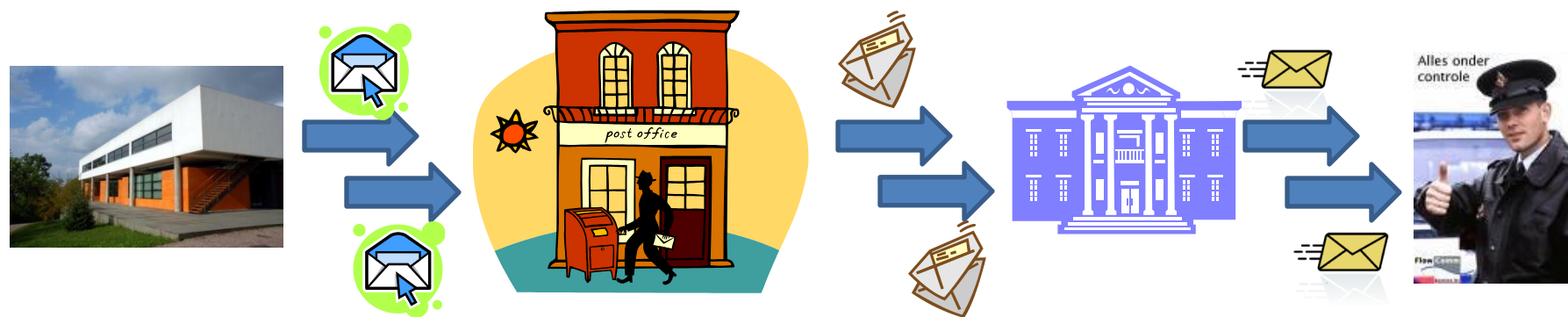


Seamless data exchanges are challenging:

Unique data requirements exist at courts, police, hospitals, border control, motor vehicle, local and federal offices.

Without Semantic and Structural Alignment, Data Exchanges result in significant failures and overheads

- ❑ Poor Legislative Compliance
 - ❖ Failure to have legislation changes show up in data exchanges
- ❑ Poor Message Localization
 - ❖ Unique data requirements are not addressed well
 - ❖ Rework and manually tailoring of schemas
- ❑ Poor Data Quality
 - ❖ Mistakes due to incomplete data and misinterpreted data
 - ❖ Incorrect data results in the need to re-send information.



The Evidence of the Problem for XML Message Builders

I am spending all my time comparing business components across different versions of XML Schemas.



What is the meaning of this business entity? Give me a proper definition.



How do we make an integrated model that makes sense?



Am I working with the right XML Schema?



How do I share domain knowledge with my colleagues?



Actually, I don't want to be bothered with details of XML Schema at all !



I don't like to retype everything by hand.



I need more context, please.



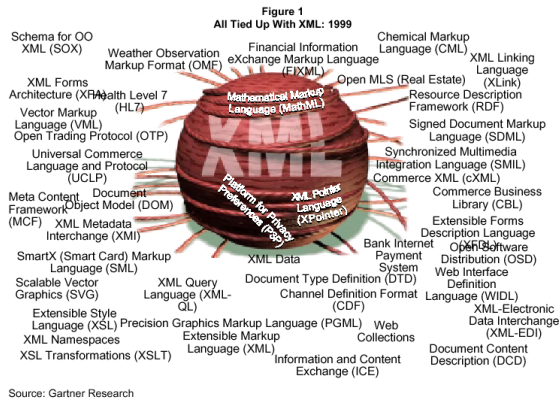
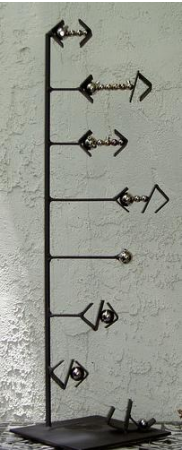
I want generic building blocks and reuse them!



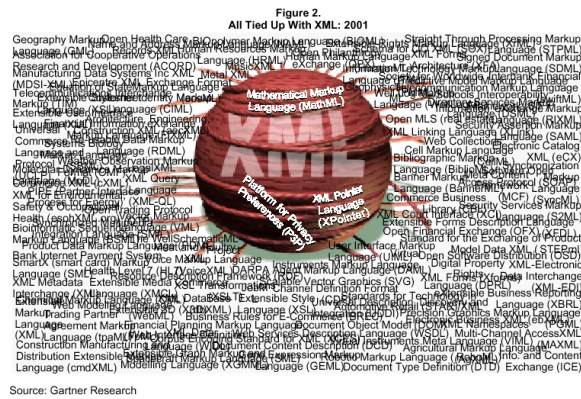
Semantics can't work without a conceptual model.



Tangled Up in XML



Gartner: All Tied Up with XML: 1998



Gartner: All Tied Up with XML: 2001



2010: SOA and the “Cloud”

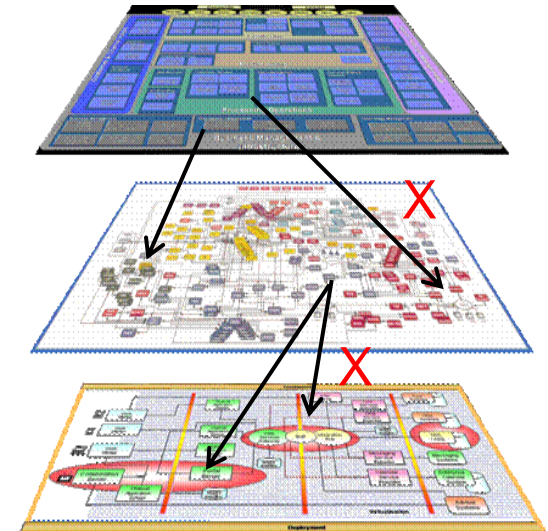
XML Challenges:

- ❖ How do you have common vocabularies
- ❖ How do you have a common way to construct schemas
- ❖ How do you represent data in a consistent way?
- ❖ How do you represent data types in a consistent way?
- ❖ How do you preserve semantics?

“Living in the XML Ecology” Challenges

Seamless data exchanges are challenging:

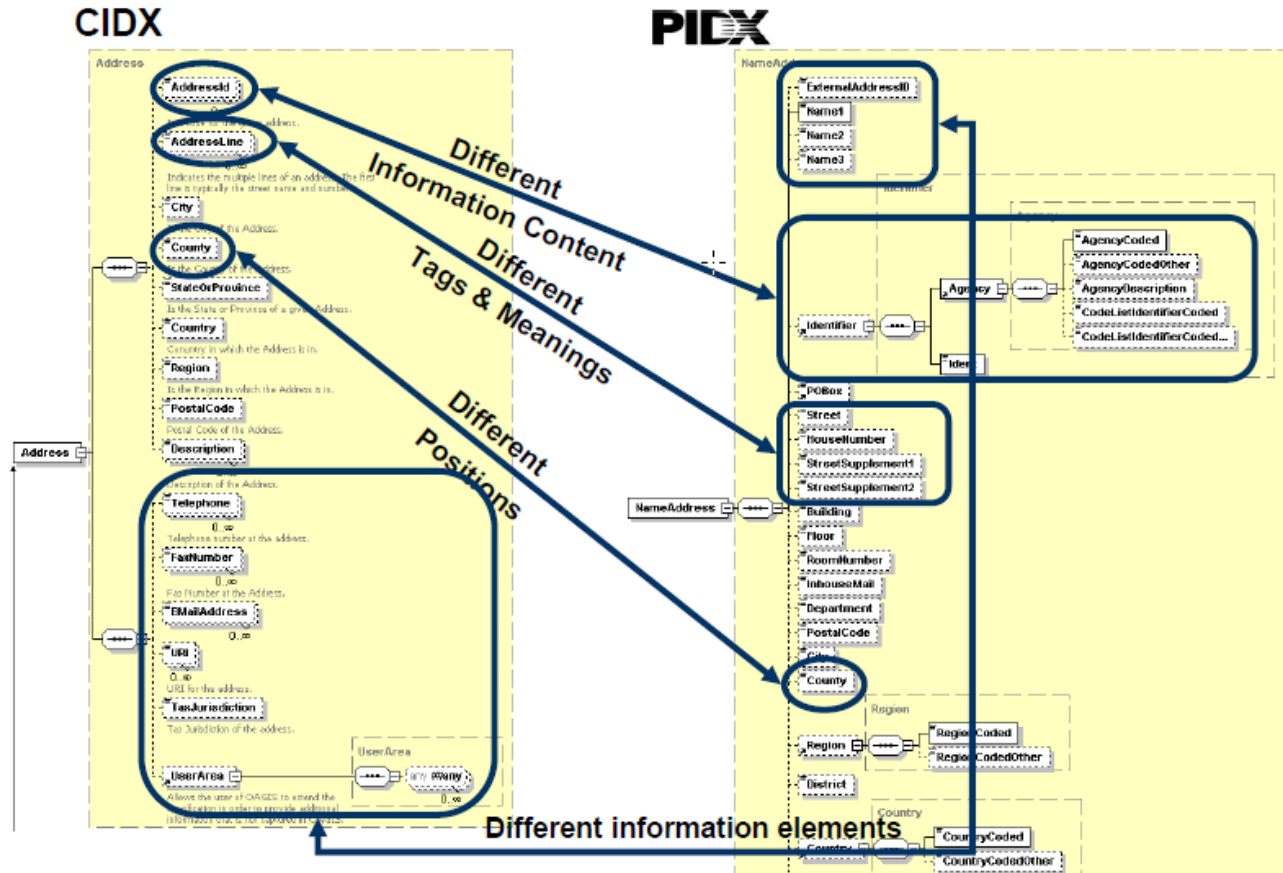
- ❑ Addressing the "standards dilemma"
 - ❖ Too many exchange mechanisms and standards
 - ❖ Lack of conformance to XML (and OWL) Naming and Design Rules
- ❑ Brittleness in data models:
 - ❖ often very complex,
 - ❖ often incomprehensible
 - ❖ Sometimes non-implementable.



What can go wrong with XML

Example Please!

Barriers to Semantic Interoperability



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THE BEST-RUN BUSINESSES RUN SAP™



Source: "CCTS – Semantic Data Modeling Within and Across The Firewall", Mark Crawford and Gunther Stuhec, SAP

TopQuadrant's Ontology-Driven CCTS Message Builder Solution



First an Industry Survey of Interoperability Standards:

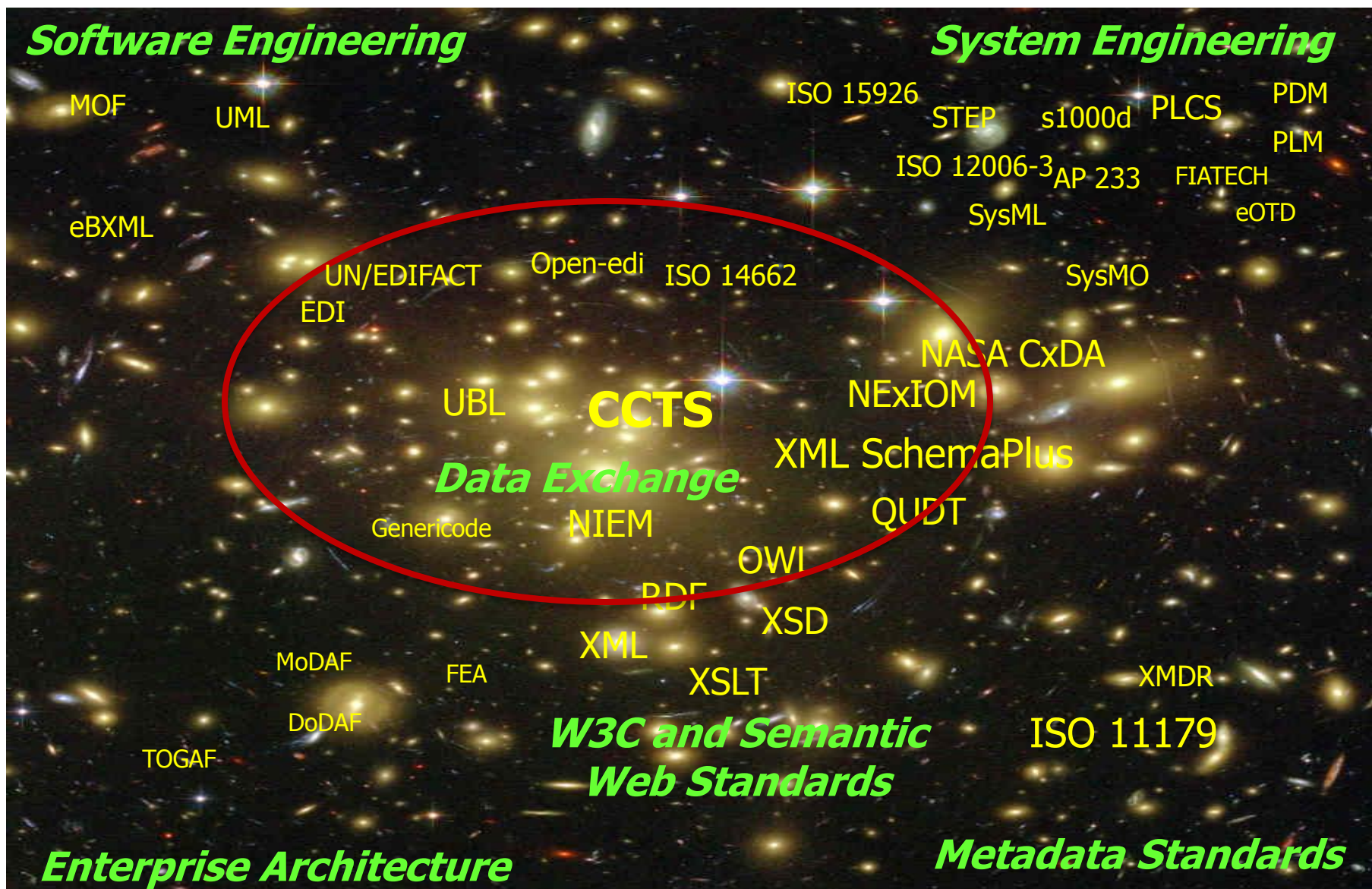
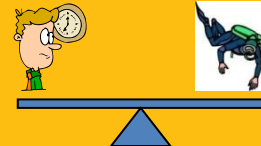
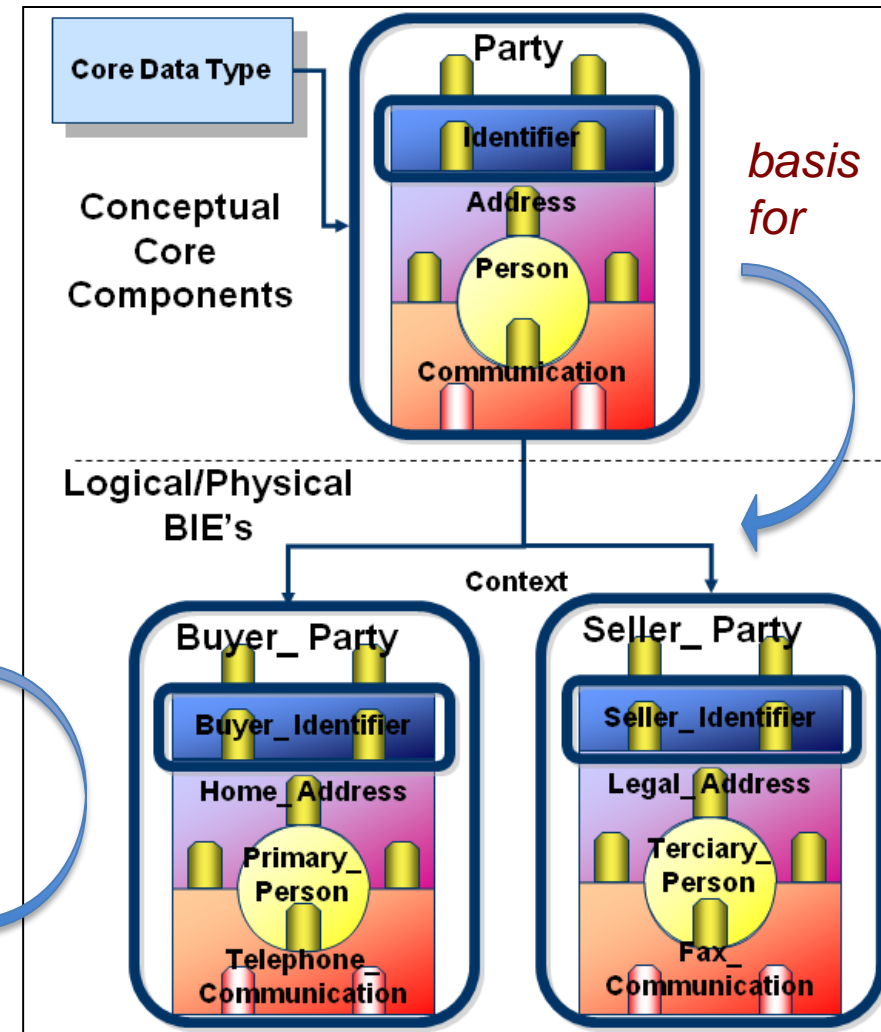


Image source: <http://hubblesite.org/newscenter/archive/2003/01/> - Abell 1689 deep space image

Why Choose the UN/CEFACT CCTS Core Components Technical Specification?

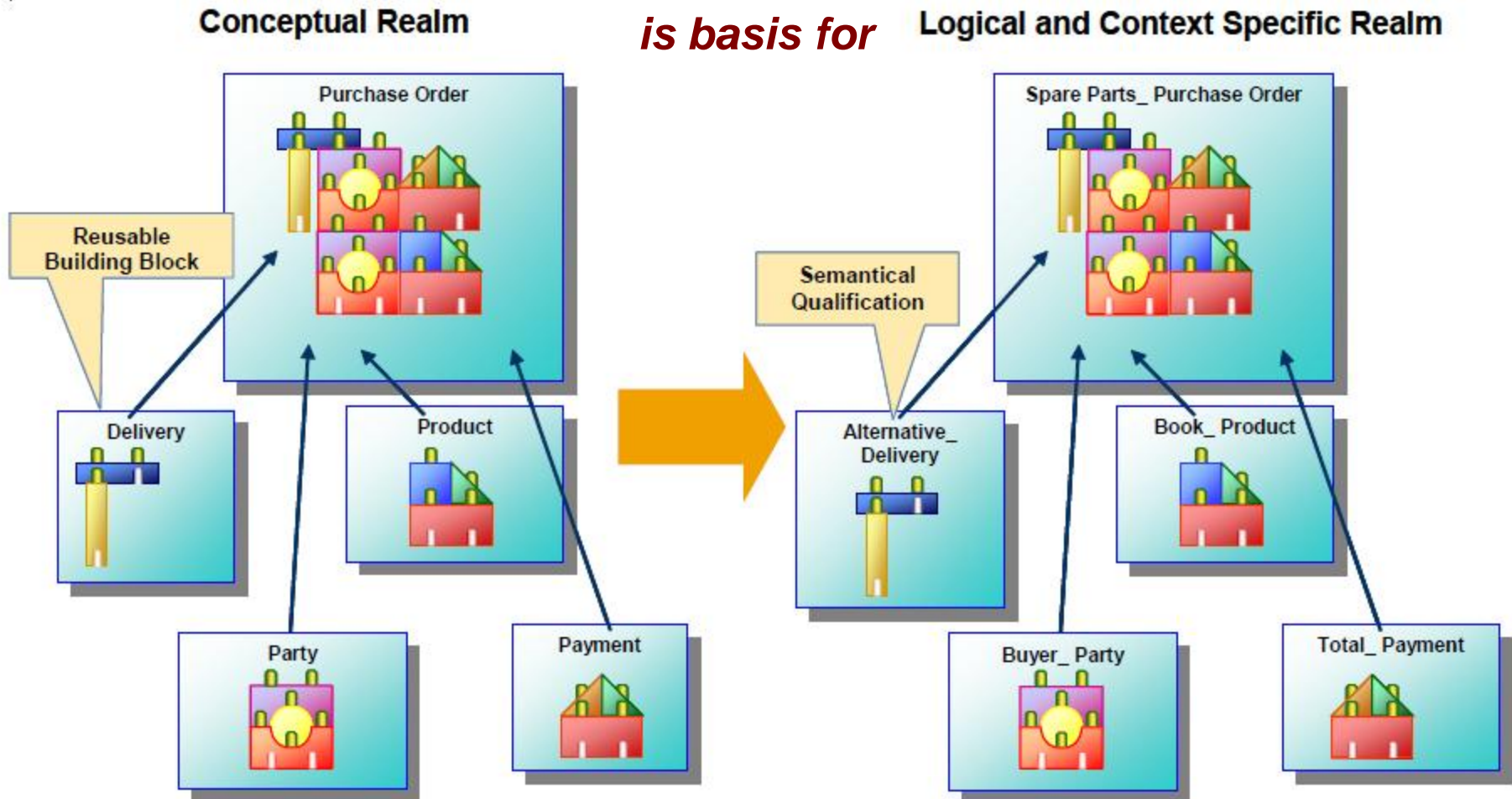
- ❑ UN/CEFACT CCTS – a standard with growing adoption
 - ❖ Reusable building blocks for building business documents
 - ❖ Based on a common semantic model
 - ❖ Context support for industry/domain specific documents
- ❑ CCTS at a Glance:
 - ❖ Core Components: *basis for*
 - Basic Core Components, Aggregate Core Components, Association Core Components
 - ❖ Business Information Entities
 - Basic Business Information Entities, Aggregate Business Information Entities, Association Business Information Entities



ref: "Electronic Data Interchange", Philipp Liegl, Business Informatics Group, Institute of Software Technology and Interactive Systems, Vienna University of Technology

CCTS Standard – “Building Blocks”

Semantics of the business information is based on a standard grammar and library that is well known and understood by both humans and machines.



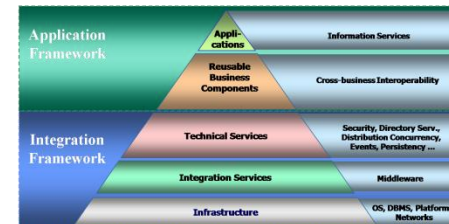
From SAP Article: [How to Solve the Business Standards Dilemma - The Context Driven Business Exchange](#)

UN/CEFACT CCTS – has been widely adopted

- ❑ Multiple Industries: (many use it through [OAGIS](#))
 - ❖ Automotive, Retail, eCommerce, Aerospace, ...
([Who uses OAGIS?](#))
 - ❖ Manufacturing ([Standards for Manufacturing Systems Integration](#))
 - ❖ Telecom ([OAGIS at SonyEricsson](#))



GCSS-AF Architecture
Reference Architecture



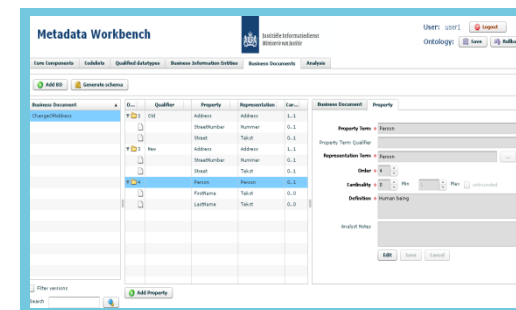
❑ Government Data Exchange

- ❖ USAF ([US Air Force/Open Applications Group Activities](#))
- ❖ Department of Navy ([XML Naming and Design Rules](#))
- ❖ DOD, DCMA ([Using Data Exchange Standards to Improve Program Management Data Quality](#))

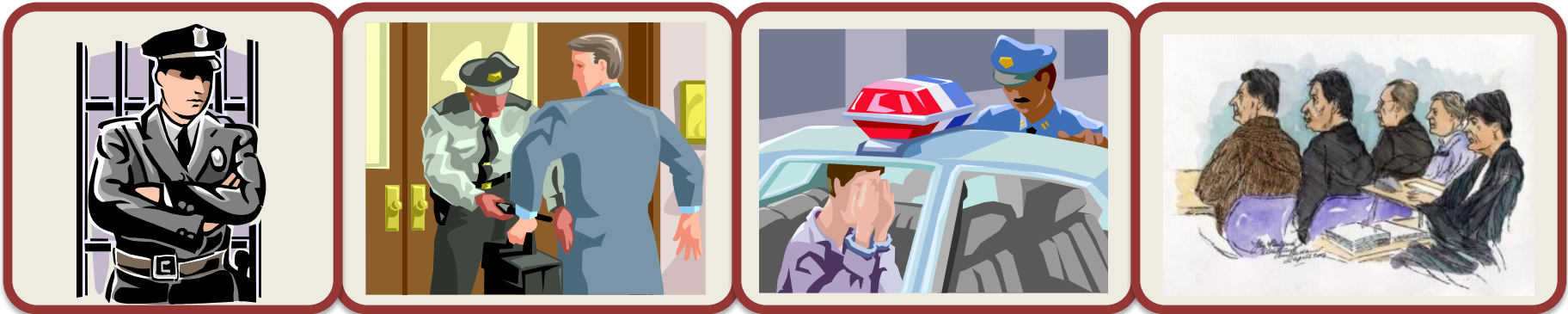


❑ And by Vendors

- ❖ SAP ([UN CEFACT CCTS – SAP Developer Network](#))
- ❖ IBM
- ❖ TopQuadrant



TopQuadrant's Metadata Workbench Solution *at* The Netherlands Ministry of Justice



The Ministry of Justice's motivations for using RDF / OWL with CCTS



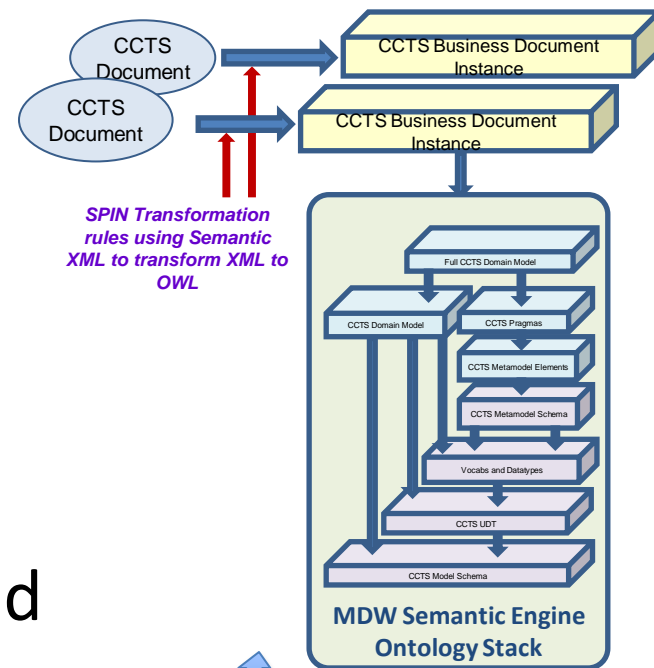
- ❑ **Past:** approaches were limited
 - ❖ Version control only for each project.
 - ❖ No reuse and much manual work

- ❑ **Now:** use of RDF/OWL means
 - ❖ Conceptual models
 - no longer in the heads of the modelers.
 - ❖ Traceability
 - Impact assessment/version control no longer done manually

❖ Reuse of

- Components
- Vocabularies and code-lists

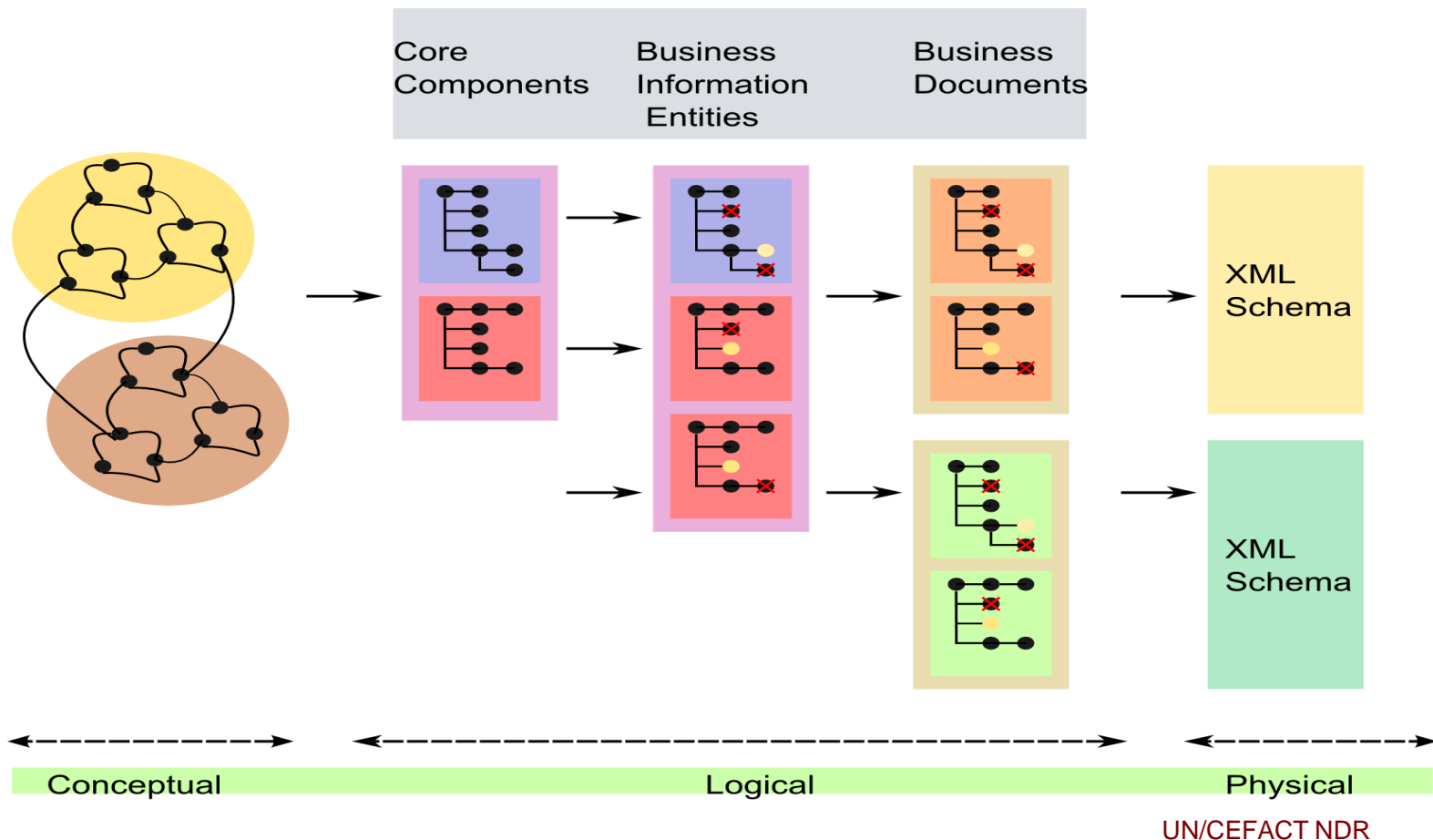
- ❑ **Future:** support for inferencing and ontology-based process design



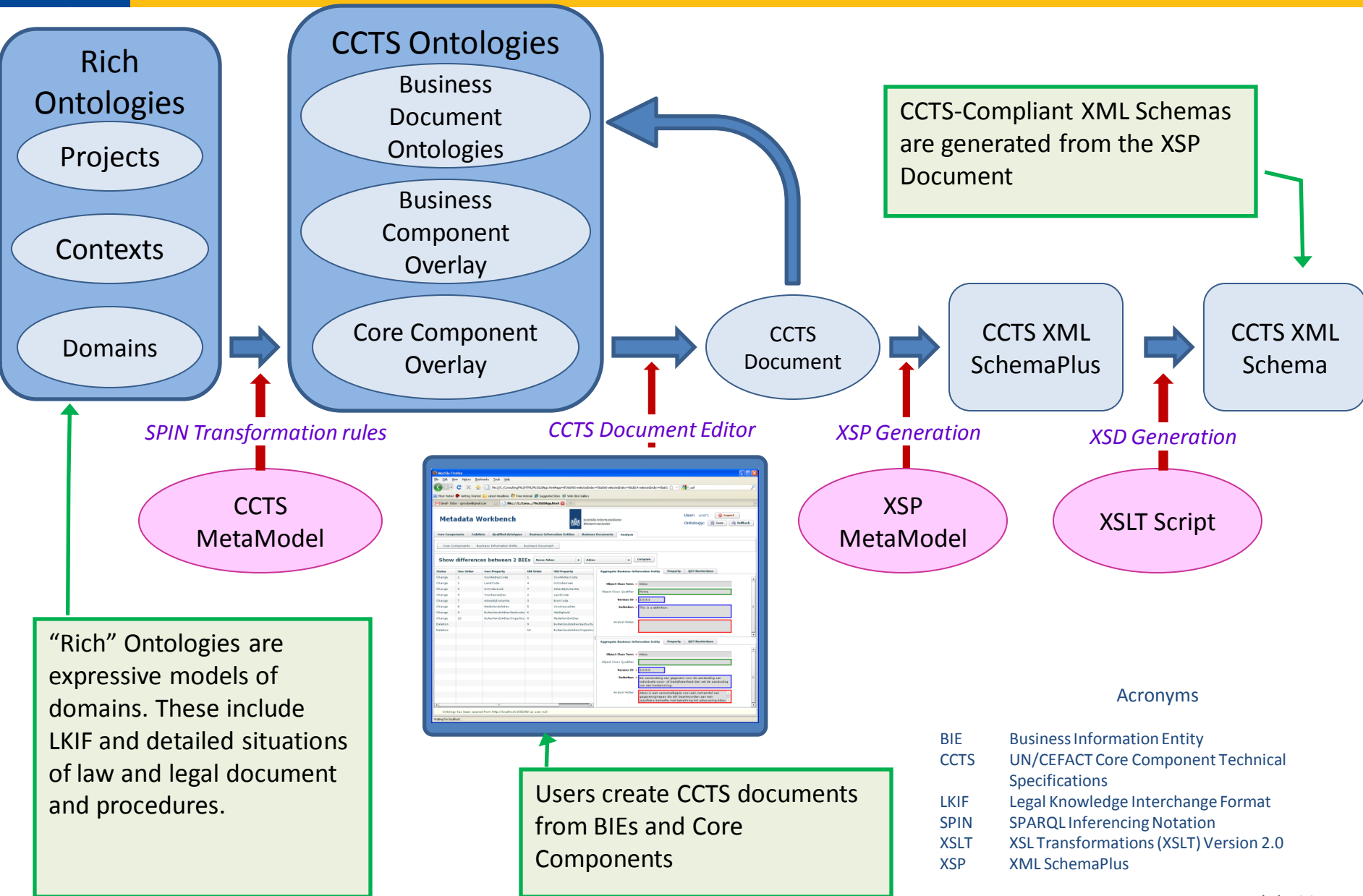
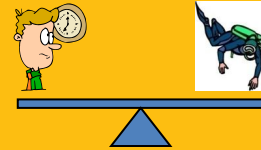
Ontology-Driven Approach to Message Design for Interoperability

Solution: Ontology-Based Metadata Workbench:

Transform Domain Models into CCTS Ontologies and allow Business Analysts to assemble business documents for electronic messages from Component Parts.

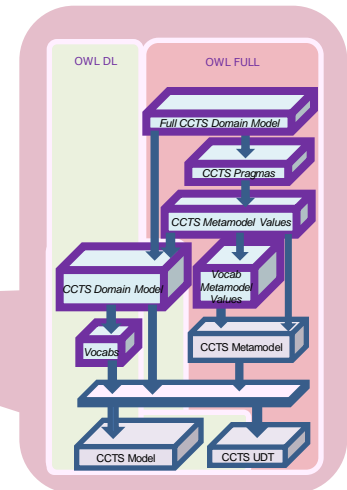
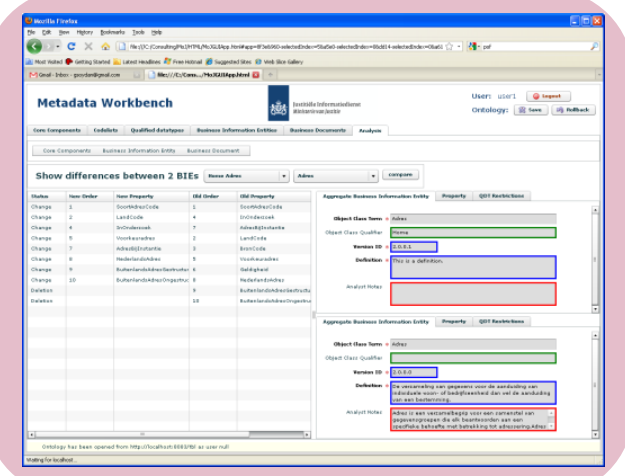
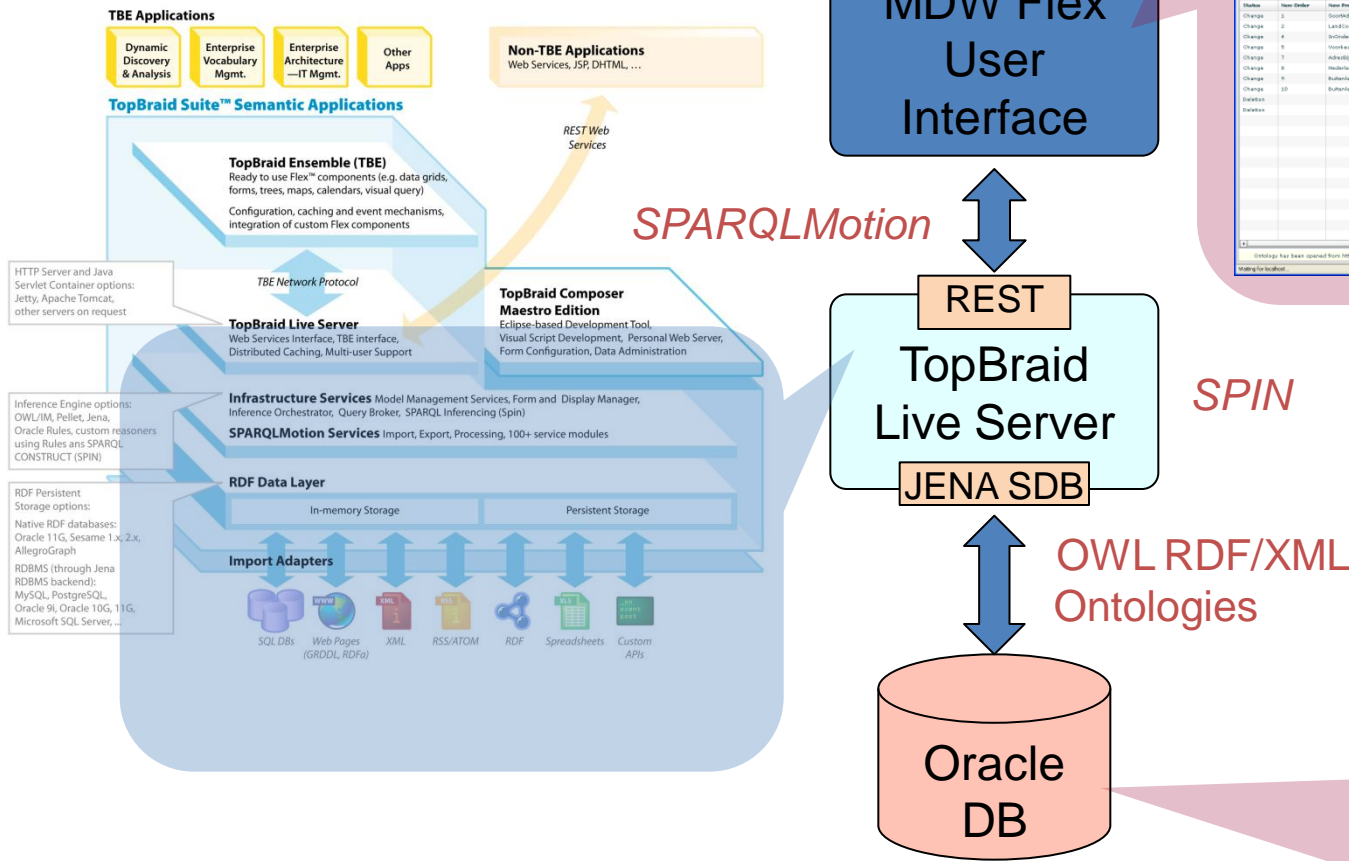
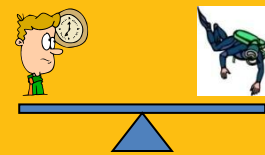


Creation of XML Message Schemas

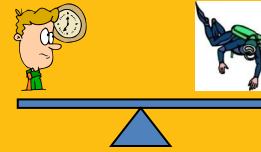




Metadata Workbench: Solution Architecture



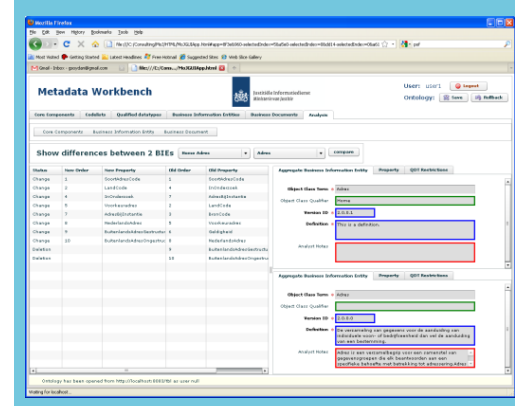
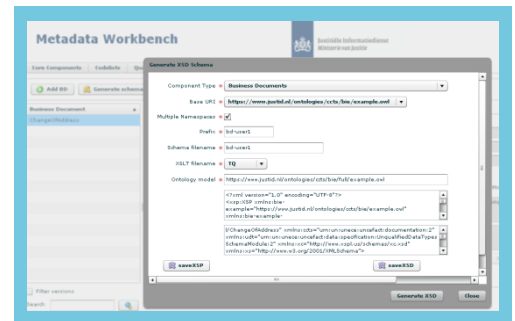
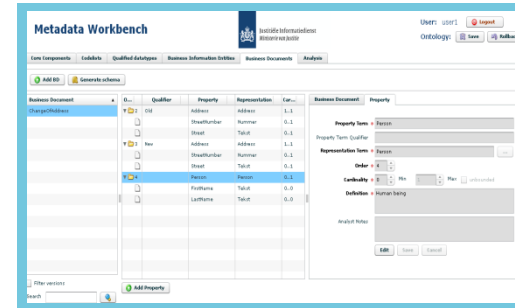
Metadata Workbench: Key Solution Capabilities



- ❑ CCTS Component and Business Entity Construction
 - ❖ Reusable Core Information Components
 - ❖ Purpose-specific Business Information Entities from Core Components
 - ❖ Business Documents (electronic messages) by combining one of more Information Entities
- ❑ Model Transformations
 - ❖ Domain Model Import
 - ❖ Generation of CCTS OWL Models from Domain Models
 - ❖ Generation of **XML Schemas** for Business Documents
- ❑ Vocabulary Management
 - ❖ **Code Lists** and **Data Types**
 - ❖ Terms, Qualifiers and Constraints in the form of Metadata
- ❑ Model Management and Evolution
 - ❖ Versioning, comparison, governance, difference comparisons

Demo: What you are going to see

- ❑ Scenario: Creating a Business Document
- ❑ UI Walkthrough
 - ❖ Core Components, Business Information Entities (BIEs) and Aggregate BIEs
- ❑ Data Types:
 - ❖ Unqualified and Qualified Data Types (UDTs and QDTs)
 - ❖ Vocabularies and Codelists
 - ❖ CCTS Metadata
- ❑ “Change of Address” Business Document
- ❑ XML Schema Generation
- ❑ Version and Change Management
- ❑ “Under the Hood”
 - ❖ Ontology Models
 - ❖ SPIN rules and SPARQL queries
 - ❖ SPARQLMotion scripts



In Conclusion

- ❑ An Ontology-Driven XML Message Builder based on UN/CEFACT CCTS is proving to have the following benefits:

- ❖ Business Benefits

- Accurate communication between organizations
- Agility in response to legislation changes
- Data Quality Guarantees
- Reduced Message Schema Development Costs

- ❖ Technical Benefits

- Reuse
- Semantic Consistency
- Traceability
- Version and Change Management

Semantic Web Technologies and TopBraid Suite were key to the implementation.

Some Resources

- ❑ *“The Netherlands Ministry of Justice Metadata Workbench: Composing XML Message Schemas from OWL Models”*, Ralph Hodgson, Harry Biersteker
 - ❖ <http://www.enterprisedatajournal.com/article/netherlands-ministry-justice-metadata-workbench-composing-xml-message-schemas-owl-models.htm>
- ❑ UN/CEFACT CCTS Specifications
 - ❖ http://www.unece.org/cefact/codesfortrade/CCTS_index.htm
- ❑ SPIN, SPARQL Inferencing Notation
 - ❖ <http://www.spinrdf.org>
- ❑ XML SchemaPlus
 - ❖ <http://www.xspl.us>



Thank You



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