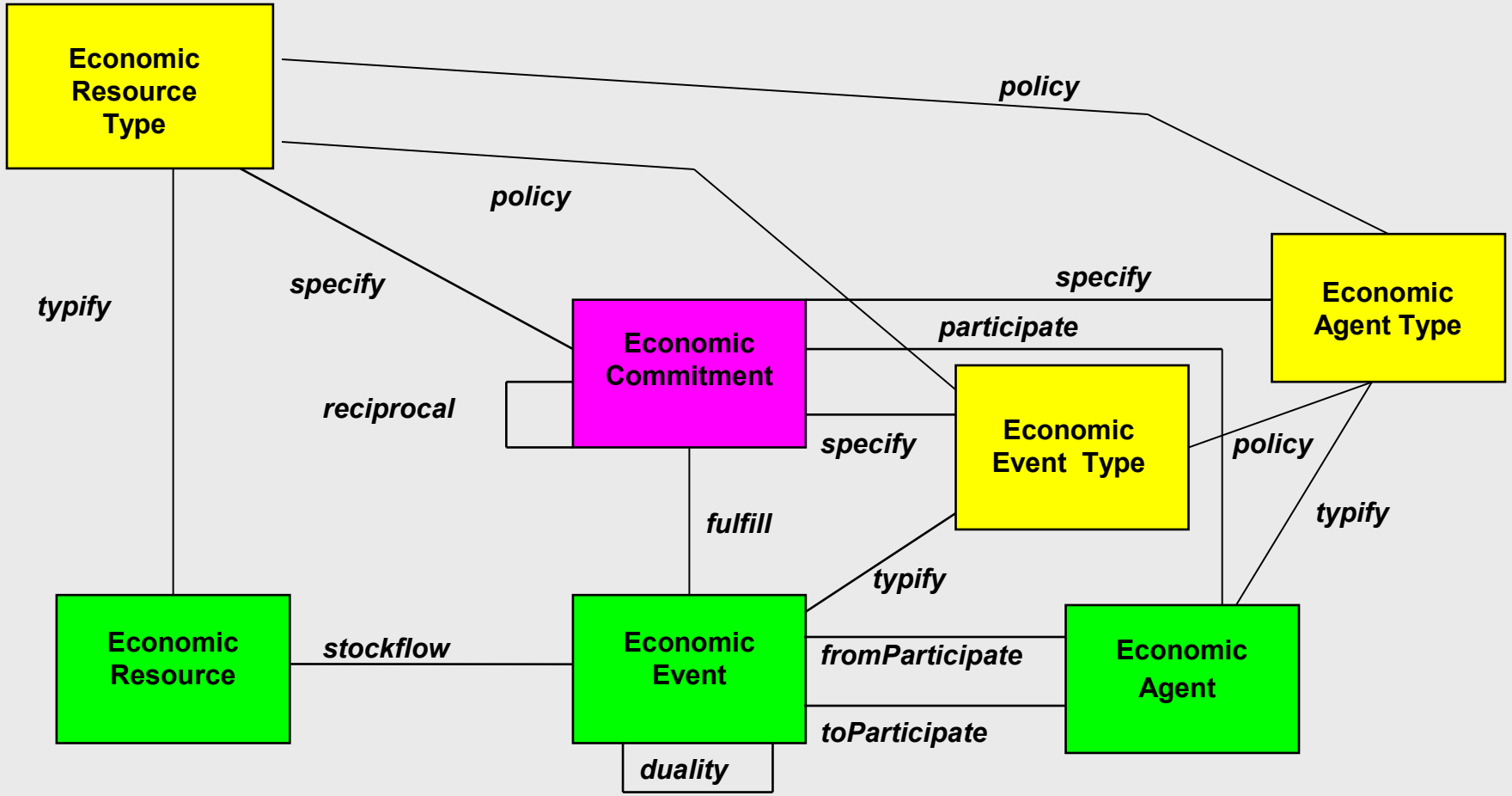
"Ontologically-Driven Standards -- the Natural Tensions"

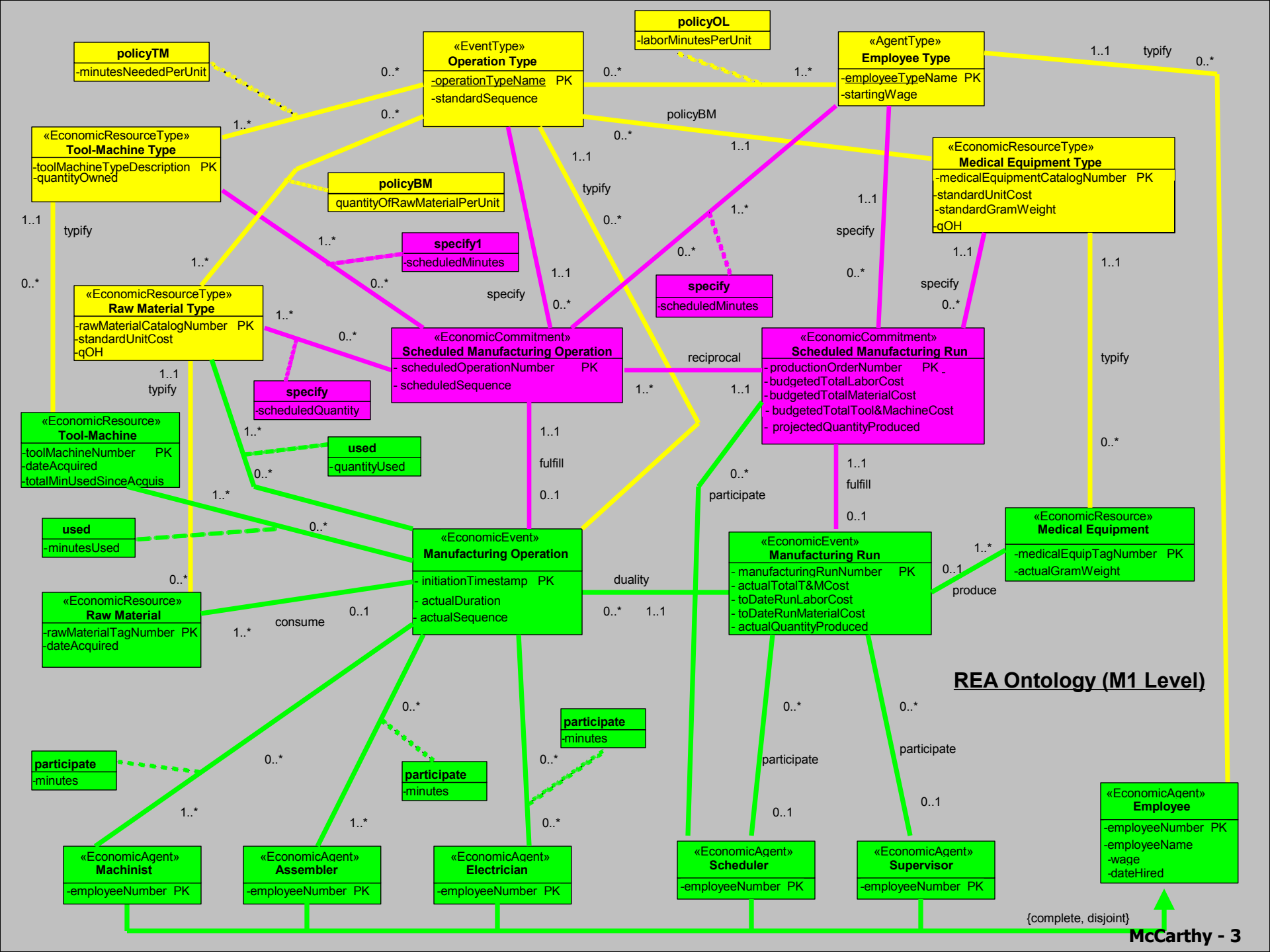
Bill McCarthy, Michigan State University

- Professor of Accounting & Information Systems & KPMG Faculty Scholar – MSU
  - REA (resource-event-agent) research work & teaching
- ISO/IEC 15944 – Open-edi standards editor
  - Part 4 (15944-4) – The accounting & economic ontology (November 2007)k
  - Part 3 – Open-edi descriptive techniques (in progress)
- UN/CEFACT – TMG – Business Process Group
  - Editor for the REA extension to the UMM (development methodology)
- ONTOLOG participant



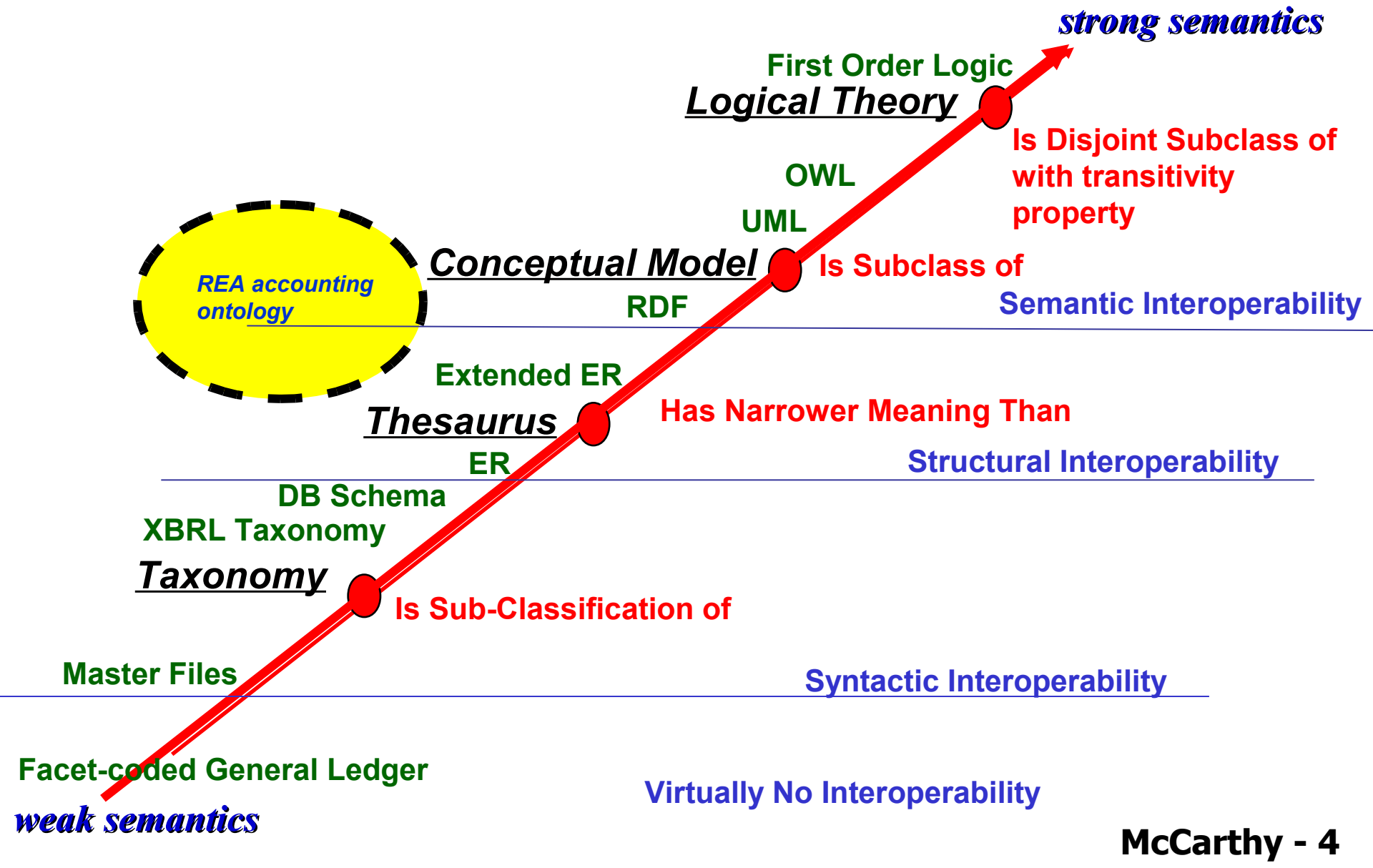
1. Green – "What has occurred" – REA, duality, stockflow, participate {from, to}
1. Yellow – What could be or should be – TYPES, typify, policy
1. Purple – What is planned or scheduled – COMMITMENTS, specify, fulfill, reciprocal, triggers

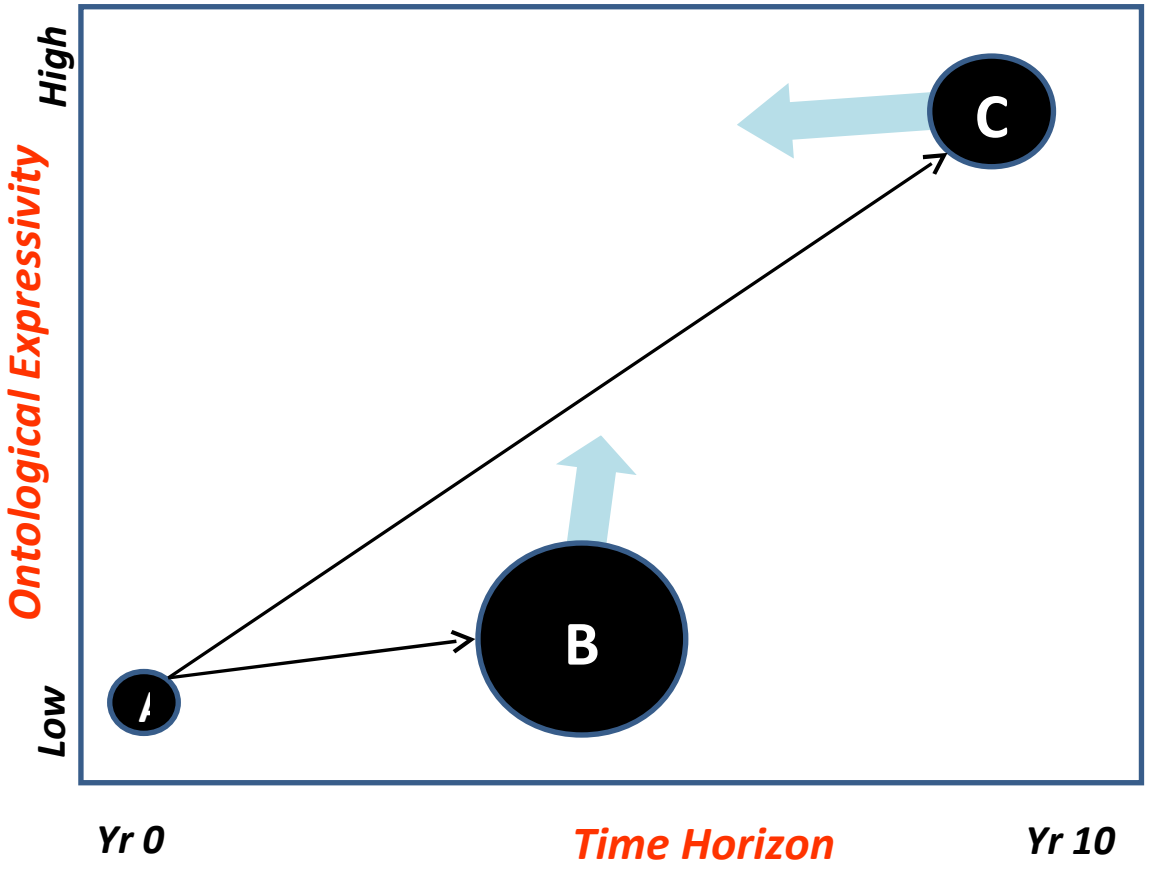
REA ontology (M2 level)


policyTM
-minutesNeededPerUnit
policyOL
-laborMinutesPerUnit
«EventType»
Operation Type
-operationTypeName PK
-standardSequence
«AgentType»
Employee Type
-employeeTypeName PK
-startingWage
typify
policyBM
«EconomicResourceType»
Tool-Machine Type
-toolMachineTypeDescription PK
-quantityOwned
policyBM
quantityOfRawMaterialPerUnit
«EconomicResourceType»
Medical Equipment Type
-medicalEquipmentCatalogNumber PK
-standardUnitCost
-standardGramWeight
-qOH
specify1
-scheduledMinutes
specify
-scheduledMinutes
«EconomicResourceType»
Raw Material Type
-rawMaterialCatalogNumber PK
-standardUnitCost
-qOH
«EconomicCommitment»
Scheduled Manufacturing Operation
- scheduledOperationNumber PK
- scheduledSequence
reciprocal
«EconomicCommitment»
Scheduled Manufacturing Run
- productionOrderNumber PK
- budgetedTotalLaborCost
- budgetedTotalMaterialCost
- budgetedTotalTool&MachineCost
- projectedQuantityProduced
specify
-scheduledQuantity
«EconomicResource»
Tool-Machine
-toolMachineNumber PK
-dateAcquired
-totalMinUsedSinceAcquis
used
-quantityUsed
fulfill
participate
used
-minutesUsed
«EconomicEvent»
Manufacturing Operation
- initiationTimestamp PK
- actualDuration
- actualSequence
duality
«EconomicEvent»
Manufacturing Run
- manufacturingRunNumber PK
- actualTotalT&MCost
- toDateRunLaborCost
- toDateRunMaterialCost
- actualQuantityProduced
produce
«EconomicResource»
Medical Equipment
-medicalEquipTagNumber PK
-actualGramWeight
«EconomicResource»
Raw Material
-rawMaterialTagNumber PK
-dateAcquired
consume
REA Ontology (M1 Level)
participate
-minutes
participate
-minutes
participate
-minutes
participate
participate
«EconomicAgent»
Machinist
-employeeNumber PK
«EconomicAgent»
Assembler
-employeeNumber PK
«EconomicAgent»
Electrician
-employeeNumber PK
«EconomicAgent»
Scheduler
-employeeNumber PK
«EconomicAgent»
Supervisor
-employeeNumber PK
«EconomicAgent»
Employee
-employeeNumber PK
-employeeName
-wage
-dateHired
{complete, disjoint}
McCarthy - 3

Interoperability Spectrum

(adapted by McCarthy from Leo Obrst)





Different implementation scenarios for financial interoperability standards

Benefits measured by size of circle

1. **First Dimension –** ***Ontological Expressivity*** **(following Leo Obrst):**
   - **Low** ontological expressivity (syntactic interoperability) with term-based thesauri and taxonomies;
   - **Medium** ontological expressivity (structural interoperability) with semantic conceptual models (such as E-R models and UML class diagrams); and
   - **High** ontological expressivity (semantic interoperability) with description logic based theories.
2. **Second Dimension –** ***Time Horizon for Implementation*** **:** The implementation horizon for adoption of higher expressivity and more useful interoperability standards can range over multiple years. For the purposes of the workshop, we are limiting ourselves to an immediate – long-range spectrum of one to ten years (readily conceding that these are only present estimates).
1. **Third Dimension –** ***Benefits Accruing to Implementation*** **:** Implementation of ontological solutions to business problems occurs because of a suite of perceived benefits to be gained. These benefits can be estimated in a range from low to medium to high, and they may flow from some combination of improved interoperability with other standards and systems, lower transaction costs, and improved functionality for consumers of information. (**SIZE of CIRCLE)**

The tensions between a theoretical ontology community and a standards community

- ***Get it completely right (the perfect)*** vs. ***Get it working (the good)***
- ***Reality model (scientific)*** vs. ***Present practice model***
- ***A wrong branch*** vs. ***a permanent branch***
- ***Being successful (get past the tipping point)*** vs. ***Being right (domain and computer science)***
- ***National bodies*** vs. ***journals/referees***
- Different representation levels (identification, measurement, and market issues)

Some recent workshop discussions on these issues

- ***The Financial Interoperability Summit*** sponsored by the National Science Foundation (Frank Olken) -- looked at formal issues associated with accounting and financial interoperability at both the reporting level and the transaction level
  - http://nsfaccountingontology.wik.is/Workshop
- The Value Management and Business Ontologies Workshop
  - http://vmbo.blogs.dsv.su.se/