

Where Are We Going?

Semantic Grids, ROR, and the Semantic Web

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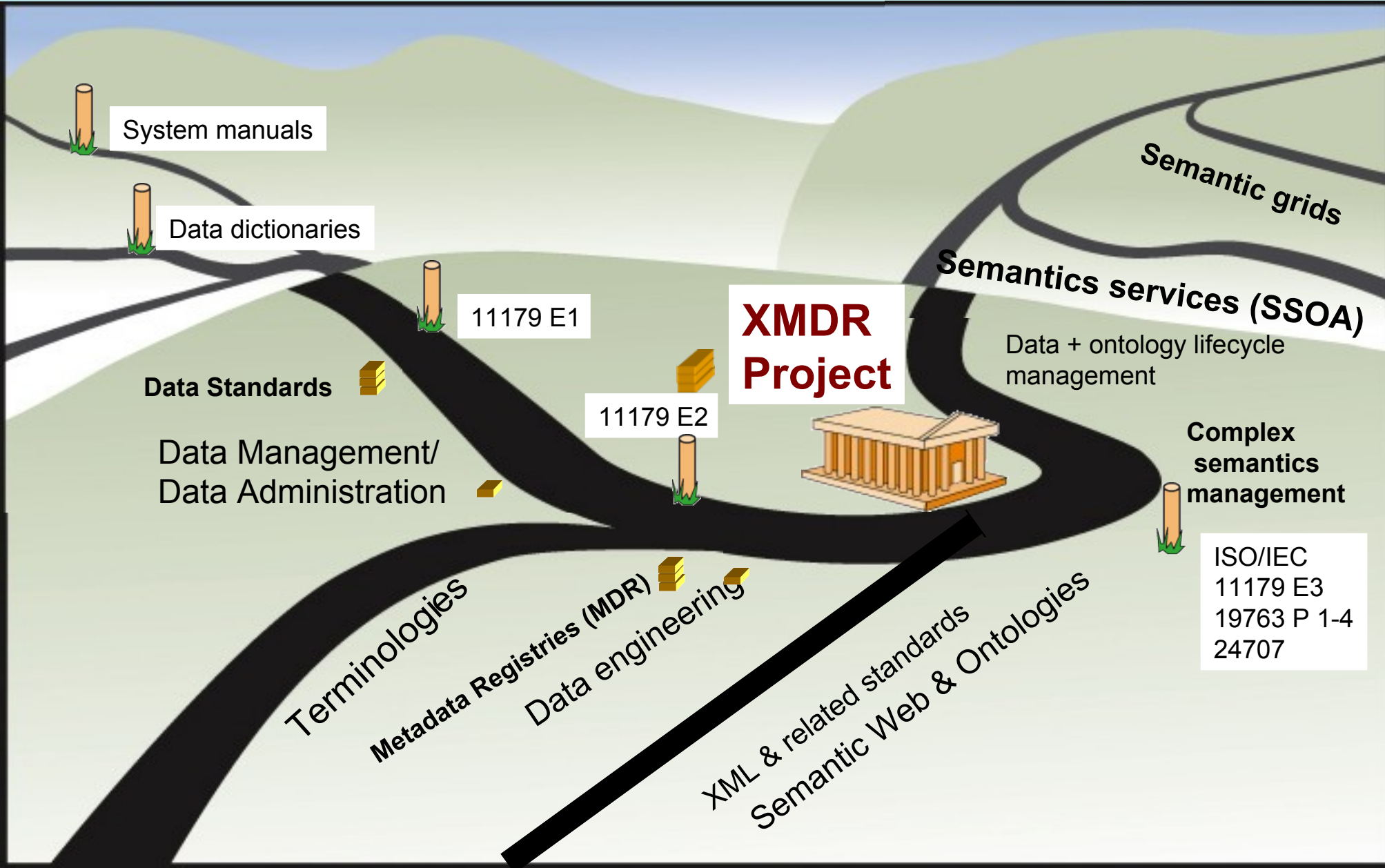
September 4, 2008

Workshop on ROR, On-Demand Model Selection and Semantic Metadata Mapping Process
Wuhan, China

Outline

- XMDR and 11179-3 Ed 3
- Change Management
- Semantic grids
- Beyond Semantic Grids

XMDR and 11179-3 Ed 3



Historically Distinct Disciplines

- Data Management
 - ISO SQL
 - OMG UML, CWM
 - W3C XML
- Vocabulary Management
 - ISO TC37
 - OMG TQS
 - W3C SKOS
- Ontology Management
 - ISO Common Logic
 - OMG ODM
 - W3C OWL/RDF

The Gap

- Other standards connecting data to concepts
 - concepts are generally not enough
- Other standards (e.g., ISO/IEC 19763-3) connect ontologies to each other
- What will connect them together?

Aligning different realms of metadata standards

Information Artifacts

OMG Standards:
MOF, UML, CWM
schemas, models, ...

Conceptual Models (of the “real world”)

Terminology Standards
ISO 1082,
thesauri, ...

11179 E3 Metadata Registry

- Data Elements
- Value Domains
 - e.g, enumerated
-

- Data Element Concepts
- Conceptual Domains
- Concepts
- Ontologies
-

Ontology Standards:
OWL, CL
(ISO/IEC 24707),,
....

ISO/IEC 11179-3 Ed 3 (CD)

- Data description model only slightly changed from Ed 2.
- Administration model adds some key extensions
 - grouped administration
 - multiple RAs
- Elaborates Concepts model
- Adds Ontology registration

Ontology/Concept Mismatch

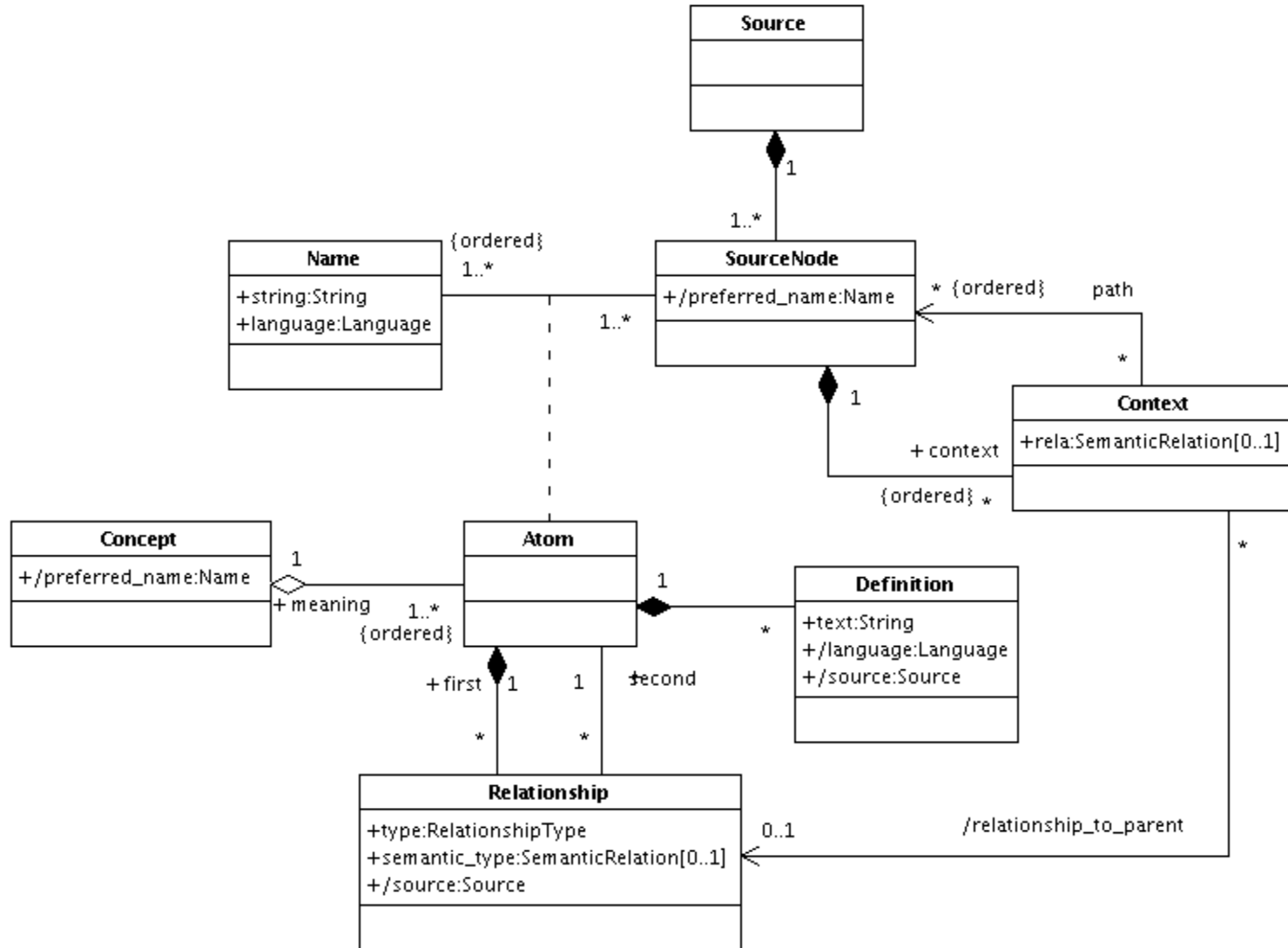
- Multiple ontologies may describe the same concept, in different ways, using different names and identifiers
- Synonymy of terms is not the same as equivalence of ontology entries (synonymy \neq sameAs)
 - see Cyc microtheories
- Concept maintenance is a lot of work!

Metathesauri

- Integrate multiple thesauri into a common knowledge base
- First UMLS Metathesaurus of Medicine published 1990, by US National Library of Medicine
- NCI Metathesaurus released in 1999, by US National Cancer Institute
- Not (currently) a standard, but formats and many tools are in the public domain
- Substantial published literature

Metathesaurus Model

Metathesaurus Core

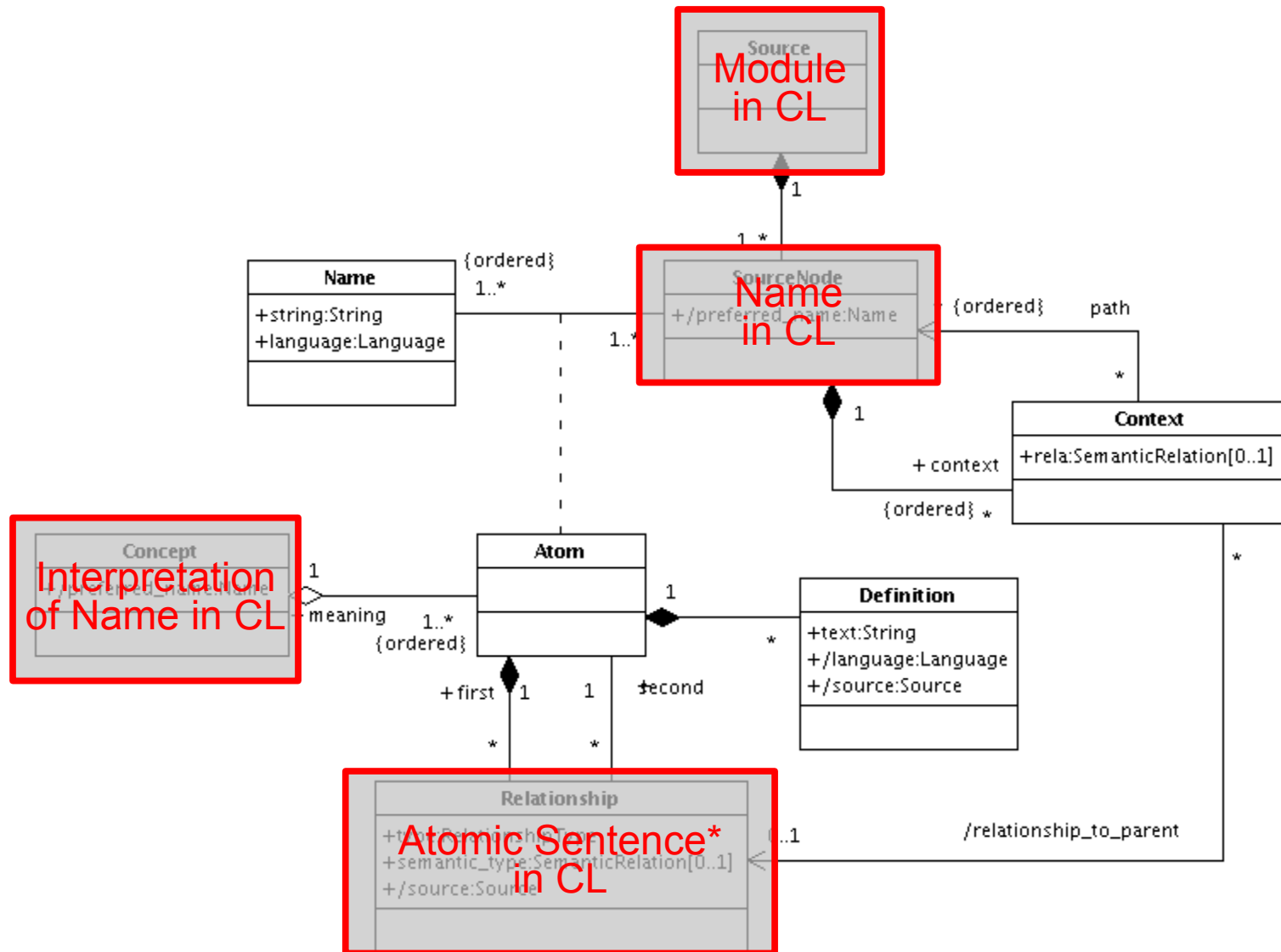


Metathesauri As Interpretations

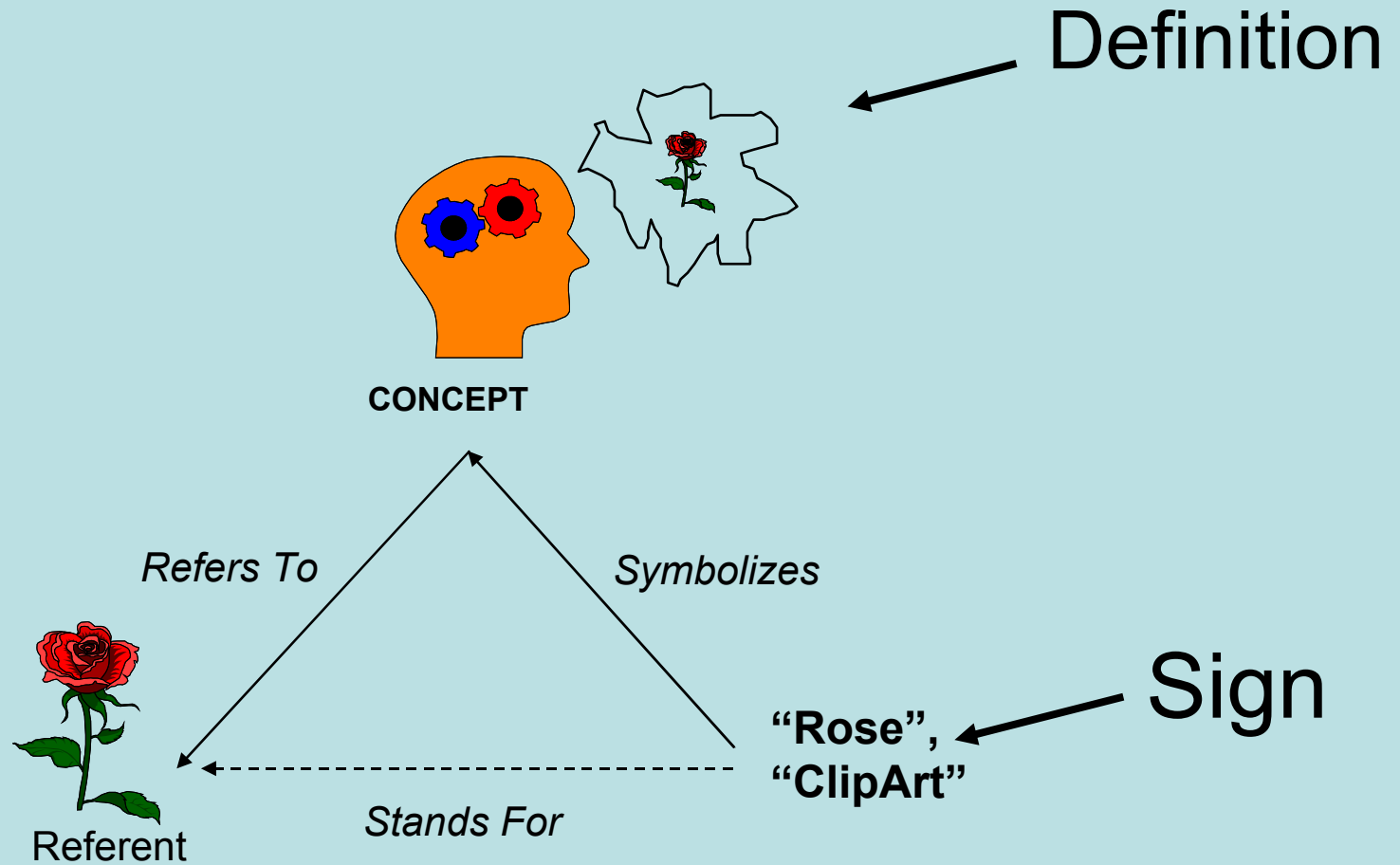
- Very close resemblance between metathesaurus, and interpretation in model theory
- Reflects (but not entirely?) intension/extension distinction

Metathesaurus As Interpretation

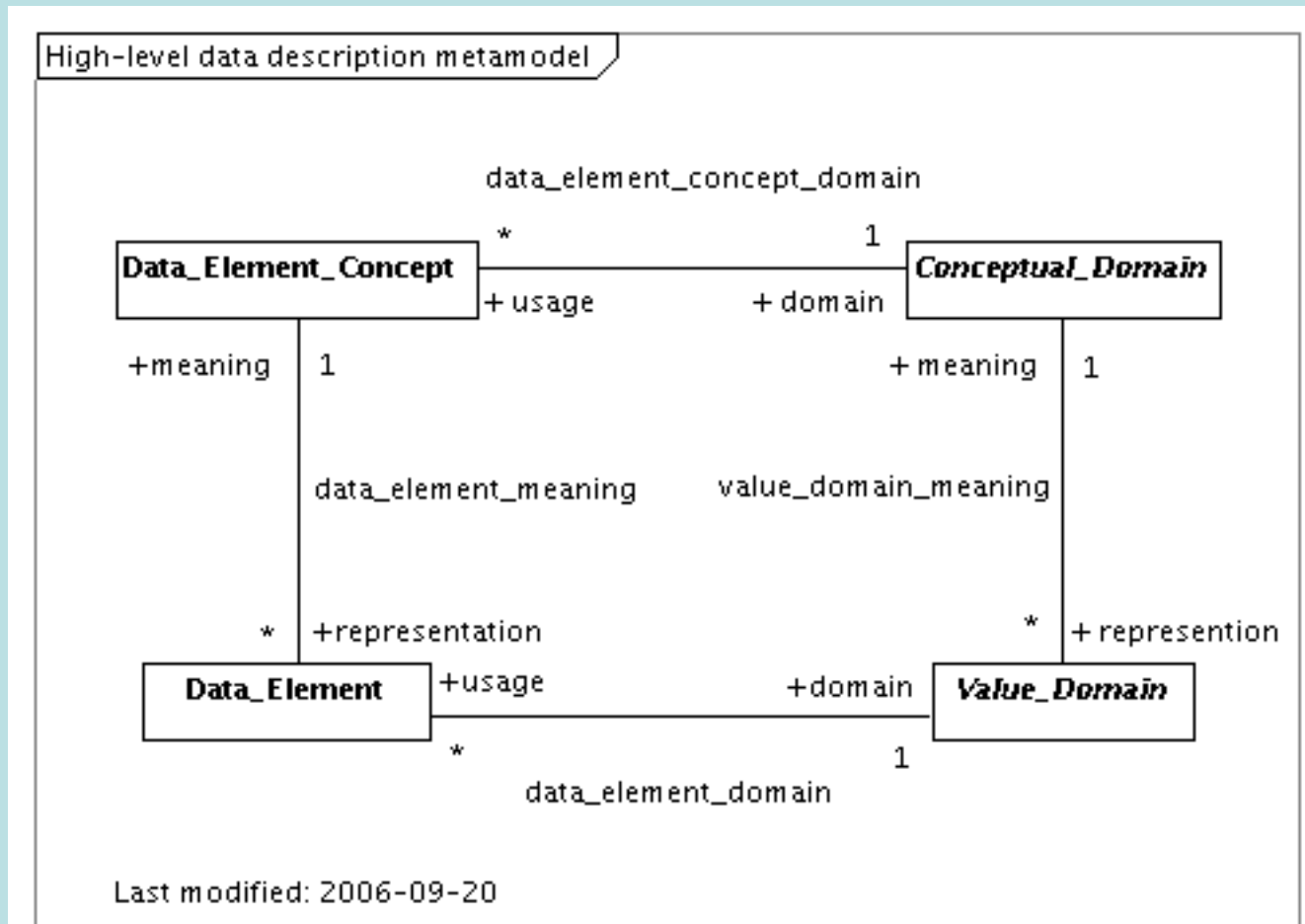
Metathesaurus Core



Ontologies As Representations



Ontologies As Representations



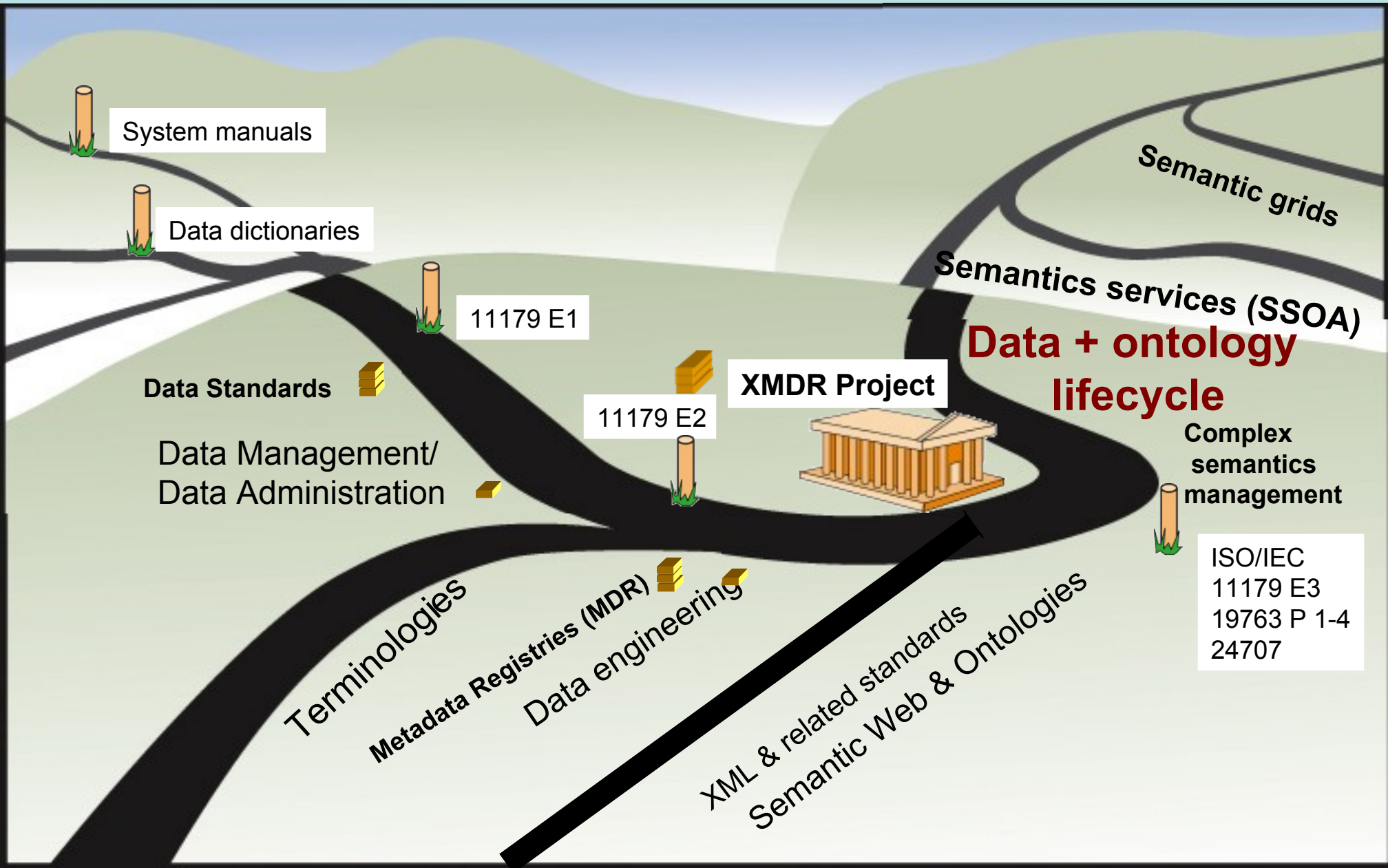
Ontologies As Representations

- Multiple identifiers for same concept
- Multiple assertions of same relationship
- Multiple notations
- Divergent formal (logical) semantics
- Always partial description

Semantic Stack

- Ontology
- (Meta-)Thesaurus
- Data Description
- Data

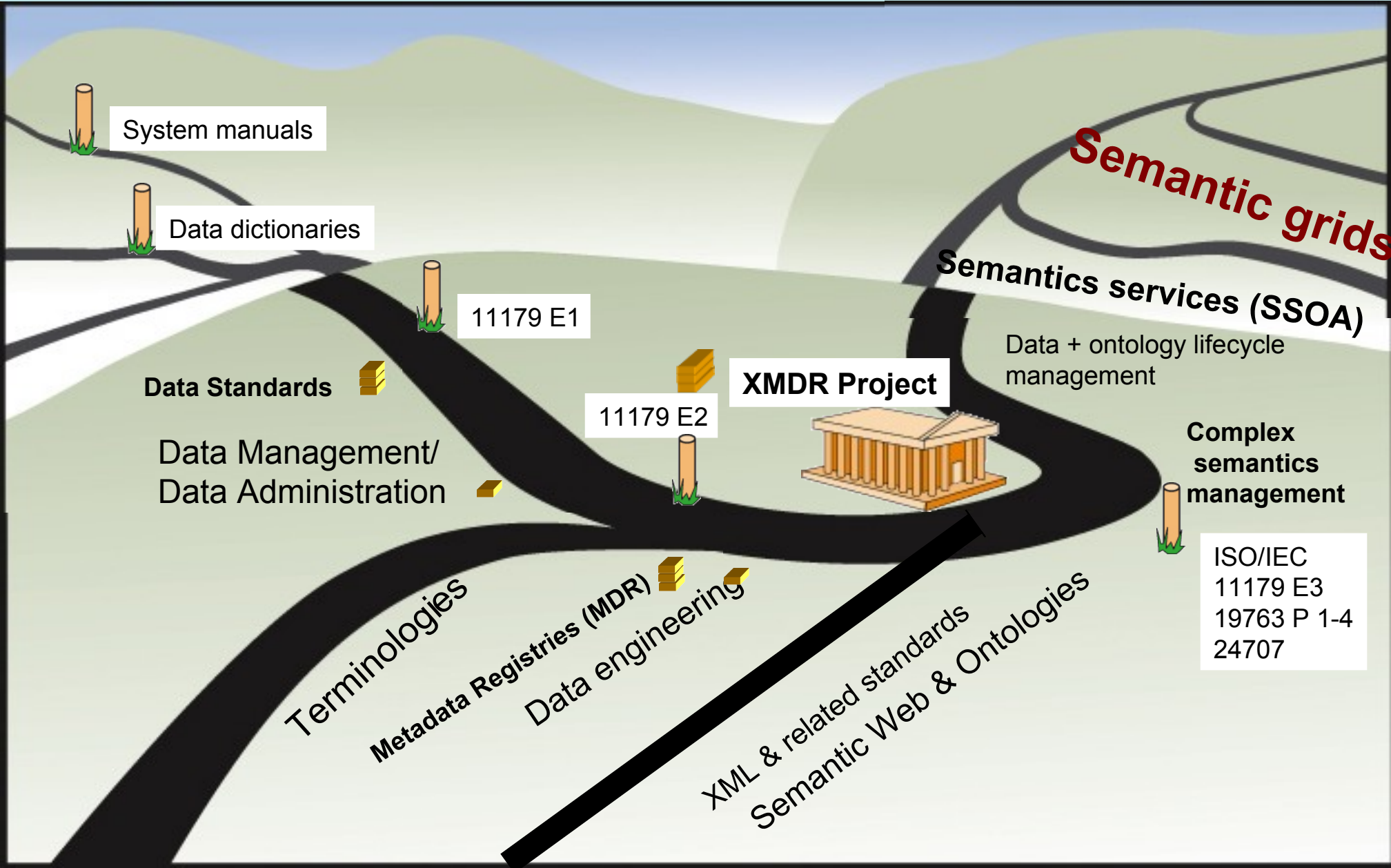
Change Management



Ontology Evolution

- 19763-3 Ed 2 draft proposes one model
- OOR is investigating
- Consider metathesaurus/interpretation based approach
 - symmetric (adirectional)
 - chronological ordering need not be known
 - uniform treatment of between source mappings and between version mappings
 - spans distant versions easily
 - more consistent with W3C recommendations?

Semantic Grids



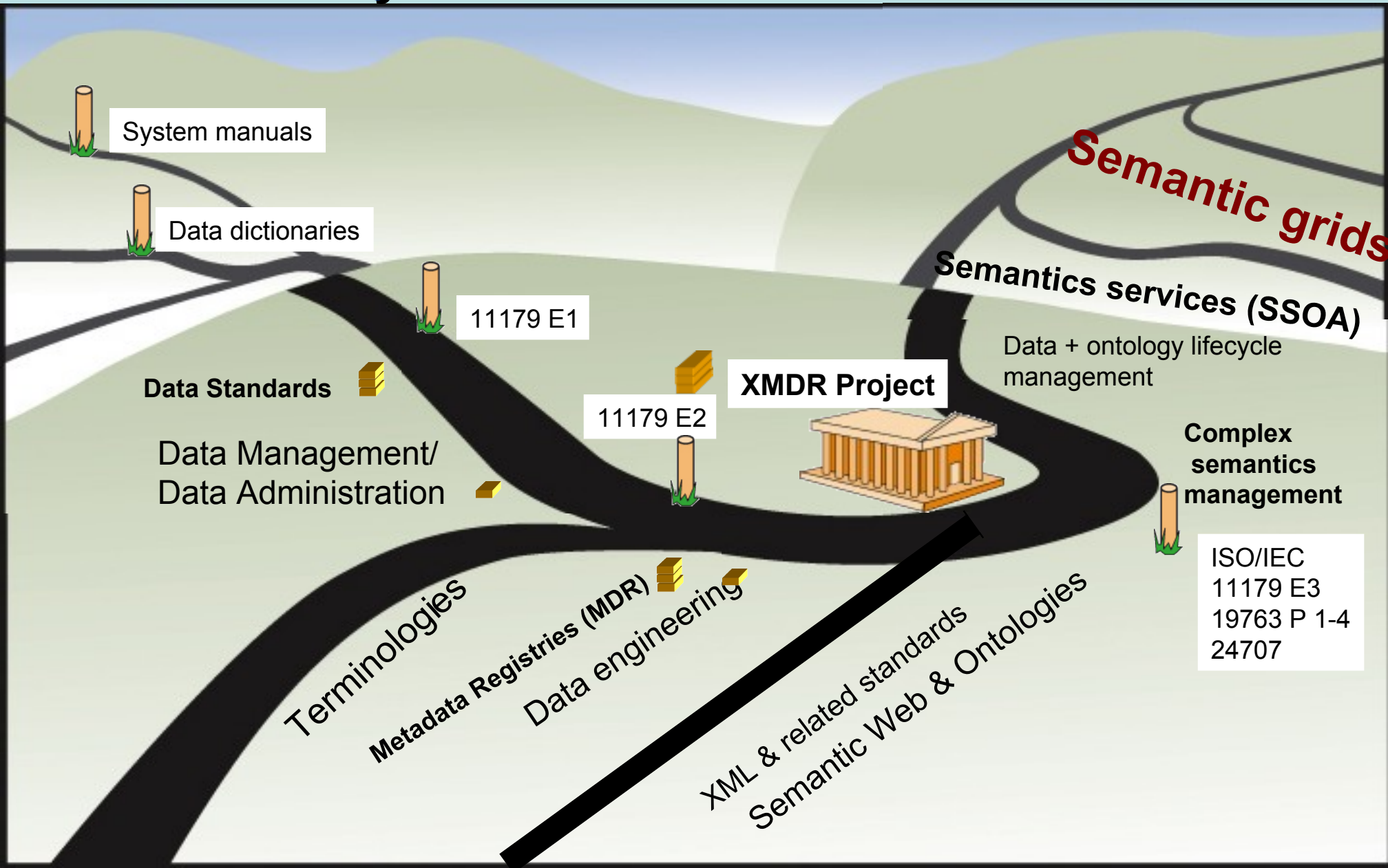
Registry of Registries

- Should enable semantic grids to span registries
- How to get down to data?
- Mission critical: must have high availability, reliability, and trust

Registry of Registries

- Critical to success is getting the update model right
 - logical update model (who updates registry, and how are updates documented)
 - operational update model (how do applications get notified, and what are they supposed to do about them)
- Suggest looking at DNS for architecture and update model
 - robust, tested, and familiar

Beyond Semantic Grids



Web 1.0:

Content Is King

Web 2.0:

Interaction Is King

The Semantic Web

- W3C OWL/RDF
- OMG MDA & ODM
- ISO Common Logic
- ISO/IEC 19763 Framework for Metamodel Interoperability
- OMG SBVR, ...

Where's the data?

Semantic Web Too

- Statistical data: DDI & SDMX
- Financial data: SBRL
- Scientific data: caGrid, WISE,
DOE Science Grid, SEE Grid...
- Other data: GData

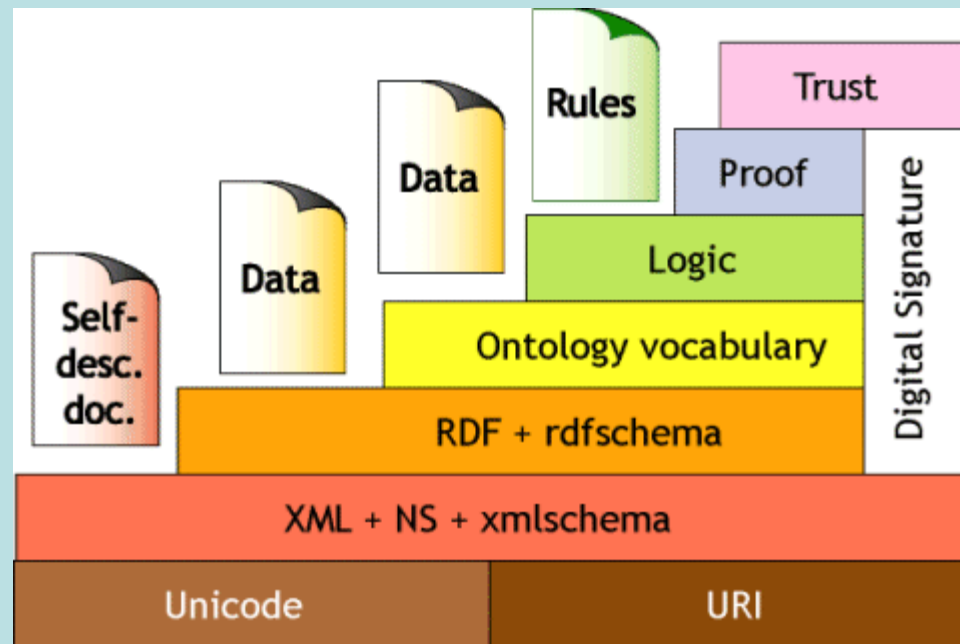
Web 3.0:

Data Is King

Web 4.0:

??

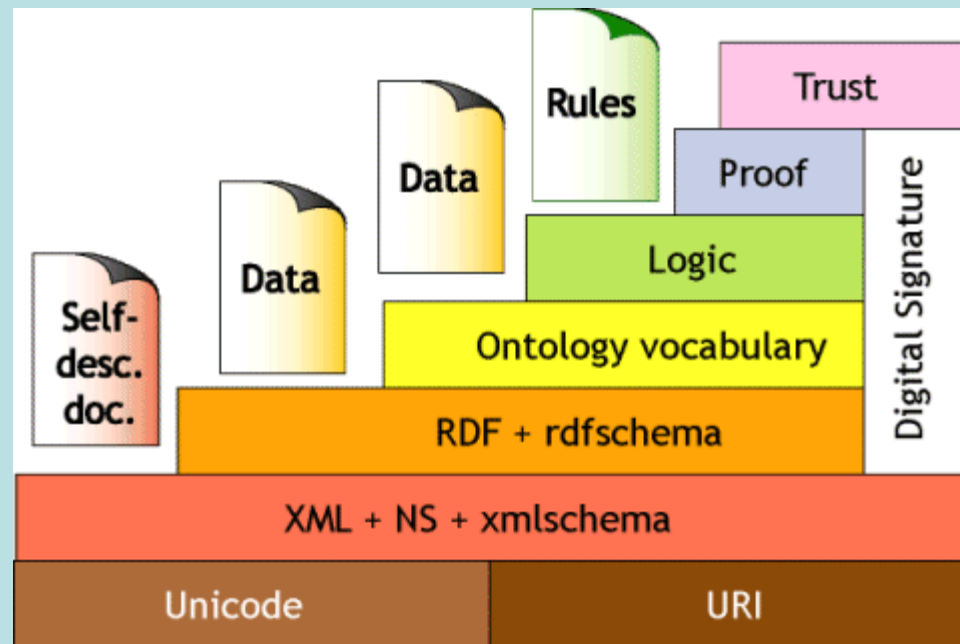
Tim Berners-Lee's Semantic Web Vision



Web 4.0:

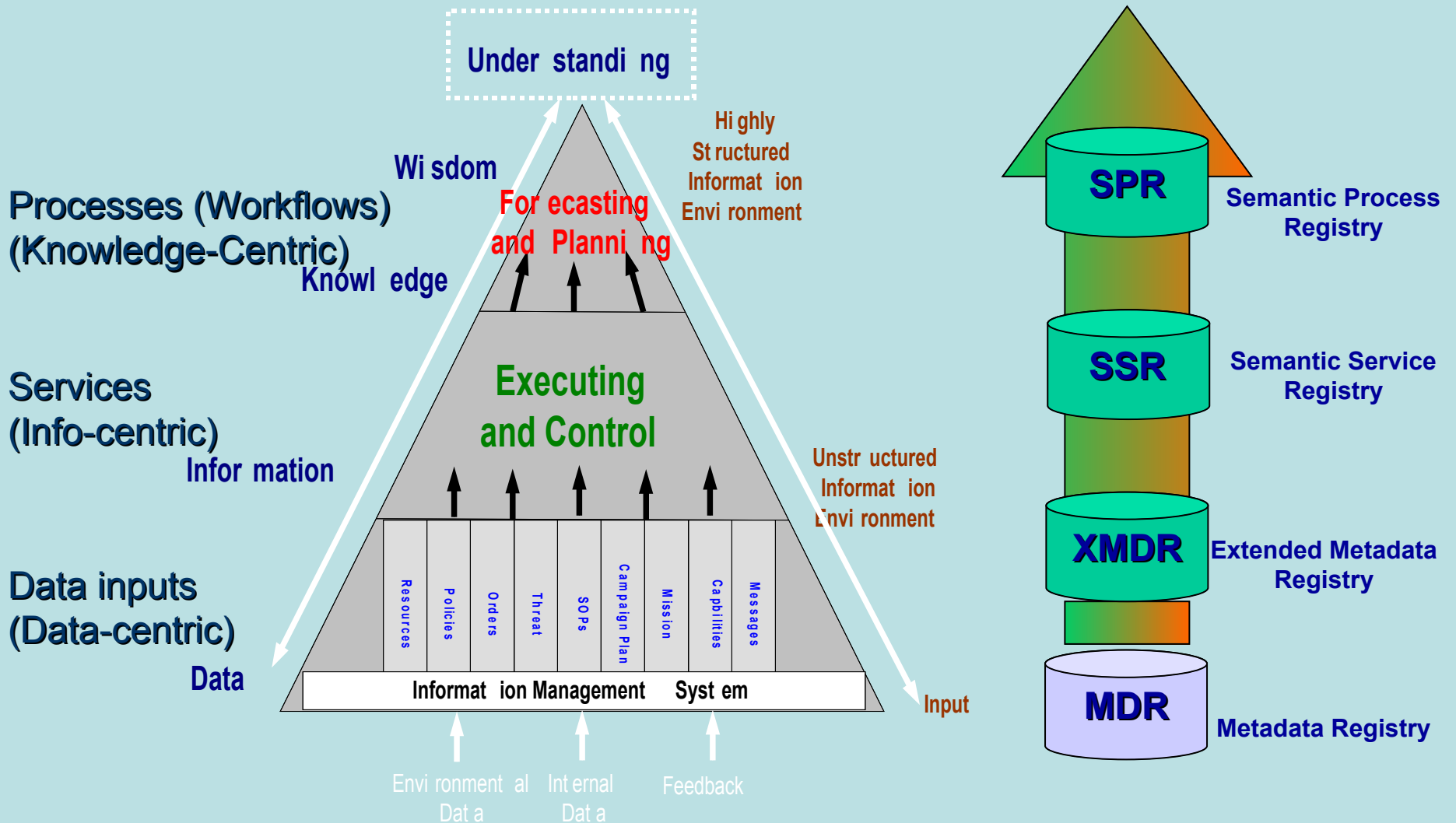
Automation Is King?

Tim Berners-Lee's Semantic Web Vision

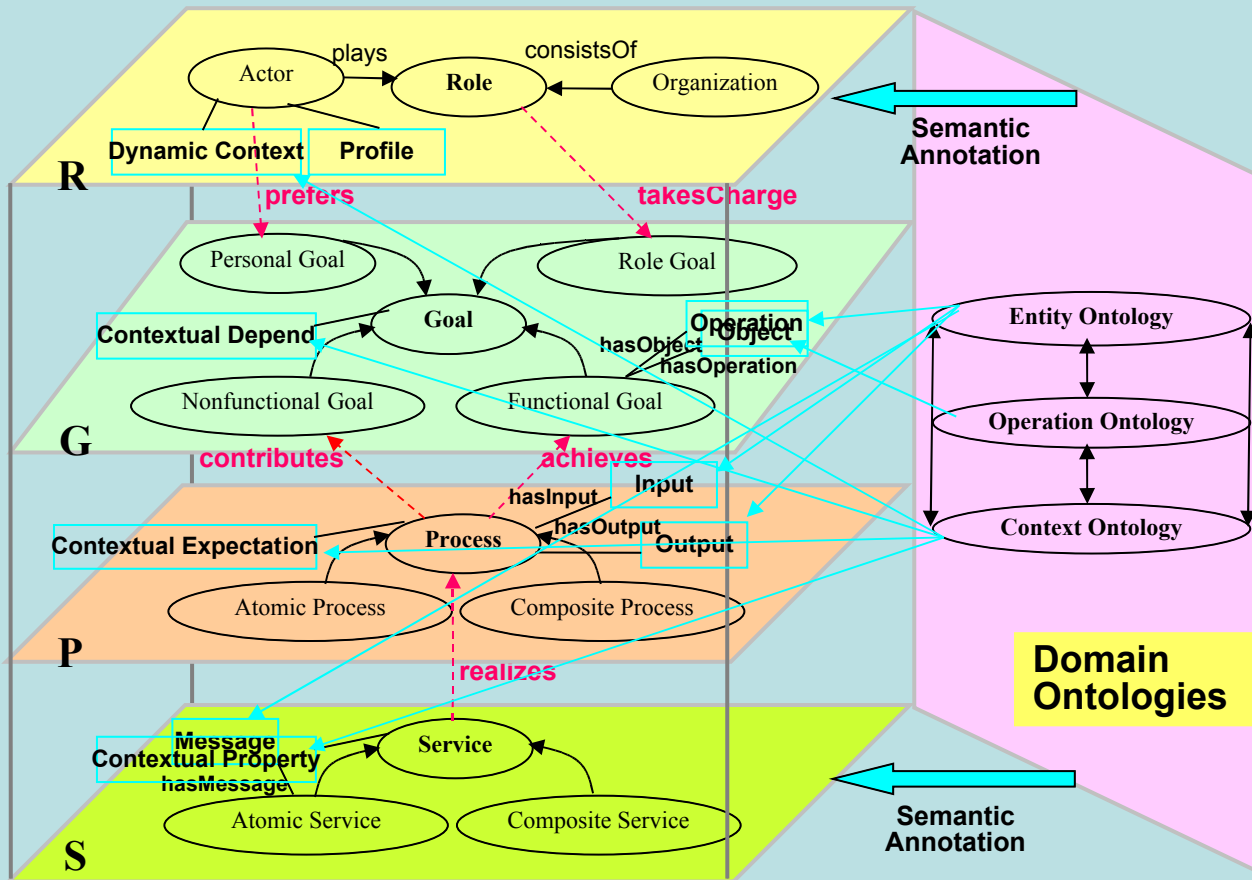


What about process?!

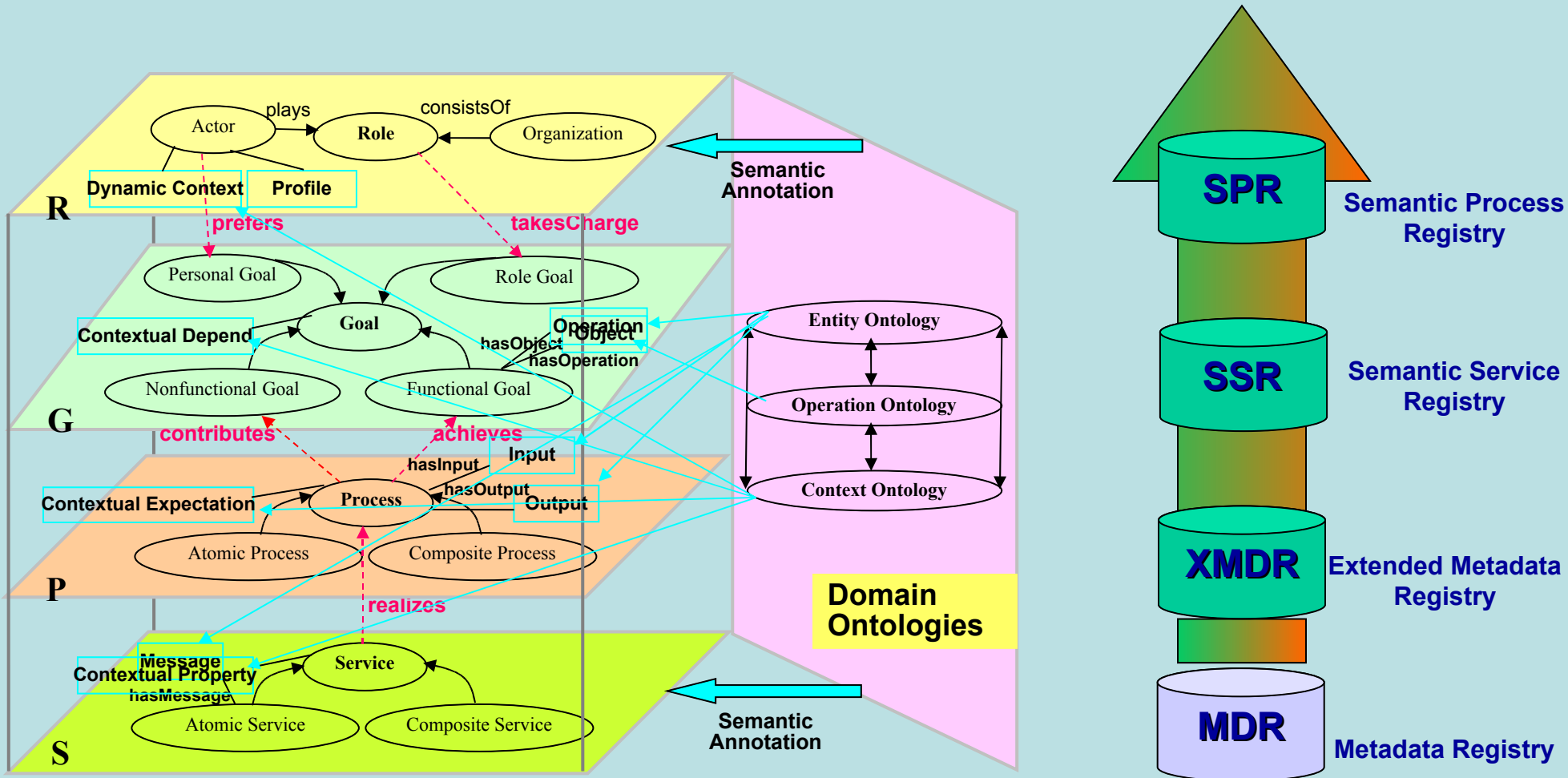
Sam Chance's SSOA Vision



The RGPS Stack

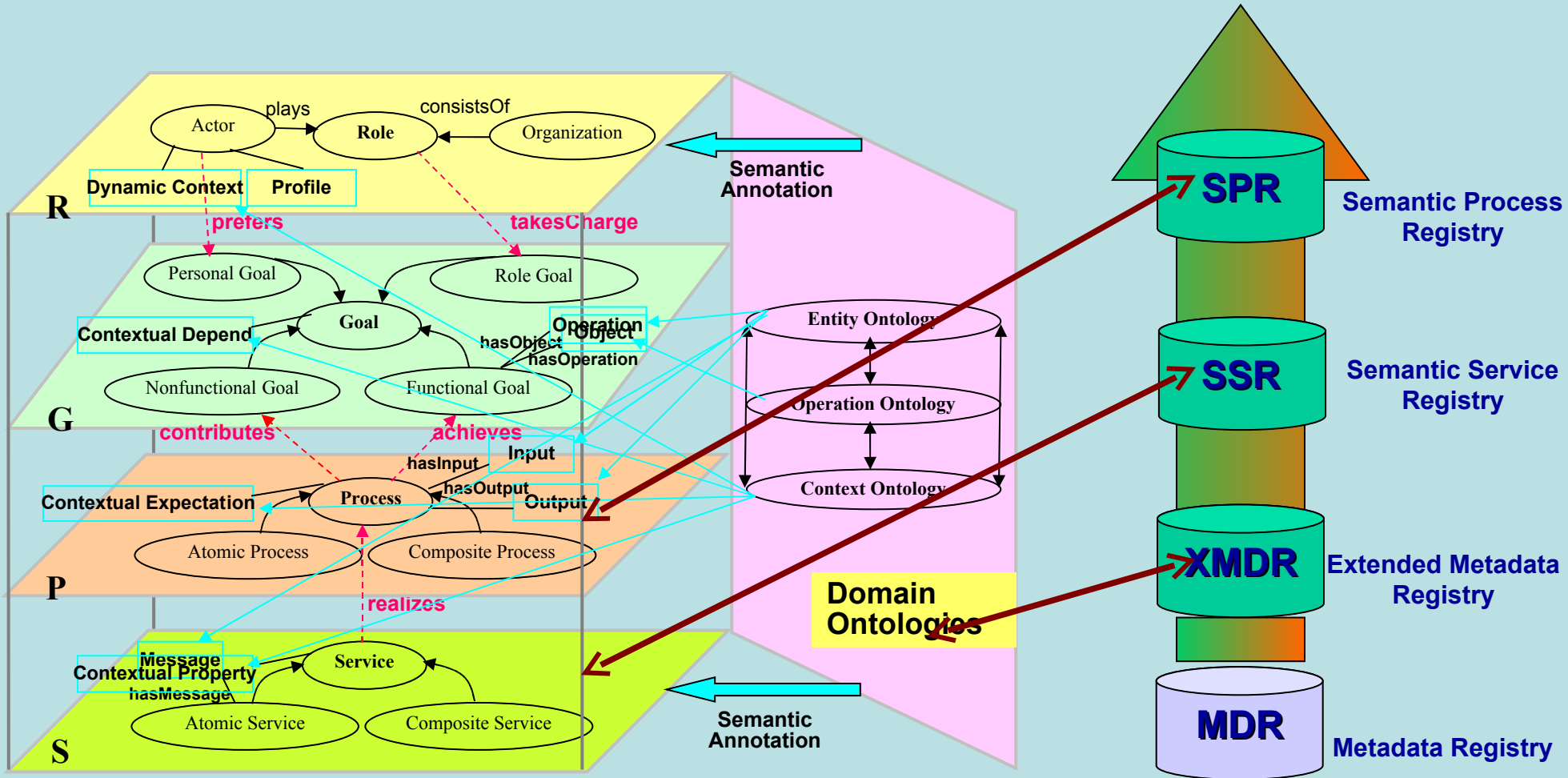


RGPS vs. SSOA



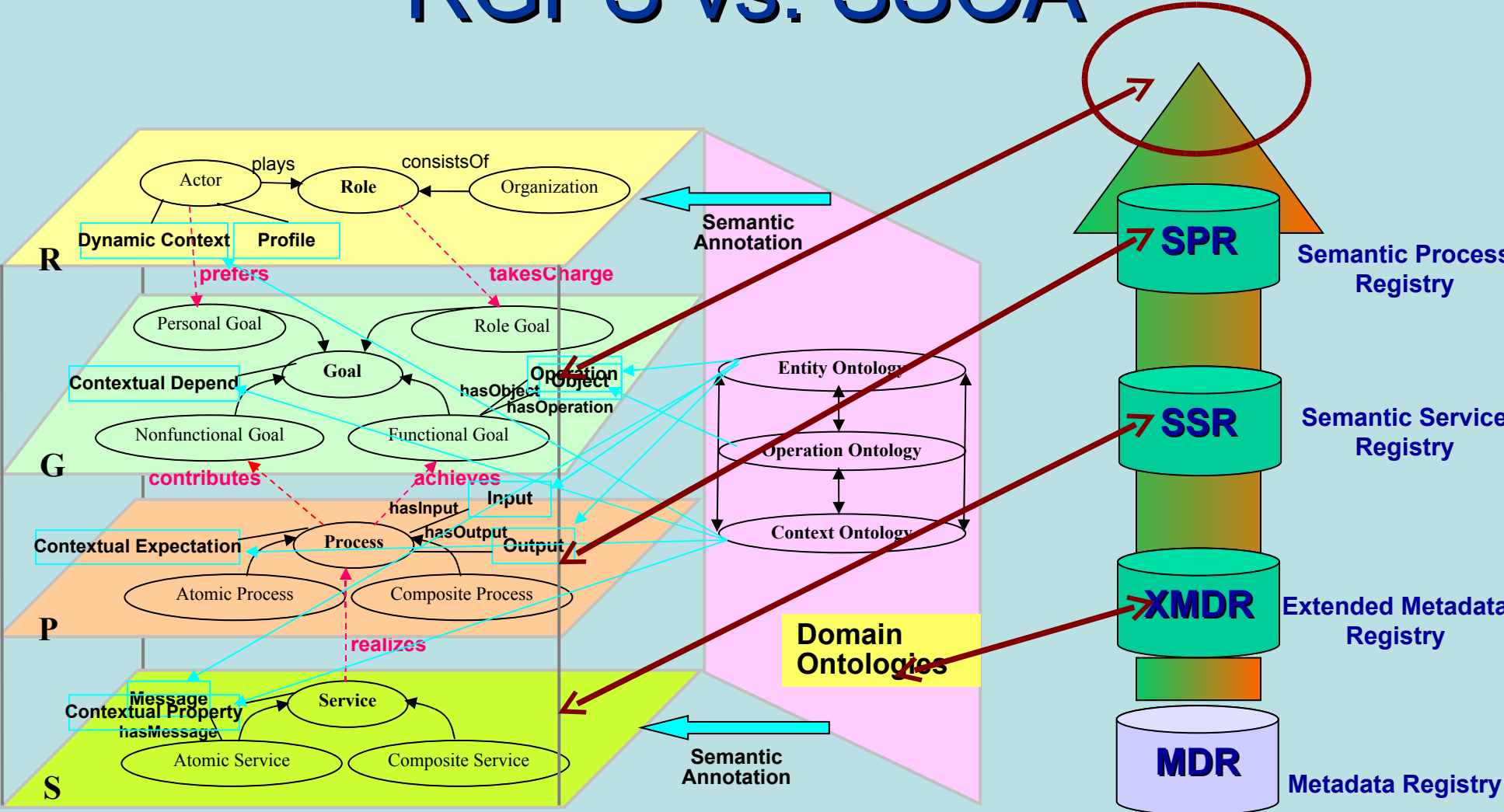
Can you see the parallels?

RGPS vs. SSOA



Can you see the parallels?

RGPS vs. SSOA



Goal layer is an important addition!

Web 4.0:

Automation Is King

Web 4.0:

Collaboration Is King

Web 4.0: Collaboration Is King

- Data evolution, co-development
- Model evolution, co-development
- Goal-driven teamwork, crossing institutional boundaries, on WWW scale
 - Wikipedia meets “mission critical”
- Common (open) workflow tools, integrated with Semantic Grids
- Stage of learning to fully leverage Web 3.0

Web 5.0:

Automation Is King

Web 5.0: Automation Is King

- Build on infrastructure supporting rich collaboration
- Collaboration models provide a user model for how to interact “naturally” with automation software.
- Automation itself is made transparent and portable

Contact Information

XMDR Project

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