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Douglas Mann, Secretary, ISO/IEC JTC 1/SC 32
Farance Inc *, 360 Pelissier Lake Road, Marquette, MI 49855-9678, United States of America
Telephone: +1 906-249-9275; E-mail: MannD@battelle.org
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ISO/IEC 19763 Framework for metamodel interoperability

Open Forum 2005 on Metadata Registries

Day 3, Wednesday, April 13th, 2005

Hajime HORIUCHI,

SC32WG2 Japan,
UMTP/Japan,

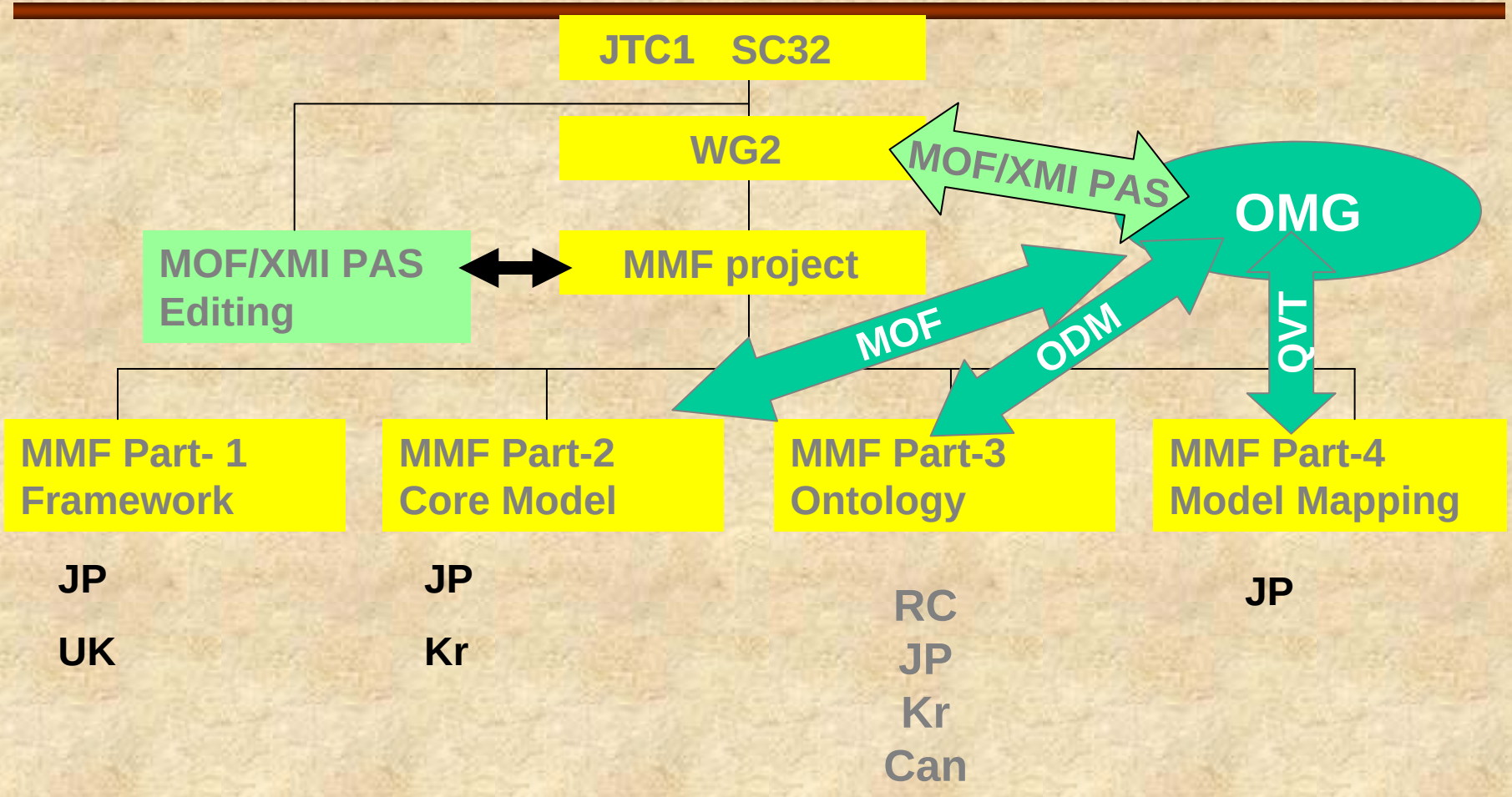
Tokyo International University

Document No. GEC-2005-001

ISO/IEC 19763 Projects

- “Frameworks for Meta Model Interoperability”
- Project started: May 2002
- Project Leader: Hajime Horiuchi (JP)
  - Part 1: Reference Model (JP, UK)
  - Part 2: Core Model of MMF (JP, KR)
  - Part 3: MMF for Ontology Registration (Cn, JP)
  - Part 4: MMF for Model Mapping (JP)
- POC Ad-hoc Project with ebXML Asia Commitee

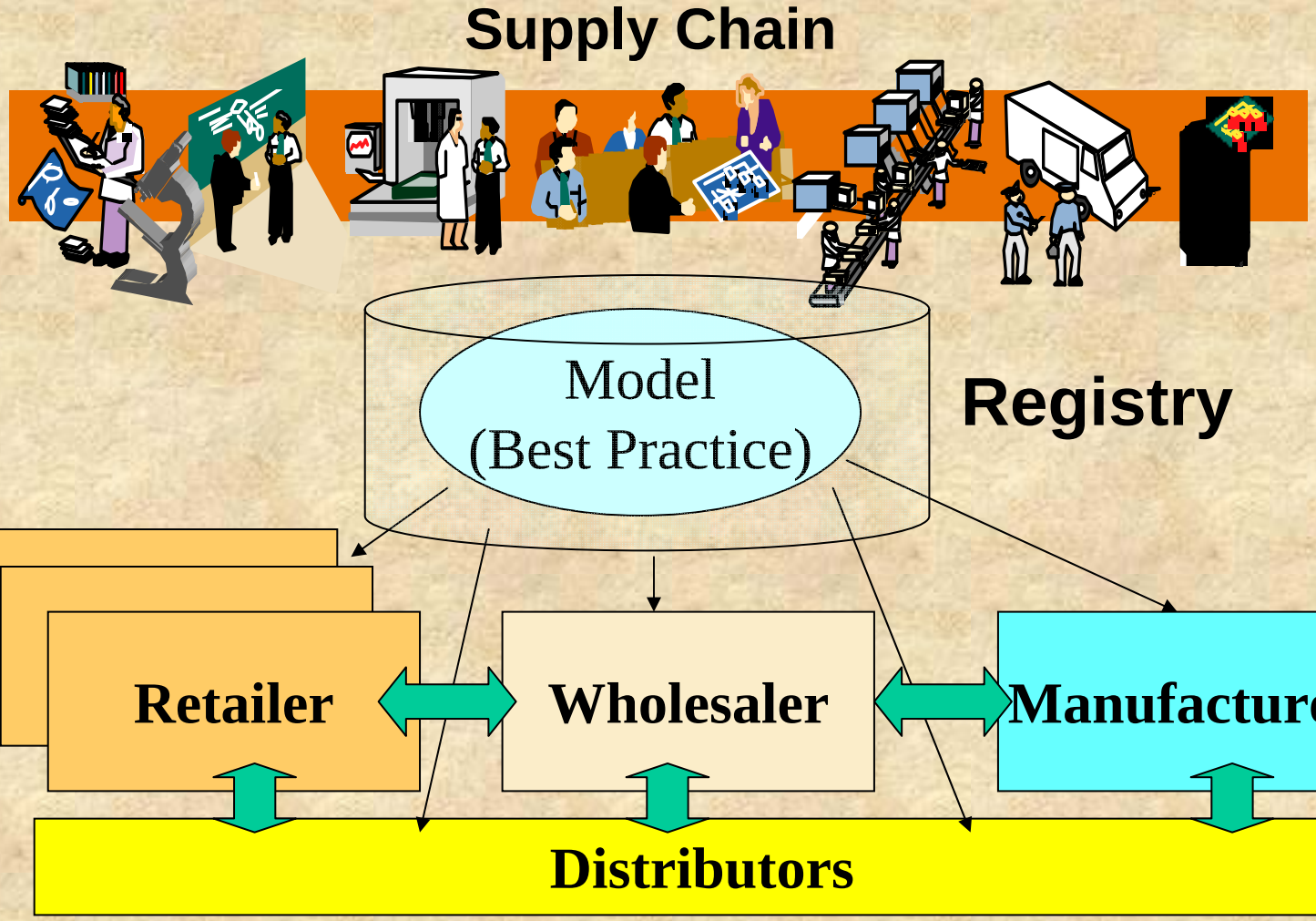
Project Formation



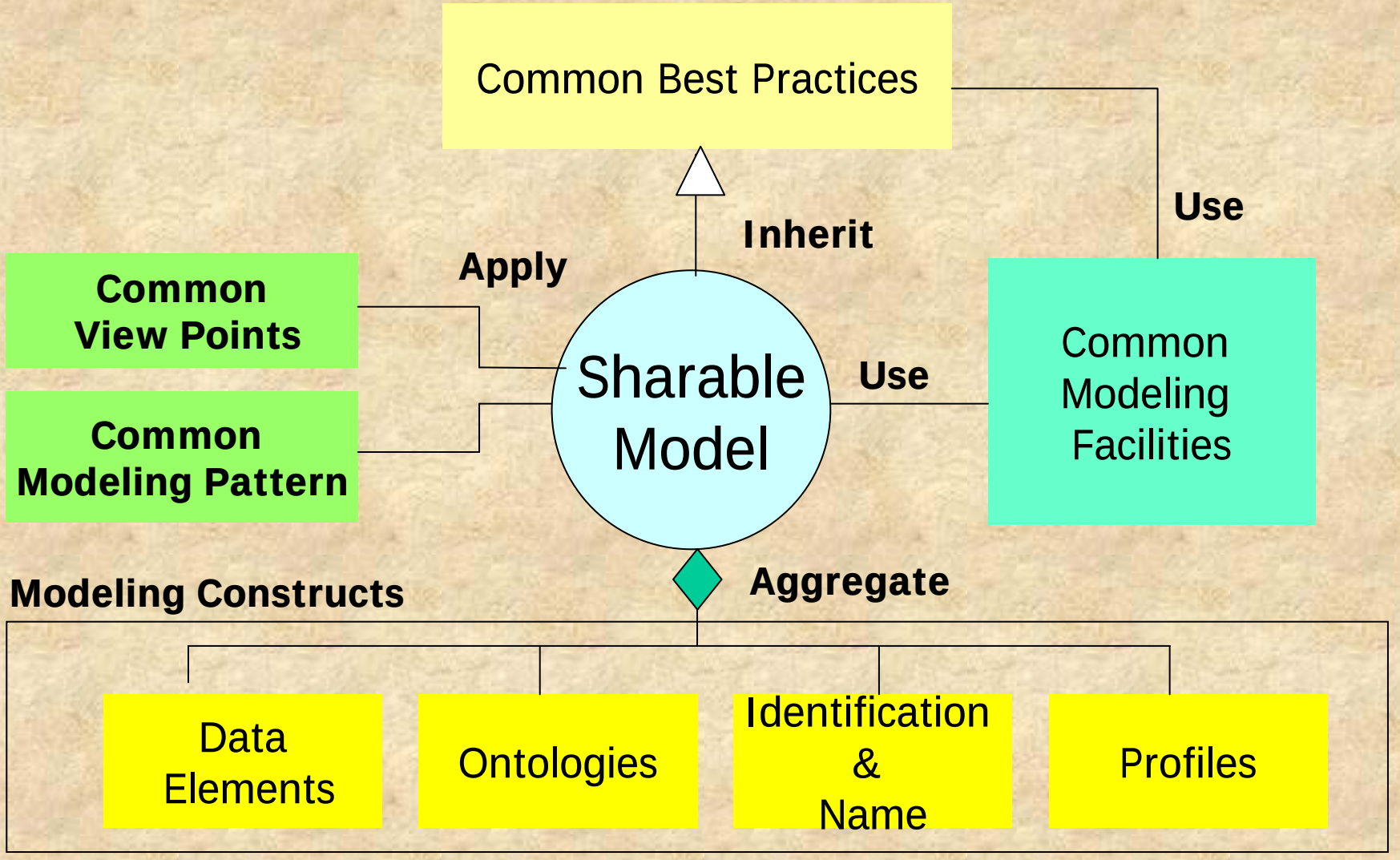
Efforts on the Metamodel Standardization

- OMG
  - CWM(Common Warehouse Metamodel)
  - ODM (Ontology Descriptive Metamodel)
  - SPEM (Software Process Engineering Metamodel)
  - BPDM (Business process Definition Metamodel)
  - Organization Structure Metamodel
  - Business Incentive Metamodel
  - Metamodel Integration on UML2.0 & MOF2.0

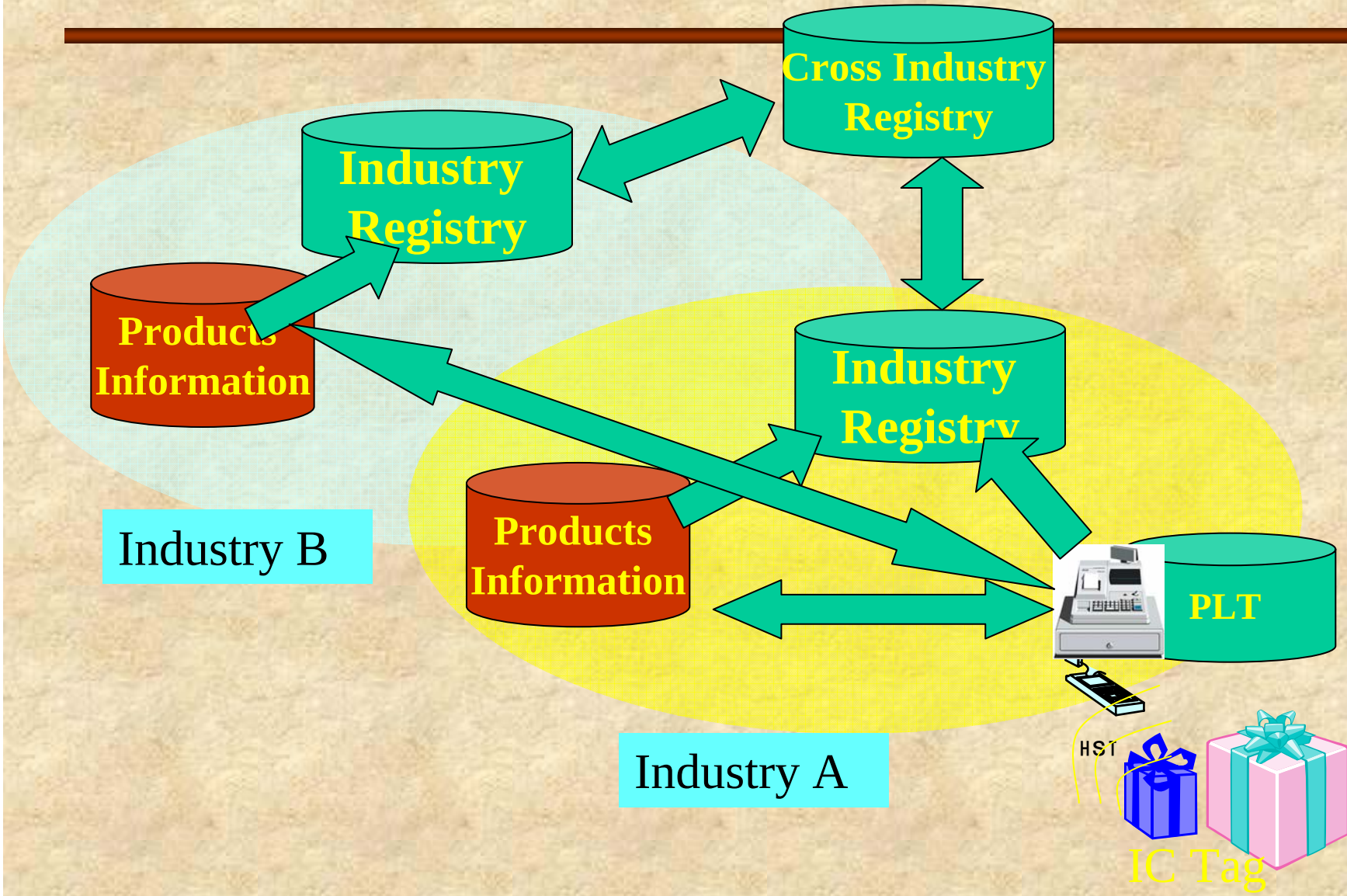
Model Sharing in the Business Collaborations



For Sharable Model

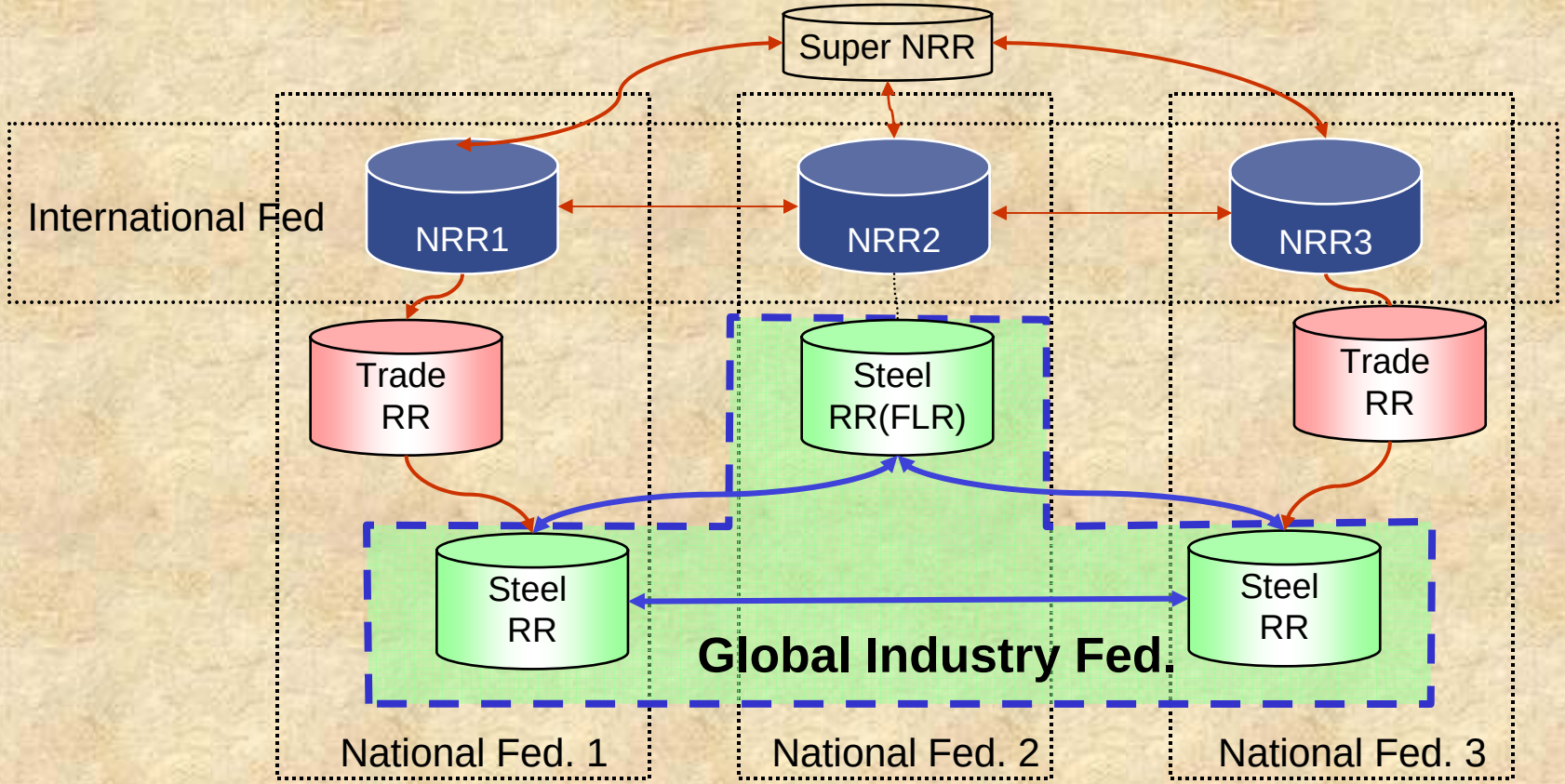


Registry Interoperation

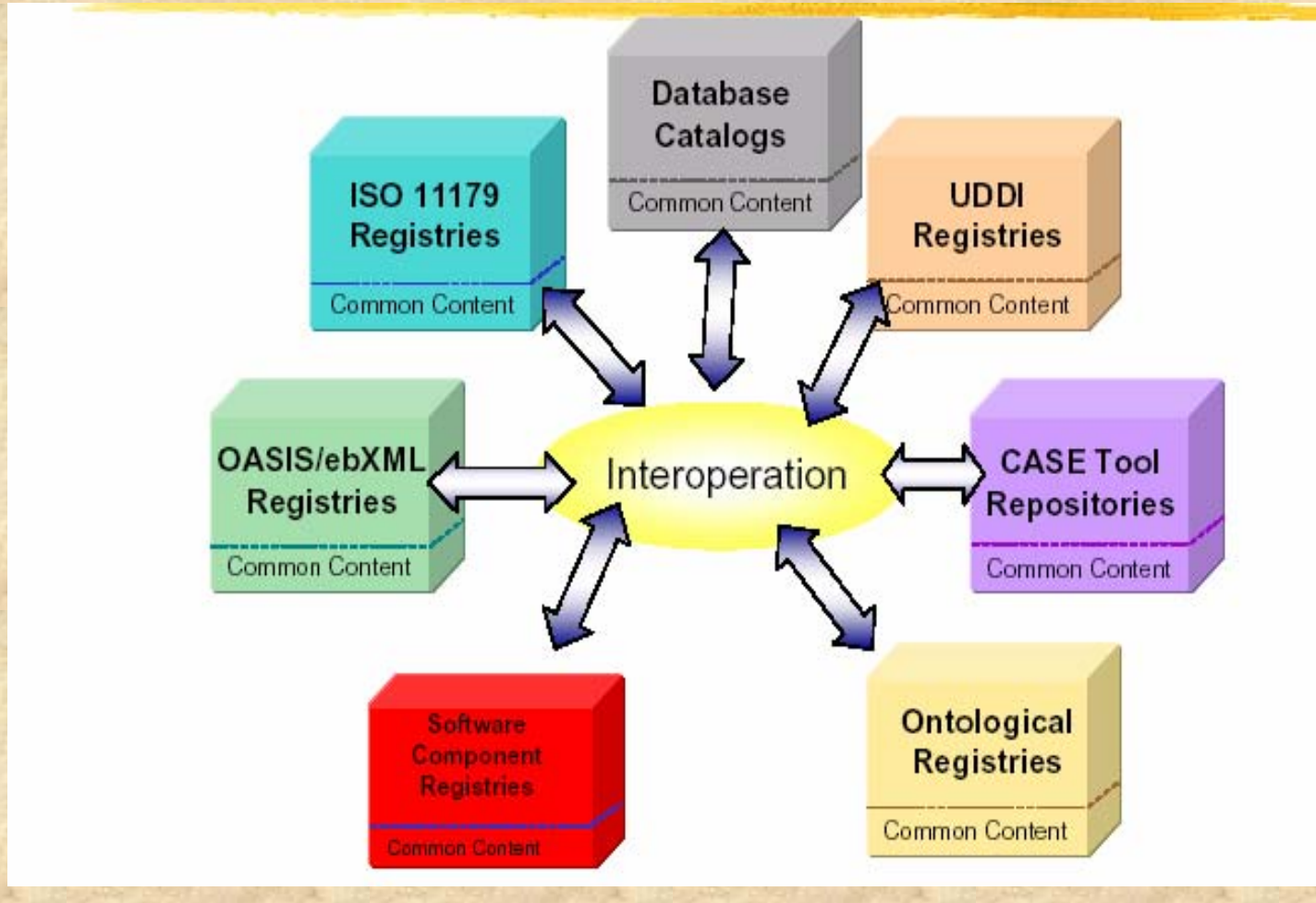


Global Industry Federation Model

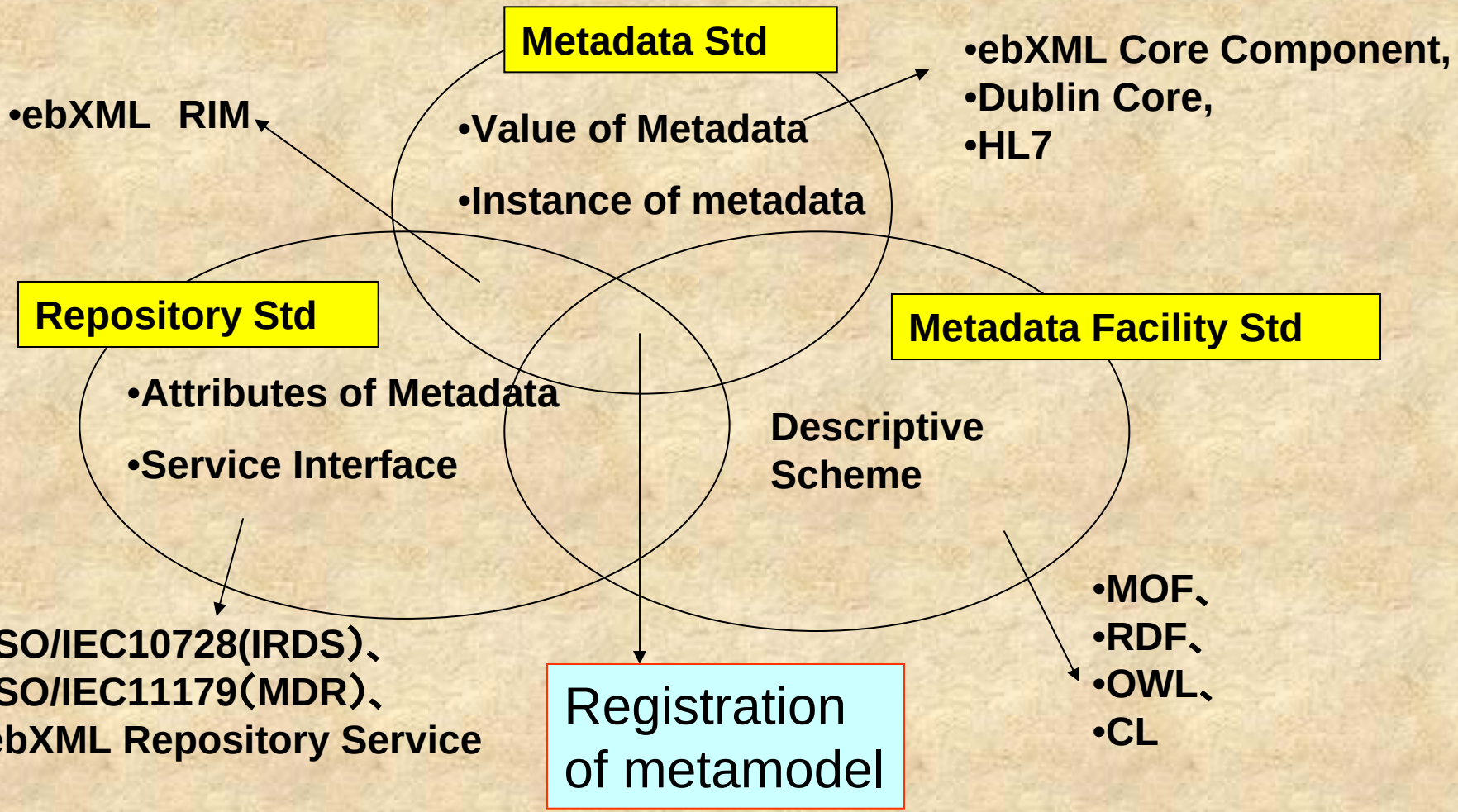
Each global industry, one federation !



Goal of the Metamodel Frameworks



Type of standard on Metadata and Metamodel



What is MMF

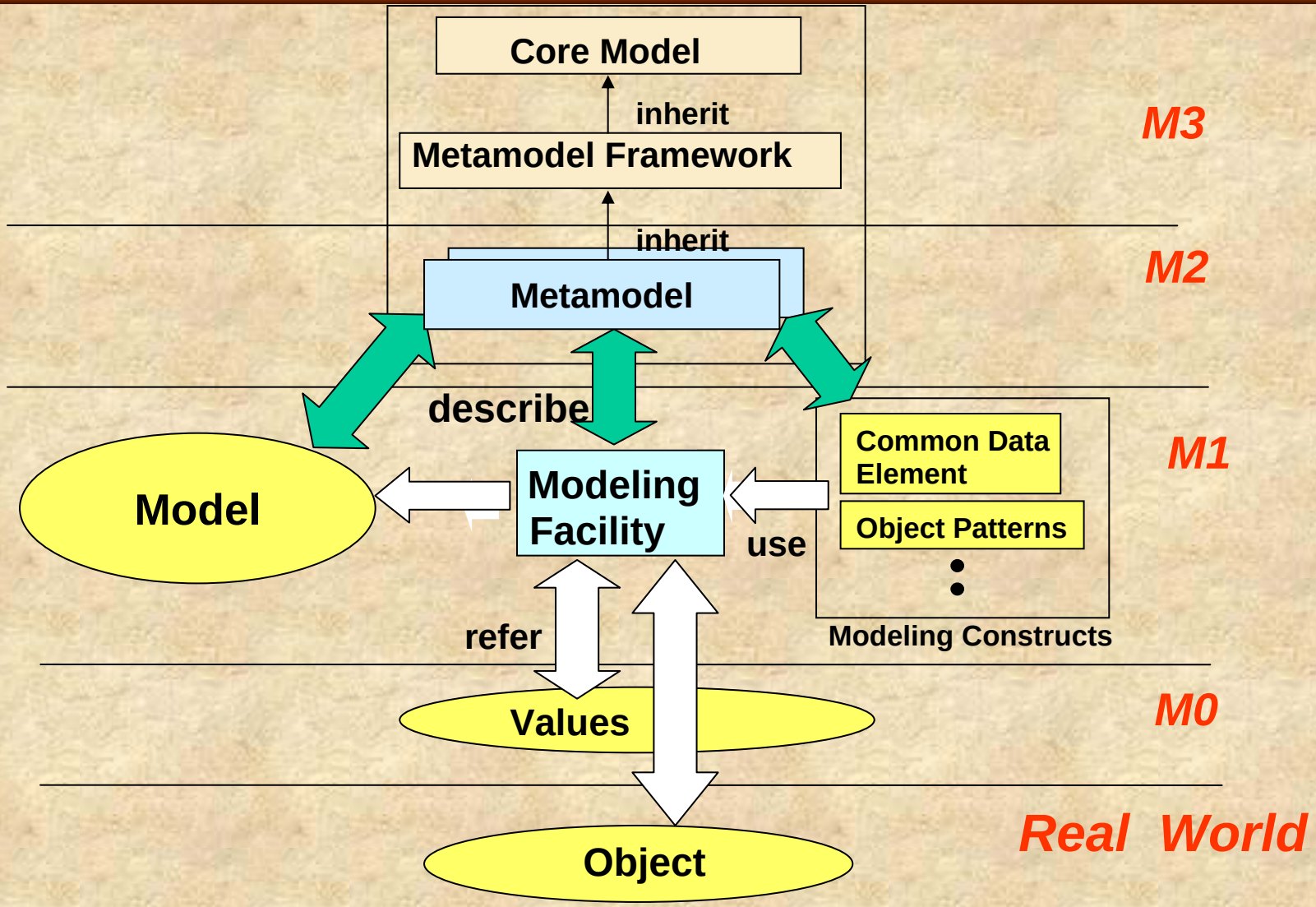
Objectives of MMF Family of standards

- Provide common metamodel frameworks to register various types of
  - metamodels
  - models (Ontologies)
  - modeling constructs

to enable them to be

- Sharable
- Reusable
- Exchangeable

Metamodel Framework Architecture

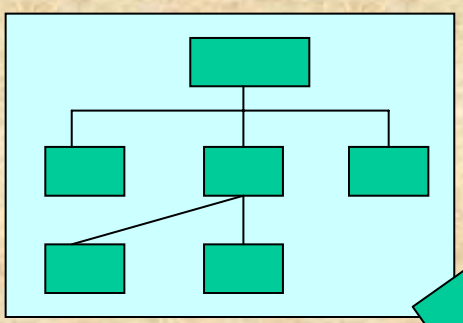


Targets to be Registered

- **Metamodels**
  - Modeling Facility metamodels (e.g. UML, etc.)
  - Registry metamodels (e.g. ebXML R&R, UDDI,)
- **Domain models**
  - Various business application models (UML based, IDEF1X based,)
  - Ontology models
  - Terminology
- **Modeling Constructs**
  - Basic Information elements metadata (e.g. ebXML Core Components)
  - Normative Codes
  - Modeling Patterns
  - Modeling View definitions (RM-ODP)
  - Basic Terminologies

Basic Structure of MMF

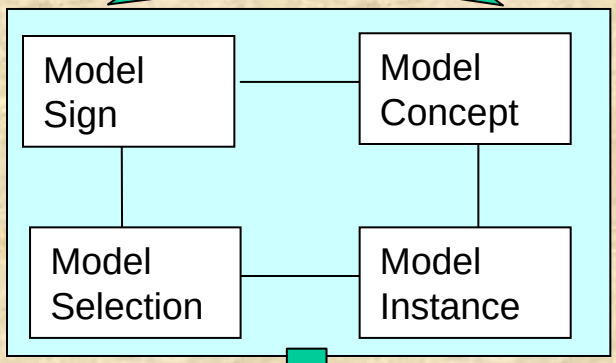
Meta-meta model of MOF



Defining Concept of MDR (ISO/IEC 11179)

Concept	Conceptual Domain
Object	Value Domain

Quadrant Scheme for representing objects



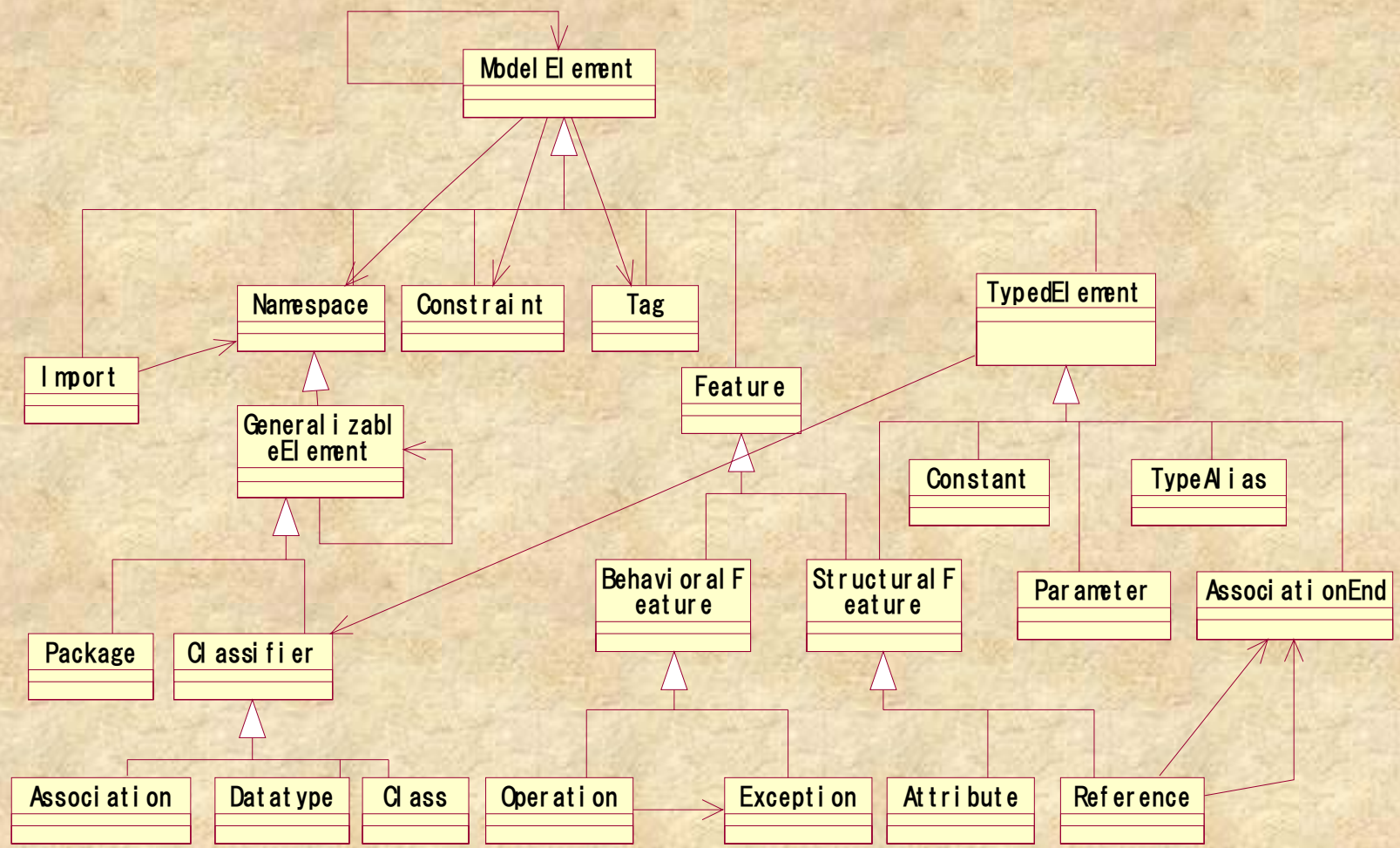
MMF Core Model

Inherited

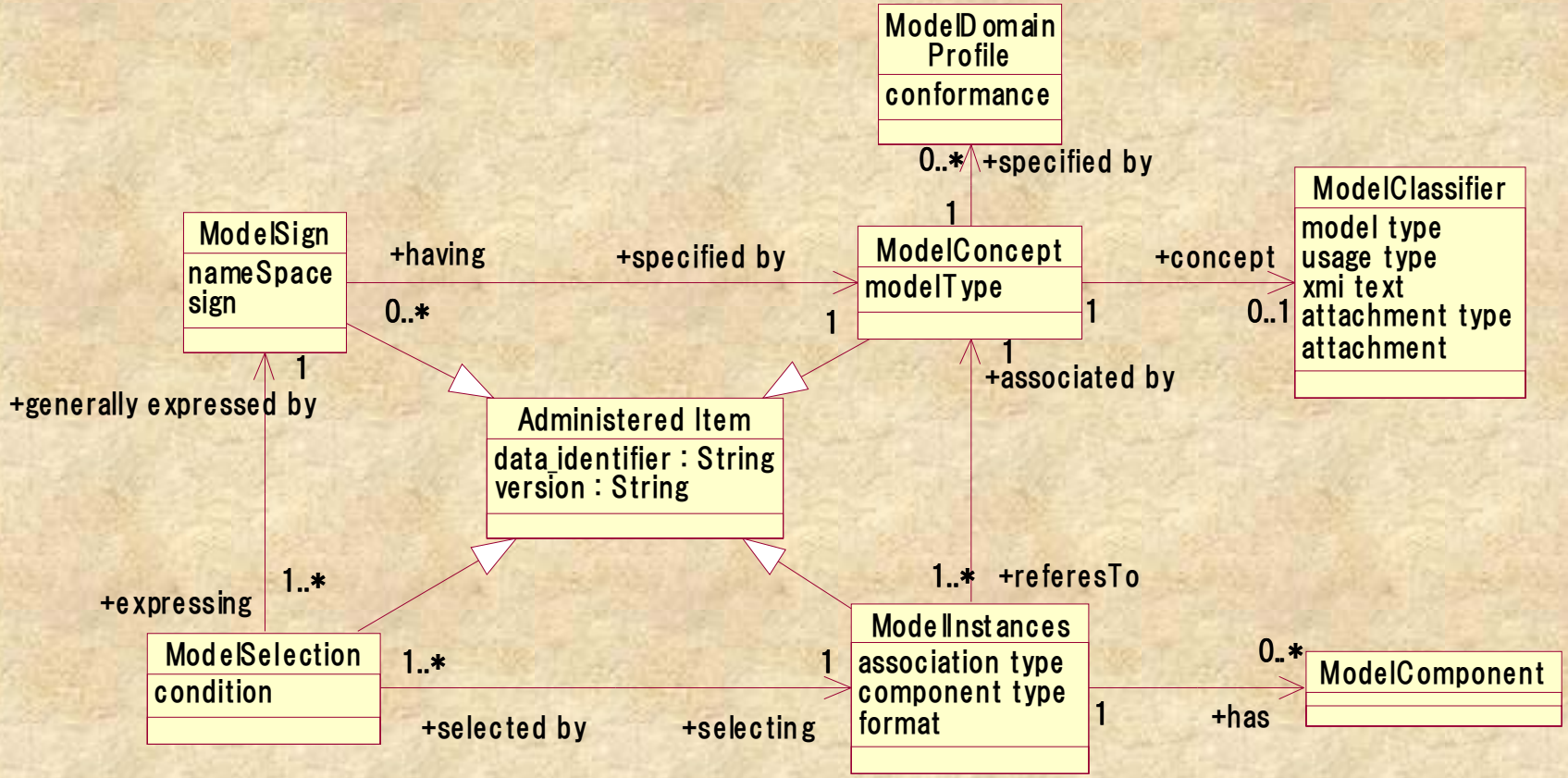
MMF for Model Mapping

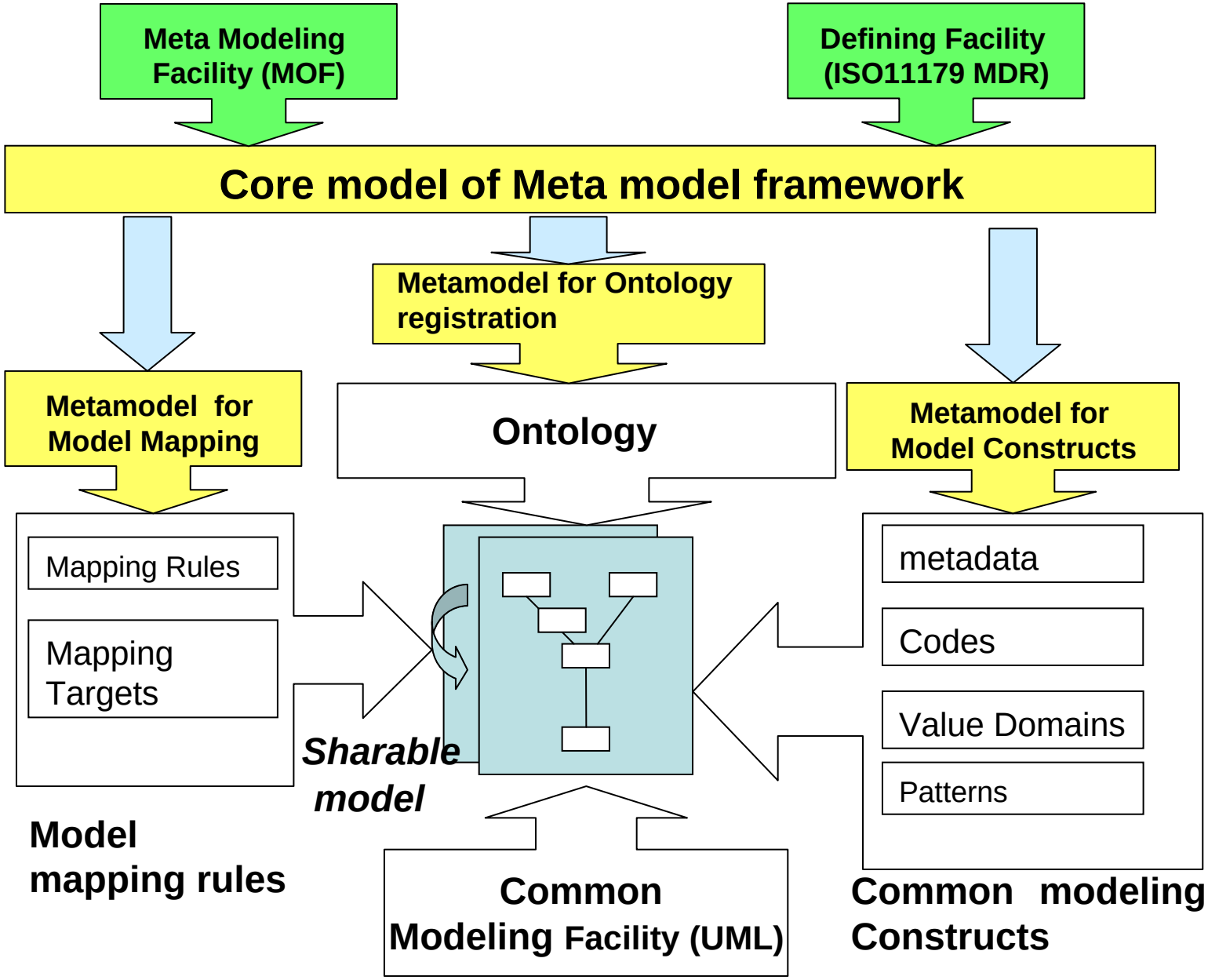
MMF for Ontology

MOF Model, More closer look

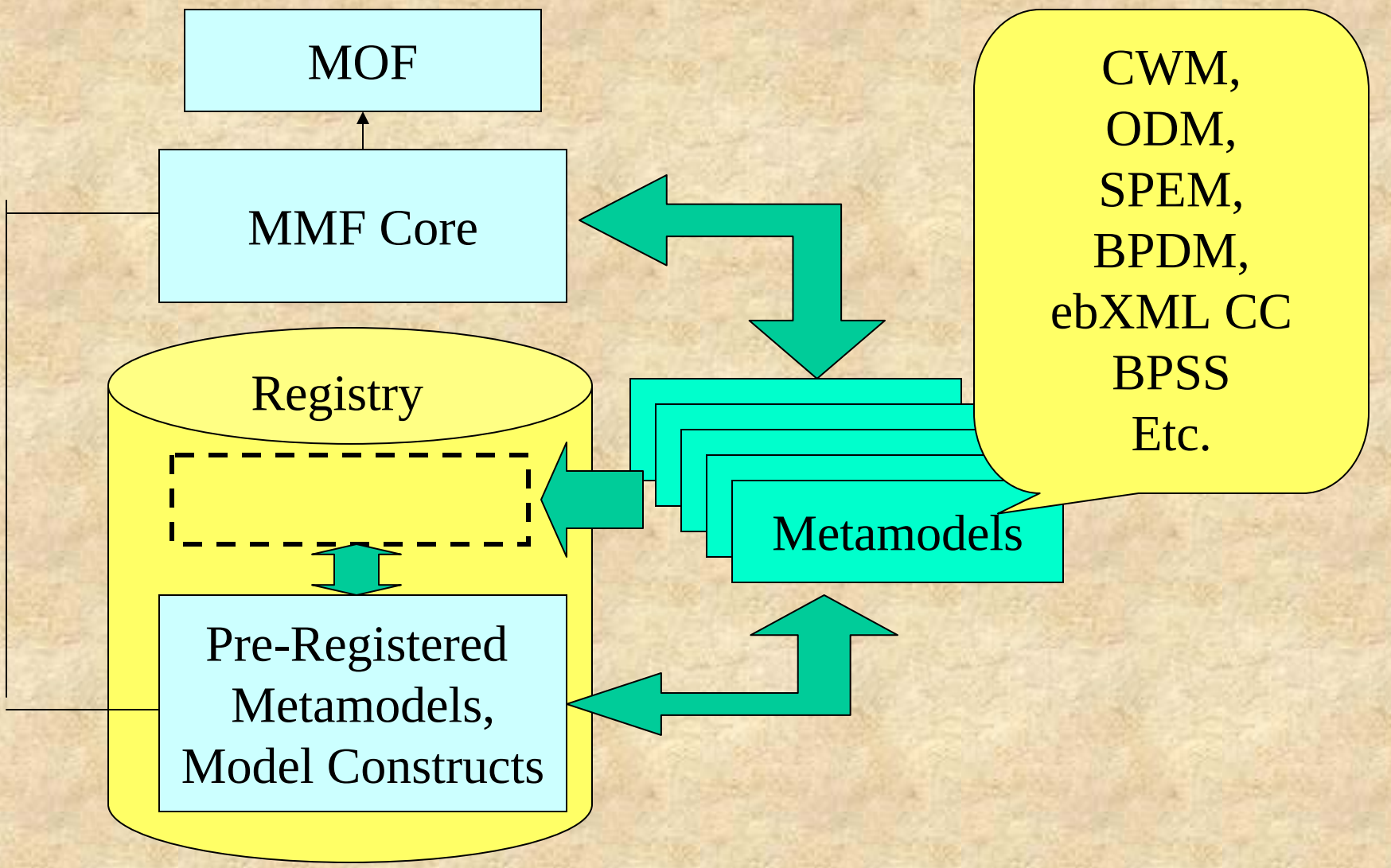


Basic Scheme of the Core model




Meta Modeling Facility (MOF)
Defining Facility (ISO11179 MDR)
Core model of Meta model framework
Metamodel for Ontology registration
Metamodel for Model Mapping
Ontology
Metamodel for Model Constructs
Mapping Rules
Mapping Targets
Sharable model
metadata
Codes
Value Domains
Patterns
Model mapping rules
Common Modeling Facility (UML)
Common modeling Constructs

Metamodel Registration & Sharing



19763 part-2: Core Model

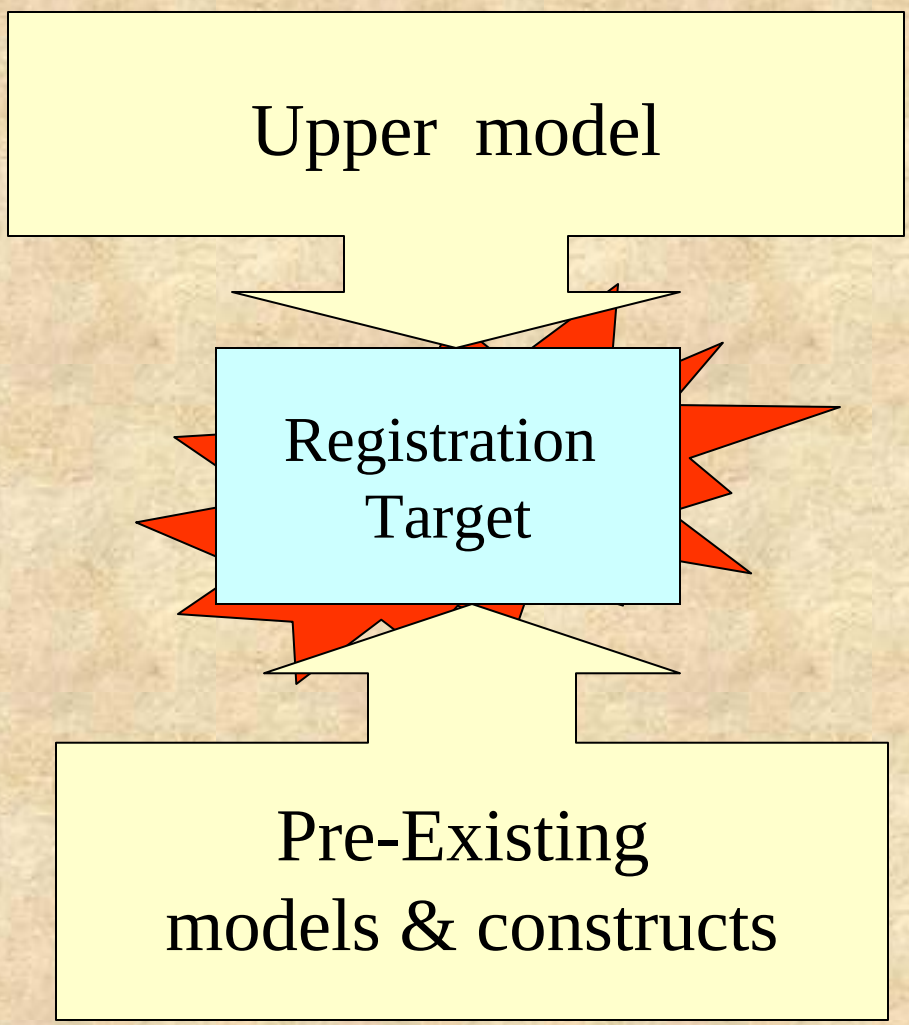
Currently: 2nd CD

19763-2: Core Model

- Provide base for registering models and metamodels, Keeping relationship among them and pre-registered various model constructs
- Provide selection mechanism of models with its whole structure or a part of the model

  (Zoom IN/ Zoom Out)
- Provide selection mechanism of a model or metamodel with appropriate description of concept

Restrictions for the registration



Registering Aspects

What name space was uses

What is the upper model which restricts this model

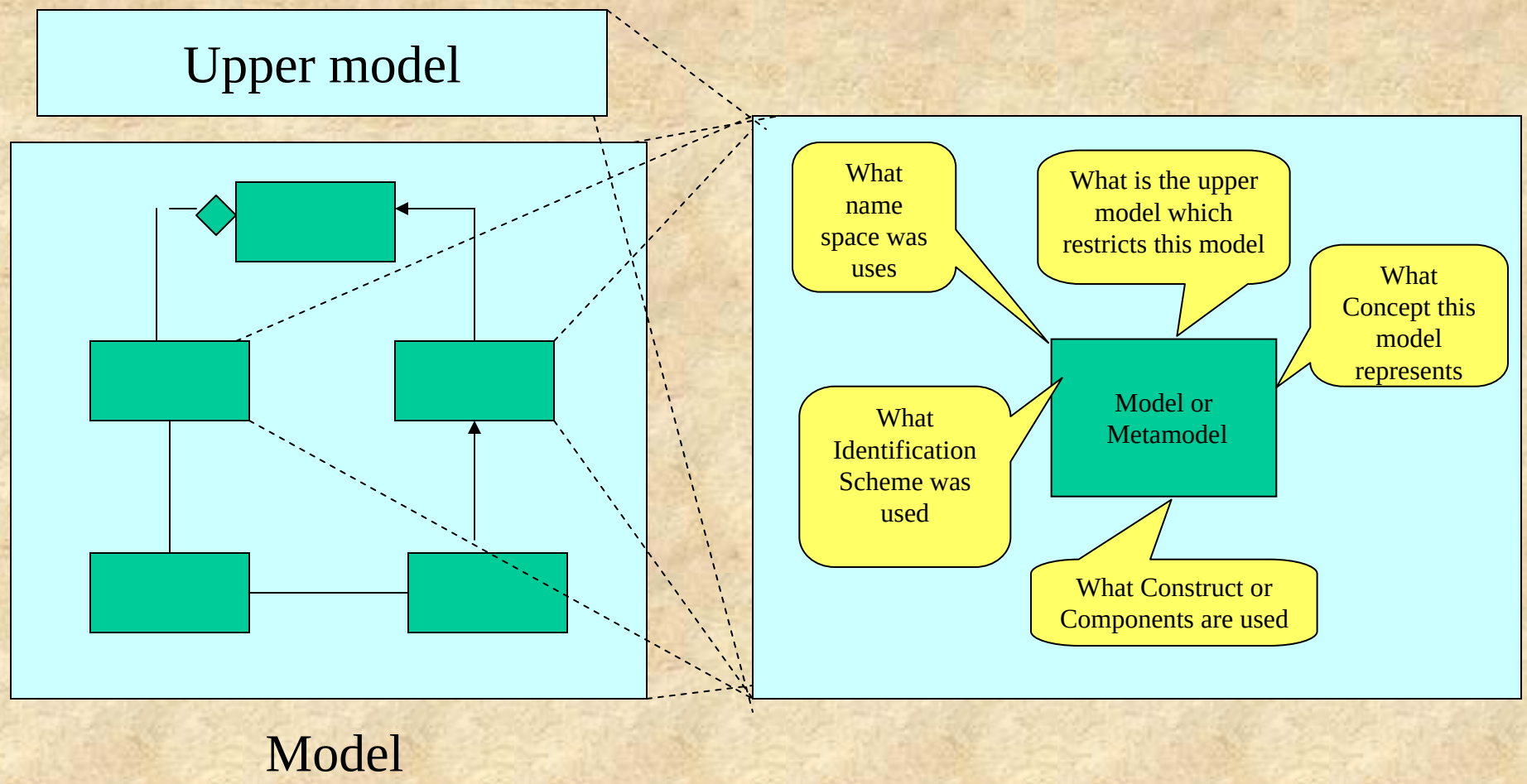
What Concept this model represents

Model or Metamodel

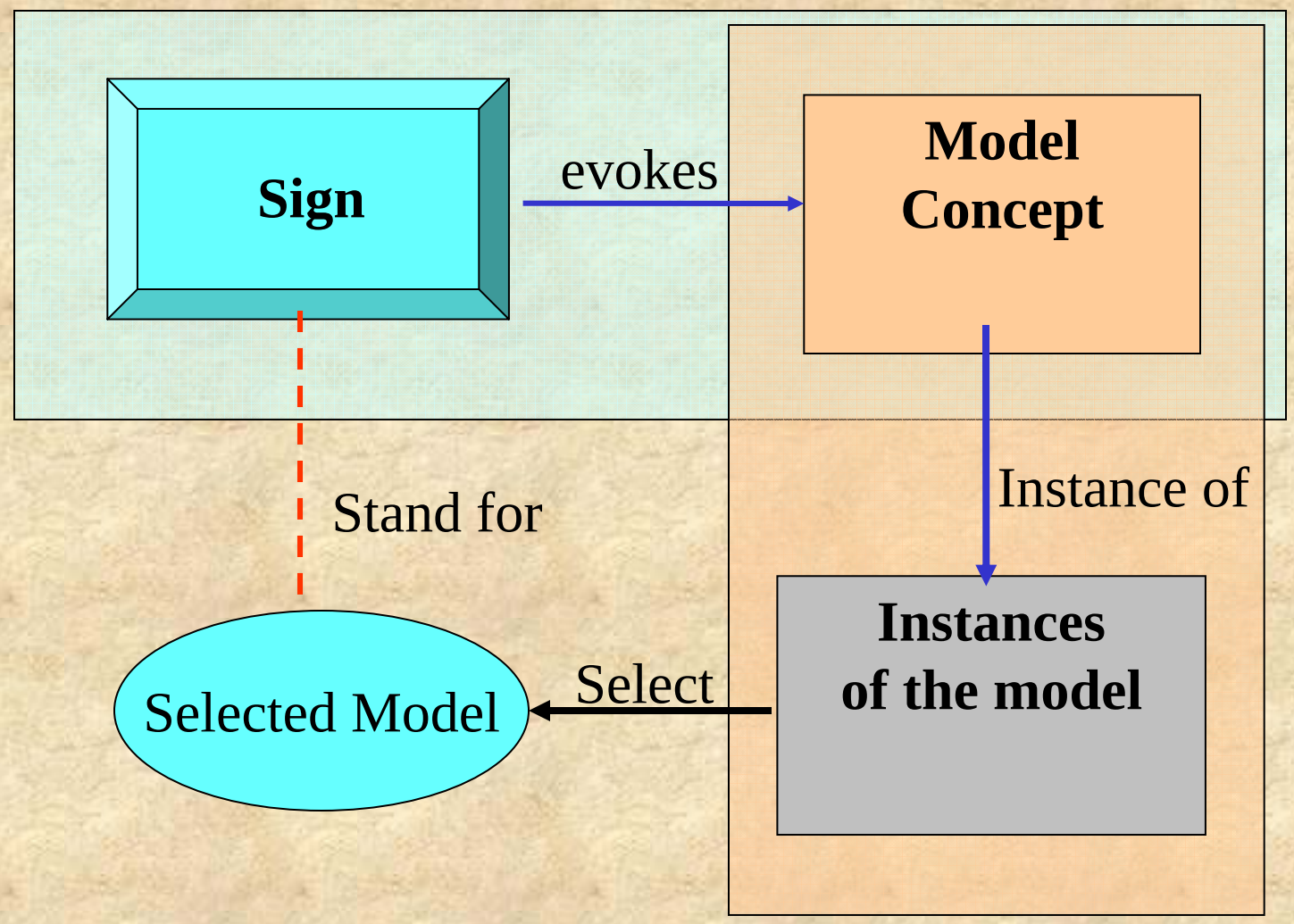
What Identification Scheme was used

What Construct or Components are used

Hi resolution registering



Four Quadrants Idea came from 11179



Framework of Registering

- **Sign-Concept-Instances**
  - **Sign**
    - **a symbol designating a named element in a namespace.**
    - **Namespace is a collection of signs**
  - **Concept**
    - **specify meaning of sign.**
    - **generally expressed with sign.**
  - **Instances**
    - **a set of instance of the Concept designated by a sign.**
- **Selection**
  - **a result of selecting a set of model instance from referents designated by a sign.**

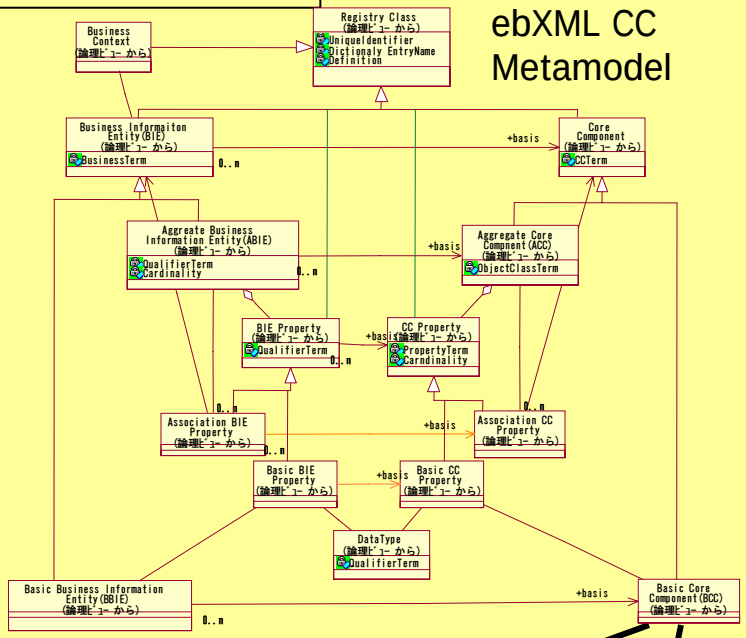
Sign

BCC

(Basic Core Component)

Model Concept

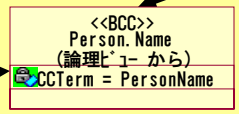
ebXML CC Metamodel



Model Selection

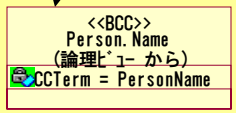
Selected Model

Model Instance

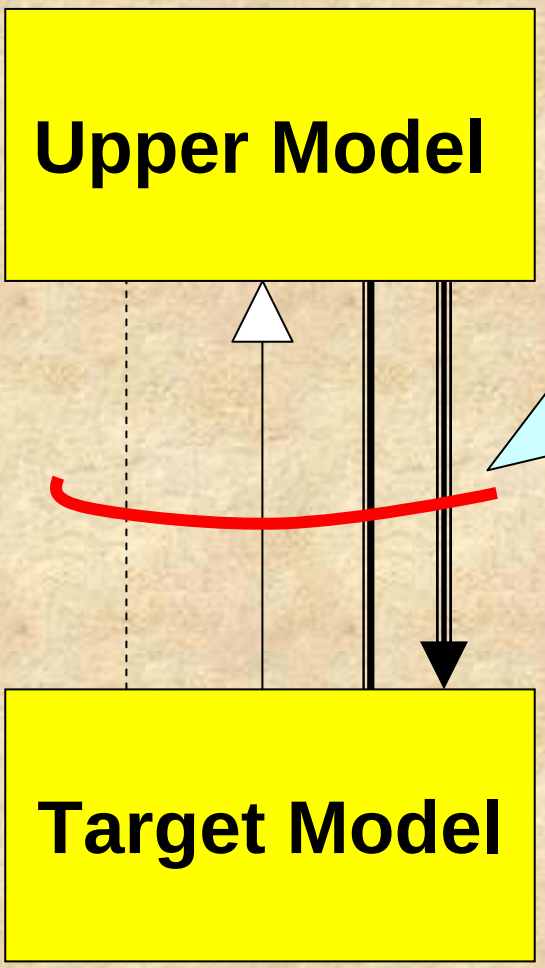


• • •

Models



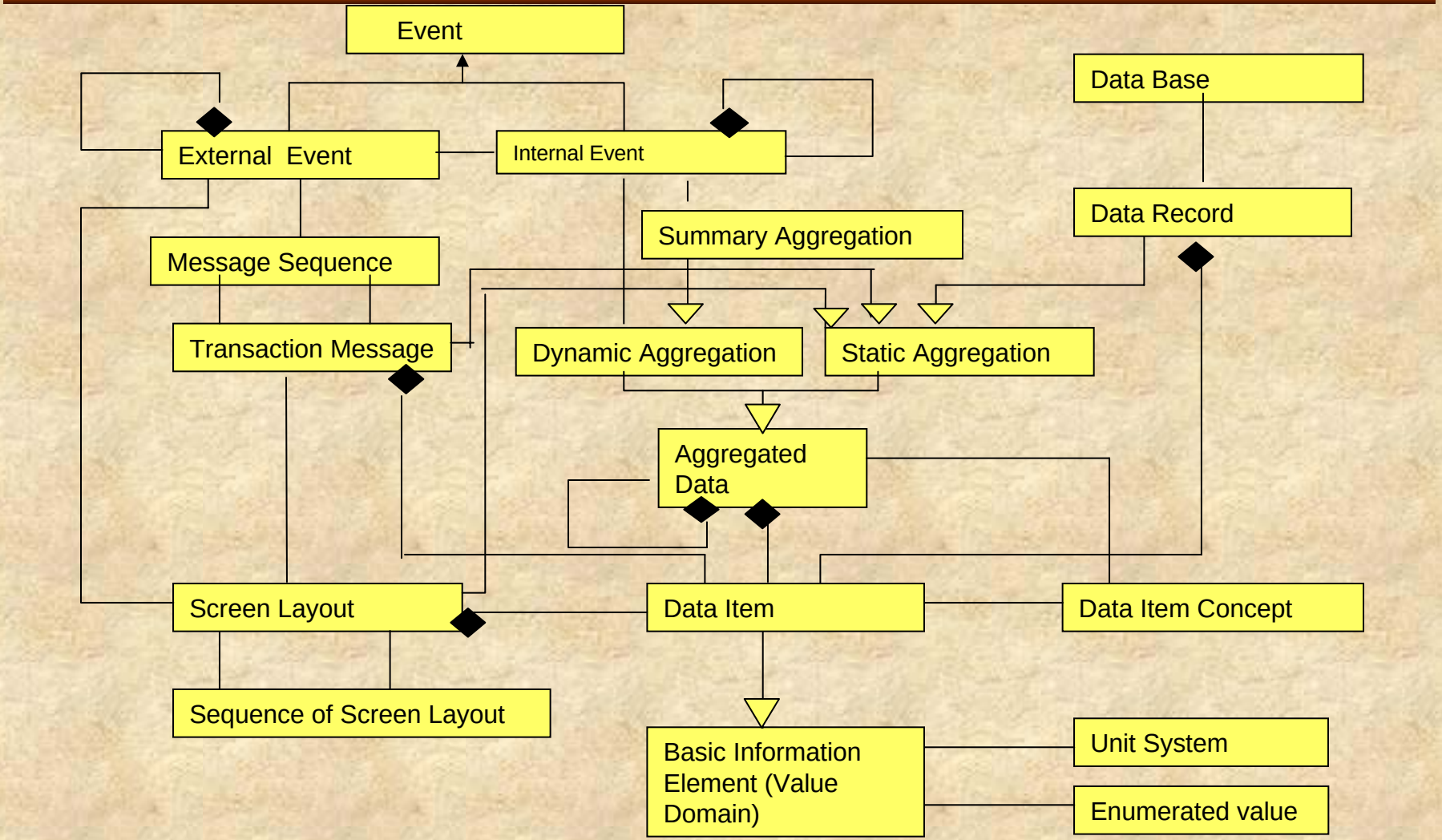
Upper & Lower (Association type)



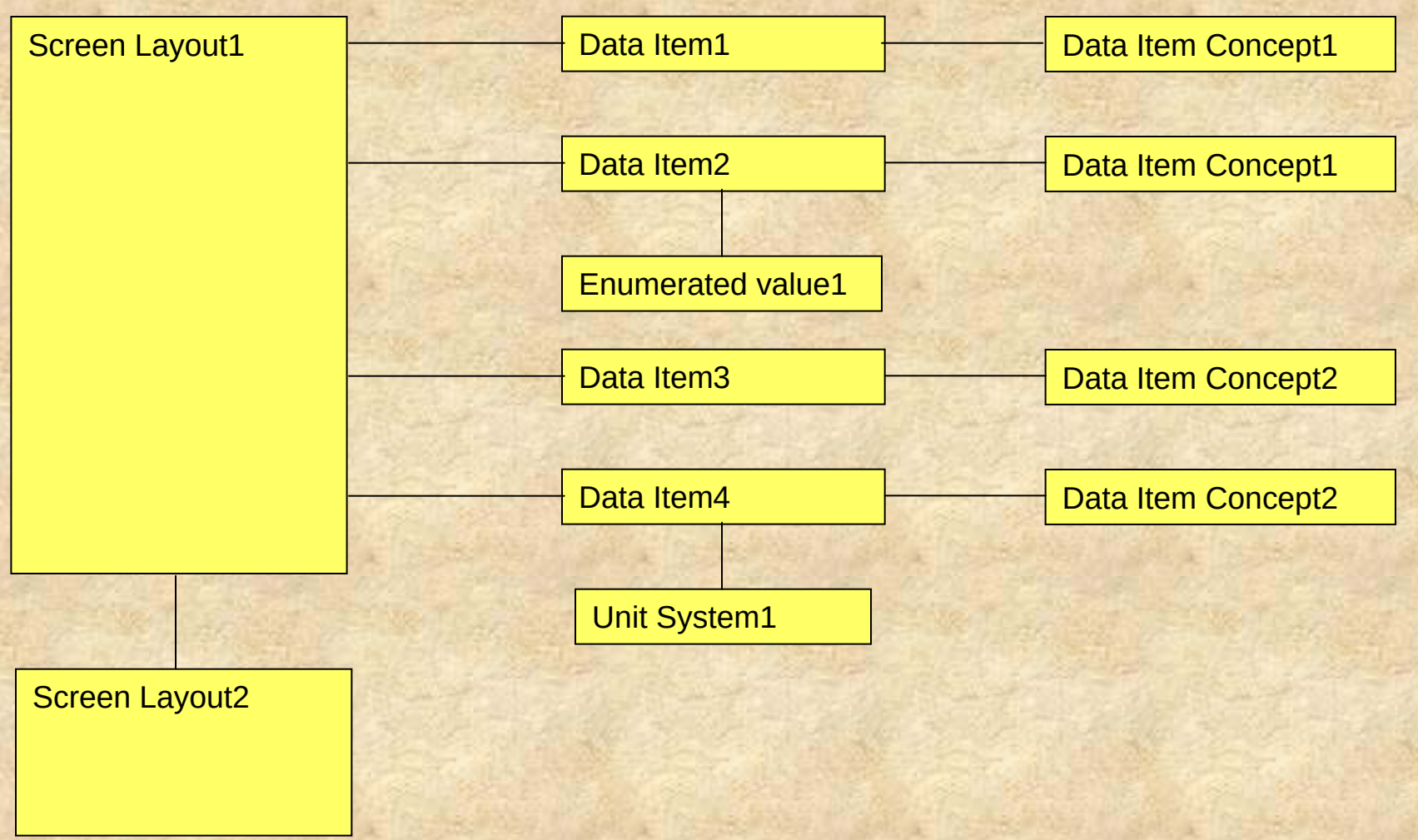
- Type and Instance
- Super and Sub
- Base and Variant
- Abstract Syntax and Expression

We need additional standard notations !!

Example of Software Metamodel

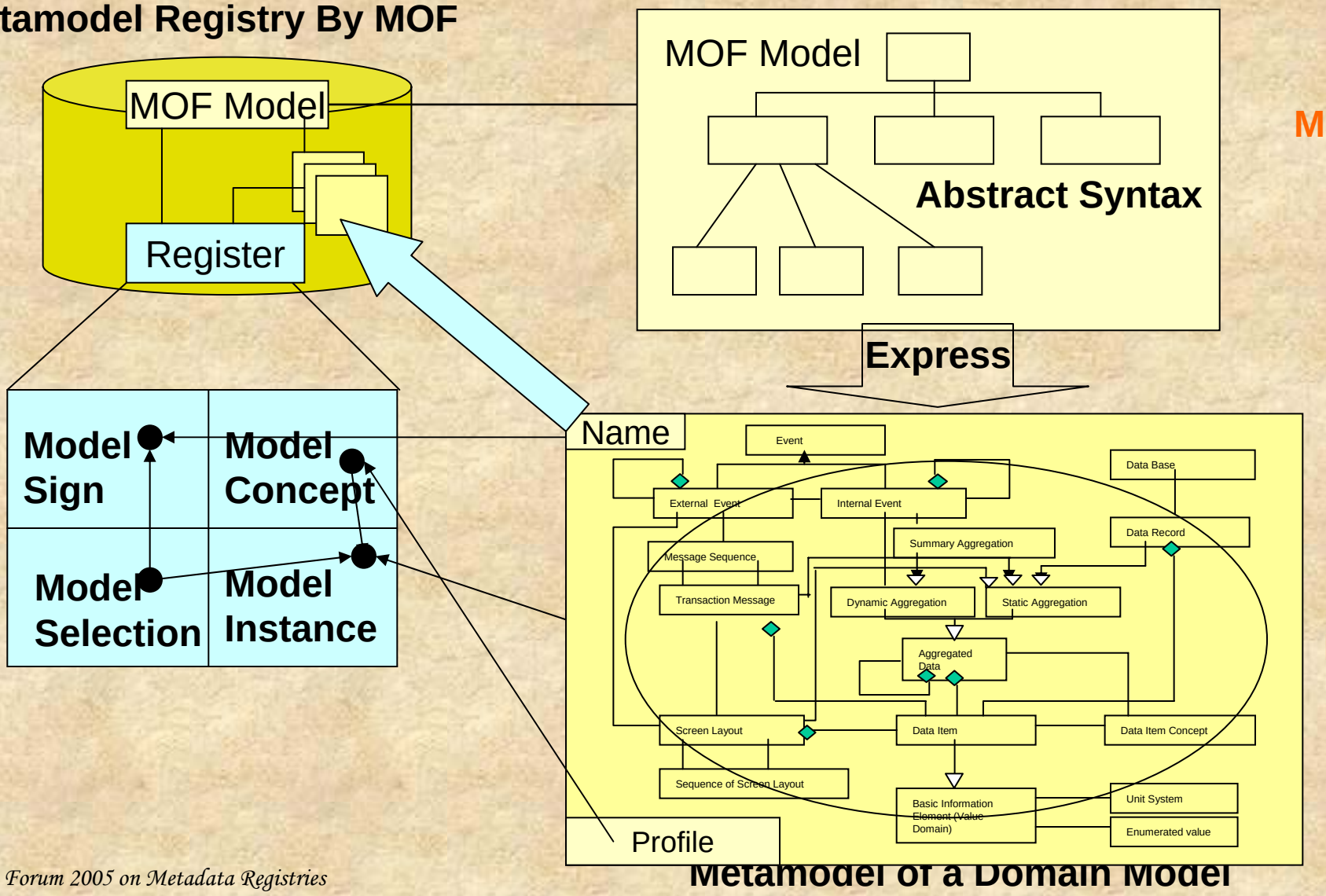


Example model of an user interface metamodel

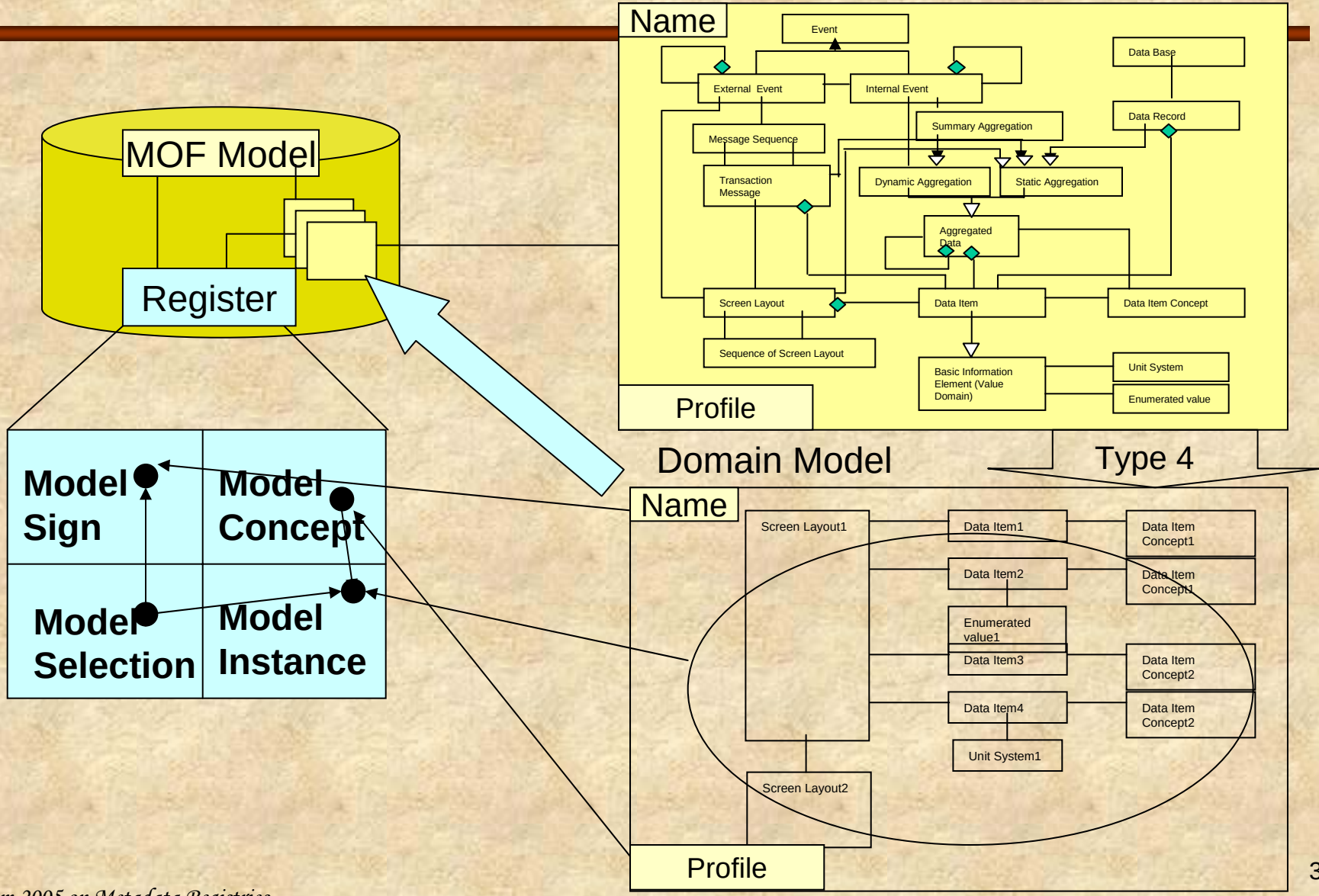


Registration of a Domain Metamodel

Metamodel Registry By MOF

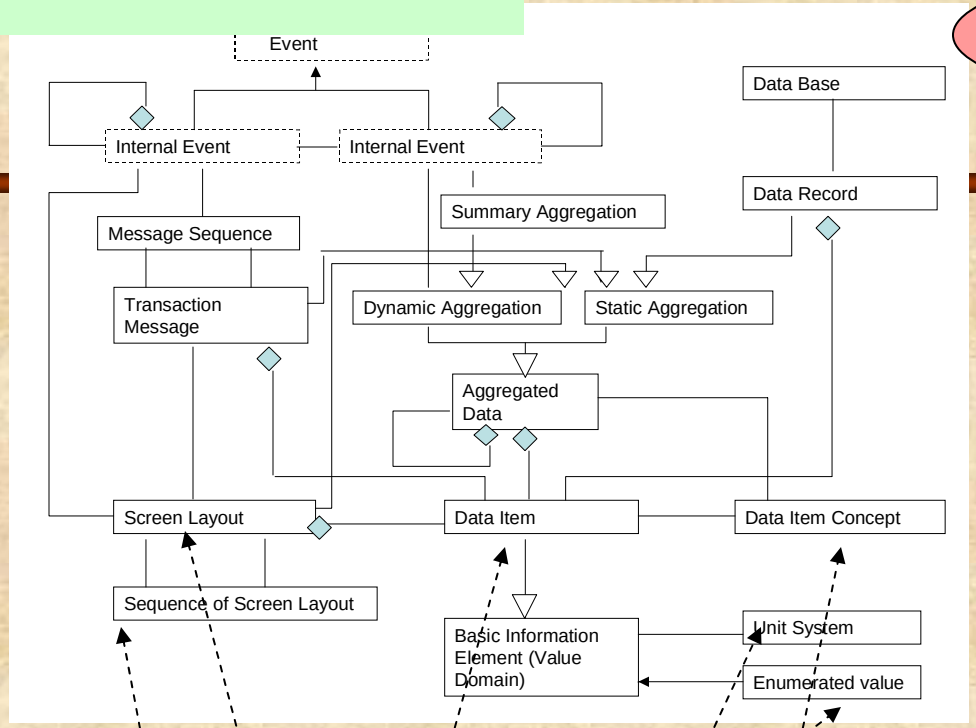


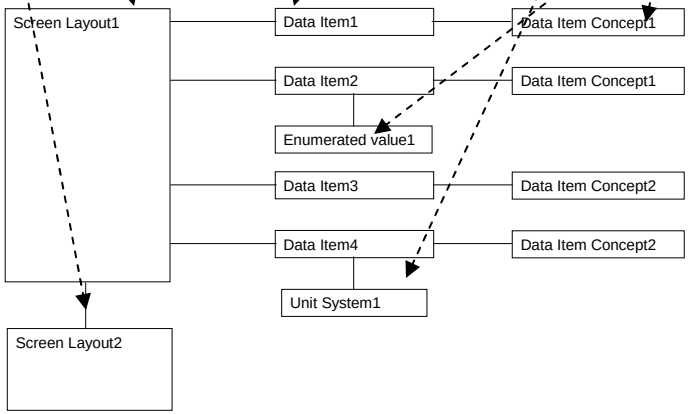
Registration of Domain Model



Software Element Metamodel

Abstract Syntax



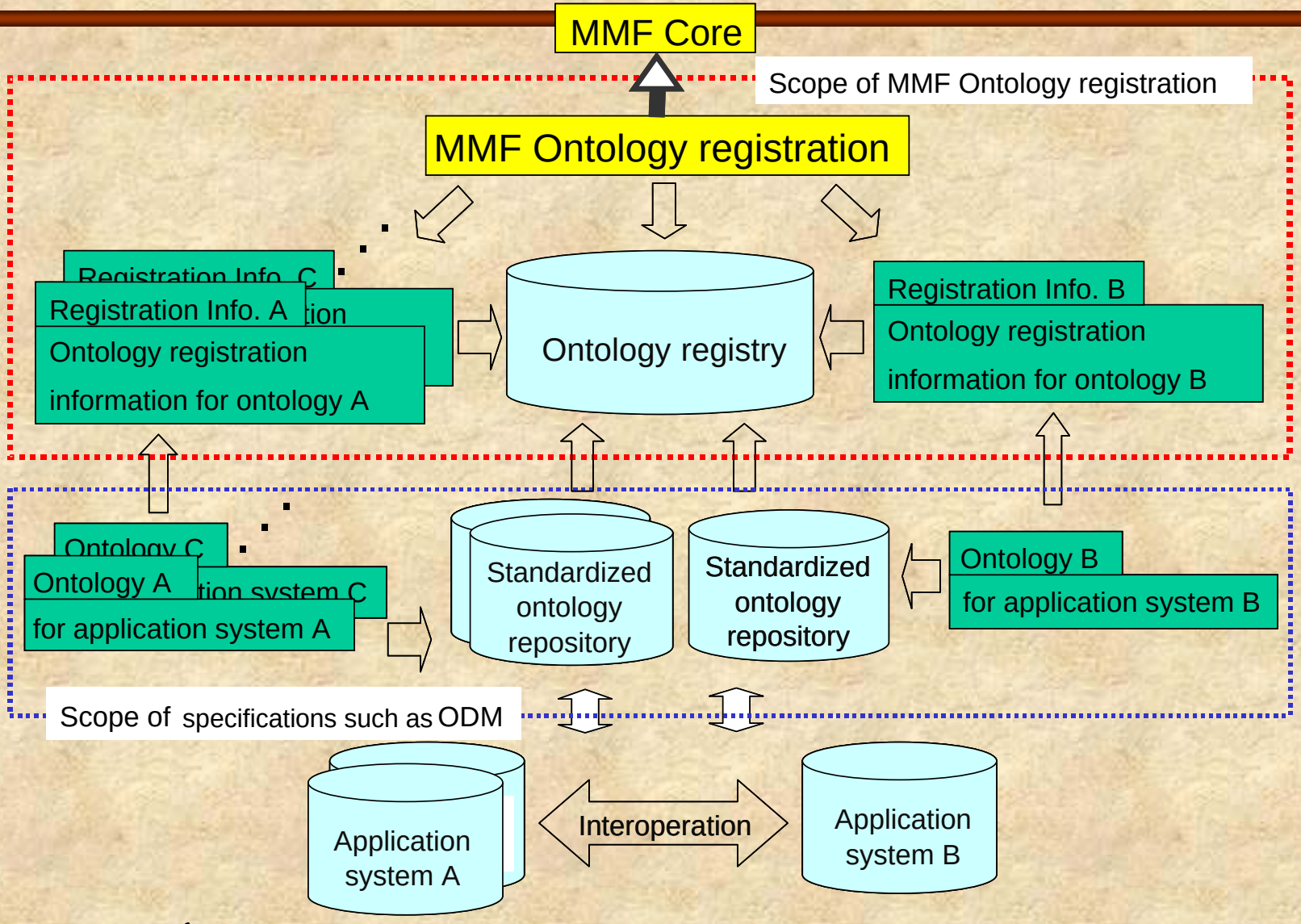


Expression

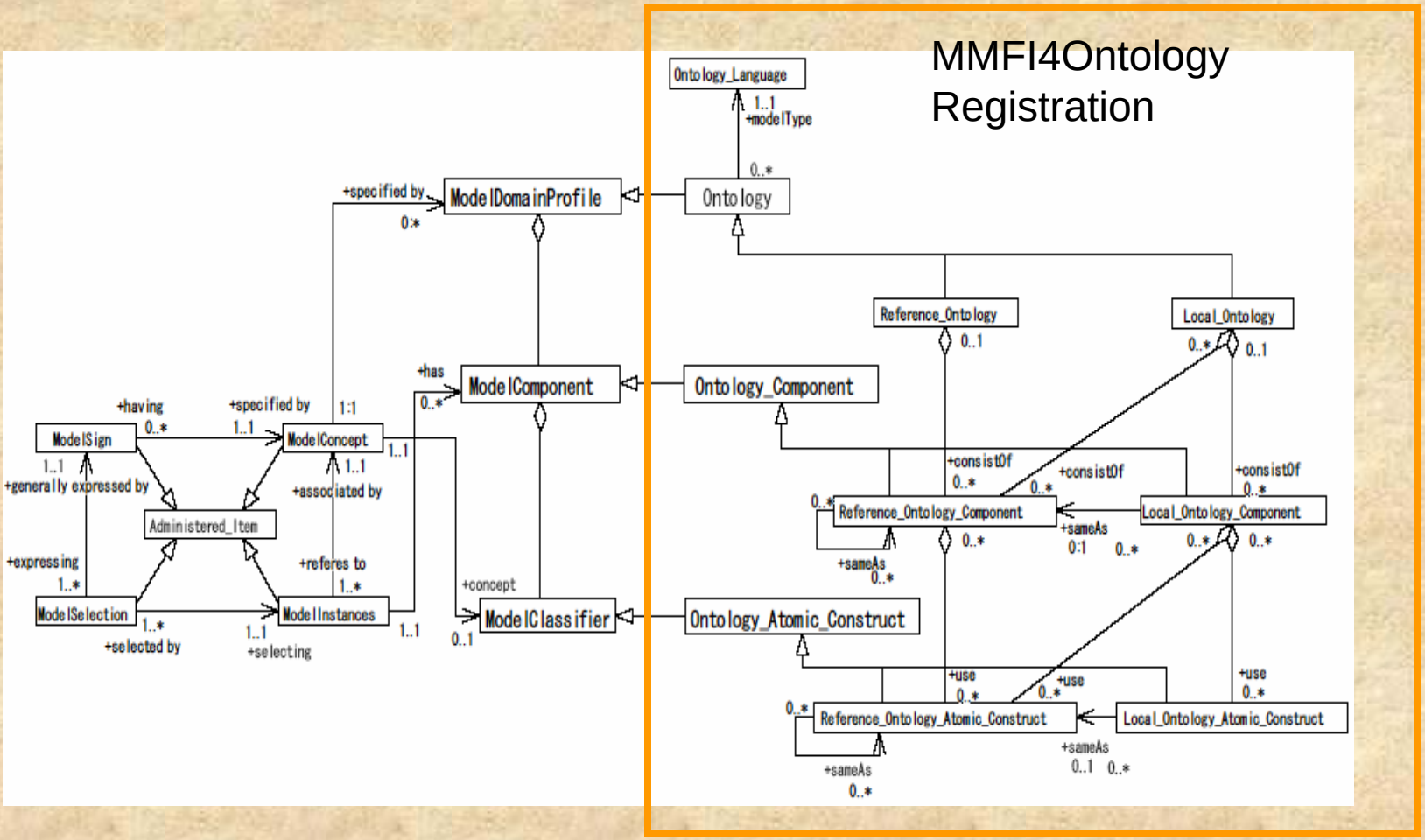
19763 Part 3: MMF for Ontology Registration

Currently: WD

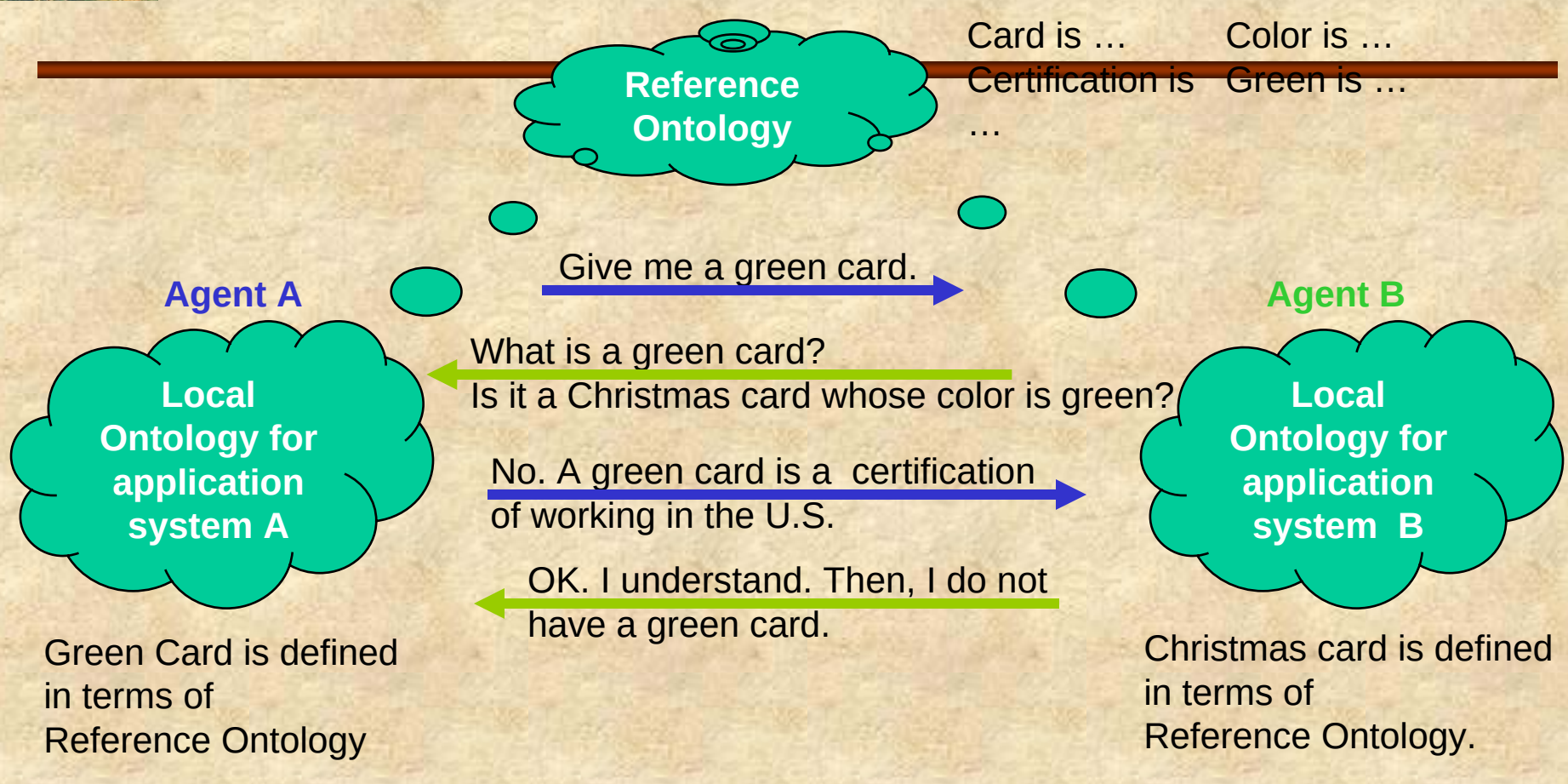
Scope of MMF Ontology Registration



MMFI4Ontology Registration & MMFI Core Model

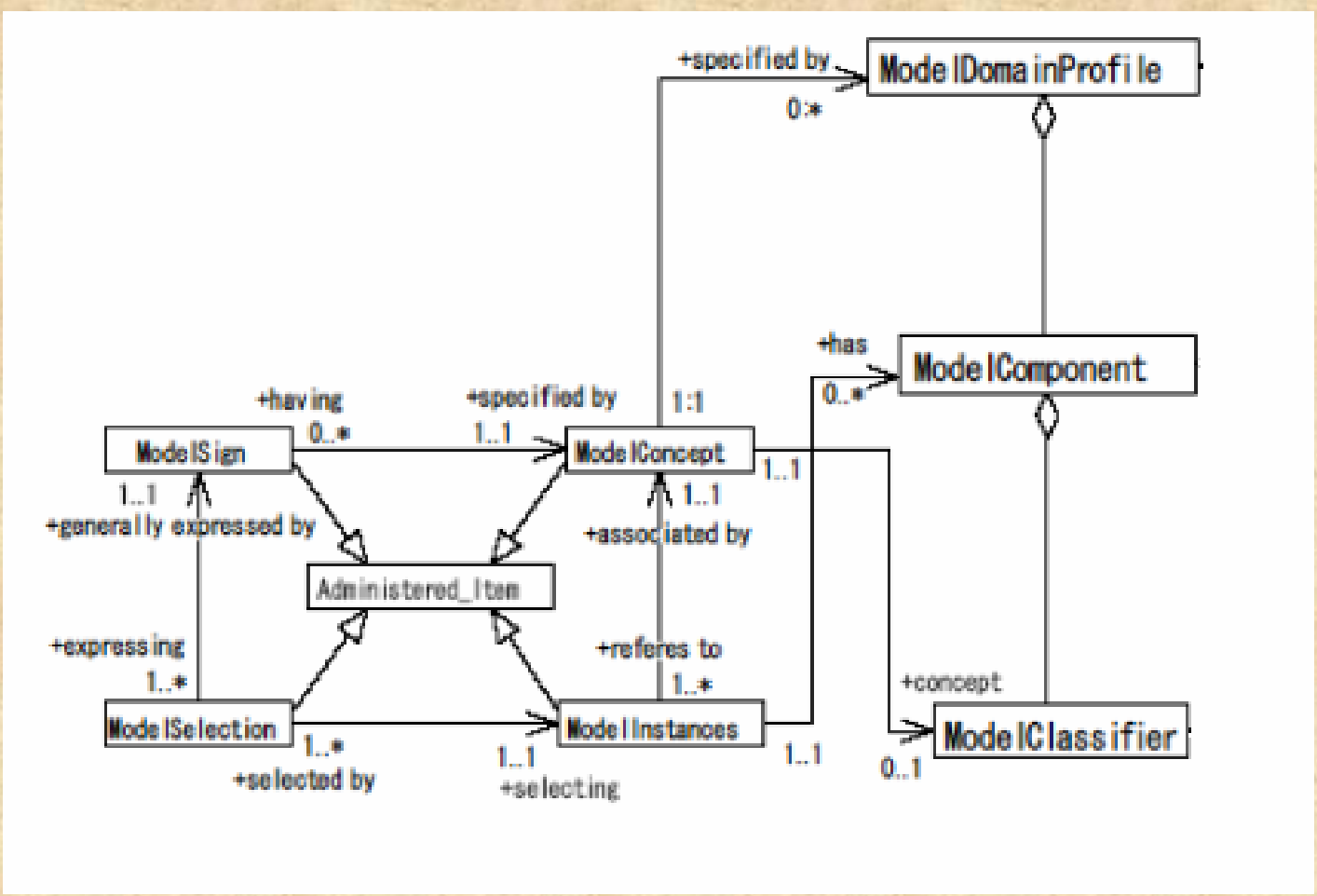


With Reference Ontology



- MMF Ontology registration provides the registration framework where a local ontology is defined based on reference ontologies

MMFI Core Model



From ISO 19763 –2

ODM (Ontology Descriptive Metamodel)

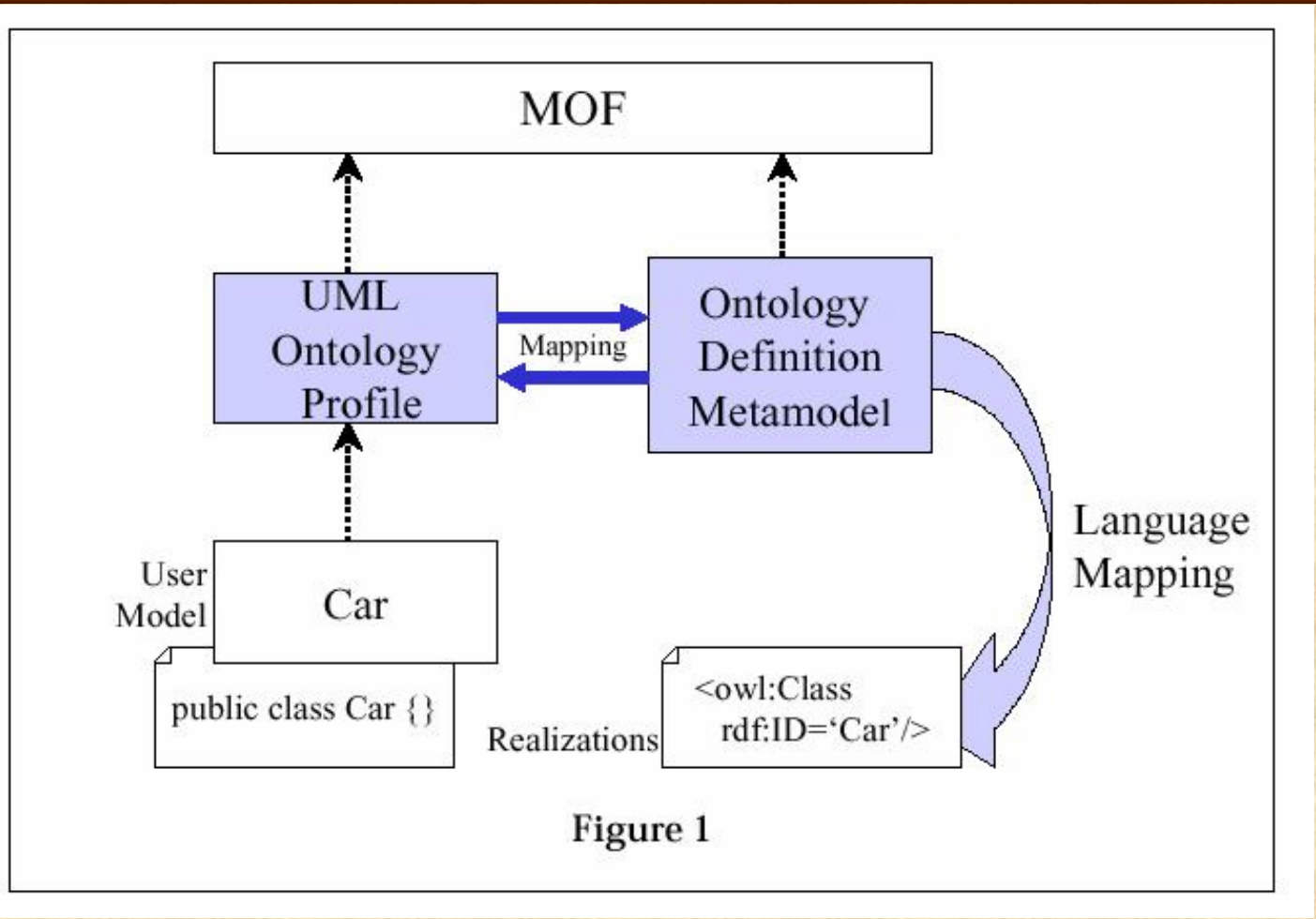
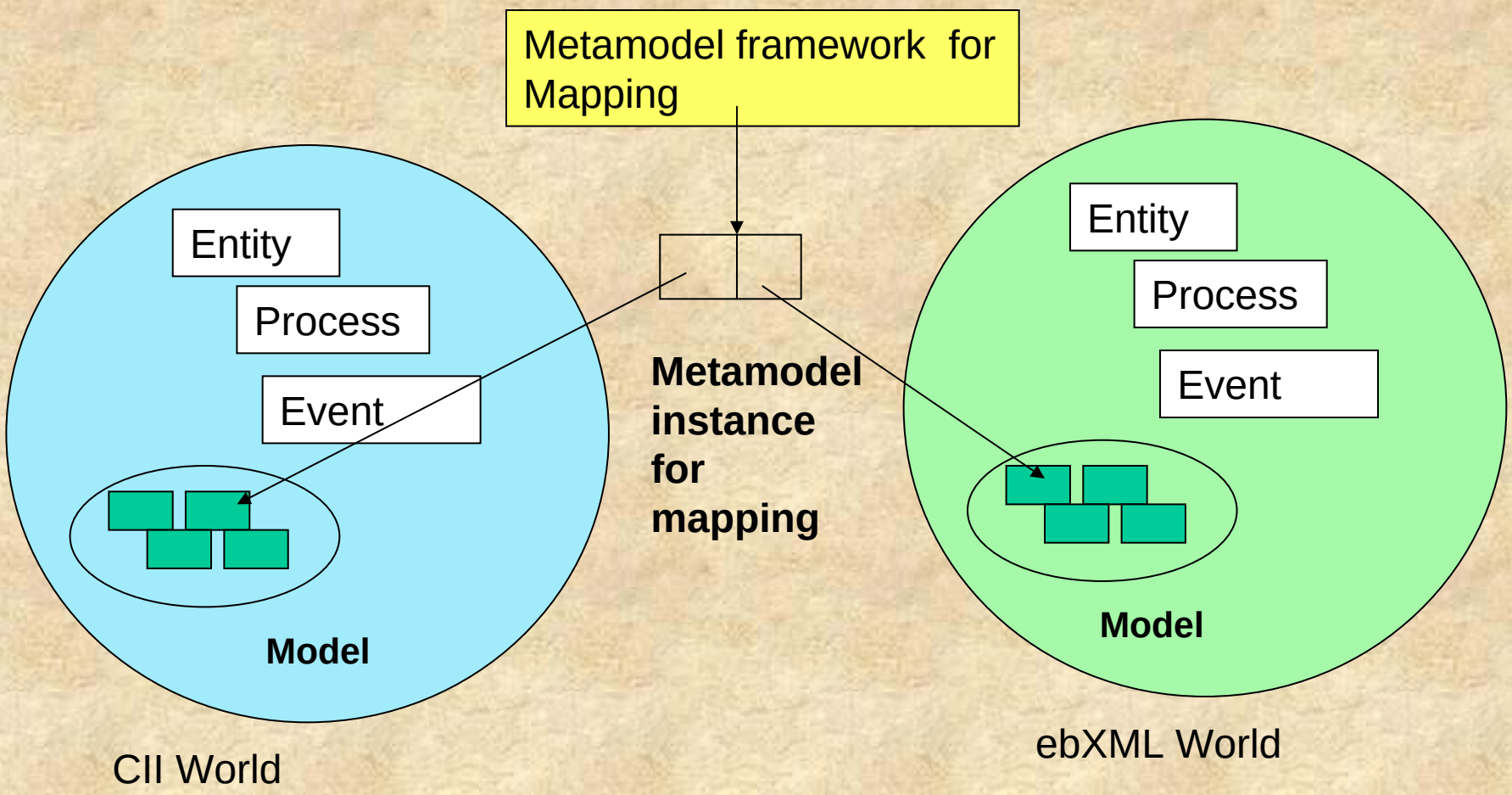


Figure 1

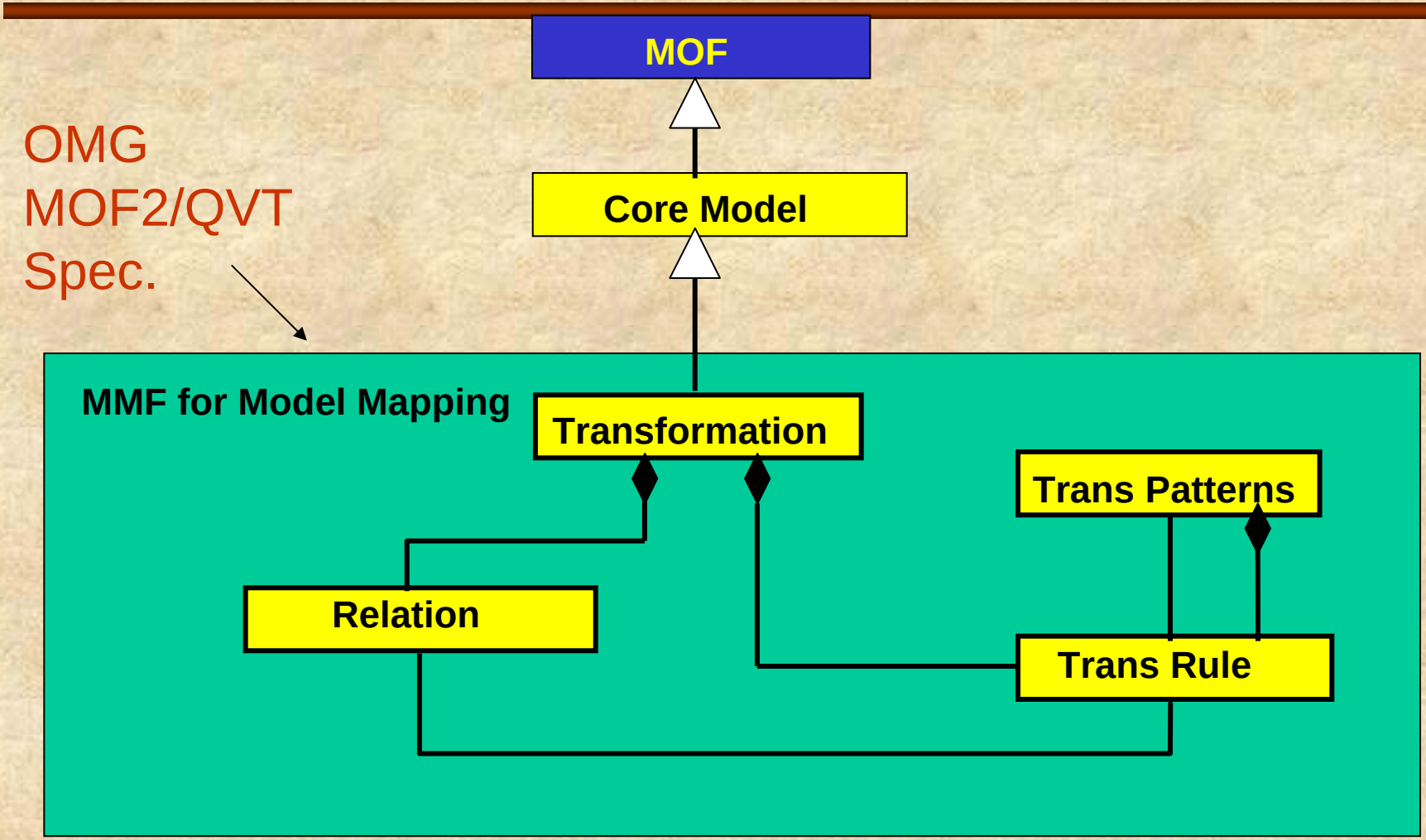
sandpiper software

19763 Part 4: MMF for Model Mapping

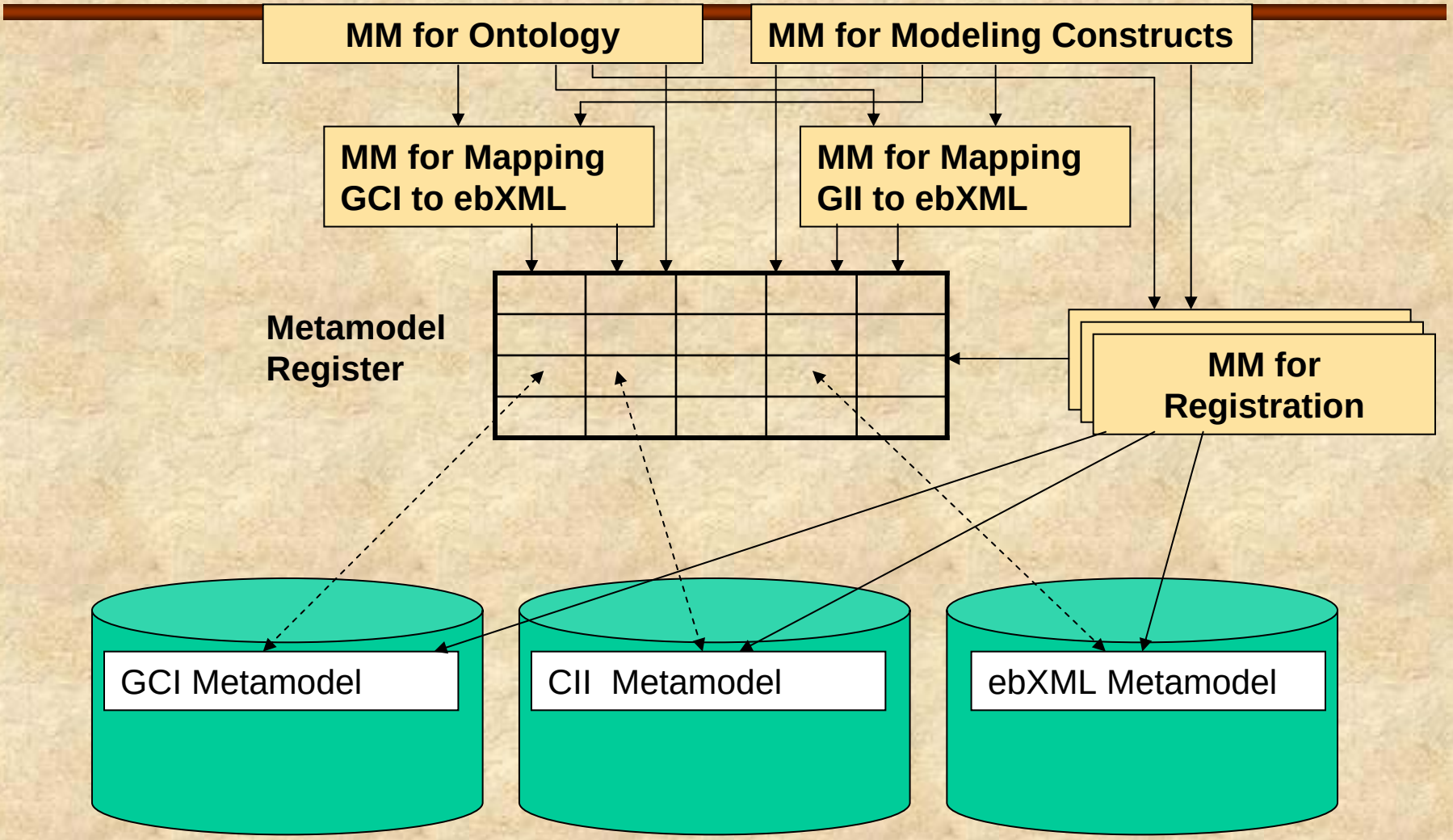
MMF Part-4: Model mapping



Synchronize with OMG QVT



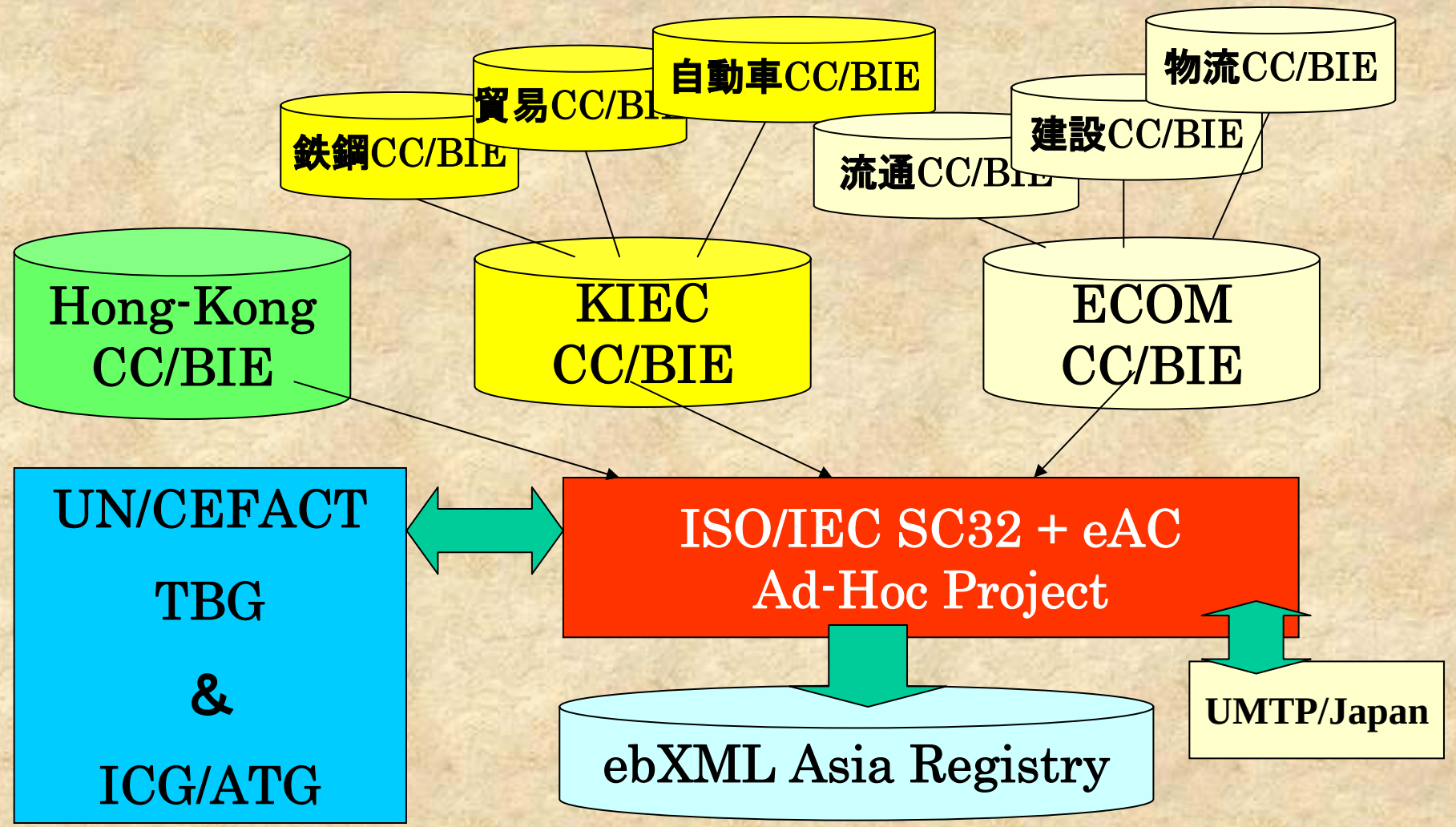
Consolidation of Different Metamodels



Proof of Concept

SC32WG2 + ebXML Asia Committee

An Actual Project on Registry Federation over Asia



Proof of Concept

- **The Project is supported by METI, as an "International Joint Standards Development Project", since 2003~.**
- **POC:**
  - **"The National Registry & Repository for E-Commerce" , Project, in ECOM Japan, 2003-2007.**
  - **SC32WG2 & ebXML Asia Committee Joint Ad-hoc Working group for "Registry and Repository Federation", 2004~. (Jp, Kr, Cn, Sp, My, Tw, HK,)**
  - **The Registry Development project (LCDM) for the Construction Industry in Japan, Jan., 2005 ~**

Registry & Repository Federation Project

- Initiated at SC32 Xian Meeting, April 2004.
- ebXML Asia Committee + SC32WG2
- Implement actual registry federation using ISO/IEC11179 (MDR) and ebXML RR
- POC for ISO/IEC19763(MMF)
- Members:
  - Japan, Korea, China, Hong Kong, Taiwan, Singapore

Discussion

For More Information

Hajime Horiuchi,

Tokyo International University

hori@tiu.ac.jp