



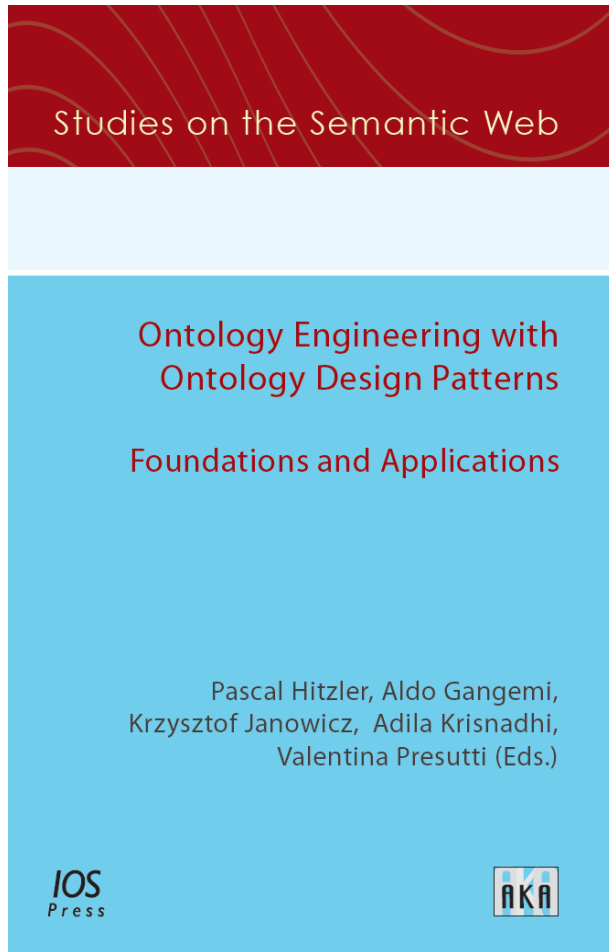
Methods and Tools for Modular Ontology Modeling

Part I: Introduction to Ontology Design Patterns and First Pattern Examples

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**Pascal Hitzler, Aldo Gangemi, Krzysztof Janowicz, Adila Krisnathi, Valentina Presutti (eds.),
Ontology Engineering with Ontology Design Patterns: Foundations and Applications.
Studies on the Semantic Web.
IOS Press/AKA Verlag, 2016.**

This Tutorial (all parts)



- **Pascal Hitzler (60 mins):**
Introduction and first examples
- **Karl Hammar (30 mins):**
Worked Example

coffee

- **Cogan Shimizu (90 mins):**
Three tools: OPLa, OPLa Annotator, SDOnt

lunch

- **Md Kamruzzaman Sarker (with intro by Pascal Hitzler) (90 mins):**
Two tools: OWLax and ROWL

coffee

- **Karl Hammar (90 mins):**
Tool: eXtreme Design for Protégé

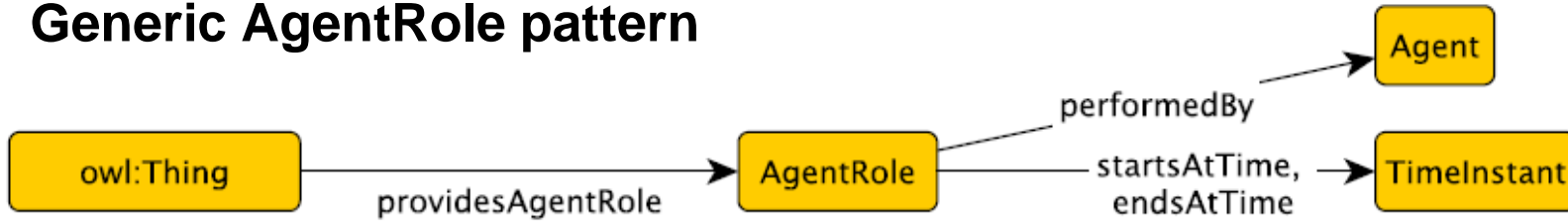


- A tutorial about modular ontology modeling best practices and some available modeling tools.
- Coming from the “Ontology Design Patterns” community.
- Recommended by us for all types of ontology modeling, including as graph schema for linked data and knowledge graphs.
- We are approaching a point where our experiences can consolidate into crisp recommendations, but we’re not quite there yet. I.e. there’s still work (and research) to be done.
- Join us if you’re interested:
Google Group called “Ontology Design Patterns”

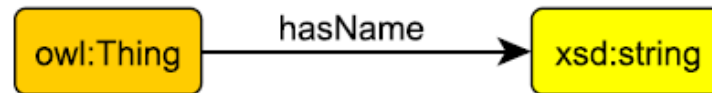
Very first example



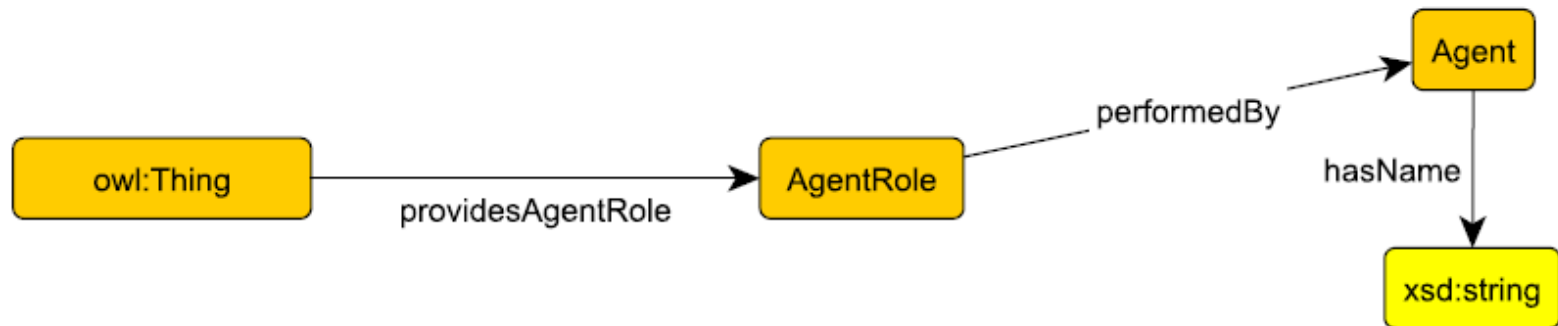
Generic AgentRole pattern



Generic NameStub pattern

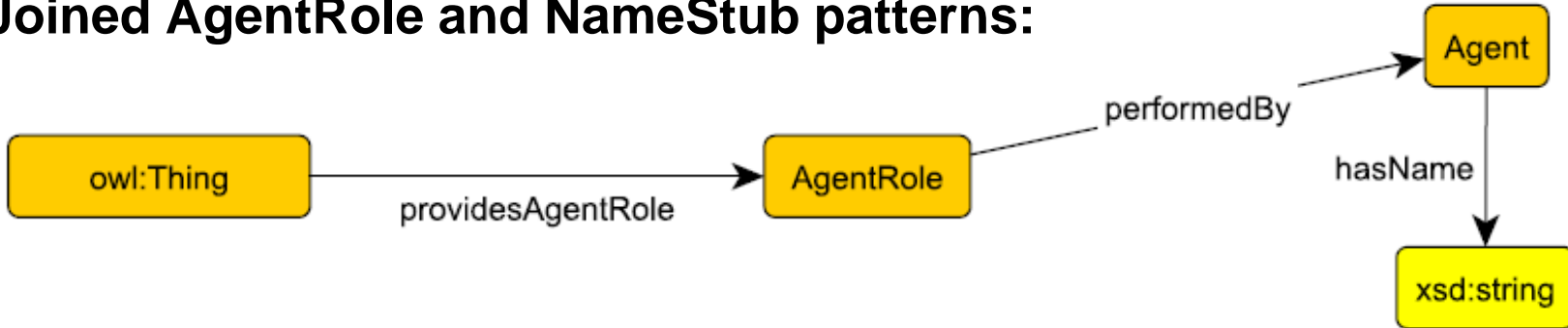


Joined:

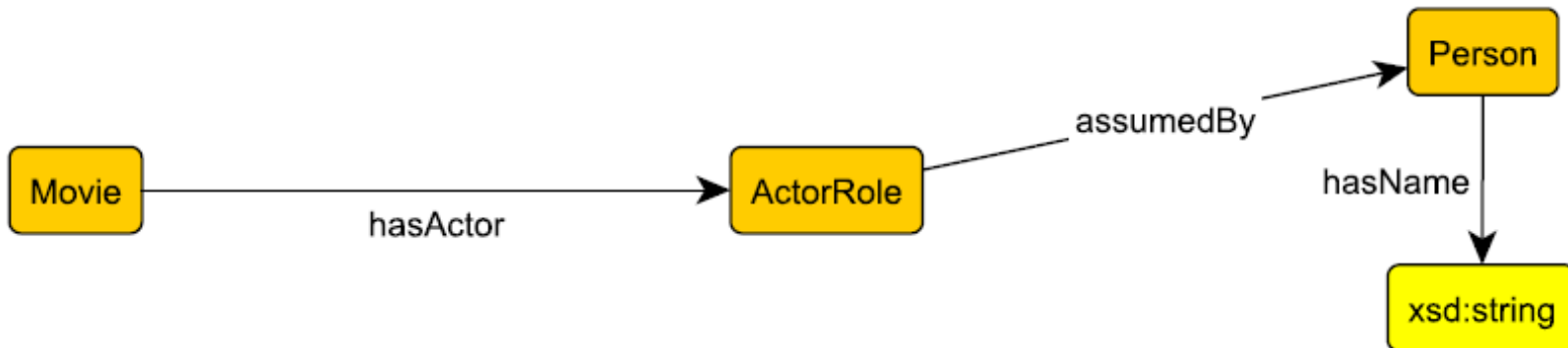


Very first example

Joined AgentRole and NameStub patterns:

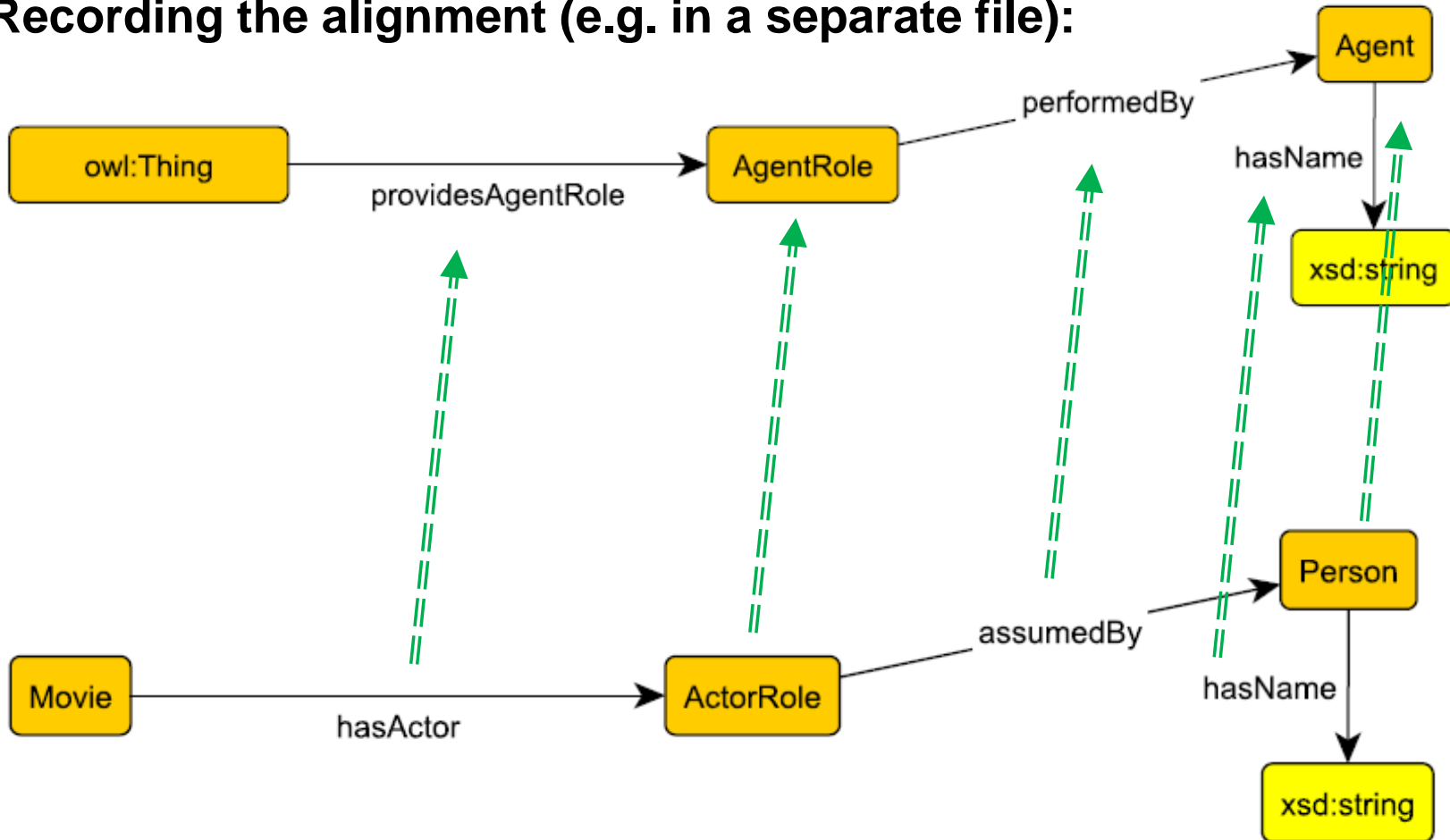


Used as a template for a concrete modeling problem:

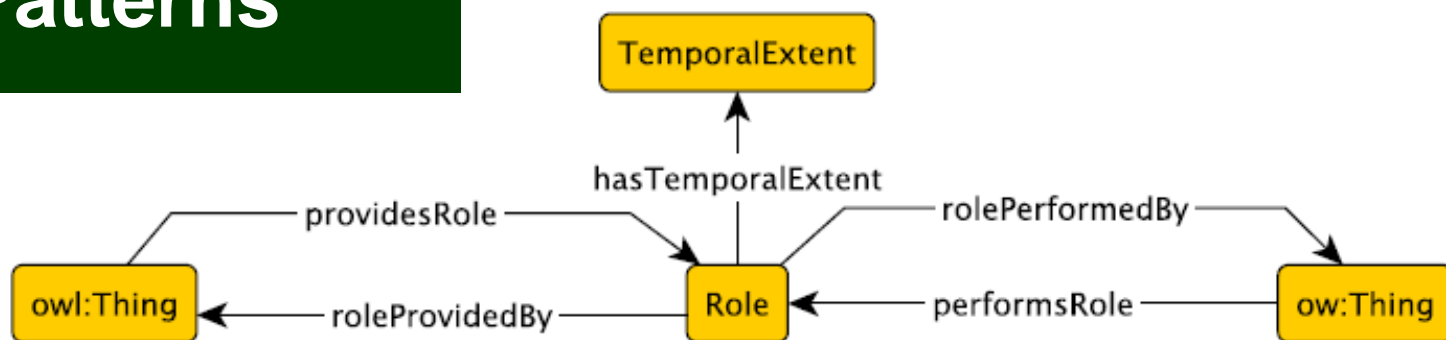


Very first example

Recording the alignment (e.g. in a separate file):



The Role Patterns



$\top \sqsubseteq \forall \text{providesRole}.\text{Role}$

$\exists \text{roleProvidedBy}.\top \sqsubseteq \text{Role}$

$\text{providesRole} \equiv \text{roleProvidedBy}^{-}$

$\top \sqsubseteq \forall \text{performsRole}.\text{Role}$

$\exists \text{rolePerformedBy}.\top \sqsubseteq \text{Role}$

$\text{rolePerformedBy} \equiv \text{performsRole}^{-}$

$\text{Role} \sqsubseteq \exists \text{hasTemporalExtent}.\text{TemporalExtent}$

$\sqcap \forall \text{hasTemporalExtent}.\text{TemporalExtent}$

$\sqcap (\leq 1 \text{ roleProvidedBy}.\top)$

$\sqcap (\leq 1 \text{ rolePerformedBy}.\top)$

range

domain

inverse

range

domain

inverse

existential

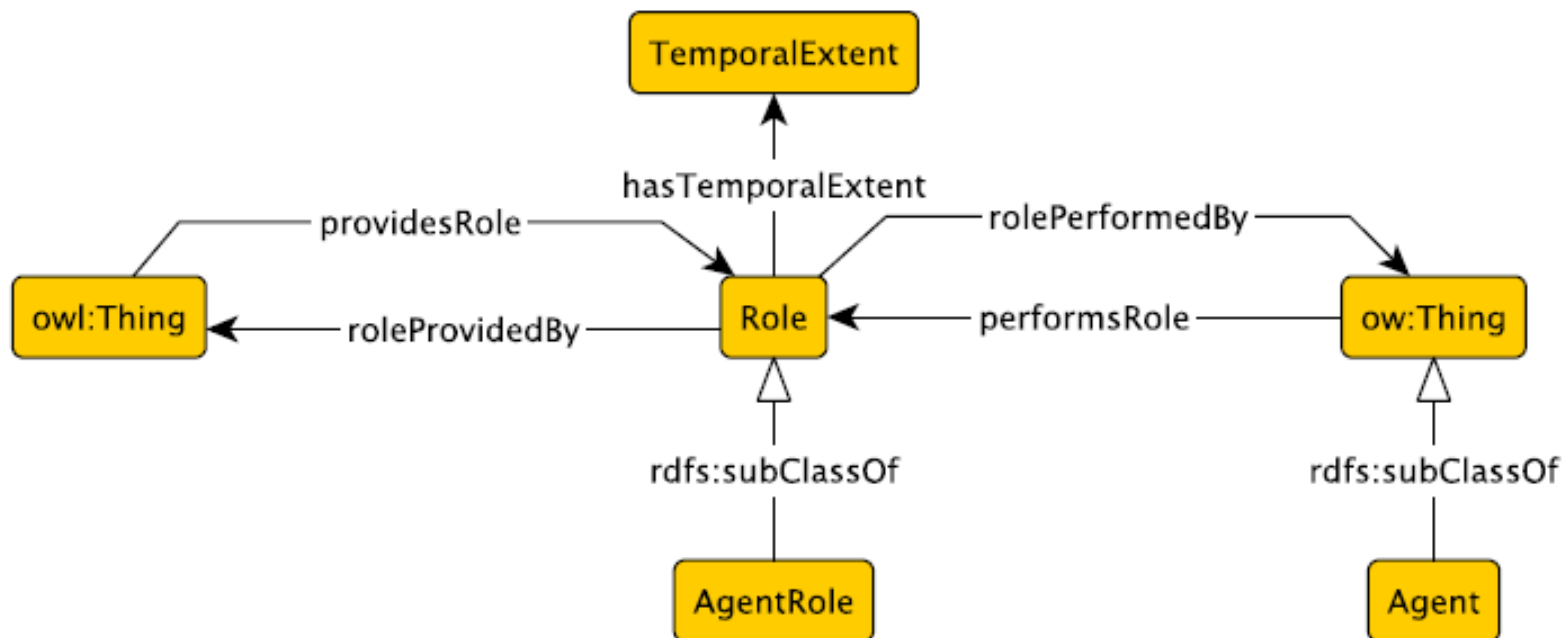
scoped range

range cardinality

range cardinality

existentials

disjointness



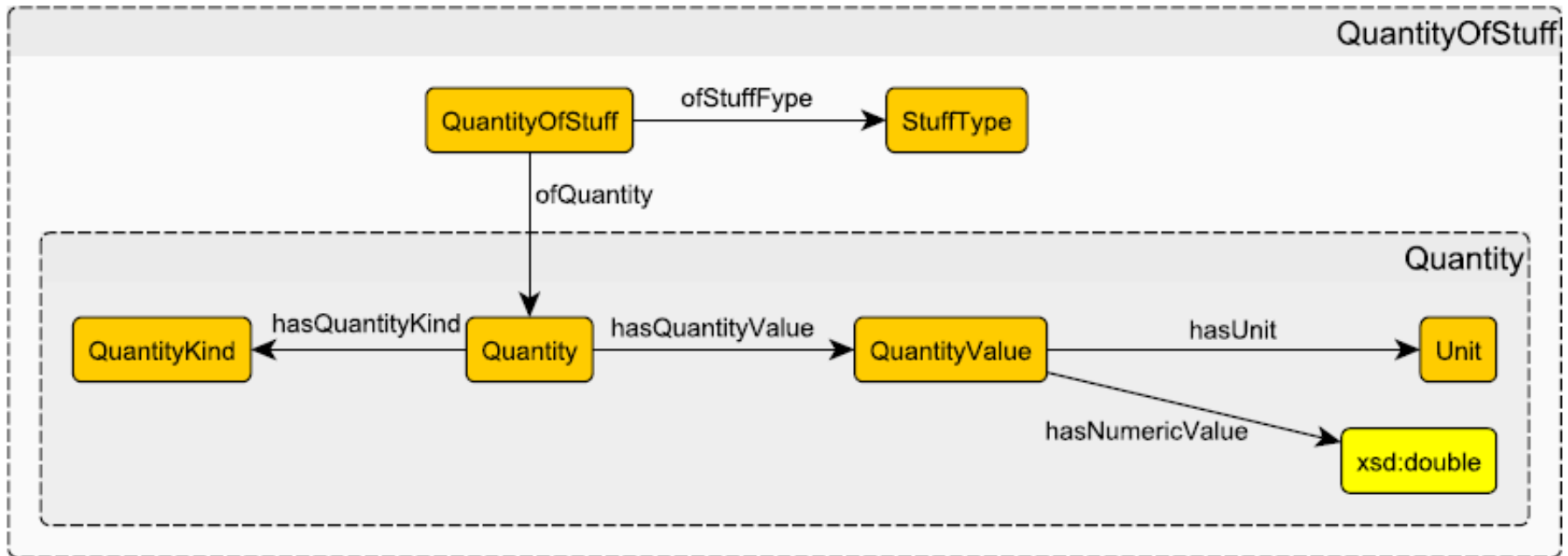
Axioms: all previous plus the following.

$\text{AgentRole} \sqsubseteq \text{Role}$

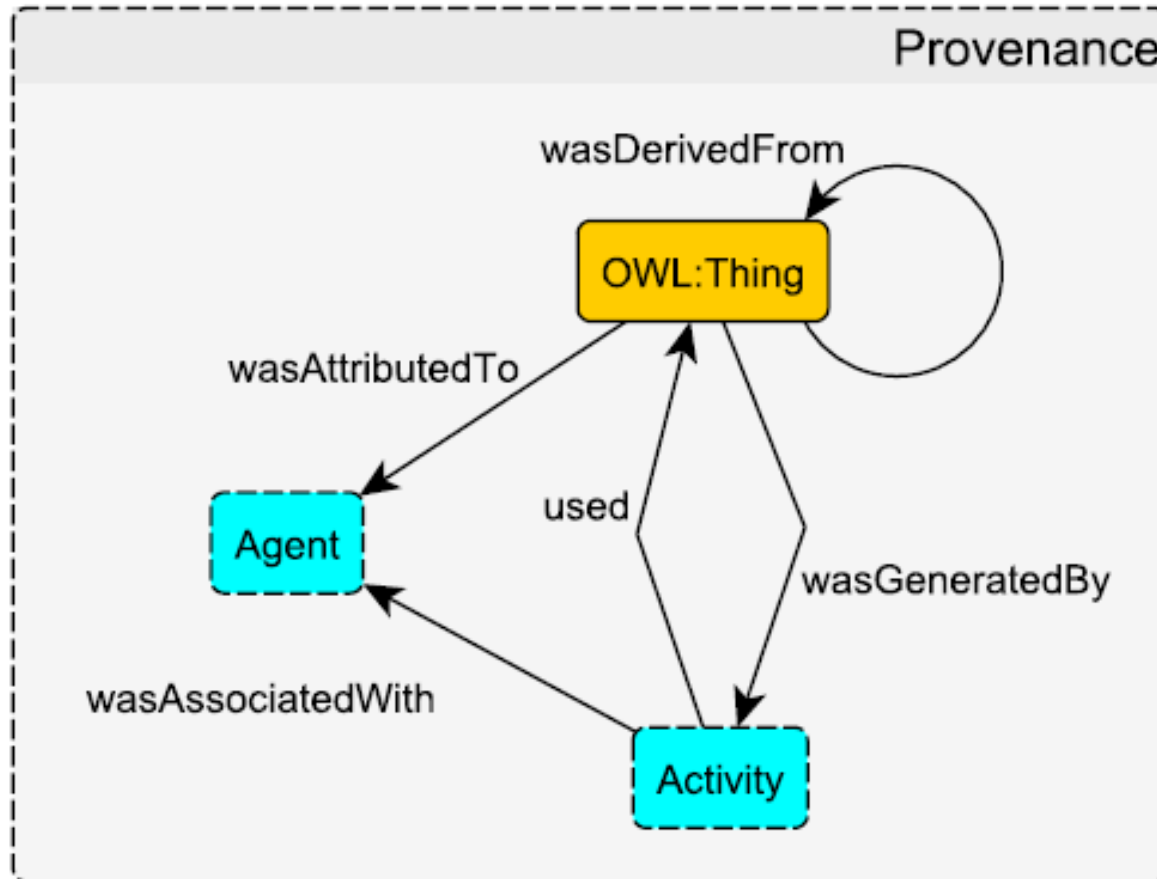
$\exists \text{rolePerformedBy. Agent} \sqsubseteq \text{AgentRole}$

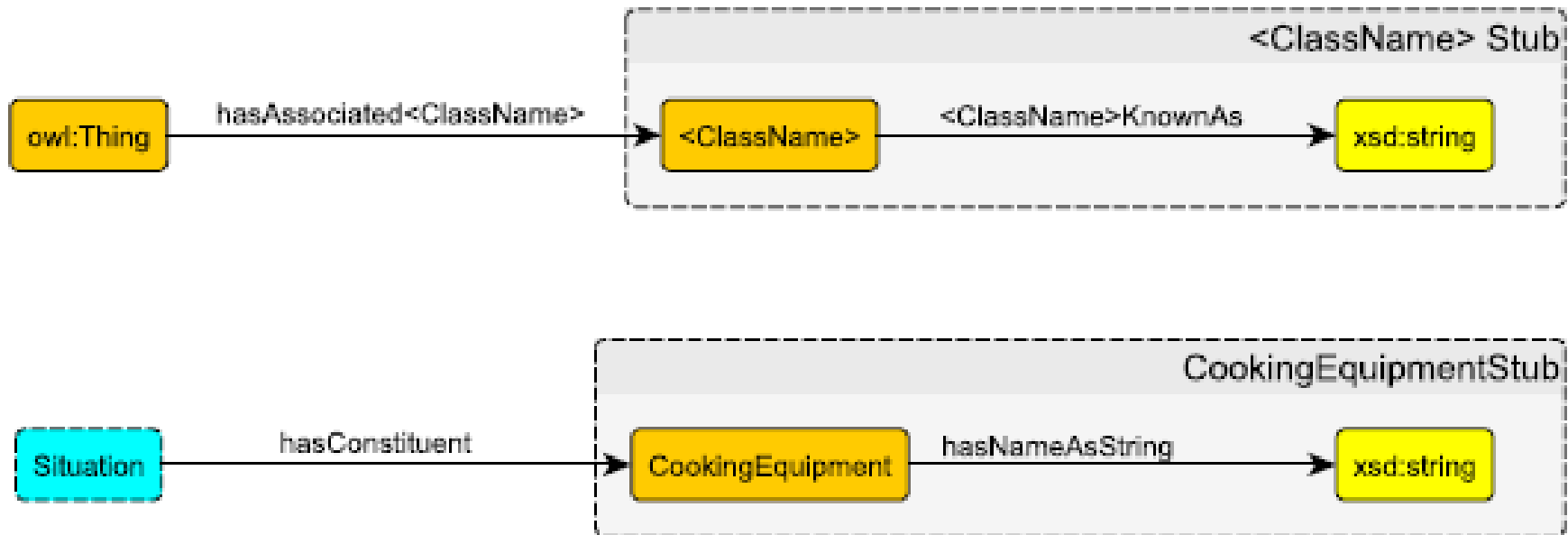
$\text{AgentRole} \sqsubseteq \forall \text{rolePerformedBy. Agent}$

Borrowed from the QUDT ontology



Borrowed from PROV-O





Bottom: The CookingEquipmentStub derived from it.



Thanks!



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