A methodology for standards-driven metamodel fusion

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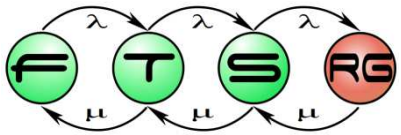


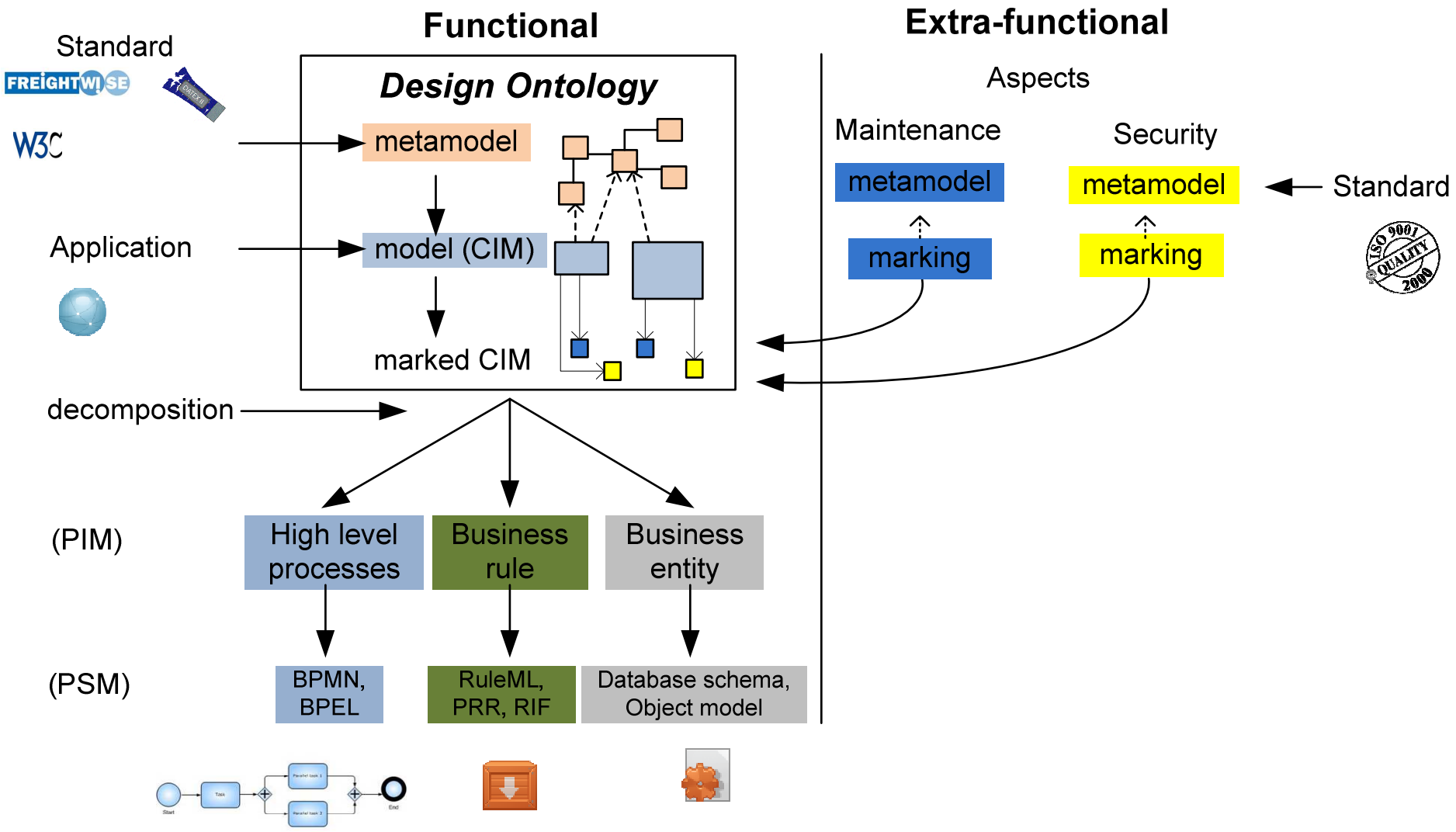
Motivation

- Apply model-driven engineering methods in various domains
- Business processes/services are continuously changing
  - Process logic
  - Data formats and standards
  - Service interfaces
  - Regulatory requirements
- Rigorous refinement is needed to ensure consistency and maintainability
- Design driven by a common metamodel (ontology)
  - Data structures (derived from standards)
  - Use cases
  - Requirements (“input should be validated”)
  - Patterns

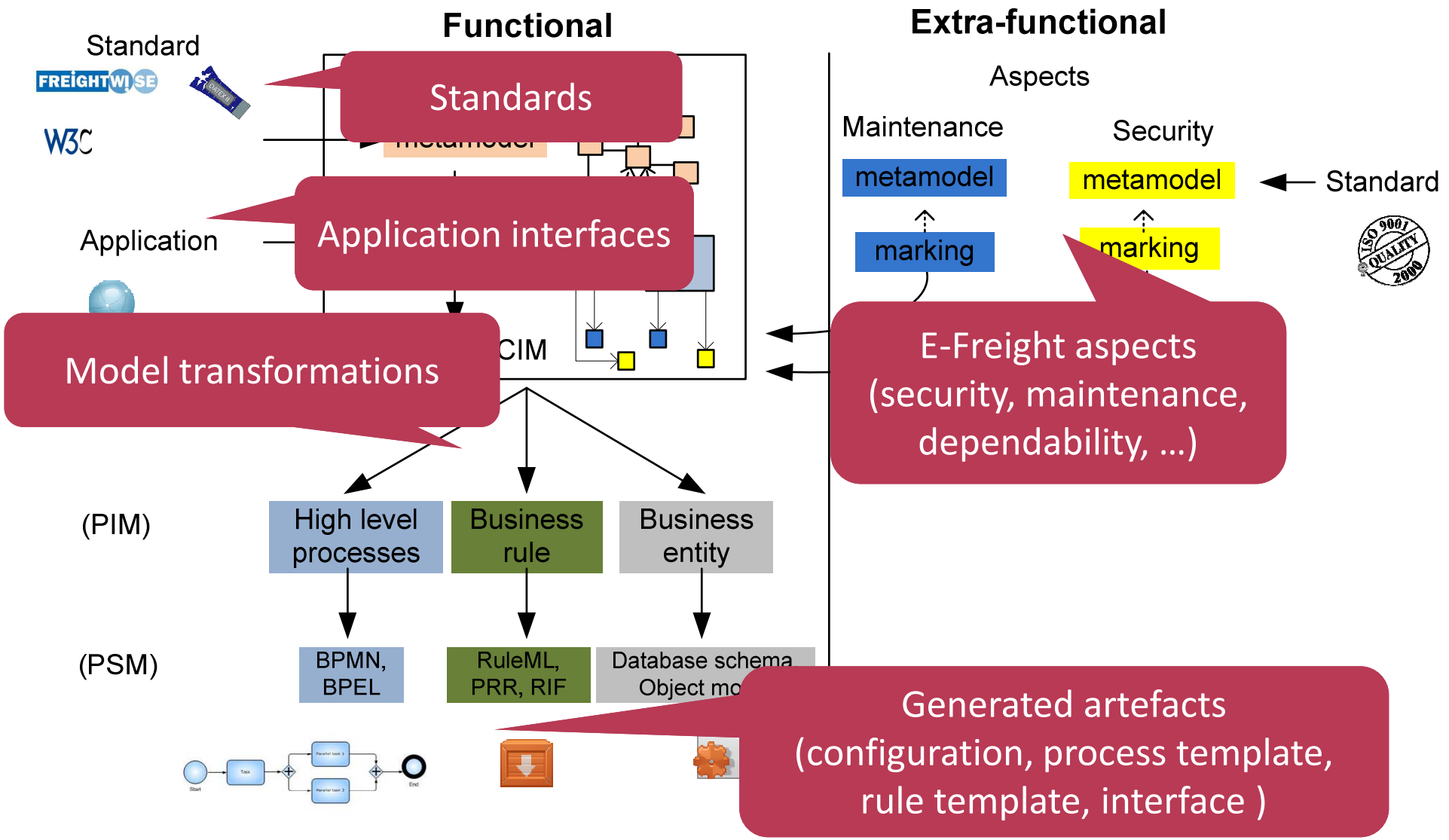
Goals

1. Guided expert review in early design
2. Systematic use of standards and design patterns
3. Portable and maintainable models
4. Multi-aspect validation
5. Deployment support

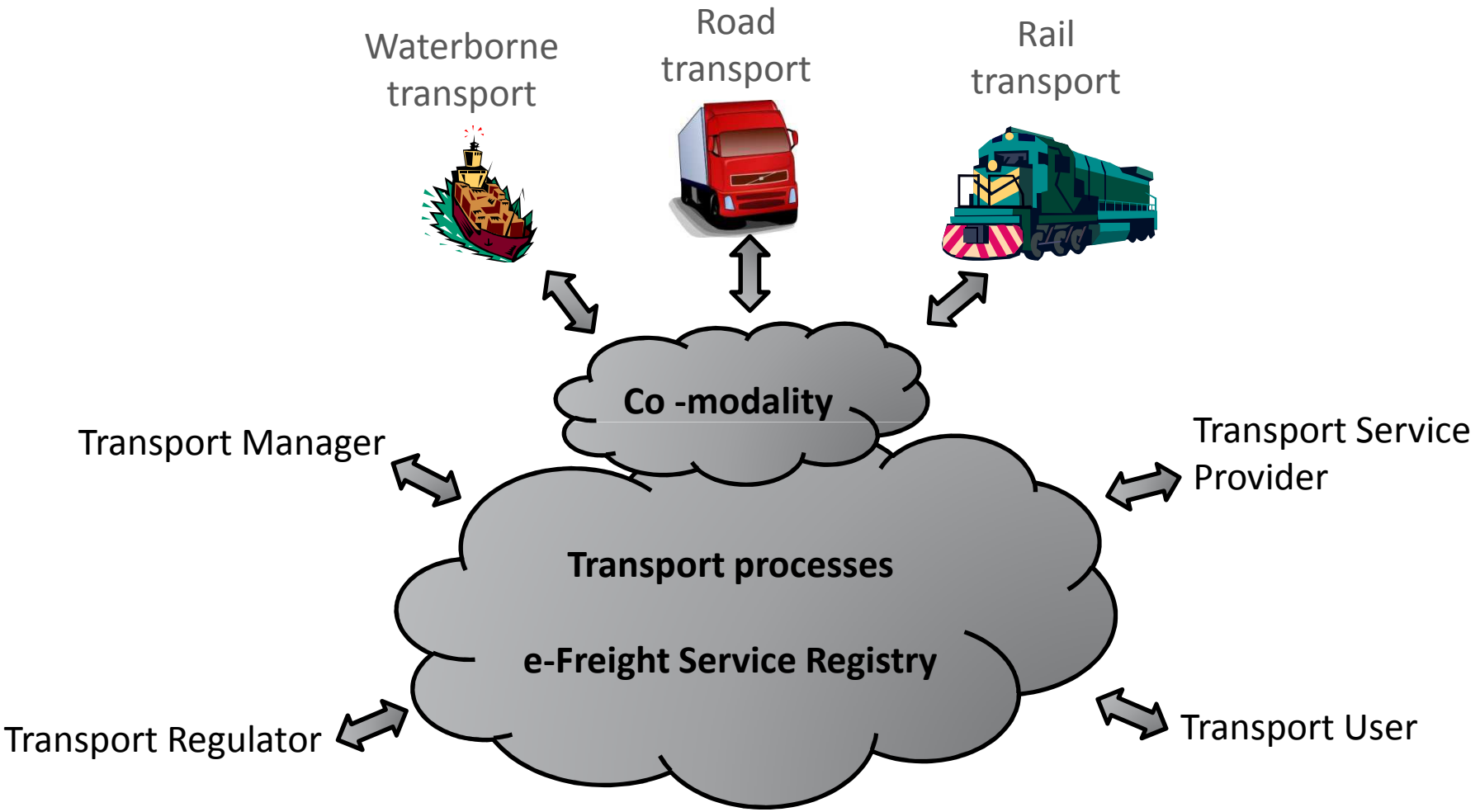
Ontology-supported MDA



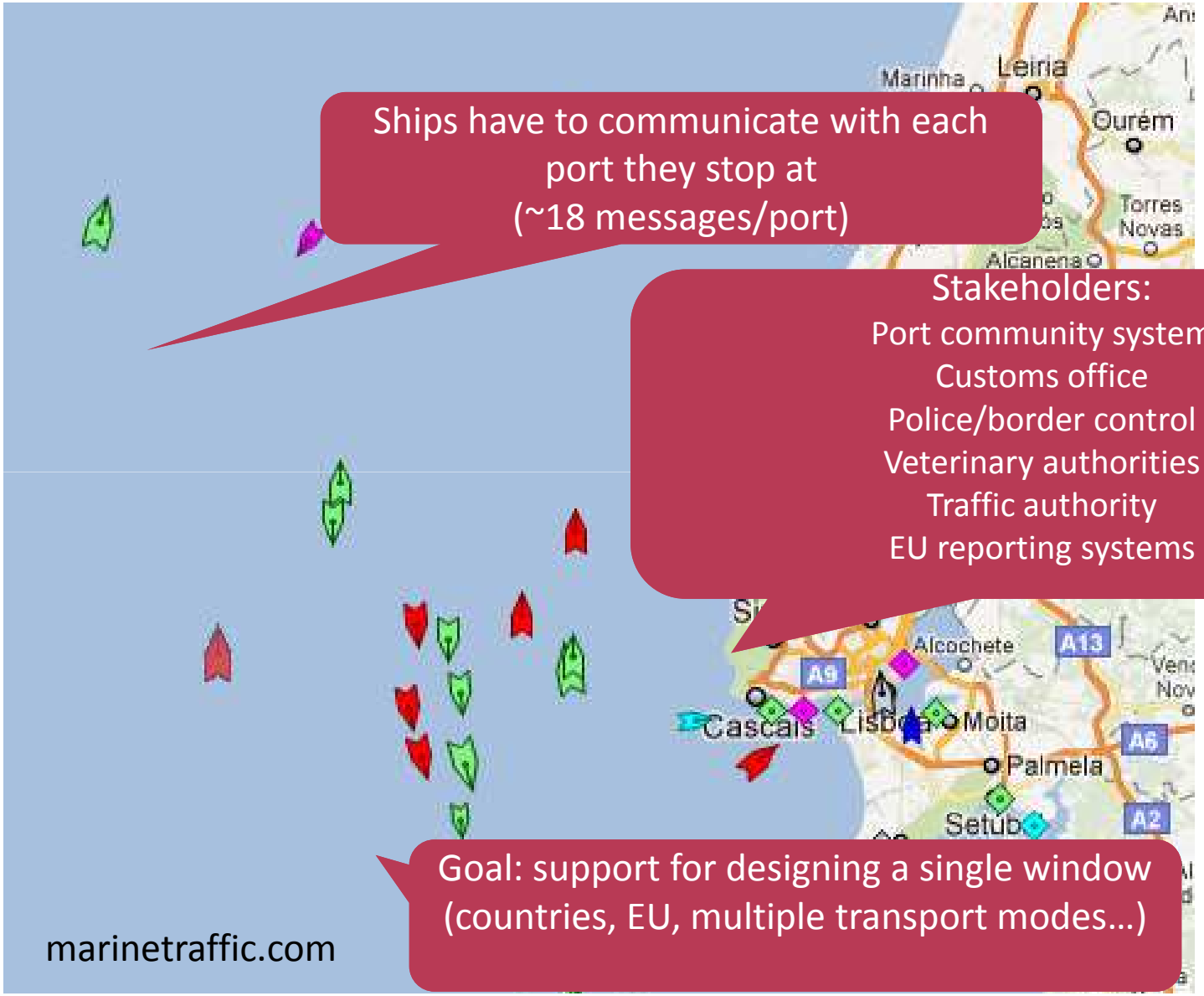
Ontology-supported MDA



Overview of e-Freight project



Case study: marine traffic

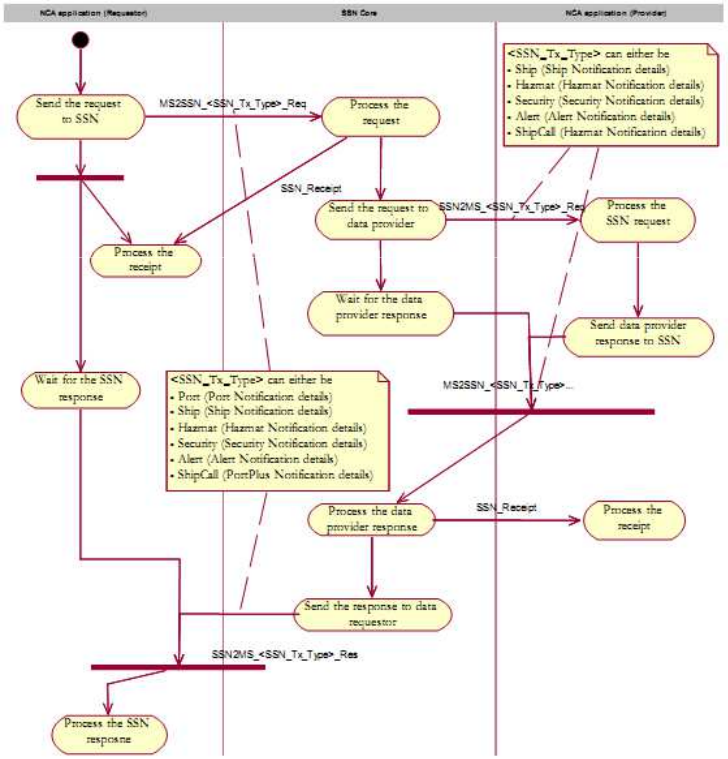


Use case collection

- Functionalities of the system
- Can be derived from
  - User requirements
  - Protocols (existing)
  - Service Interfaces (existing)
  - Regulations
- Semi-automated help for process design

Business action collection

- Refinement from use cases
- Based on service descriptors
- Regulations (e.g. “upload transport data”)
- Business cases (“load frozen cargo”)
- Patterns
  - “collect all quotes with time limit”,
  - “apply four eye principle”
- “Meet in the middle” approach
- Will translate to
  - Subprocesses
  - Rulesets
  - Human tasks
  - Service invocations
  - Database procedures (as services)
  - (Local data transformation)

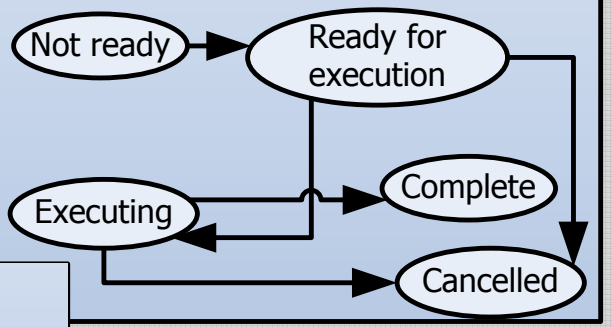


Role of business entities

Access Rights

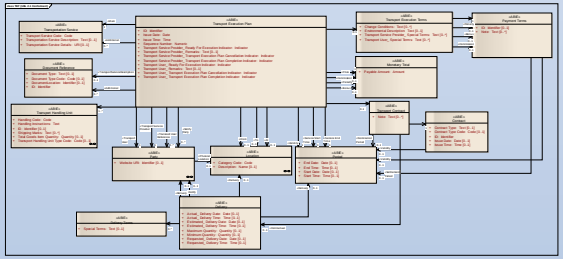
	NotR	RFE	E	Cmpl	Ccd
TU	C,R,U,D	R,U	R	R	R
TO	R,U,D	R,U	R,U	R	R
TSP	R,U	R,U	R,U	R	R
TR	R,U	R	R,U	R	R

Life Cycle



Business Entity Type

Information Model

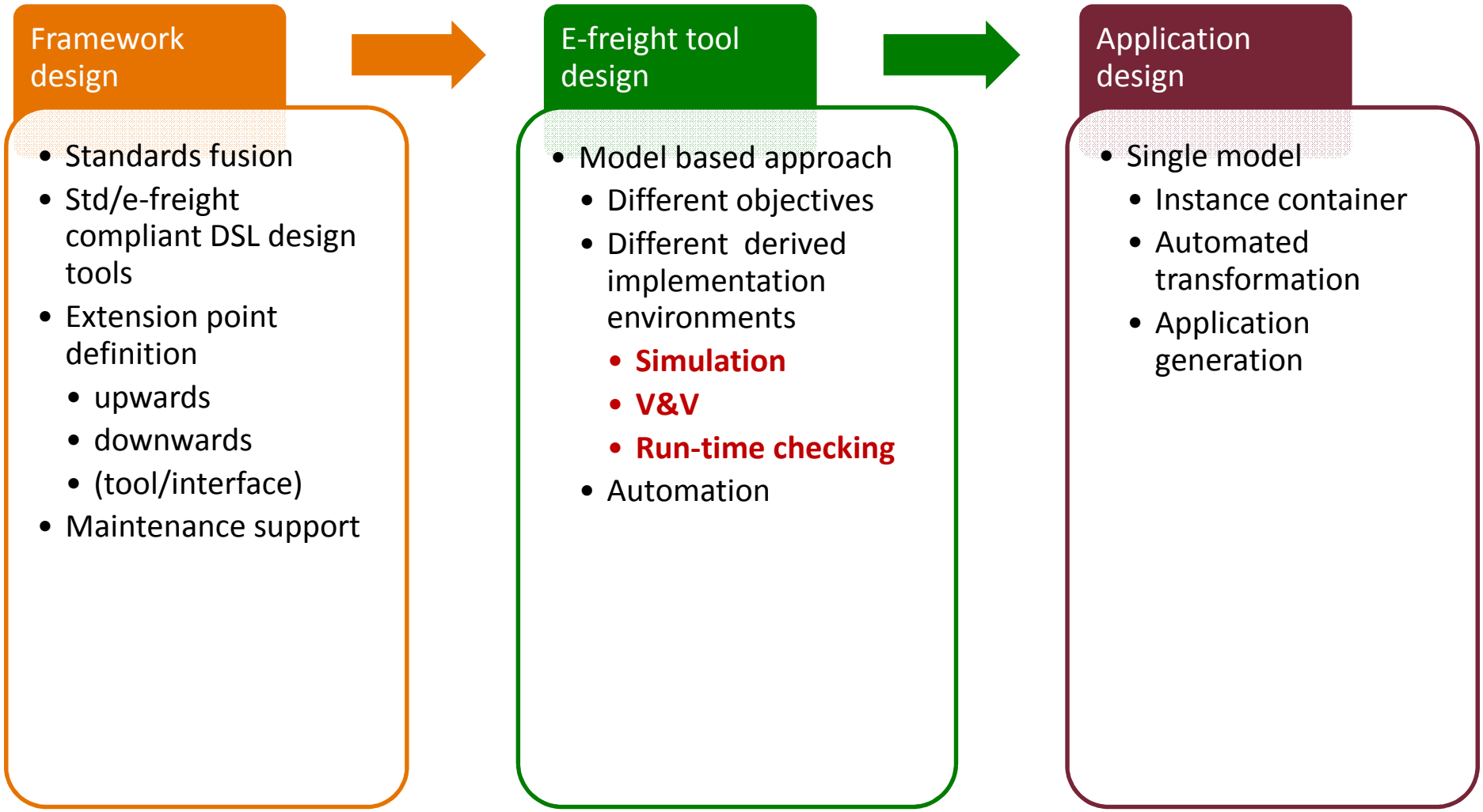


Notifications

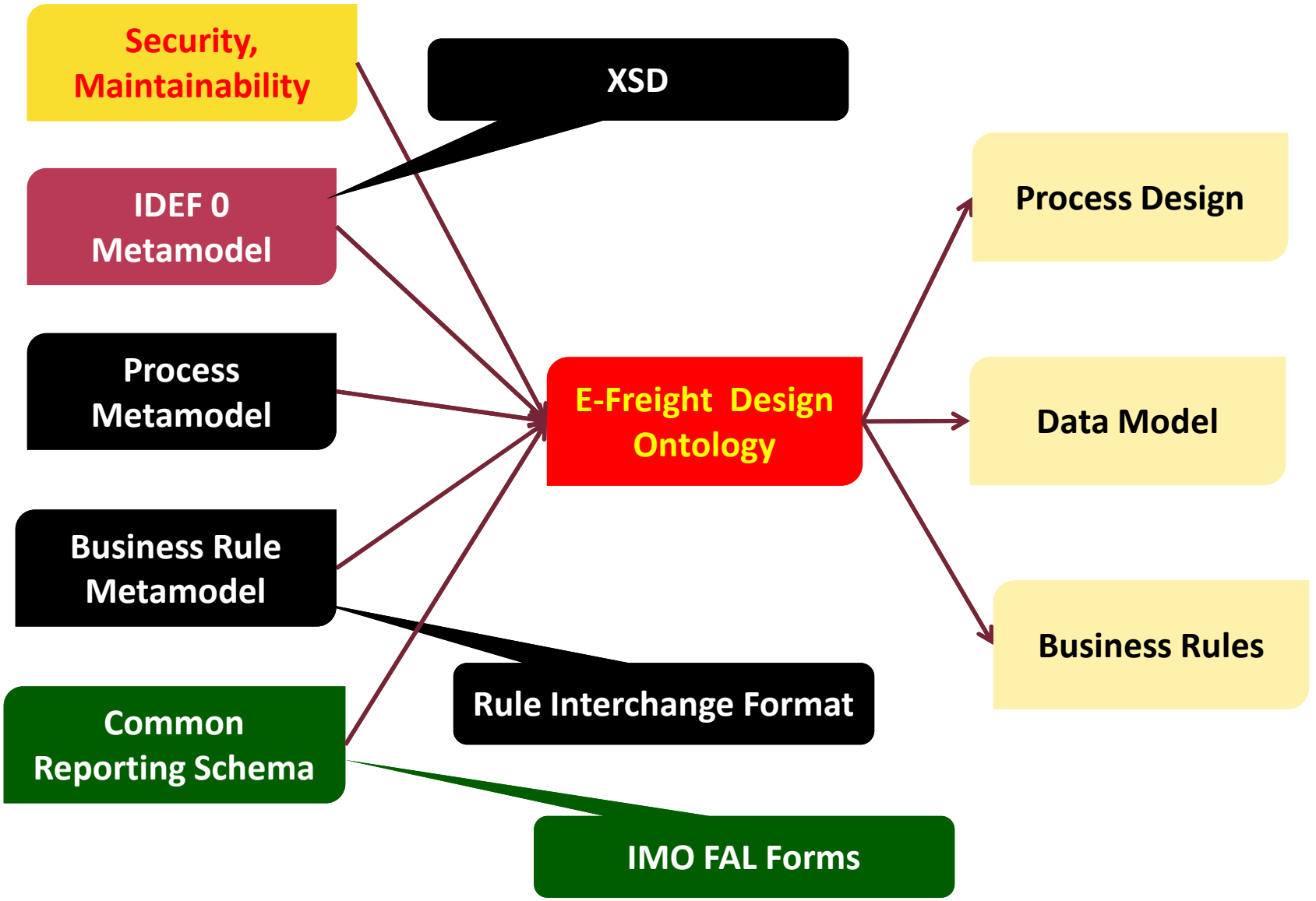
Update notification

Incompliance notification

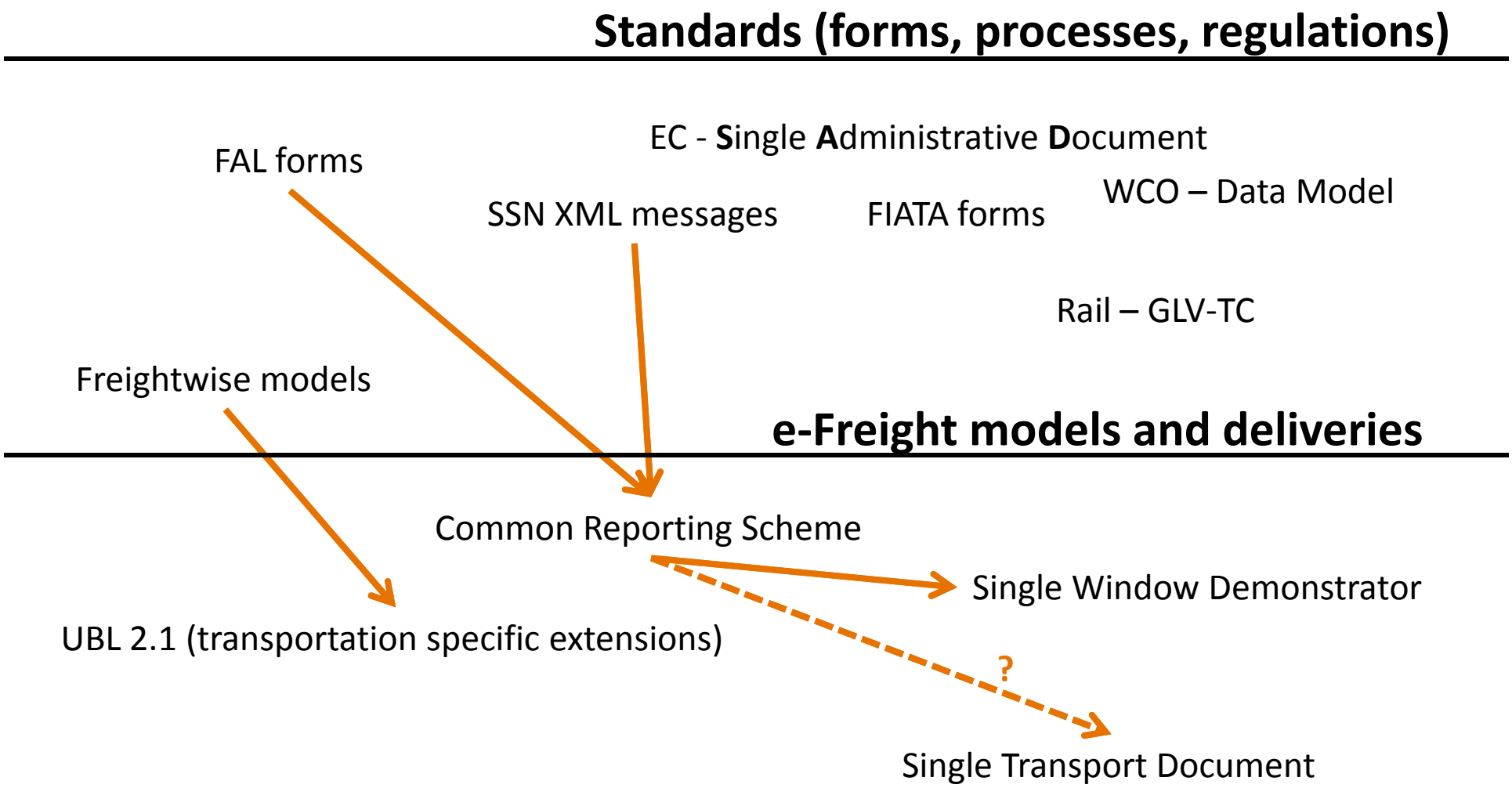
e-Freight „design ontology”



E-Freight Design Ontology

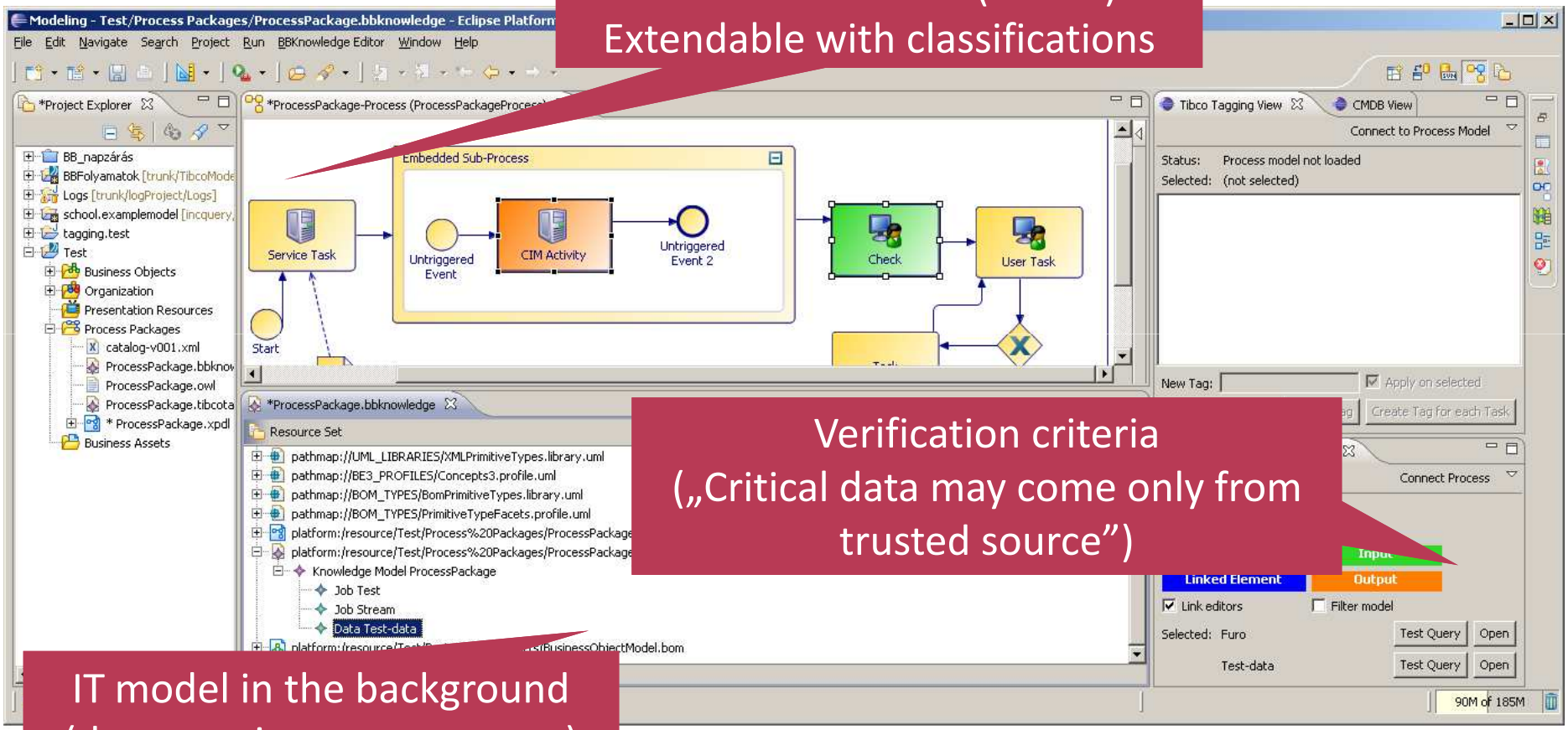


Sources of information



Business process analysis

Business workflow (BPMN):
Extendable with classifications



Verification criteria
(„Critical data may come only from trusted source”)

IT model in the background
(data, services, resources, ..)

Related metamodels (ontologies)

- **Transportation Ontology**
  - RDF: http://owl.cs.manchester.ac.uk/repository/download?ontology=http://reliant.teknowledge.com/DAML/Transportation.owl&format=RDF/XML
  - On-line: http://pellet.owldl.com/owlsight/?ontology=http://owl.cs.manchester.ac.uk/repository/download?ontology%3Dhttp://reliant.teknowledge.com/DAML/Transportation.owl%26format%3DRDF/XML
- **DAML – Transportation**
  - http://www.daml.org/ontologies/409
- „Information system for freight traceability management in a multimodal transportation context”
  - http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5069433