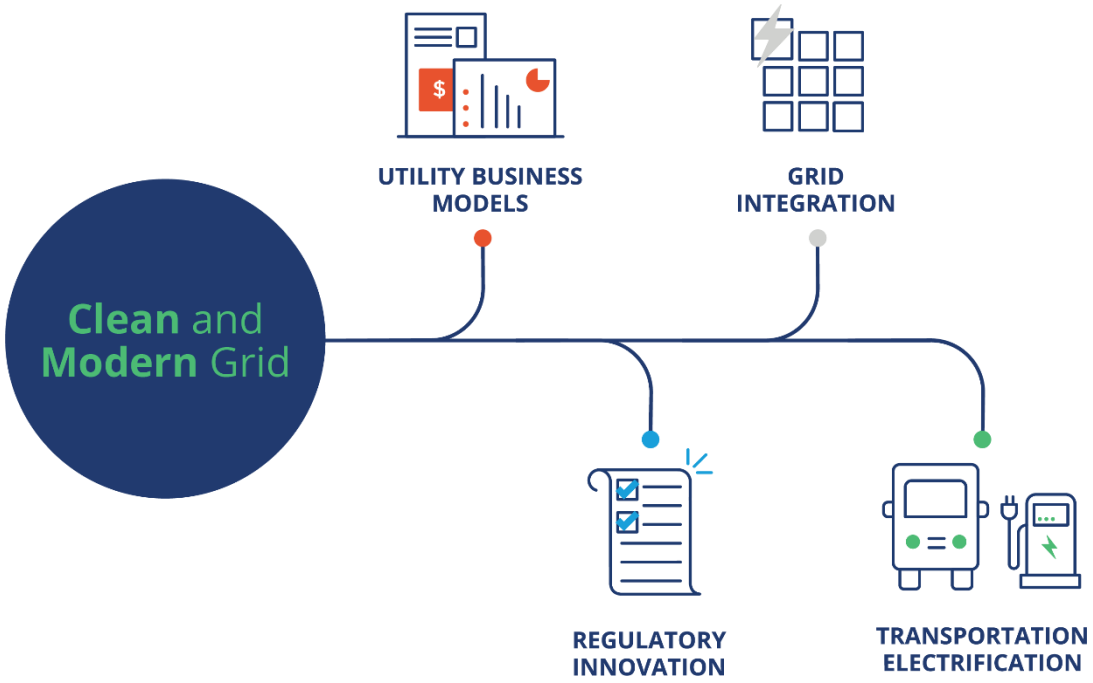
GROUPS
COLLABORATION and CONVERSATION by SEPA

Smart Grid Ontology

An approach to sharing common understanding of smart grid vocabulary and data



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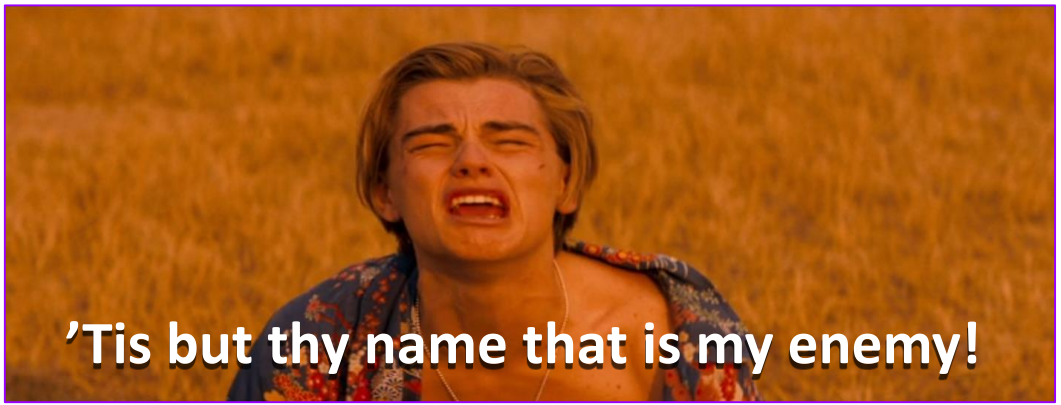
What's in a name?

...that which we call a rose, by any other name would smell as sweet?

What about a meter?

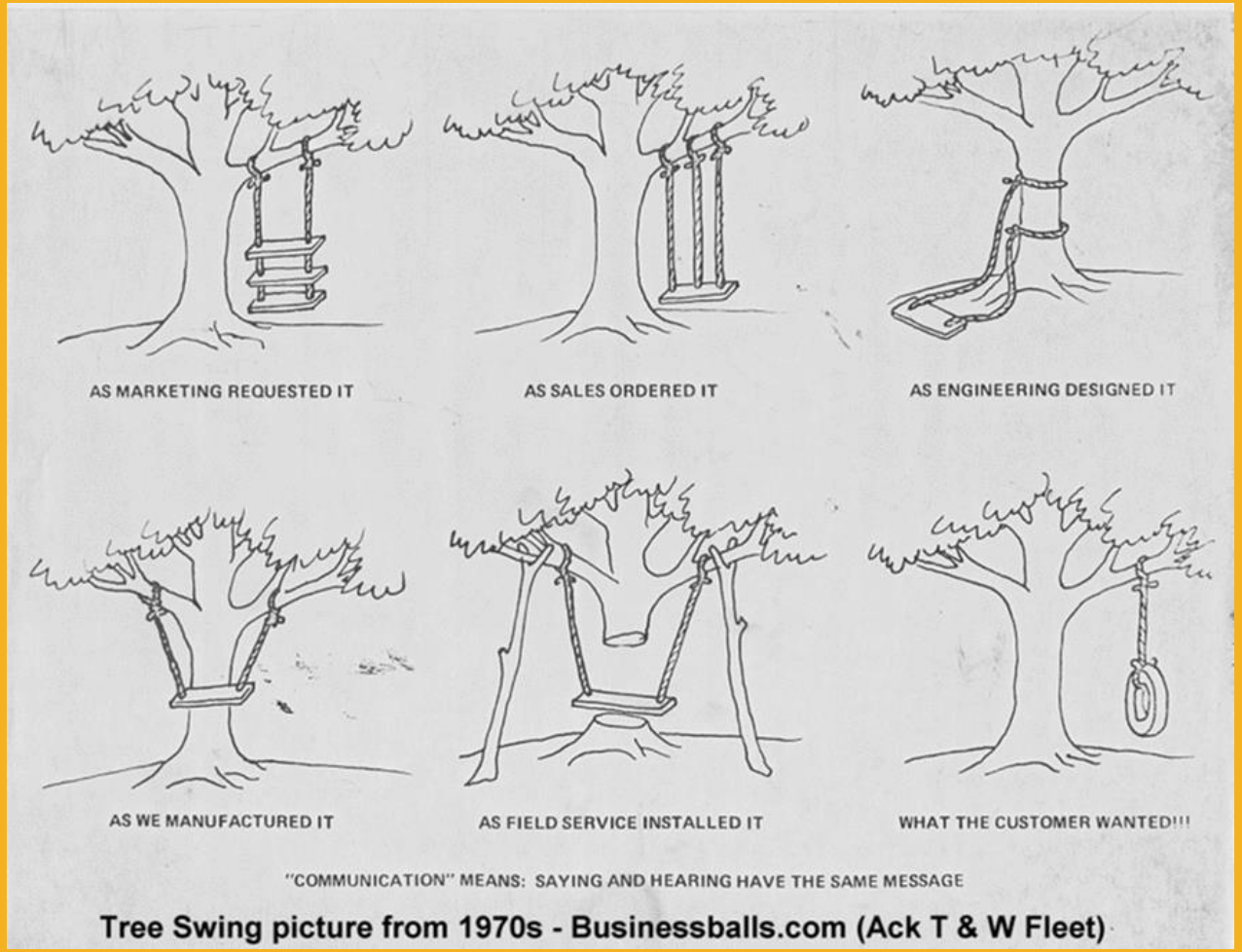


Looking for any of these business outcomes?

- Improve Time to Market for the Customer
- Improve cross-organization decision making
- Reduce Costs to Achieve Mission
- Enable the business to make sense of data
- Improve of AI & Machine Learning solutions

Are any of these Electric Grid business project use cases or scenarios familiar?

- Various groups use different languages, jargon in same company
- Terms and vocabulary are not consistent across the industry
- The same thing is named differently across stakeholders
- Teams define their own terms/definitions in the absence of a dictionary
- Data analysts struggle to interpret input data causing large variances in output
- AI solution results do not match well vetted and known “correct” solutions



Tree Swing picture from 1970s - Businessballs.com (Ack T & W Fleet)

Is this a frequent Occurrence?

Different interpretations of Customer Desires:

- **Marketing requested**
- **Sales ordered**
- **Engineering Designed**
- **As Manufactured**
- **Field Installed**

Ontology Definition

an explicit formal specification [language] of how to represent the objects, concepts, and other entities that are assumed to exist in some area of interest and the relationships that hold among them[1]

1) Scott Neumann, Arnold DeVos, Steve Widergren, Jay Britton presentation DistribuTECH 2006 Use of the CIM Ontology

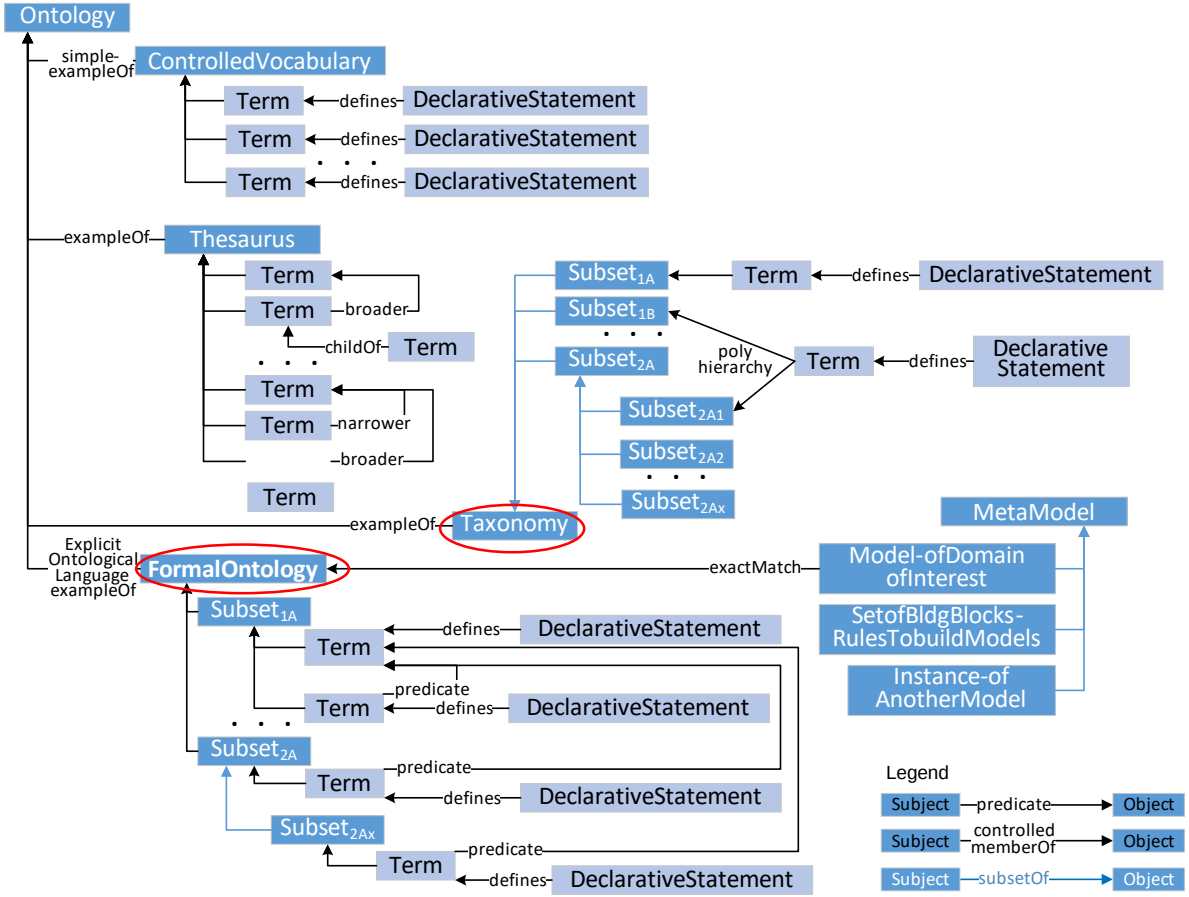
Functions of Ontology[2]

- Provides a common background and understanding of a particular domain of study
- Organizes concepts, information, and ideas that is meant to be universal within the field, and allows for a common language to be spoken
- Establishes structural framework that allows the concepts to be laid out in a way that makes sense
- Shows the connections and relationships between concepts in a manner that is generally accepted by the domain

Types:
- Controlled Vocabulary
- Thesaurus
- Taxonomy
- Formal Ontology

2) YourDictionary http://www.yourdictionary.com/ontology

Ontology Types and Related Terms



Smart Grid Ontology Focus:

- Taxonomy
- Formal Ontology

Smart Grid Ontology Project – Deliverable

Building Blocks:

- **Electric Grid Taxonomy of ~1100 uniquely named terms, categorized by:**
  - Architectural Abstraction levels: Conceptual, Logical, Physical
  - Architectural element types: Service, ServiceComposition, Actor, element subset hierarchy
- Categorization Definitions and Guidance
- Smart Grid Ontology metamodel (premised on SOA and leveraging Architectural Frameworks: TOGAF, Zachman)
- Introduced “Neutral Concepts” multi-level model including the above metadata and Smart Grid Taxonomy

Value Proposition: Tomorrow

Taking this information to the next level with pilot projects:

- How do I merge divisional data systems ?
- How do I merge two utility's data systems?
- How do I enhance my interoperability ?

Audience:

- Business Case Maker – Utility IT Staff, Bis. Dev Manager, CTO (Why?)
- Implementer/Developer – IT Engineer, Info analyst, IT architect, System Designer (How?)

S&P Global
Ratings

Industry Top Trends 2019

North America Regulated Utilities

November 8, 2018

Key assumptions

1. Conservation has reduced demand tied to economic growth

Historically, a strong correlation existed between economic growth and the demand for electricity. Since 2011, conservation has significantly curtailed sales growth, leading to a very weak correlation between utility sales and economic growth. Our base case incorporates flat to slightly negative sales growth over the next three years, reflecting new customer growth offset by conservation. To achieve growth, we expect that utilities will pursue mergers with other utilities as well as acquisitions of slightly higher-risk businesses outside of the direct utility industry.

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Download now – Participate Now

Smart Electric Power Alliance

Get the software now

- Building Blocks published
- Available to all on the SEPA Github Account

How to participate…

- **Join SEPA!! Contact membership@sepapower.org for more information**
- **Join the Grid Architecture Working Group**
- **Join the Ontology Task Force!!**
- **Pilot your Ontology with help from the Task Force !!!!**

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Thank you

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Extra Slides

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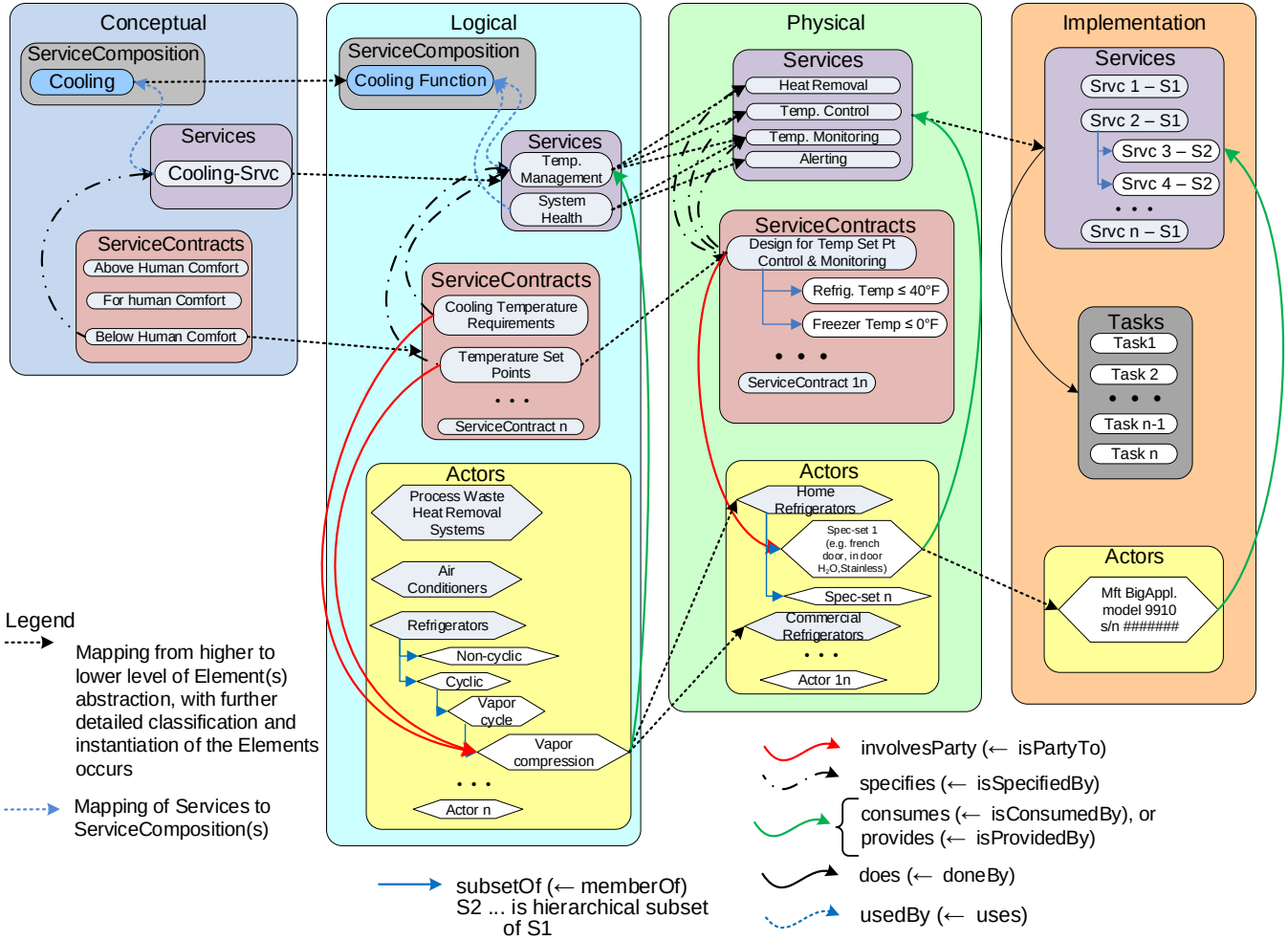
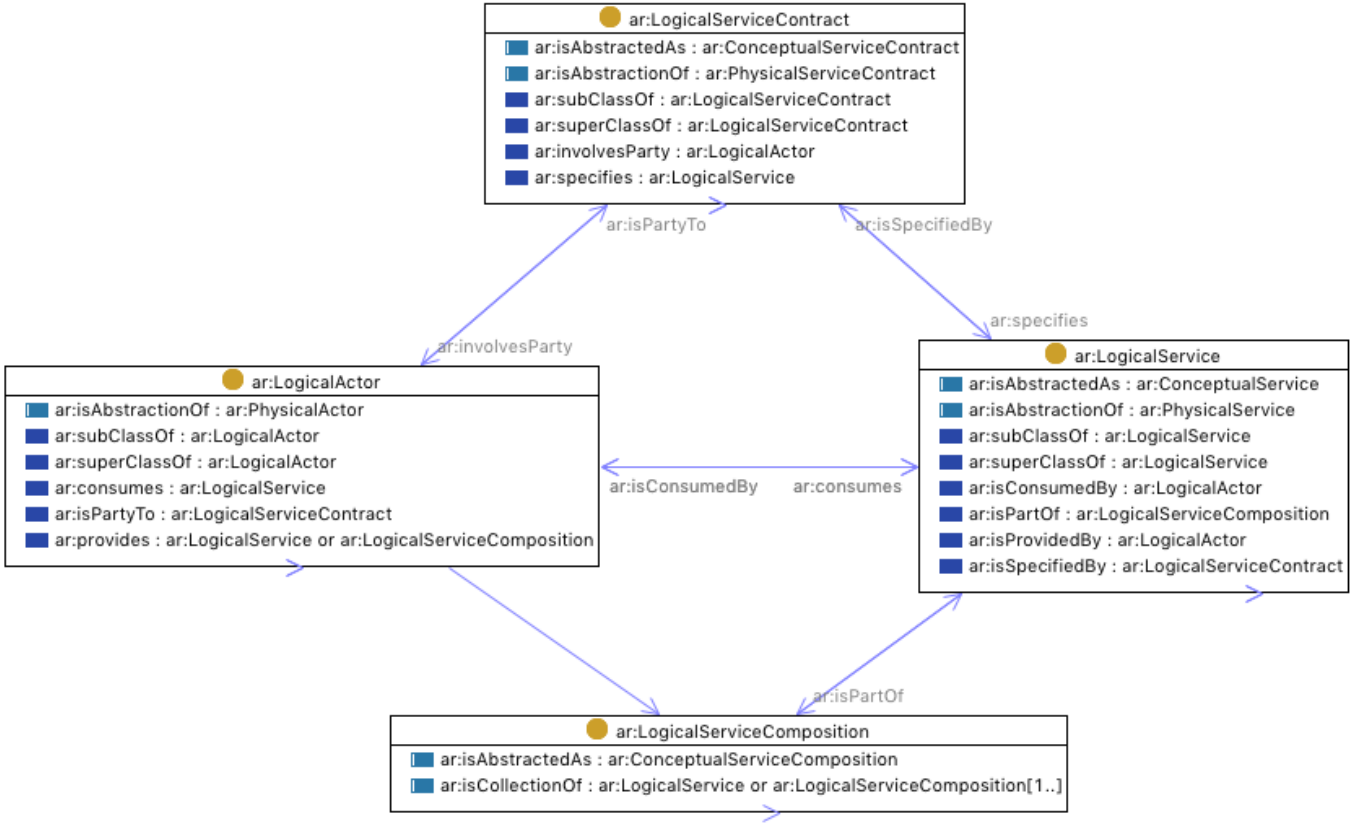


Ontology Graph illustrative

Cooling Example

Smart Grid Ontology - Metadata Model extraction at Logical Abstraction Level



“BuildingAutomationSystem” use of Neutral Concepts model - example

…and we can infer that BuildingAutomationSystem-86 can do everything BuildingManagementSystem-89 can do because of the “narrower” relation.