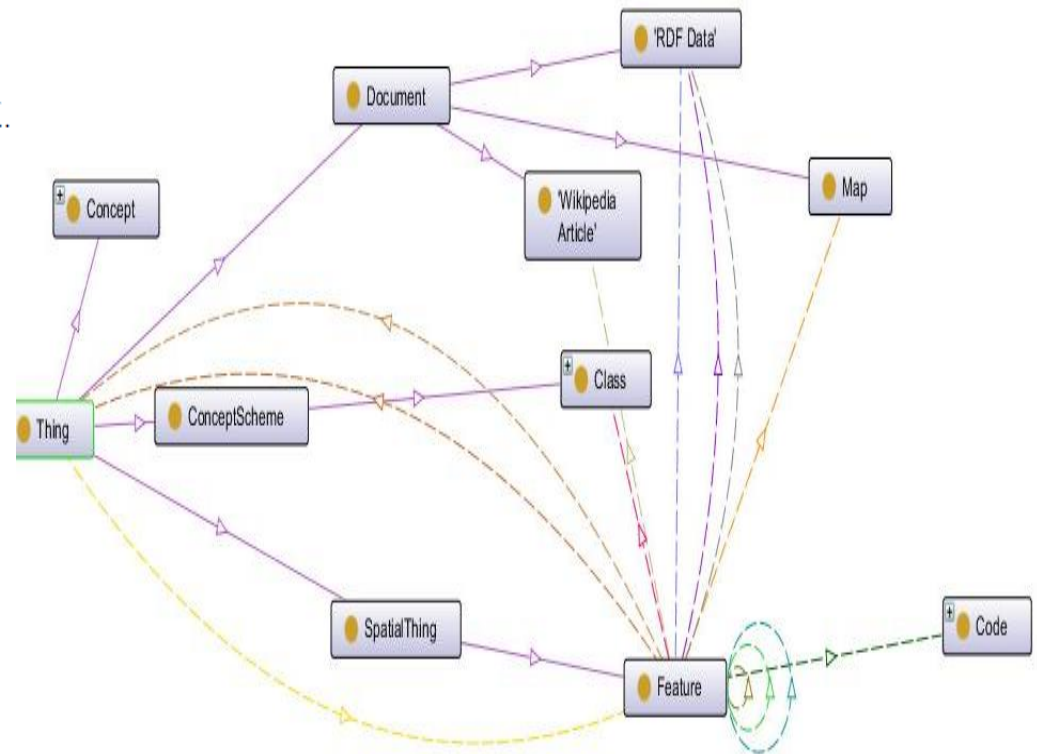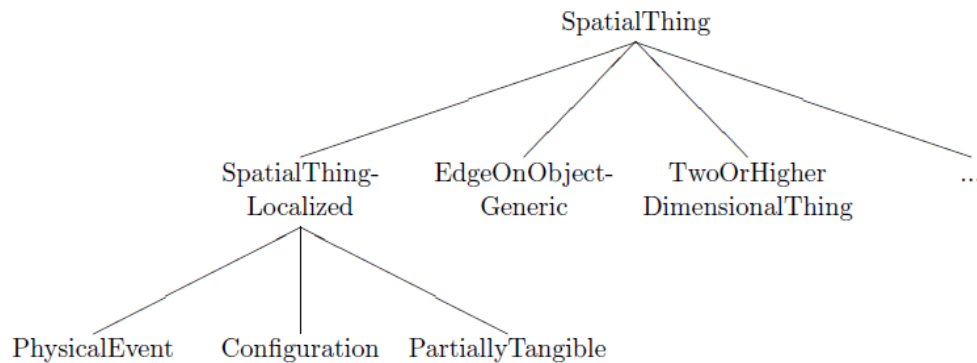# Data Conceptualizations: Resource, Object, Role, Abstraction

Presented at RDA P12
As Part of Data Properties
as Economic Goods
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How valuable are these bits?

values	32-bit integers						
typical literals	0b00000000000000000000000000001111 0b1111 0xF 0x1234						
operations	bitwise complement	bitwise and	bitwise or	bitwise xor	shift left	shift right (logical)	shift right (arithmetic)
operators	~	&	|	^	<<	>>>	>>

It depends on what they represent/encode

Data occurs in a medium used to communicate and store information which makes it seem like some type of "object" with fixed identify and function in itself with obvious, inherent value

Data and Information

- Information informs.....

- "Information is data that has been processed and/or communicated into a form, such as records, that is meaningful to the recipient"

- To a cognitive agent it changes the state of knowledge and that is valuable

- Change may be non-exclusively at the individual, group, institutional and culture level with many interactions.

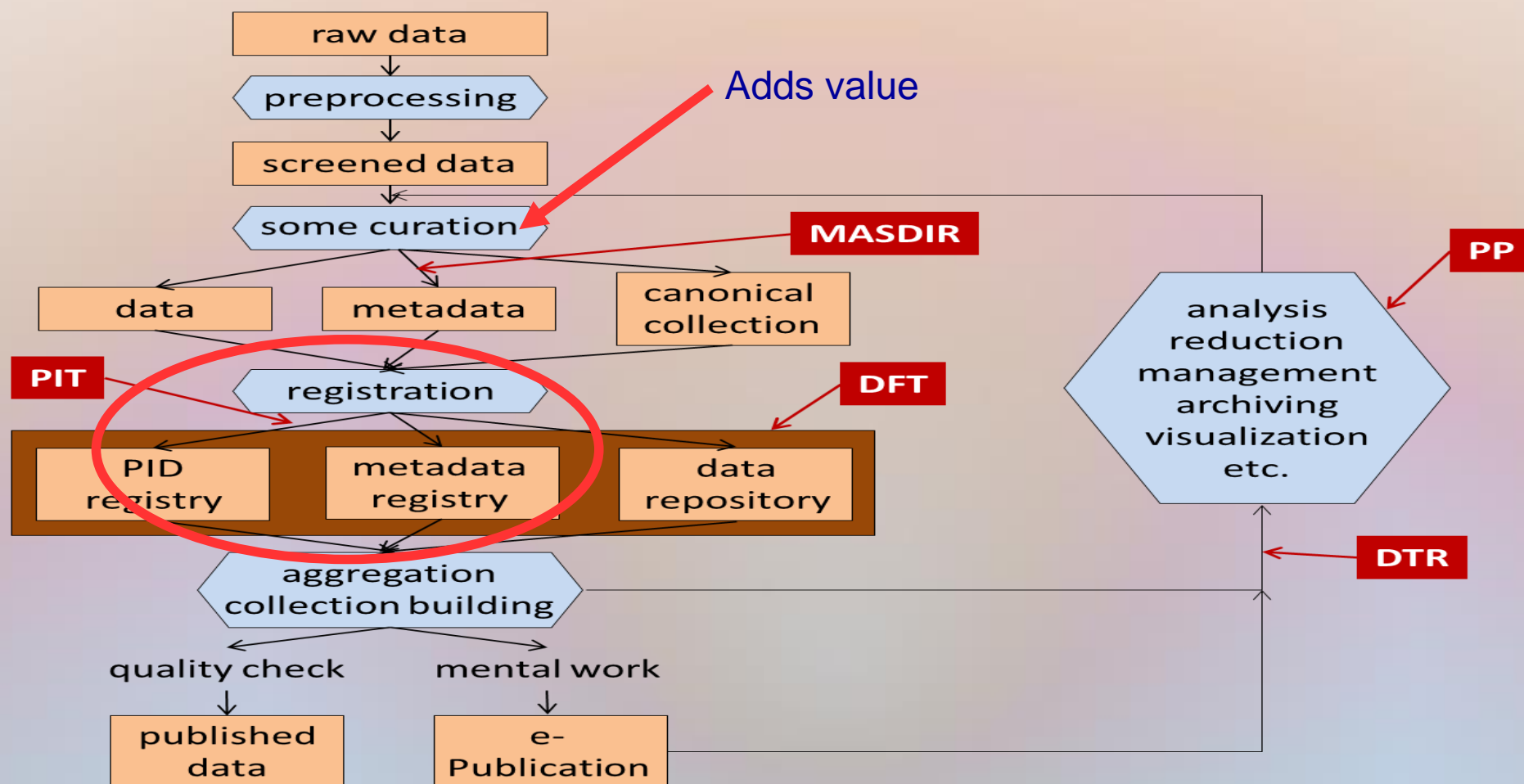- So there is a market for informative data

(Research) Data plays a **resource role**

- Data, especially digital forms seems a type of "resource."

- It may be an <u>institutional object</u>, such as money, drivers' licenses, & borders, with functions because of their social roles rather than immediate physical properties.

- Is it created from a raw form to be hosted, mined and used?

- Even raw research data has some assumed fitness for a purpose

- There are aboutness qualities to data than make it valuable for human operations, but hard to value objectively.

Overview of DFT Vocabulary

There are additional things, like <u>curation</u> or associated metadata that make it of high quality to <u>serve it's purpose</u> such as being documented, free from source errors etc

Vocabulary- part of a Symbol System for Cognitive Agents

Sets of terms used by groups of cognitive agents to represent & communicate about concepts.

In a language syntax can relate symbolic designations/ terms

A dataset series (according to ISO 19115, 19113 & 19114) is a collection of datasets sharing the same product specification…

DFT Task- Regiment Language (assertions using controlled terms?)

Dataset

Def: A dataset is a logically meaningful grouping of similar or related data.

Dataset isa grouping

Data in a dataset has relations

Relation types- source or class of source, processing level, algorithms, topic, time period, location ……..
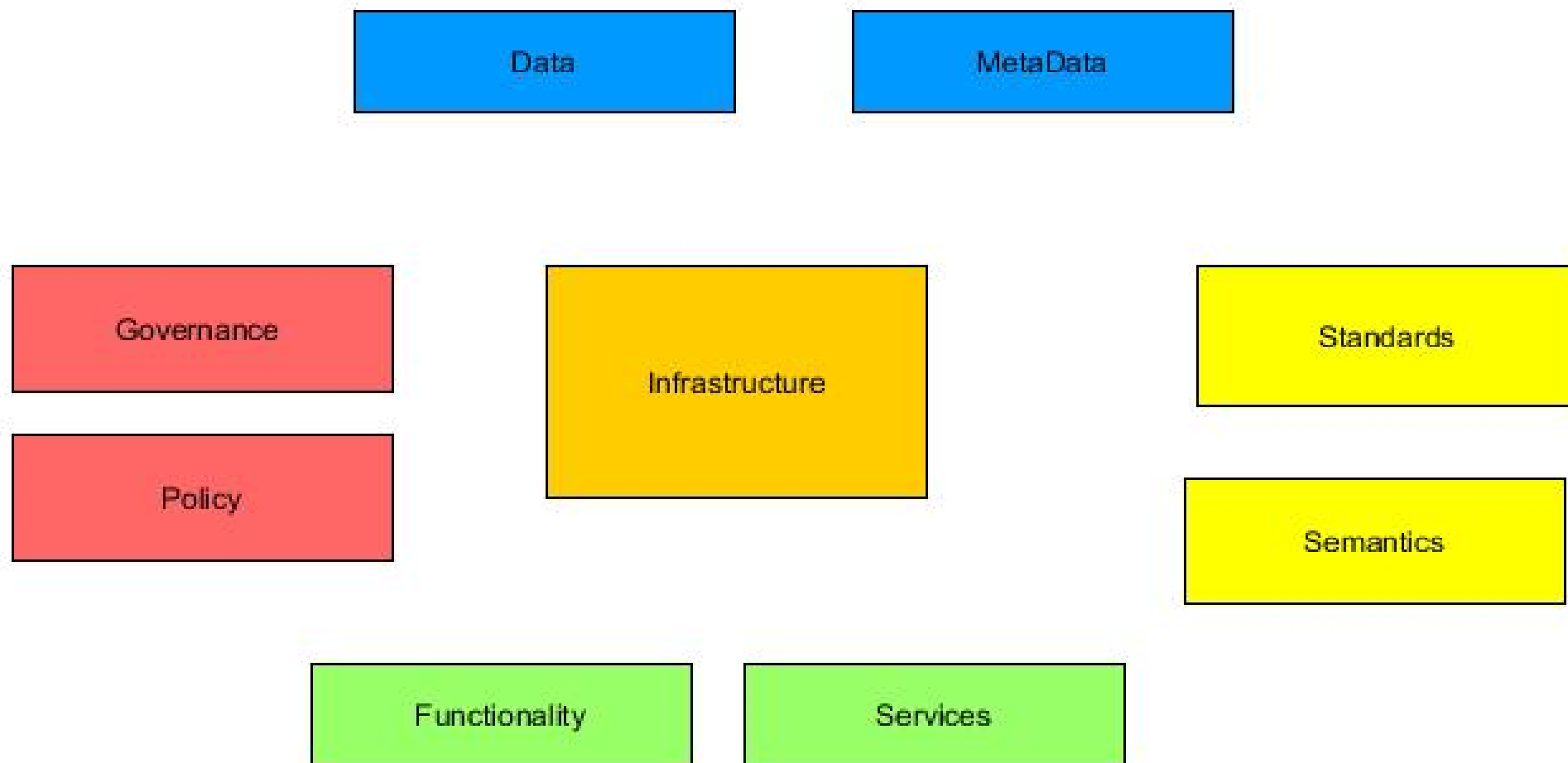
A dataset isPartOf a dataset series……

Data like Currency part of a System

Important defs include: A **Digital Object** is represented as a sequence of bits that is identified by a persistent identifier and is described by metadata.

A **Metadata description** contains contextual and provenance information ....

Maybe a Data Ecosystem View is Useful

| Data | MetaData |

| Governance | Infrastructure | Standards |
| Policy | | Semantics |

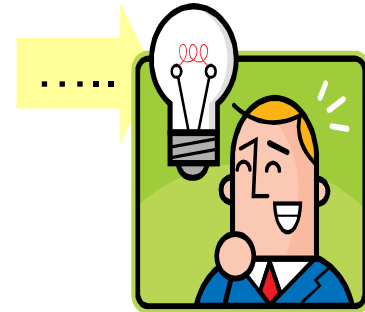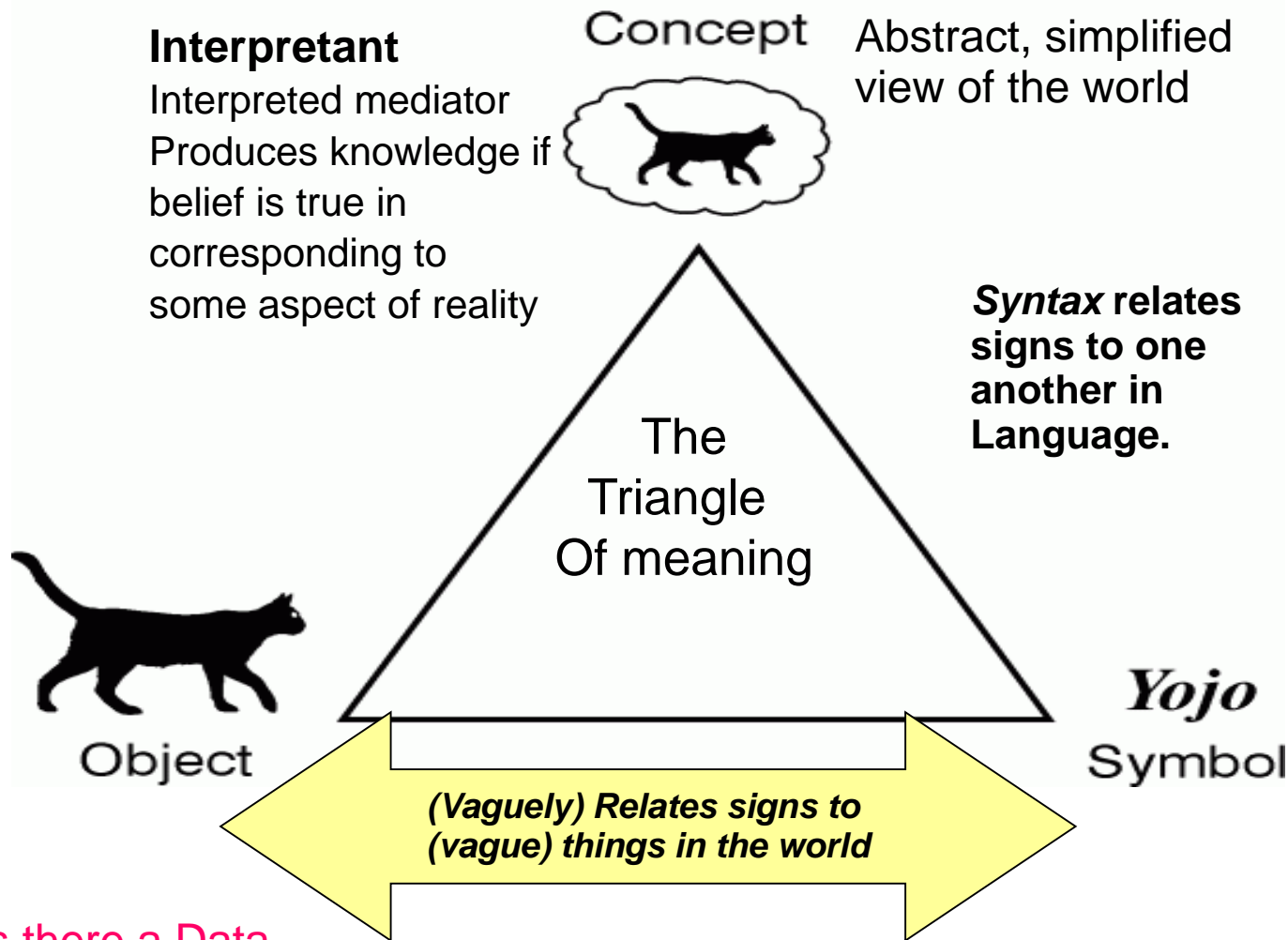| Functionality | Services |

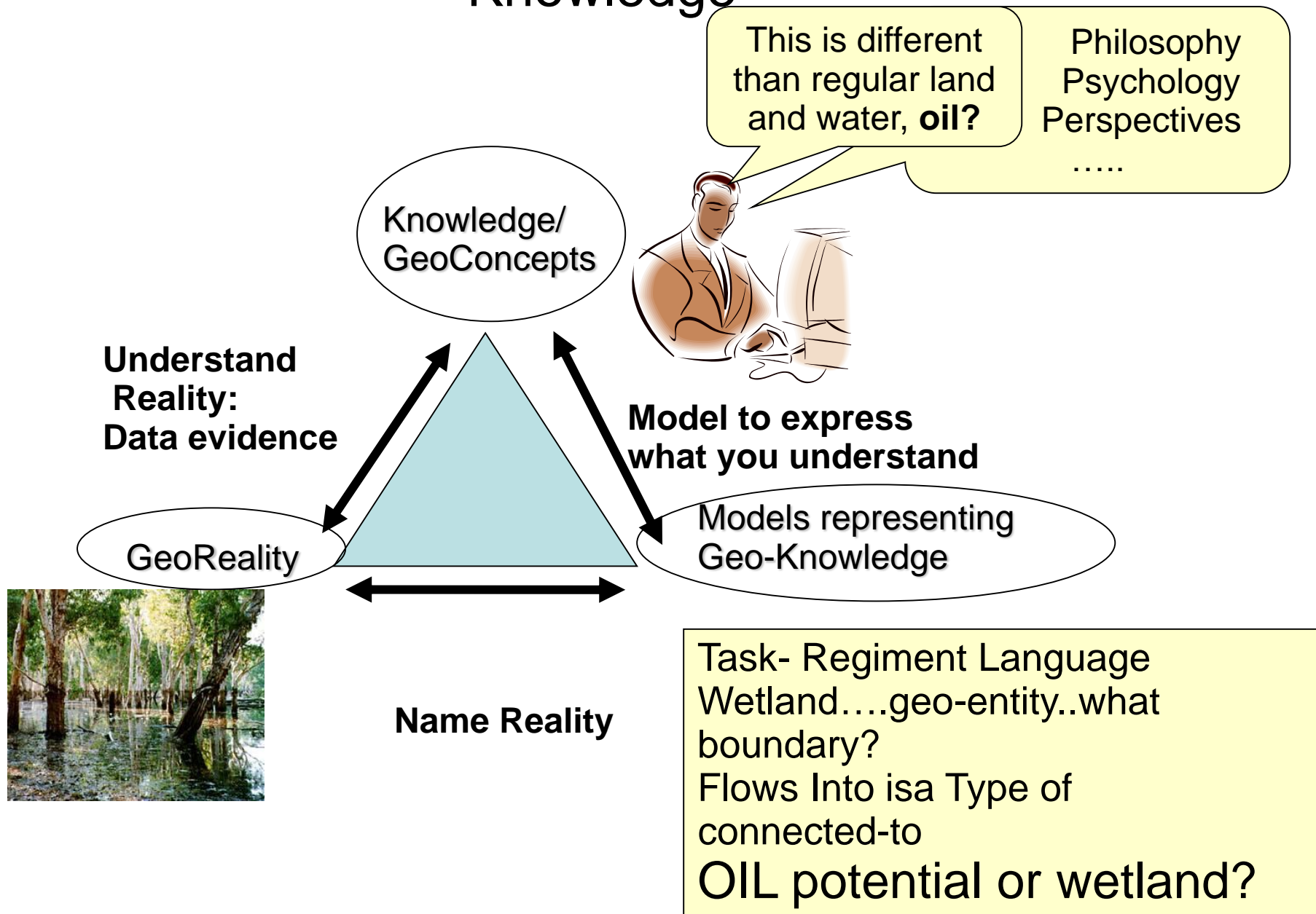**Currency is involved in exchange so needs some permanence as part of a stabilizing system**

Meaning & Knowledge Is Still central in an Ecosystem View:
Reality, Concepts & Language
All 3 parts are Needed

Interpretant
Interpreted mediator
Produces knowledge if
belief is true in
corresponding to
some aspect of reality

Concept

Abstract, simplified
view of the world

Syntax **relates
signs to one
another in
Language.**

The
Triangle
Of meaning

Object

Yojo
Symbol

*(Vaguely) Relates signs to
(vague) things in the world*

Is there a Data
Object here???

Data seems
here......Humans
make distinctions
as needed……

10

Connecting 3 Views
for Geography/GIScience Data to Info to Knowledge

Where are DO Concepts in Reality?

Data Concept (part of cognitive Organization)

Correspondence Understand Reality – Semantics starts with evidence

What is the concept? Something we understand. Oh no, it is the top-level of the OSI model!!

Objects > data Objects

"Data Object" term/Voc

Name Reality

Data has social (and economic value)

Research data has social value...things we want, such as

- improvements in agriculture
- social wellbeing in fields such as
- education healthcare, public safety and security

People and group differ in how they evaluate these

Social value comprises benefits for single users as well as larger societal/community benefits such as employment growth, productivity, and consumer surplus

Measuring Data's Economic value

Some are macro:

- organization's increase in profit,

- business growth, and/or

- competitive advantage resulting from big data adoption

- Economic value often comprises monetary benefits that are appropriated by organizations.

- Some value is avoiding expense such as building walls to keep out rising ocean levels.

Data Supply and Demand

- Quality data

- Effect of data (example, climate change, or business climate..)

GeoDomain: Fundamental but Varied (Varzi)

What is the **relationship** between a distinct kind of geographic entity (what) & their relations to a geographical/ physical territory/arena (where)?

Can a geographic entity survive without a territory or without definite borders?

Can it survive radical **changes** in its territory?

natural systems change over time and space through physical, chemical, and biological processes (but also social ones which change boundaries)

Are there clear-cut **identity** criteria for geographic categories and their parts?

Us

Social Knowledge of GeoConcepts
Group held scientific beliefs
- natural & social categories
Classifications,
Conceptual maps
Natural boundaries,
Connectedness..

} **Understand Reality -data**

Maps spatially locate conceptual entities

GeoReality
What & where
is Linked

GeoModels
Maps...

You

US & CS..