Australian Government
Geoscience Australia

Agreeing about agreements: modelling social contracts, people and data

Nicholas J. Car & Paul J. Box

“You're right, I agree, you are perfectly correct, I acquiesce, I concur. Yes, I assent, I am of the same mind, I am at one with you, I conform, I defer, I am in accord, I agree, I agree (sings) I agreeeeeeeeeeeeeee!”

-- Neddie Seagoon

Motivation

This session:

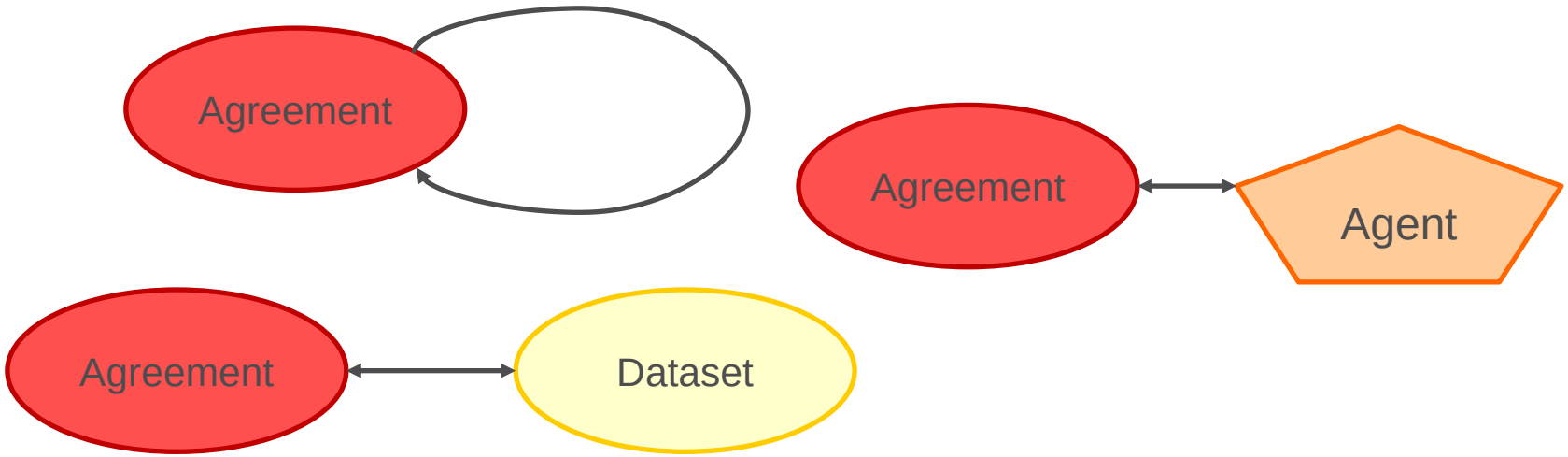
“We are especially interested in review or position papers that can be used to form a coherent research plan for the future.”

Aim

- To improve the efficiency of dealing with different forms of agreement within a data sharing scenario

By providing:

- A prototype agreements ontology which models agreements themselves as ‘things’ and the relationships between them, and between them and data, and them and agents



Introduction

Benefits of concept modelling

- By modelling them , we demonstrate we agree about Agreements
- An agreements ontology allows us to start automating tasks that require knowledge of them
  - Data repositories that can make better choices about how to deliver or withhold data without human intervention
  - See my Licenses paper, http://www.scidatacon.org/2016/sessions/84/paper/199/

Introduction – Agreements as a concept

- Standards for data sharing between organisations and even teams within organisations is well established
- Standards are a form of agreement
  - So are MoUs, charters, deeds, licences, rules of the road and even the definitions for words
- Many of these other sorts of agreements are also important for data sharing communities too

Background – Data Agreements in Australia

- We have a series of large inter-agency and intergovernmental information infrastructures built over the last decade
  - observational and modelled data about the Great Barrier Reef (eReefs)
  - Australia's water supply organisation's accounts (Water Regulations)
  - data on Australia's living species (Atlas of Living Australia)
  - terrestrial ecosystems' data (TERN)
- Authority structures are established for each initiative to govern communities
- A range of agreements, required to facilitate data sharing, are created through these structures

Background – Data Agreements in Australia

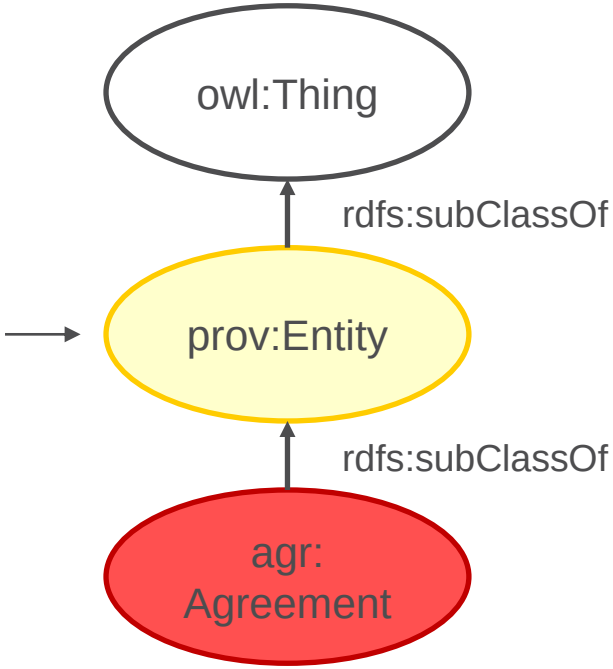
- Agreements, of all the sorts mentioned before, provide the rules of the game for those participating in collaborative activities
- These agreements are not explicitly described either in relation to the data sharing that the agreements facilitate, or the agents (organisations and people) that generate and subscribe to them
- This creates confusion, conflict and cost for data sharing and access.
- Explicit modelling and subsequent declaration of agreements and their relation to data and agents can assist!

The Agreements Ontology

- Agreements Ontology (AGR-O) presented at http://promsns.org/def/agr
  - We are using OWL [1] for the ontology in order for it to work well with existing ontologies
    - DCAT (dataset relations), Licences (my other talk), PROV (provenance) ORG & FOAF (humans & organisations)
    - [1] https://en.wikipedia.org/wiki/Web_Ontology_Language
- A 'middle' ontology
  - specializes well-known, abstract, upper ontologies
  - expected to be used in particular contexts in conjunction with detailed, domain-specific, lower ontologies

Agreement is a *Thing, an Entity*

"An **entity** is a physical, digital, conceptual, or other kind of thing with some fixed aspects; entities may be real or imaginary."
(PROV DM)



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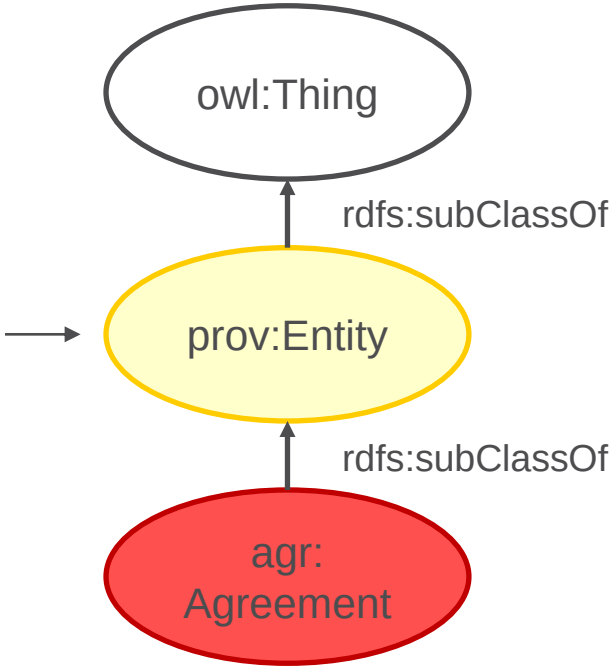
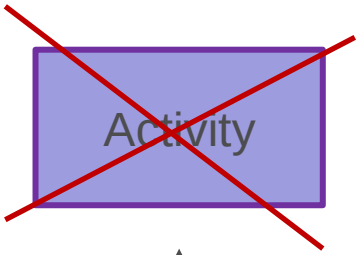
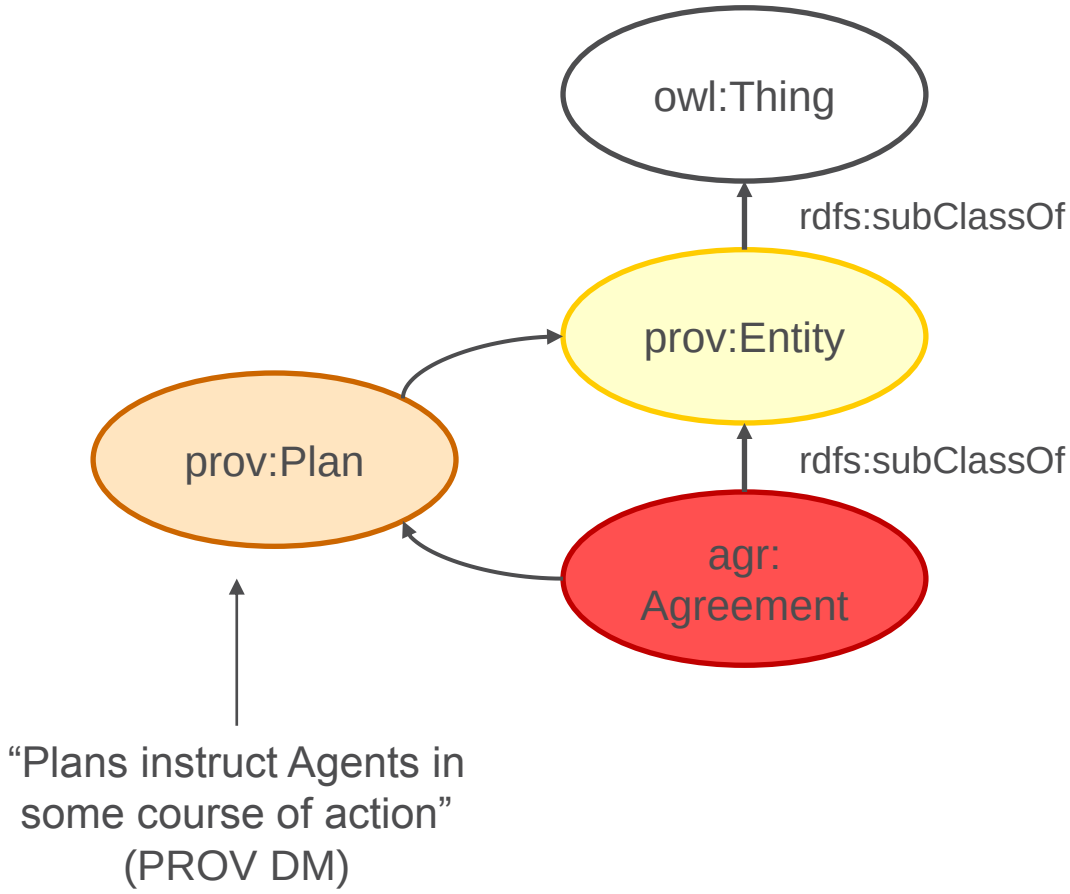




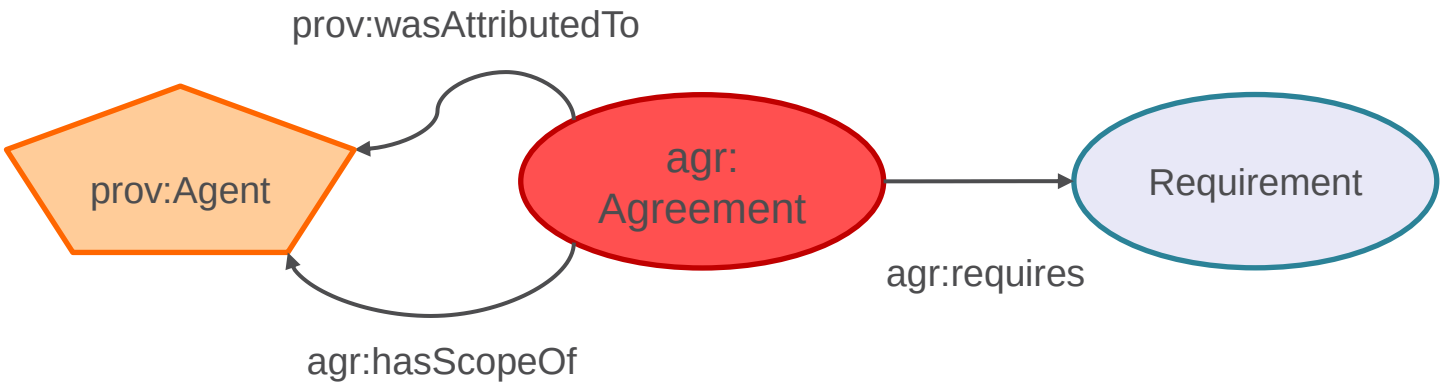
An **activity** is something that occurs over a period of time and acts upon or with entities

Agreement is a *Thing, an Entity*



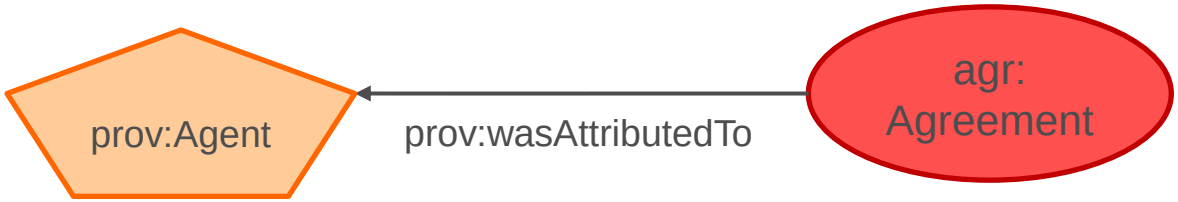
Agreement class relationships

Ignore the paper's diagram!

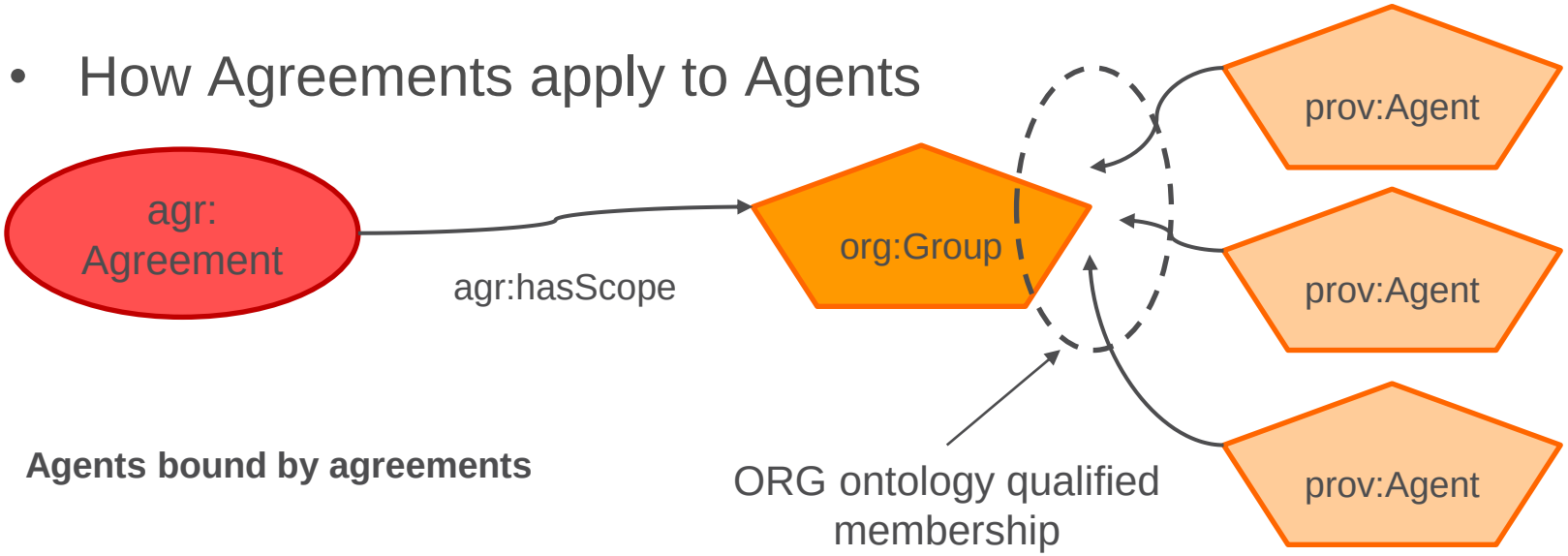


Agreement actions

- Agents make agreements
  - Could be a Group agent (between individual Agents)



- How Agreements apply to Agents

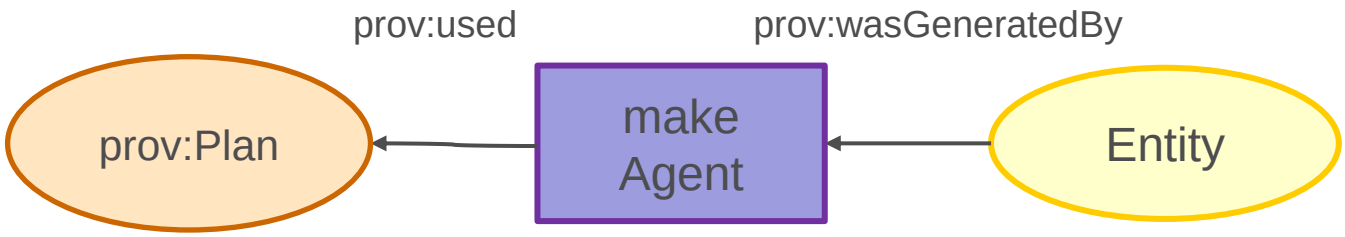


Agents bound by agreements

Agreement actions

- How Agreements apply to Agents (cont.)

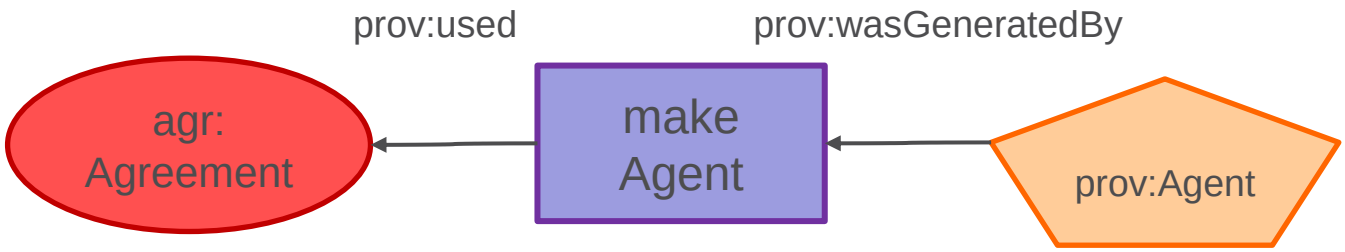
Agents created by agreements



Agreement actions

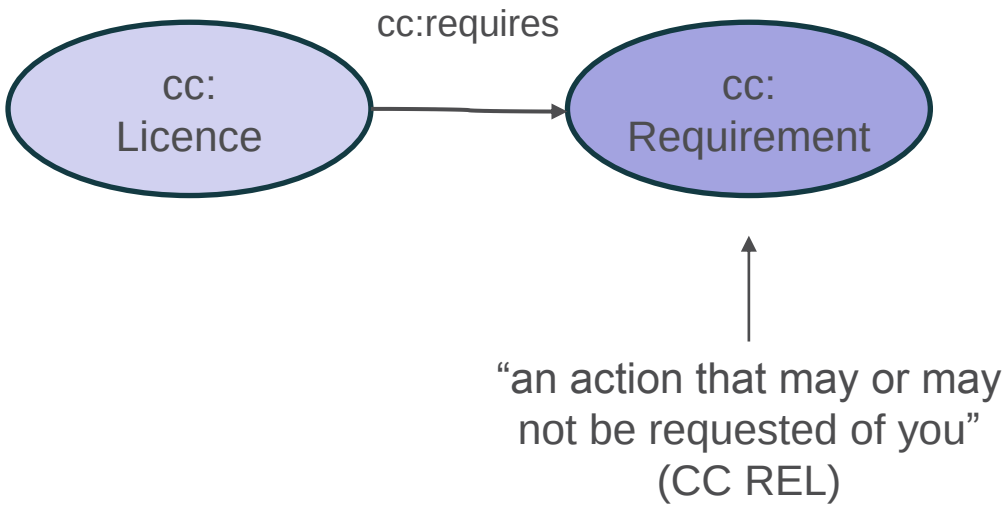
- How Agreements apply to Agents (cont.)

Agents created by agreements



Agreement actions

- How Agreements affect Agents
  - Inspired by Creative Commons' Rights Expression Language[1] and the ODI Rights Statement Voc [2]
    - [1] http://labs.creativecommons.org/demos/ns/
      [2] http://schema.theodi.org/odrs/



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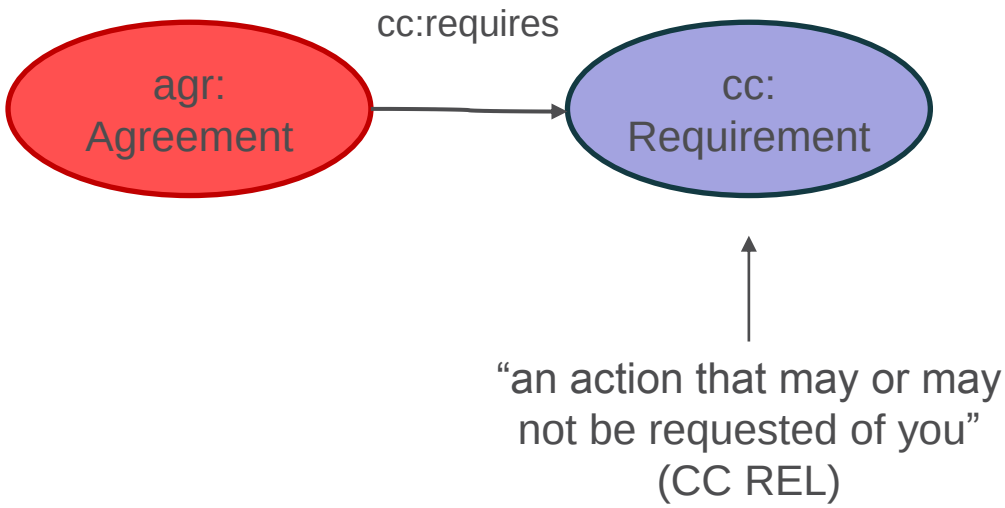
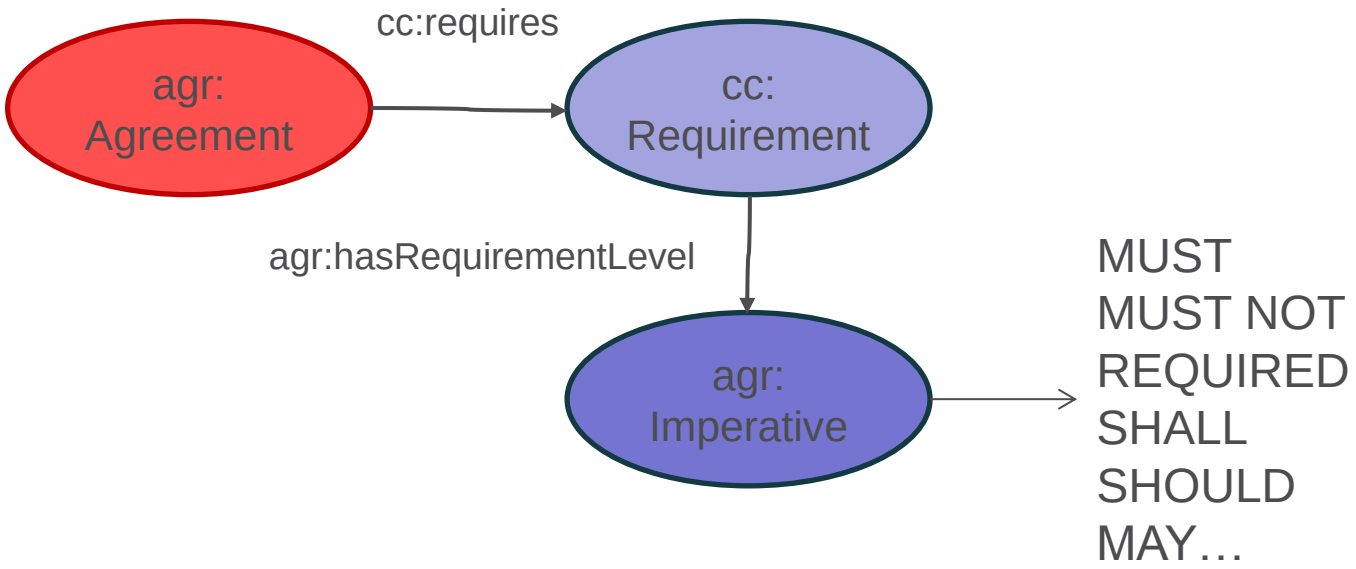


Agreement actions

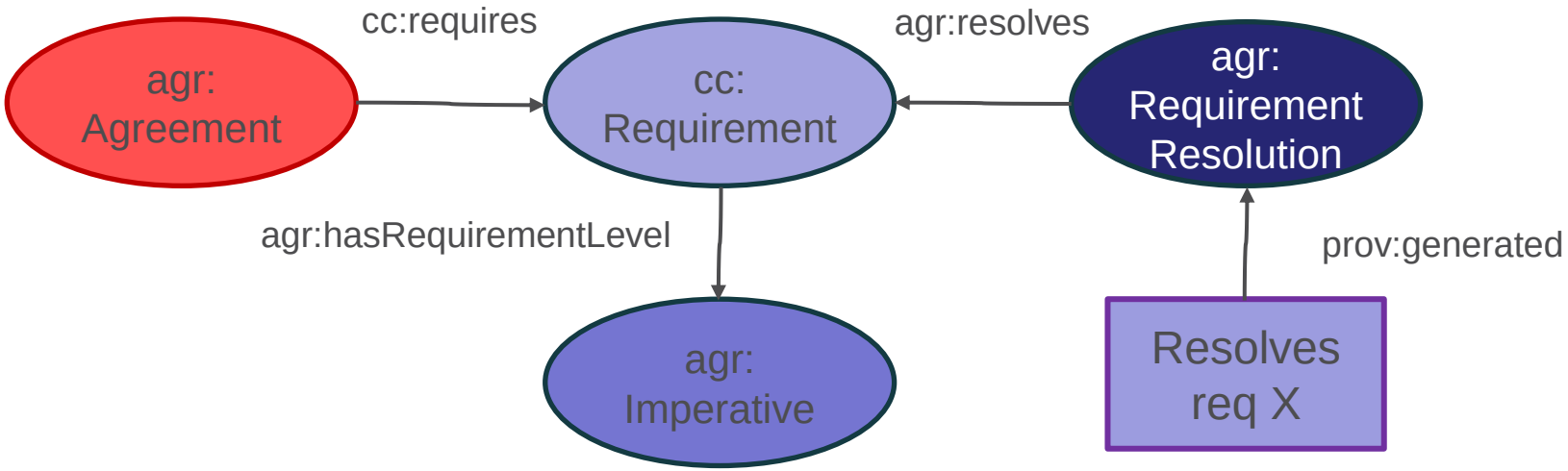
- How Agreements affect Agents
  - Qualified imperatives from “Key words for use in RFCs to Indicate Requirement Levels”[1]

[1] http://www.ietf.org/rfc/rfc2119.txt



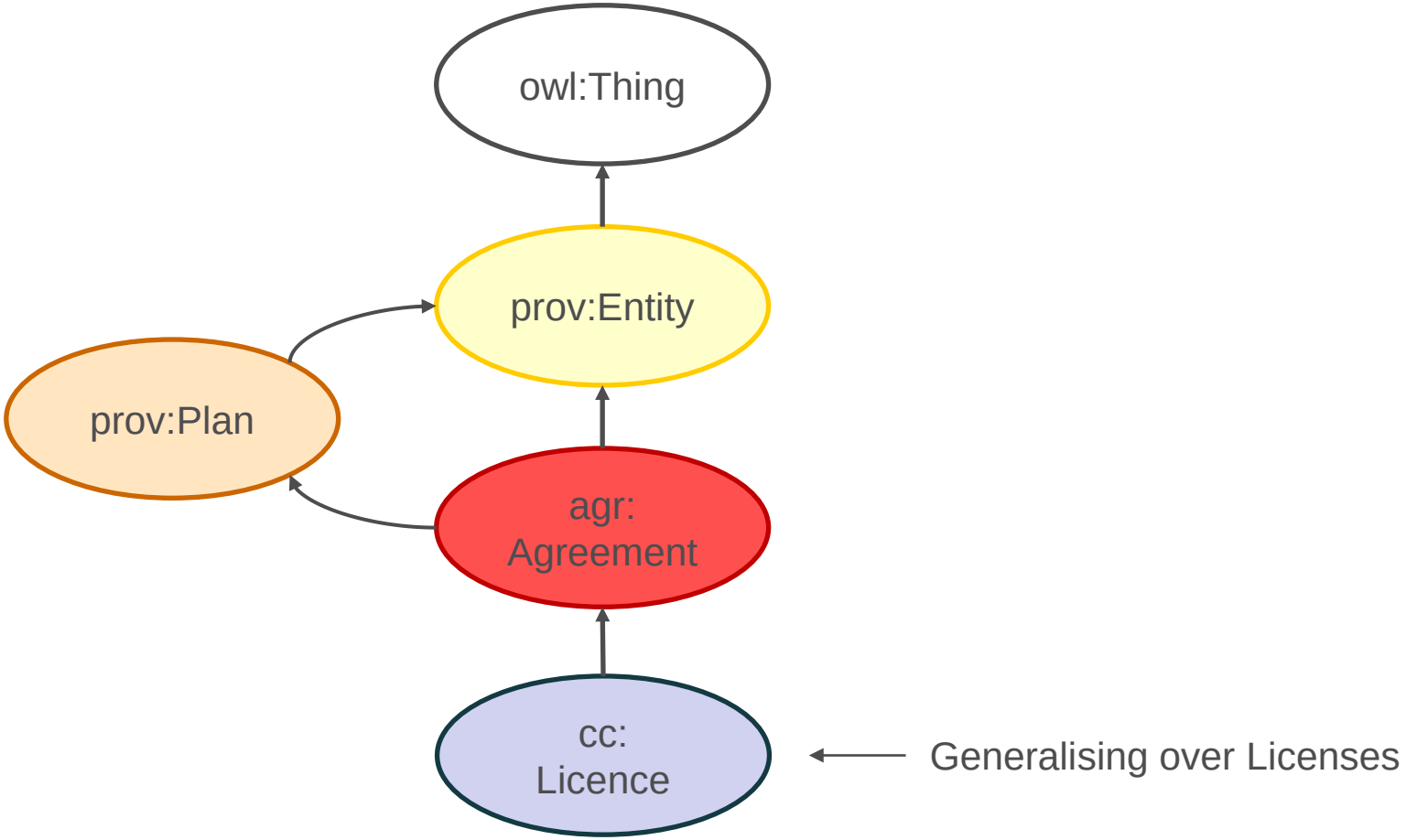
Agreement actions

- How Agreements affect Agents
  - Requirement Resolution



Agreement actions

- How agreements apply to data



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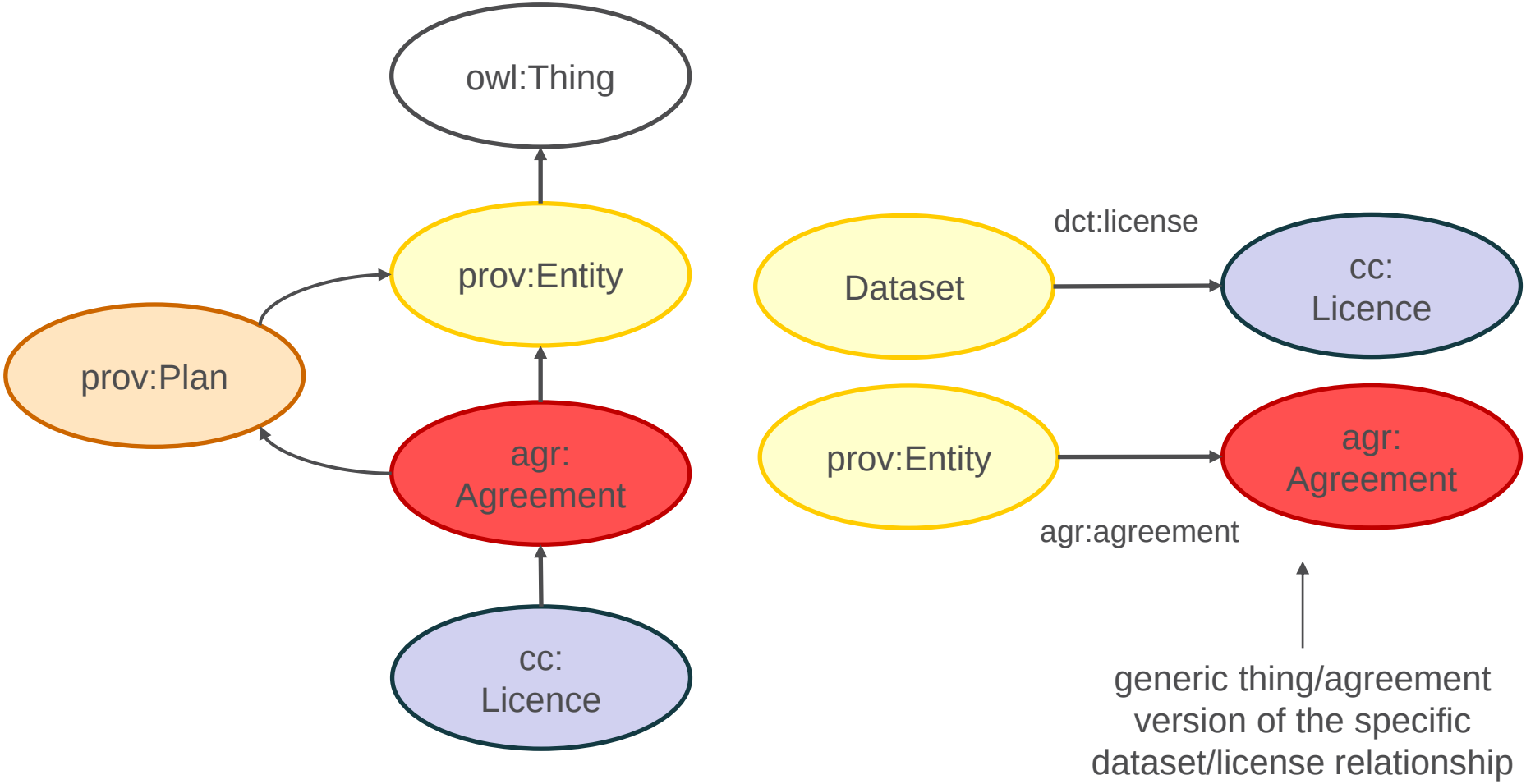

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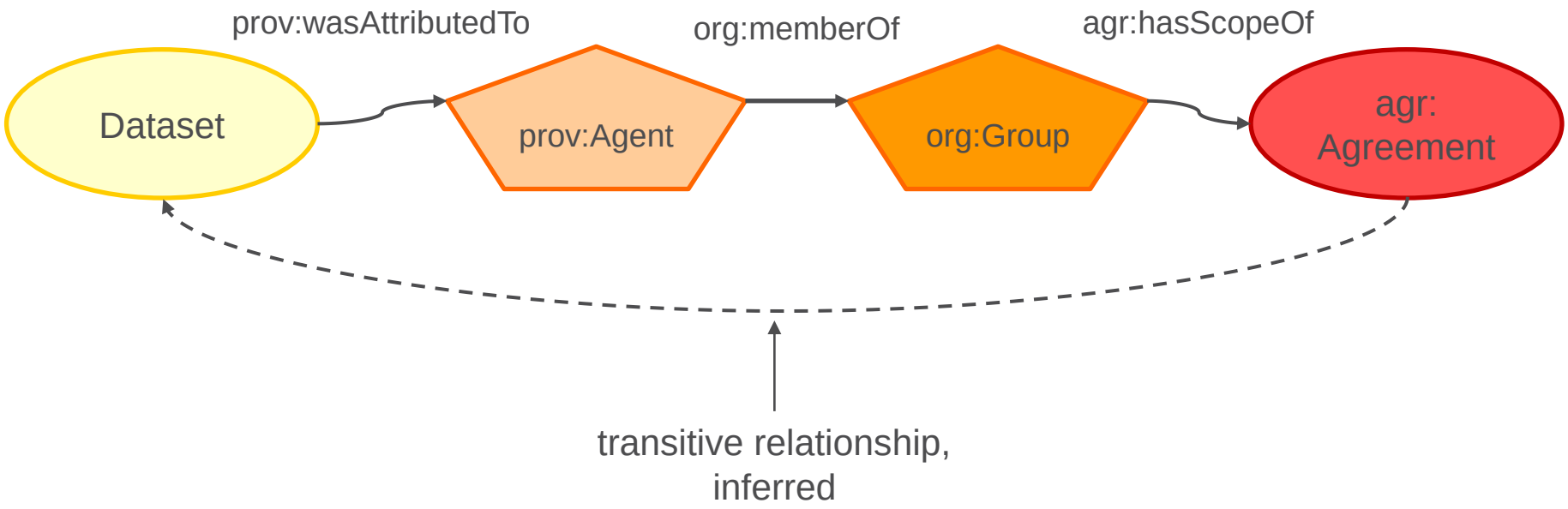

Example scenarios

1. Discovering the agreements affecting a particular dataset
2. Discovering datasets based on the agreements they are affected by
3. Discovering the Requirements imposed on an Agent via the Agreements they are within the scope of
4. Resolving the Requirements of conflicting agreements (licence v. MoU)
   - TODO
5. Demonstrating the automated satisfaction of Requirements

Conclusions

- We can model agreements, their relations to Agents and Entities using existing ontologies as a starting point
- Only a few new relations are needed
- Relationship qualification is a good ontology design pattern for these tasks

Future work

- Consider an Agreements hierarchy or speciation
- Model my organisation's agreements using AGR-O
  - We are starting with Licenses & Requirements
  - I expect to see a rationalisation of agreements, as per previous License work

Thanks!

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Background - PROV

- PROV is a family of documents by the W3C
- There is a PROV Data Model and an Ontology[1] form

[1] https://www.w3.org/TR/prov-o/