Report of the study (4)

“Current trends on Process Modeling”

-- Toward Registering Process Models --

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Entity?

“Entities are a state of mind. No two people agree on what the real world view is.”

[A. Metaxides]

From the book of

Data and Reality,

William Kent, North-Holland, 1978

Can Ontology resolve those problems ?

Contents

1. Trends on Process Modeling
   - Process Modeling
   - Notation for Process Modeling
   - Metamodels of Process Modeling
   - Process Ontology
   - Process Model Registration
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3. Conclusion

Purposes of Process Modeling

- System construction
- Business Collaboration
- Process Management
- Activity Analysis
- SOA Orchestration

Taxonomy of Processes

Domain specific processes

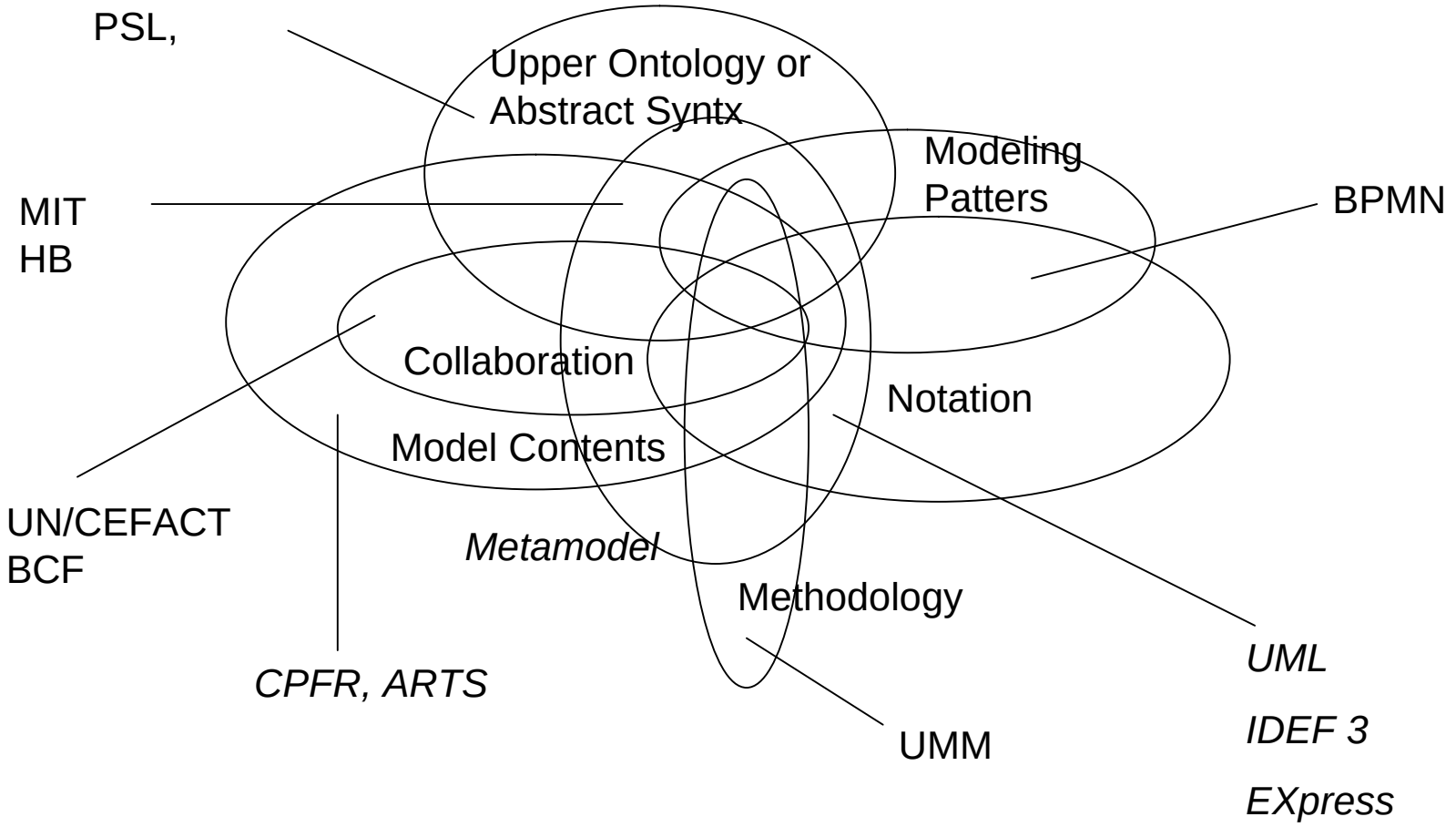
-In house Business process (Accounting, AR/AP)

-Between Enterprises (Collaboration)

-Industrial specific: Healthcare, Manufacturing,

- Software Process
- Dynamic aspect ✍ A part of an ontology
- Ontology migration process
- Registration process

Type of Process Model



Comparative Analysis

	MIT HB	PSL	OWL -S	SPE M	BPMN	UM M	IDEF 3+5	HL7	CPF R	
Upper Ontology	X	X	X				X	X		
Pattern		X			X			X		
Metamodel				X	X	X		X		
Notation			OWL		X		X		X	
Profile	X		X					X		
Method	X					X	X	X		
Collaboration of Process					X	X		X	X	
Contents	X				X			X	X	
Registration	X									

MIT Process Handbook

- The goal of the MIT Process Handbook Project, in which we have participated almost since its start, is to develop rich online libraries for sharing and managing many kinds of knowledge about business. For example, these libraries can help find interesting case examples, generate innovative ideas about new business possibilities, and develop new computer programs. Starting in 1991, we have developed one such library. We call it the Process Handbook – an extensive online knowledge base including entries for over 5000 business activities and a set of software tools for managing this knowledge.
- The Process Handbook can help people to (1) redesign existing (business) processes, (2) invent new process, especially those that take advantage of information technology, novel coordination structures, or exception handling approaches, (3) organize and share knowledge about organizational practices, and (4) automatically, or semiautomatically, be used generate software to support or analyze business processes.

An Example of MIT HB registration

ProcessModel, Inc. http://www.processmodel.com/

Products & Services

Primary Business:

Software Development and Sales

Type of Software or Service:

Decision Analysis/Decision Support
Logistics
Operations Management
Optimization
Simulation

Specific Methodologies and Applications or Areas of Expertise:

Production Planning
Scheduling
Supply Chain Management

Fields or Industries served:

Business
E-Commerce
Financial
Government (nonmilitary)
Healthcare
Manufacturing
Military
Telecommunications
Transportation
Oil/Natural Gas
Utilities - Water & Power

Notation for Process Modeling

- BPMN(2006)
- WFMG✍ BPMN
- IDEF3 (1996)

  http://www.idef.com/IDEF3.html
- CDIF(SC7,2001)
- Express(TC184,1991)

IDEF

- **IDEF METHODSIDEF0**Function Modeling
- **IDEF1** Information Modeling
- **IDEF1X** Data Modeling
- **IDEF2** Simulation Model Design
- **IDEF3** Process Description Capture
- **IDEF4** Object-Oriented Design
- **IDEF5** Ontology Description Capture
- **IDEF6** Design Rationale Capture
- **IDEF7** Information System Auditing
- **IDEF8** User Interface Modeling
- **IDEF9** Scenario-Driven IS Design
- **IDEF10** Implementation Architecture Modeling
- **IDEF11** Information Artifact Modeling
- **IDEF12** Organization Modeling
- **IDEF13** Three Schema Mapping Design
- **IDEF14** Network Design

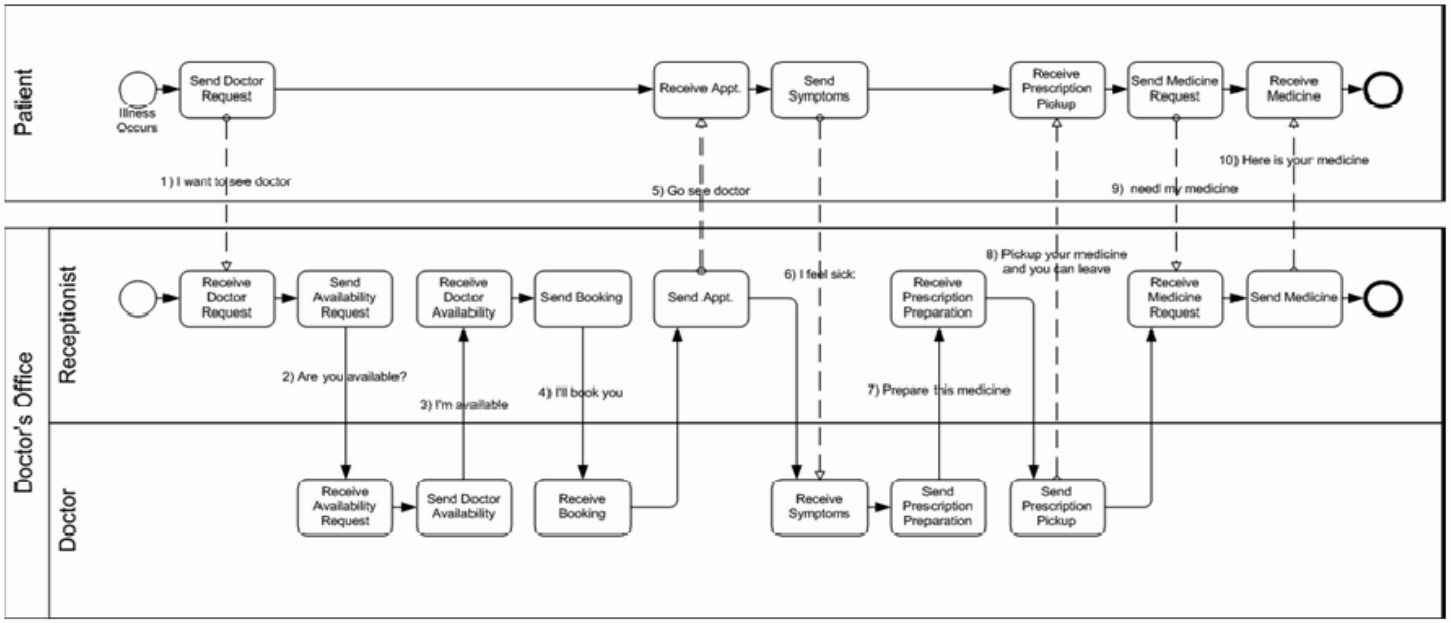
Business Process Modeling

- BPMN: Business Process Modeling Notation
- BPML: Business Process Modeling Language
- BPEL: Business process Execution Language
- XPDL: Business Process Definition Markup Language
- WS-CDL: Web Service Choreography Definition Language

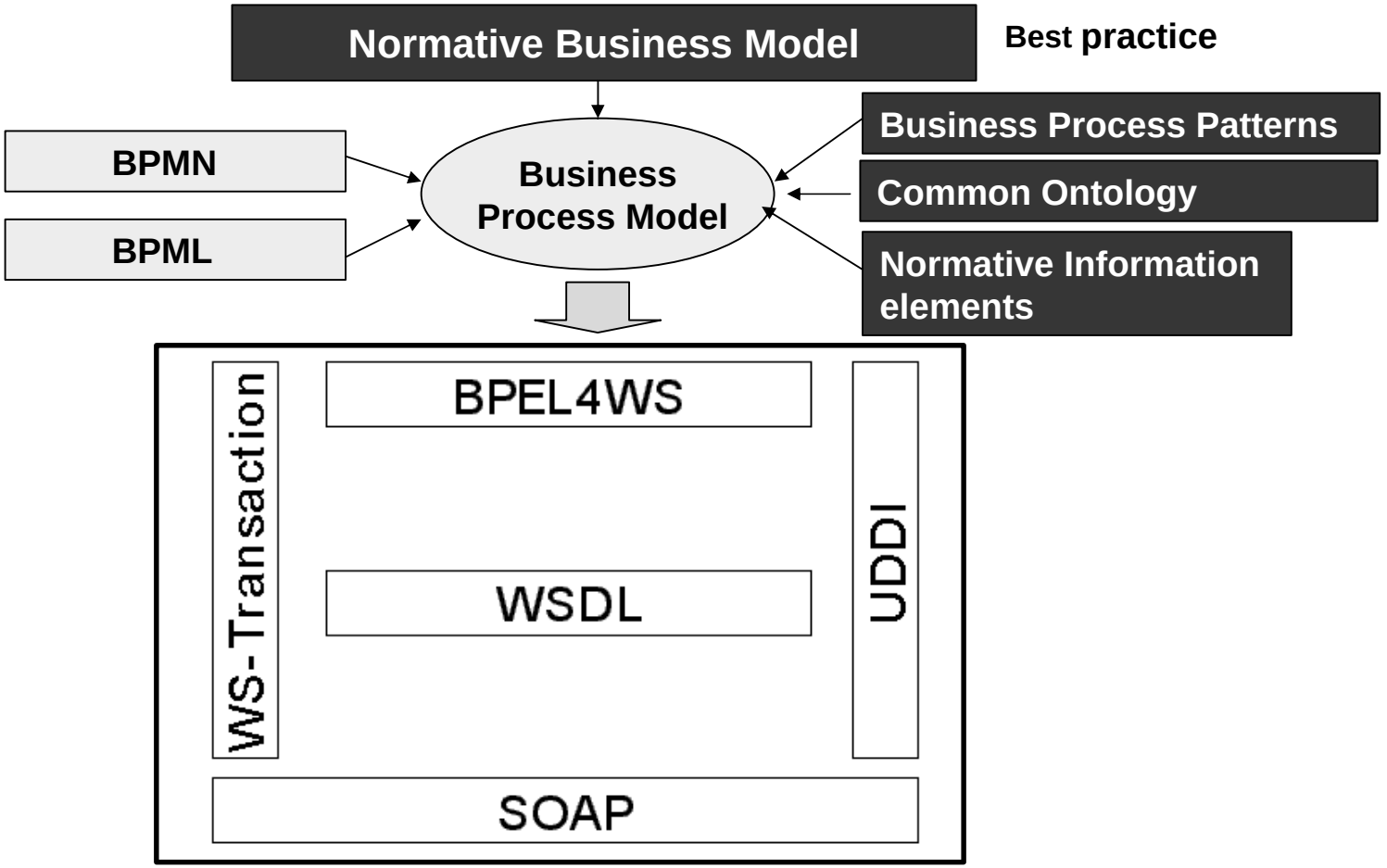
BPMN（Business Process Modeling Notation)

BPMI.org

B2B Modeling

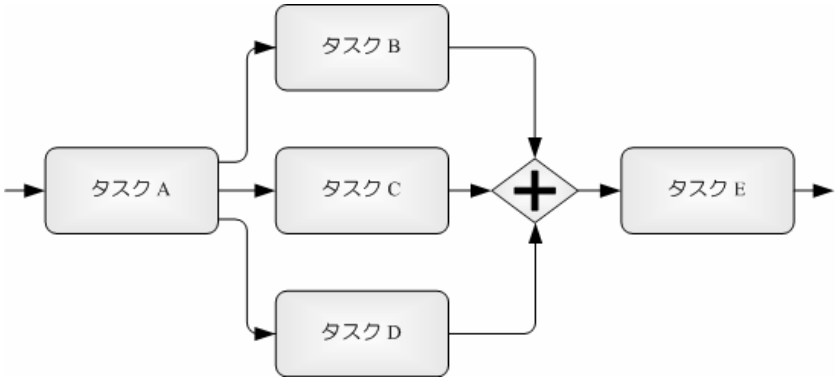


Web Service and Model

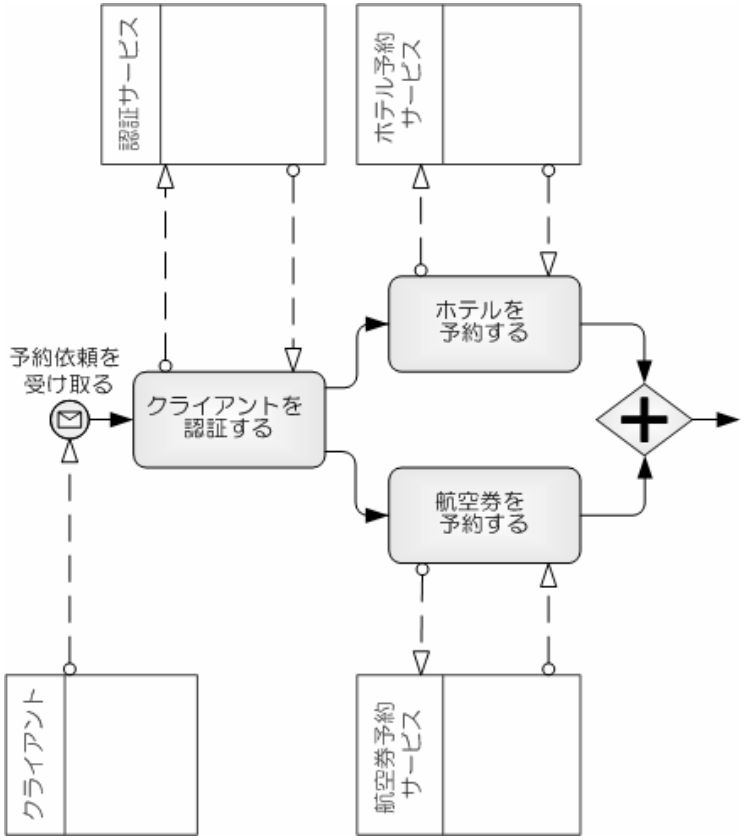


BPMN Patterns

UMTP BPMN研究会 2006年3月
ローレベルパターン 22種



フロー制御 基本制御
並列実行 パターン



適用例

In-house Workshop *http://www.bpiresearch.com/index.htm*

‘Business Process Management
The Ontology-Based Approach’

As a starting point, the two-day workshop centers around these questions:

What is an ontology?

What is a knowledge base?

Why think about using an ontology for business process design? What are the benefits?

How mature are current public standards?

How is ontology design different from object-oriented design?

What standards should a Business Process Management Ontology be based on?

What are the major characteristics of the Business Process Management Ontology?

How can the Business Process Management Ontology contribute to the better alignment of IT with business?

Using the Business Process Management Ontology as a starting point for customization - What would it involve?

Extending the Business Process Management Ontology - What would it involve?

How to generate design and development artifacts from the Business Process Management Ontology?

The above agenda can be tailored to your specific needs, and, of course, items can be added, so that issues specific to your organization can be addressed.

The workshop is targeted at members of CIO staff, business and IT strategists, business analysts, IT architects, and system designers.

Commercial base Ontology

The Open Source Business Management Ontology (BMO)

The Business Management Ontology (BMO) represents an integrated information model, which helps to better align IT with business. It brings together business process design, project management, requirements management, and business performance management (in the form of balanced scorecards). As such, it forms the basis for an integrated, vendor-neutral, Business Management Knowledge Base, from which various artifacts can be generated. While business analysts will be the primary users of the BMO, IT experts will also use it to establish mappings to software-related definitions, such as business objects and Web service descriptions

http://www.bpiresearch.com/Resources/RE_BPMORename/re_bpmorename.htm

http://www.ocrwm.doe.gov/index.shtml

US Department of ENERGY

- **Process Model Reports**

  During early assessments of repository performance, experts incorporated the results of our analysis models into more comprehensive computer models called process models. The process models analyze twelve primary repository processes. The process model reports are documents that describe the individual process models and how different parts of the repository will work together over tens of thousand of years.

- Biosphere Process Model Report Rev 00 ICN 01
  The objective of the Biosphere Process Model Report is to summarize the development of the biosphere model, and the Biosphere Dose Conversion Factors (BDCFs) developed for use in Total System Performance Assessment.

- Disruptive Events Process Model Report Rev 00 ICN 01
  The Disruptive Events Process Model Report (PMR) summarizes the results of investigations intended to estimate the hazards to the potential repository at Yucca Mountain from events associated with the processes of volcanism and seismicity.

- Disruptive Events Process Model Report, Rev 00 ICN 01
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- Engineered Barrier System Degradation, Flow, and Transport Process Model Report Rev 00 ICN 01
  The EBS Process Model Report describes the evolution of the bulk chemical environment in the repository emplacement drifts, over the 10,000-yr performance period of the potential repository. The approach begins with the evolution of temperature and relative humidity over time, then describes the chemical conditions in the emplacement drifts.

- Engineered Barrier System Degradation, Flow, and Transport Process Model Report, TDR-EBS-MD-000006 Rev 00 ICN 01
  The EBS Process Model Report describes the evolution of the bulk chemical environment in the repository emplacement drifts, over the 10,000-yr performance period of the potential repository. The approach begins with the evolution of temperature and relative humidity over time, then describes the chemical conditions in the emplacement drifts.

- Integrated Site Model Process Model Report
  The Integrated Site Model (ISM) provides a framework for discussing the geologic features and properties of Yucca Mountain.

- Near Field Environment Process Model Report Rev 00 ICN 01
  This Process Model Report (PMR) describes the analyses and modeling based on current understanding of the evolution of the near-field within the rock mass extending outward from the drift wall.

- Near Field Environment Process Model Report, Rev 00 ICN 03

Purpose of Process Ontology

- Provide generic an upper ontology to dynamic aspect
- Provide Process classification
- Enable collaborations

Domain Process Model

- Software Lifecycle Process
- Software Process

Process Ontology

- Ontology for dynamic aspect of concept
- Upper Ontology for Processes
- Upper Ontology for Services
- Domain specific Process Ontology
  - E-learning
  - PSL

OWL-S

- OWL for Web Service

  an application of OWL

  – Service profile:

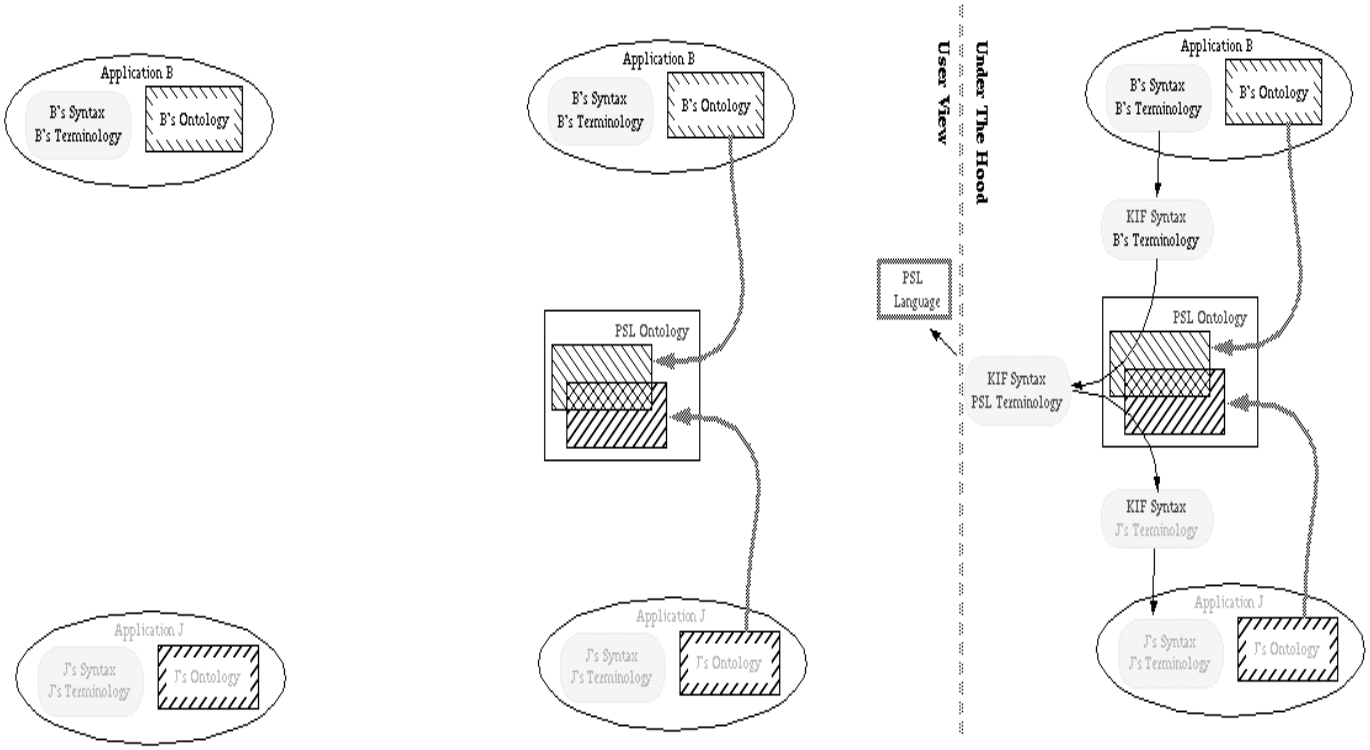
  – Service model:

PSL Ontology

http://www.mel.nist.gov/psl/ontology.html

- **PSL Ontology -- Current Theories and Extensions**
- The axioms of PSL are organized into PSL-Core and a set of extensions. PSL-Core is the set of axioms written in KIF (the Knowledge Interchange Format) and using only the nonlogical lexicon of PSL-Core. The extensions form a lattice of extensions to PSL-Core. The purpose of PSL-Core is to axiomatise a set of intuitive semantic primitives that is adequate for describing the fundamental concepts of manufacturing processes. Consequently, this characterization of basic processes makes few assumptions about their nature beyond what is needed for describing those processes, and the Core is therefore rather weak in terms of logical expressiveness. In particular, PSL-Core is not strong enough to provide definitions of the many auxiliary notions that become necessary to describe all intuitions about manufacturing processes. To supplement the concepts of PSL-Core, the ontology includes a set of extensions that introduce new terminology. An PSL extension provides the logical expressiveness to express information involving concepts that are not explicitly specified in PSL-Core.

PSL Ontology Mapping

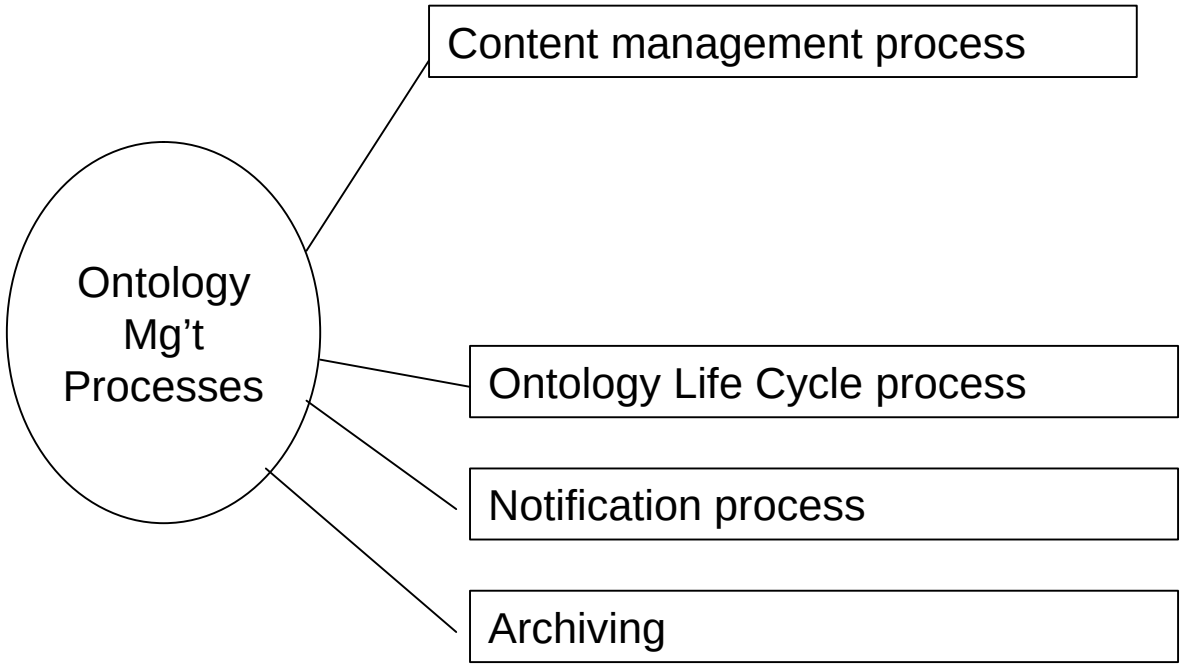


Process Model Registration

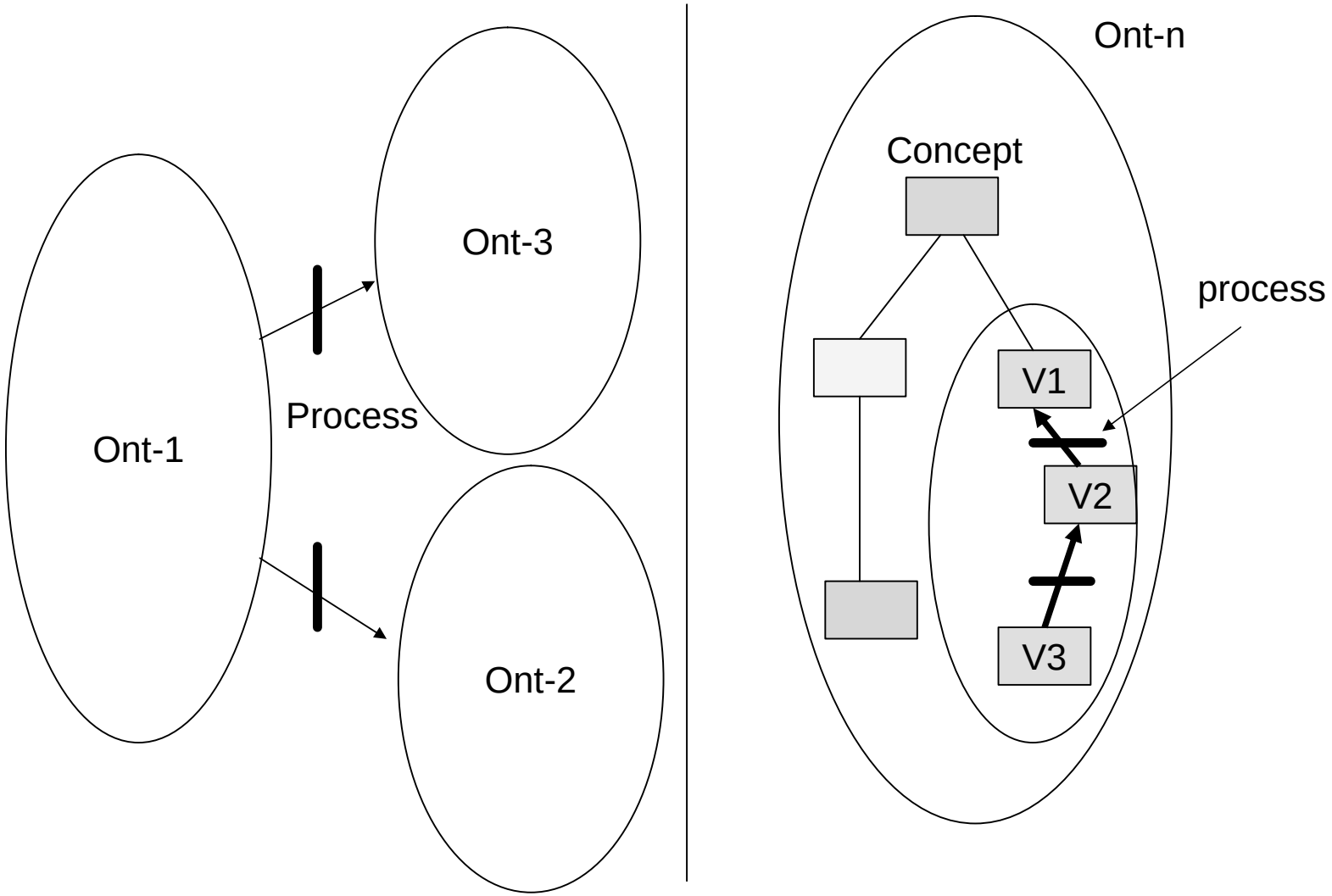
- MIT Process Handbook
- ModelZoo

Ontology Registry Management Process

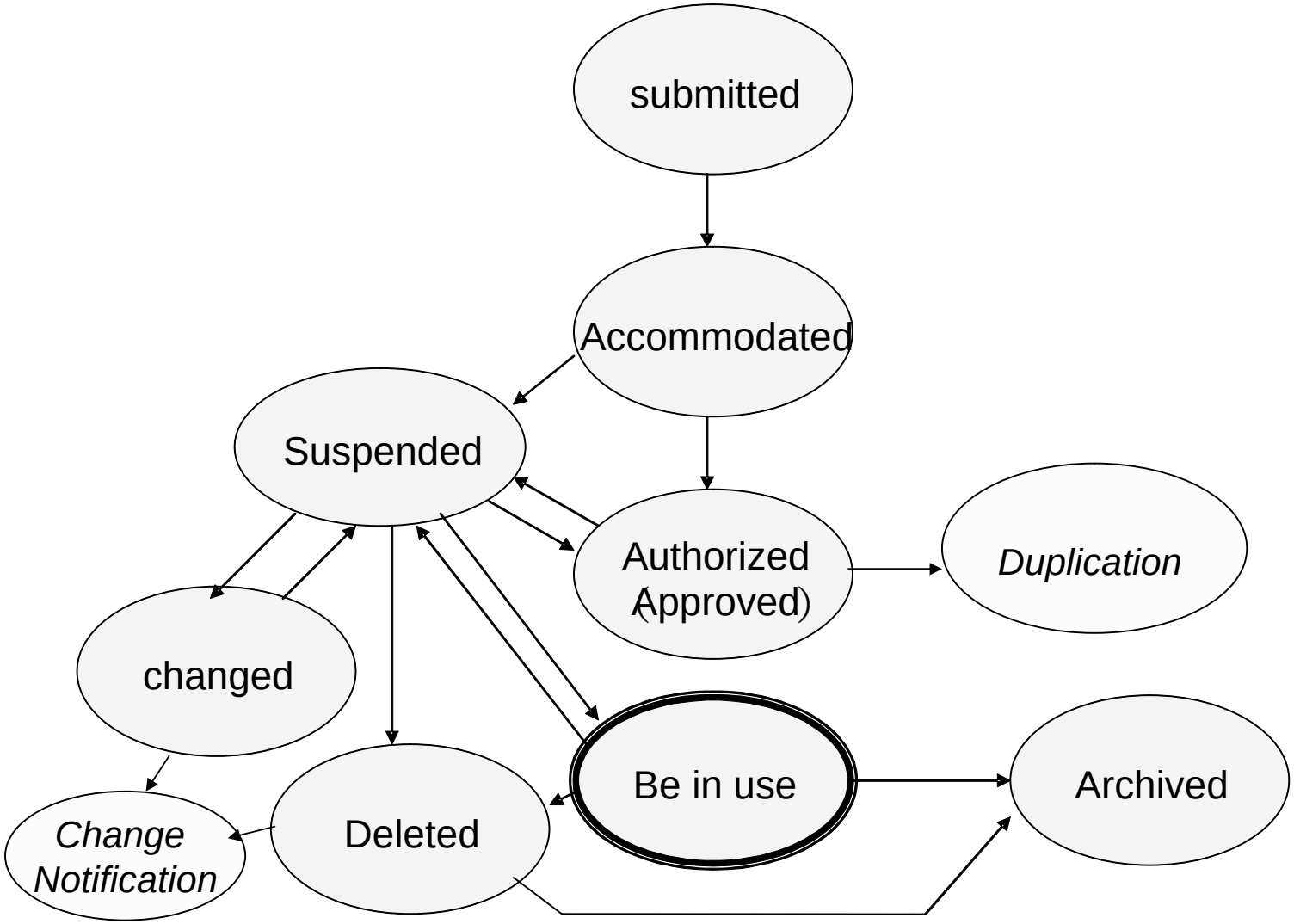
Ontology Management process



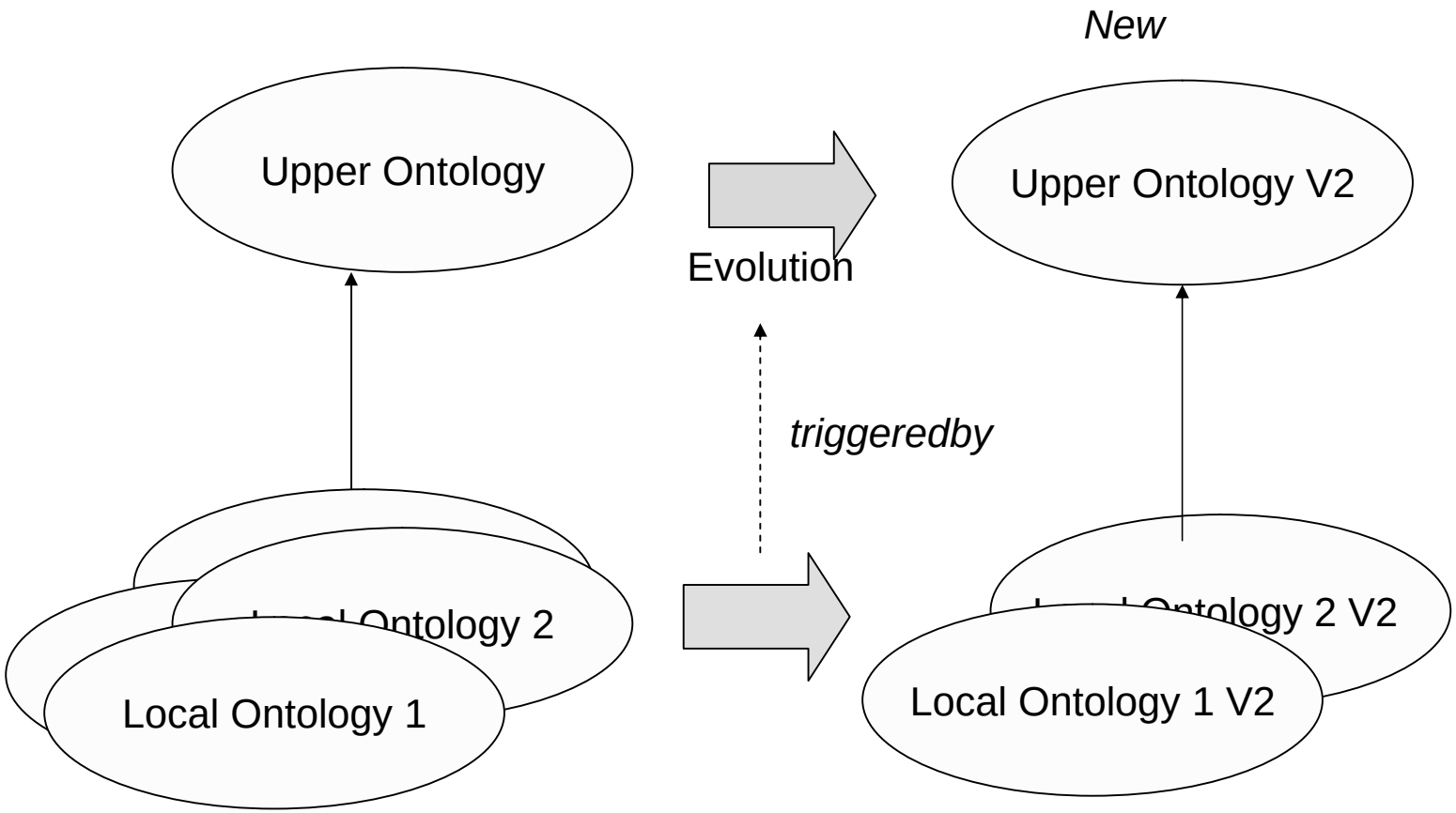
Ontology evolution process

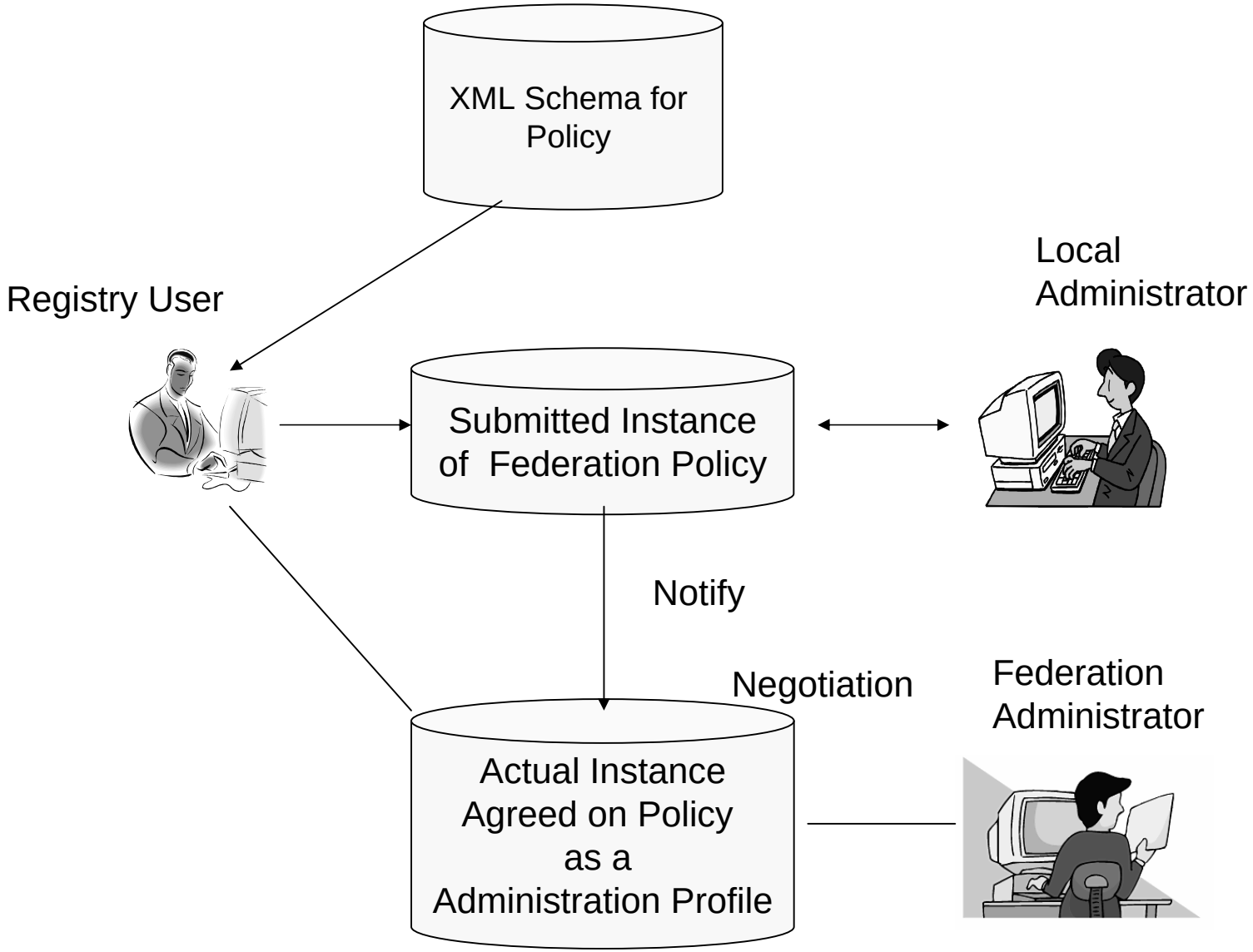


Life cycle States of an registered Ontology

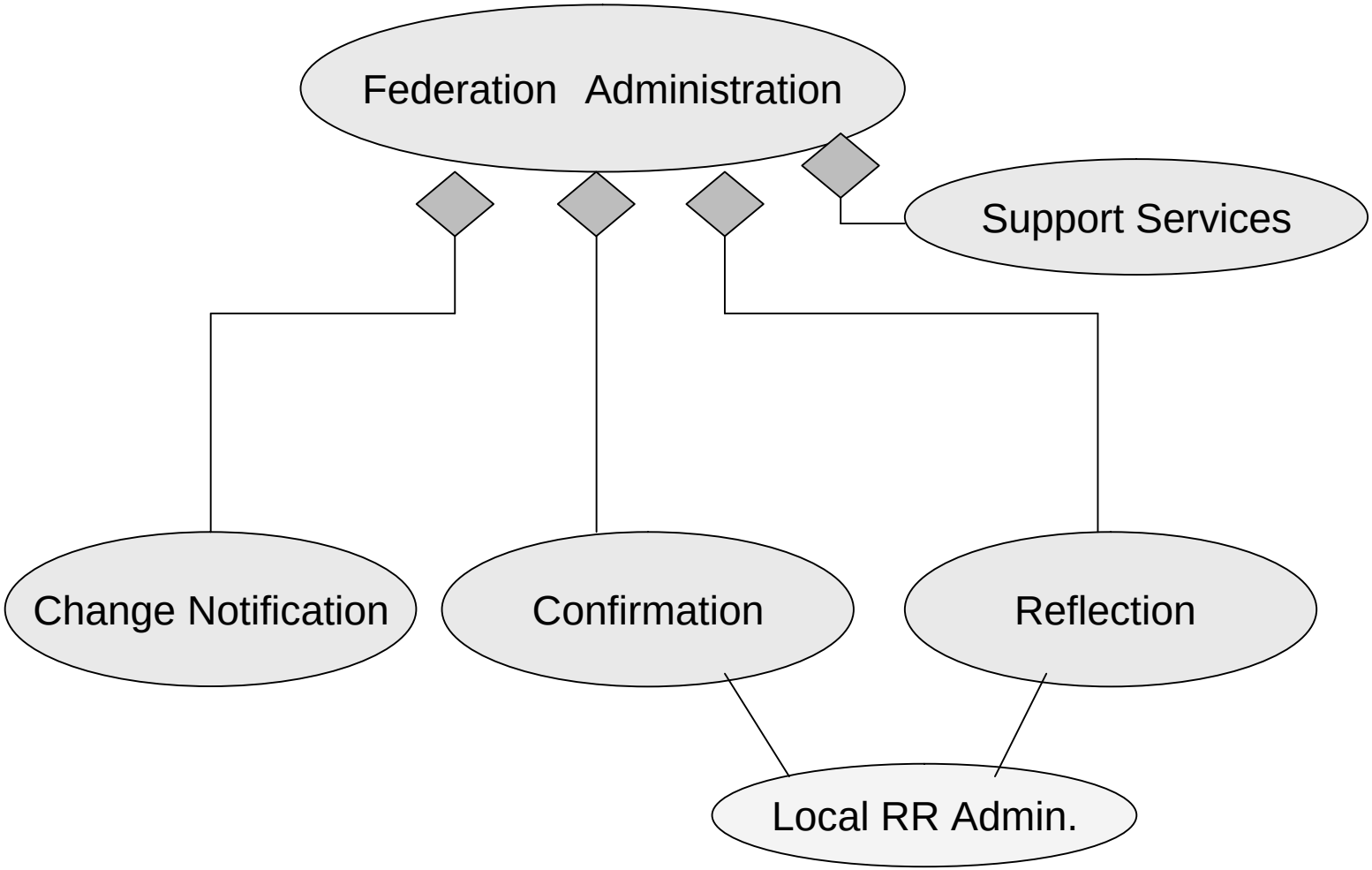


Evolution Process




XML Schema for Policy
Registry User
Local Administrator
Submitted Instance of Federation Policy
Notify
Negotiation
Federation Administrator
Actual Instance Agreed on Policy as a Administration Profile

Basic processes of Federation Administration



Requirement for ISO Standards

- Should be well Acceptable by Industries
- Advanced new technologies are tend to be rejected
- Keep harmonization with existing standards
- Negotiations must be needed with other group

Conclusion

- Process Model standardization and registrations were enforced already
- If we want to initiate new activities on the area, we have to respect existing standards
- We have to demonstrate our MFI’s advantages to the people

Possibility of the Process Model Registration by Ontology

- Stand alone standard ✍ Difficult !

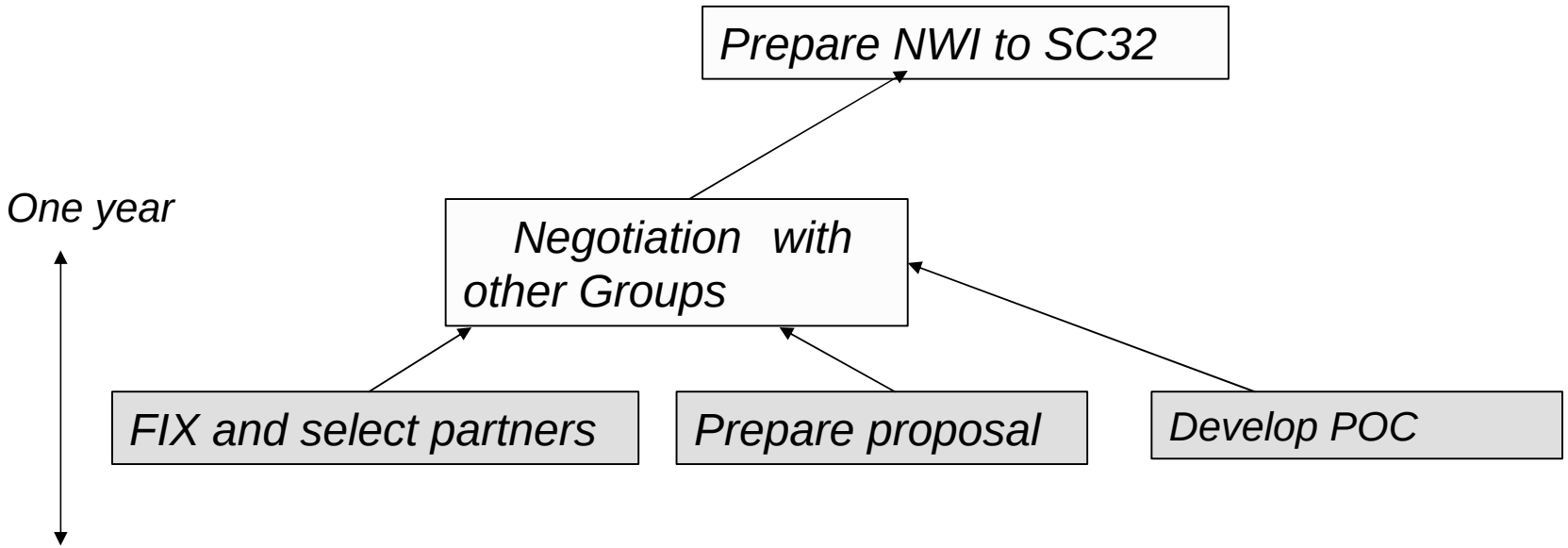
  (Even if, it is a part of MFI)
- Have to establish collaborations with;

  OMG ✍ SPEM, BSBR

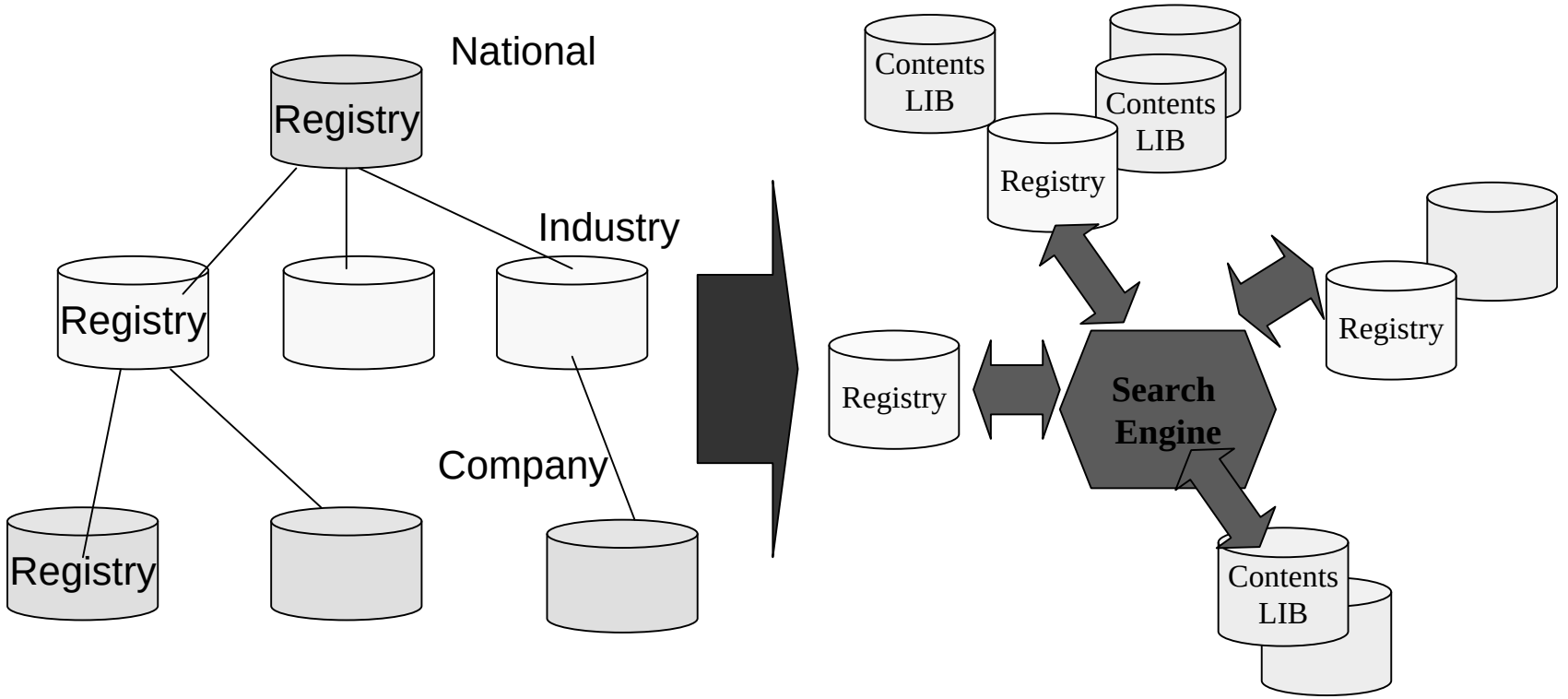
  MIT ✍ MIT Handbook

  TC184 ✍ PSL (Registration)

Road Map to the Goal



Another Trends



Tight Integration

Loose Integration

Discussion