# OSCAR Knowledge Base

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(*Aotearoa*)

## Clarifications

- Open Source Cadastral Application and Registry (OSCAR)
  - Impetus from FAO
  - Now an FAO project
- University of Otago (UO) OSCAR
  - Branding distinct but closely related to FAO OSCAR – integrate efforts `jcept.net` `jmecano.net`
  - Focus on Registry aspects: Land records, processes, time-varying data, variation, evolution, rich representations of the link between people and land

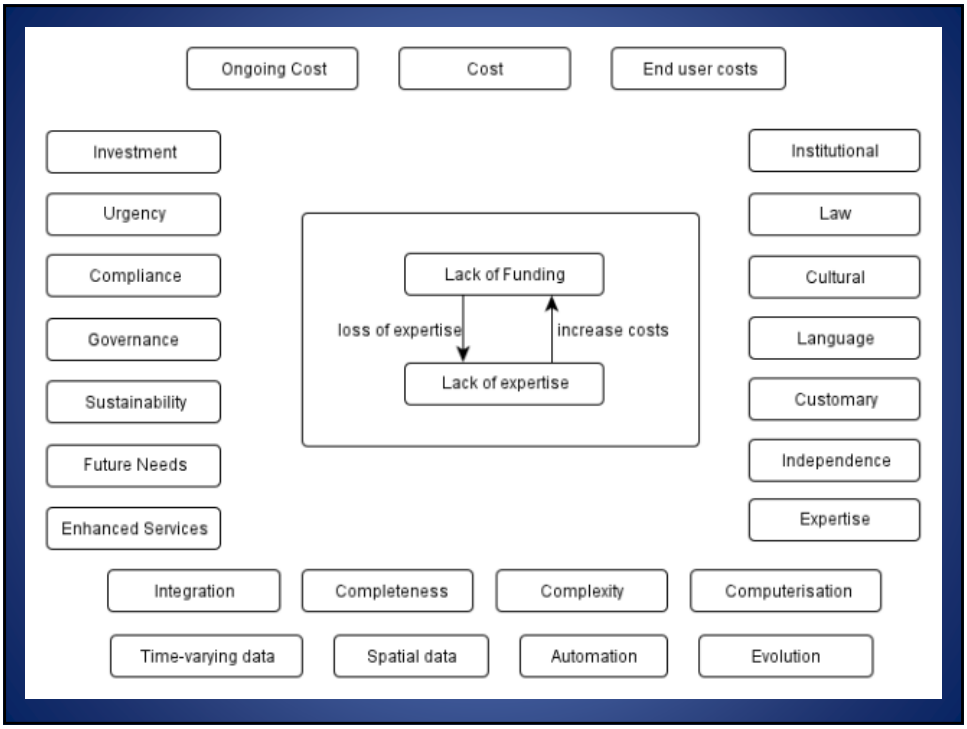
# What is the problem?

Barriers imposed by Closed World Architectures (relational, object) make it extremely difficult to resolve conflicting 'forces' (needs, requirements):

- Provide low cost, sharable, reusable, generic, inter/intra domain applications and services (FLOSS).
- Provide future proof, evolvable, highly configurable, integrated applications and services.

Result is always a trade-off between forces e.g. complexity v completeness

*We are investigating techniques that address these barriers*



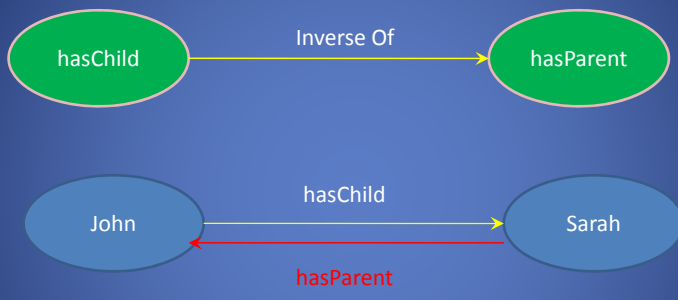
## *Closed World* Architectures

- Explicit, complete, 'up front' schema and models
- Evolution is by rebuild
- Typically 'current state'
- Integration is an extra
- Highly- coupled systems
- Isolation – many worlds

## Open World systems

- "*Anything can be said about anything*"
- *"Not all is known, unknown things may become known over time"*
- Low coupling, an extension of the WWW
- Rich and expressive representation – not limited by predefined schema

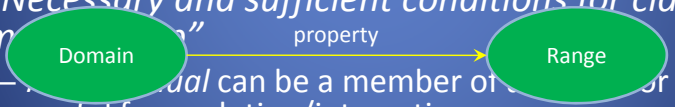
## *imagine a space…*

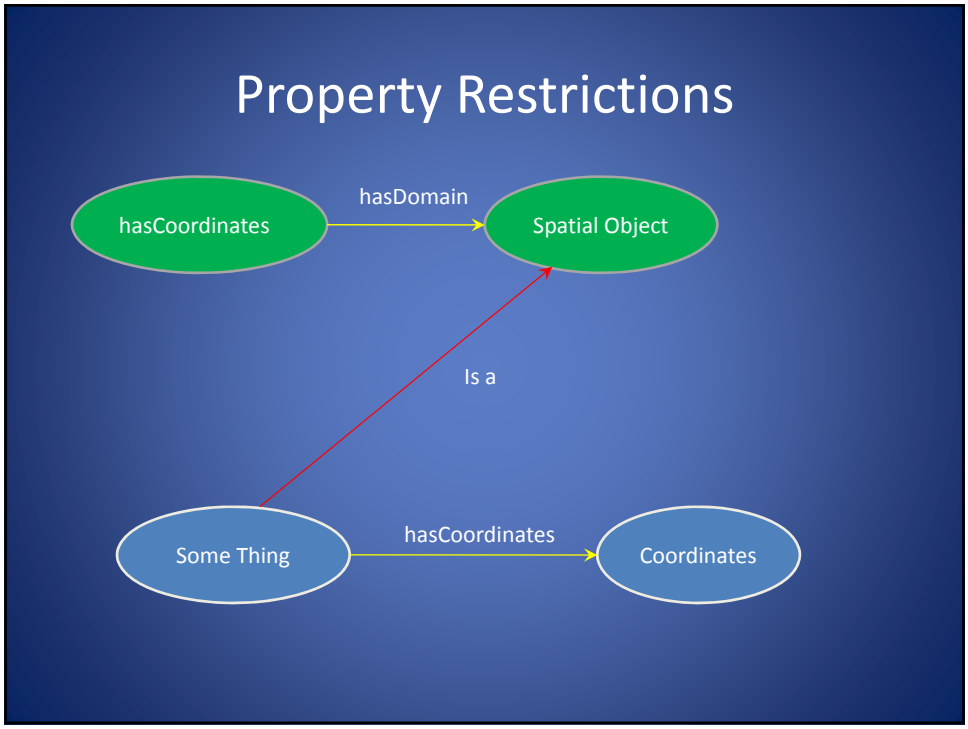


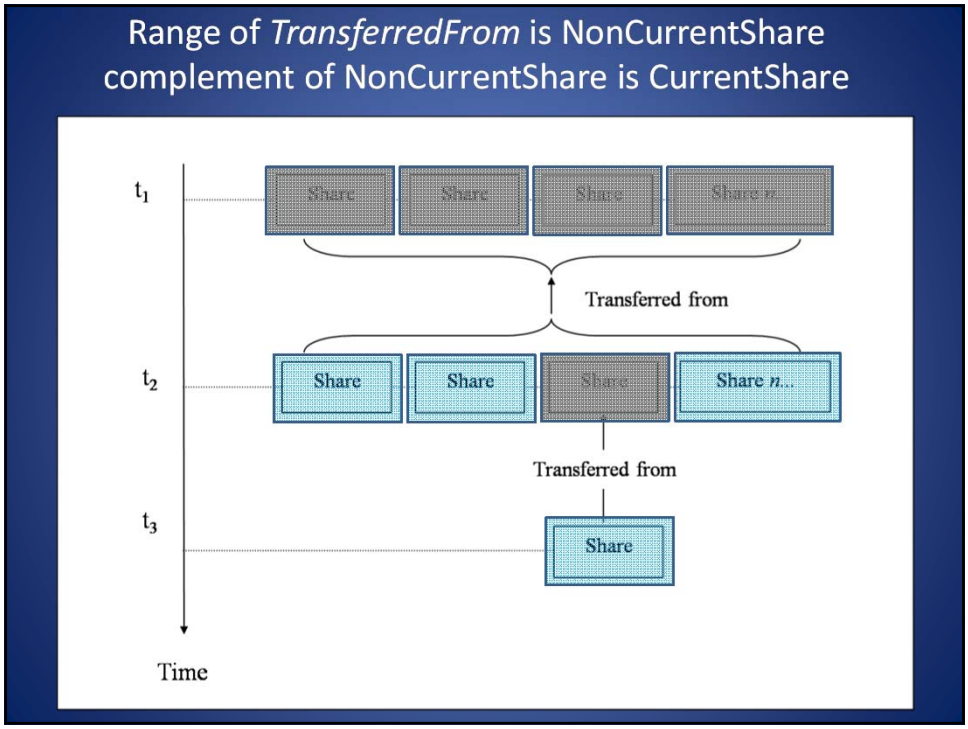

The current Samoa ontology and database contains:
3000 TBox and 870,000 ABox statements (incl inferred).

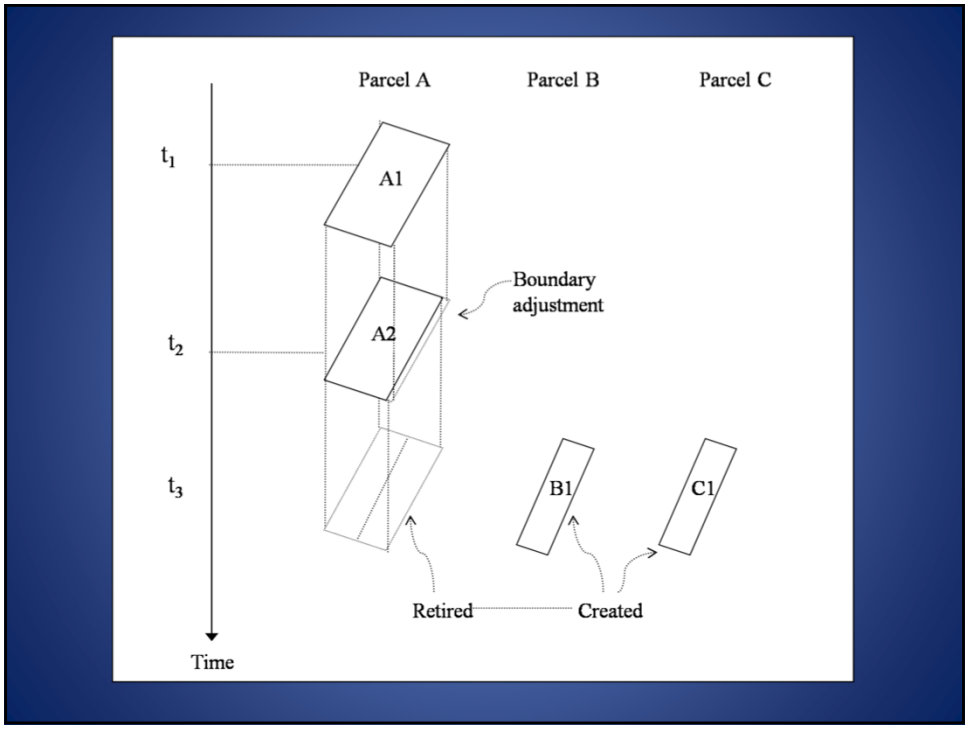
## Properties are first class

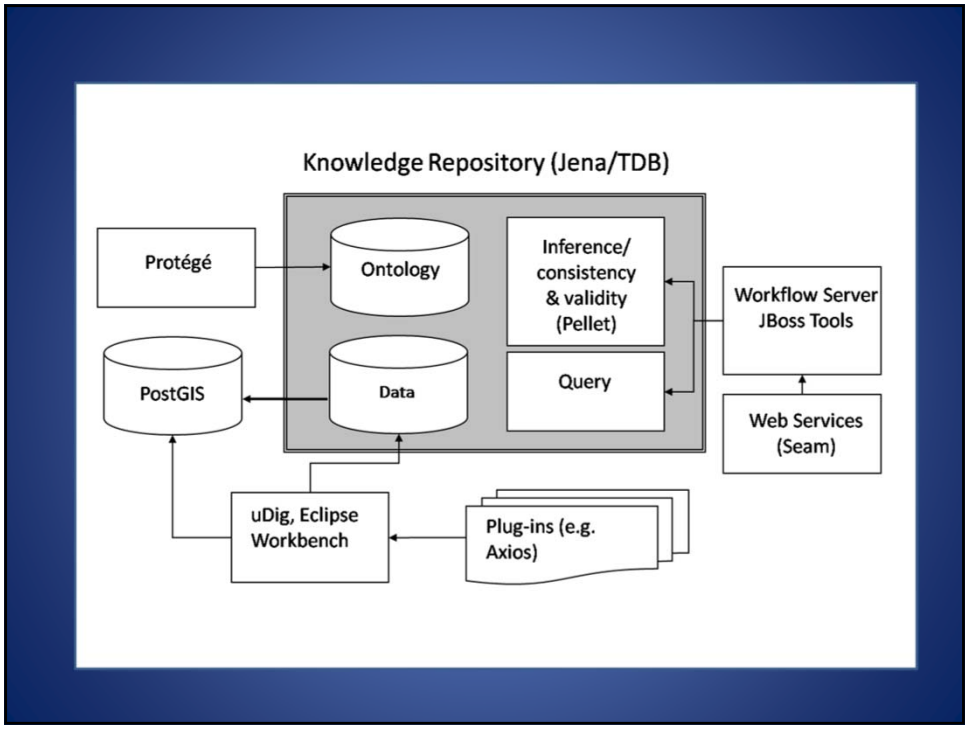
- Classes/concepts do not have predefined attribute 'slots'.
- The domain and range of a property do not imply slots.
- *"Necessary and sufficient conditions for class m…"*
  - *…ual* can be a member of … classes – useful for evolution/integration
  - Membership can be implied (via properties) or explicit via statements




Property Restrictions
hasCoordinates
hasDomain
Spatial Object
Is a
Some Thing
hasCoordinates
Coordinates


Range of *TransferredFrom* is NonCurrentShare
complement of NonCurrentShare is CurrentShare
$t_1$
Share
Share
Share
Share *n*...
Transferred from
$t_2$
Share
Share
Share
Share *n*...
Transferred from
$t_3$
Share
Time


Parcel A
Parcel B
Parcel C
$t_1$
$t_2$
$t_3$
A1
A2
Boundary adjustment
B1
C1
Retired
Created
Time


Knowledge Repository (Jena/TDB)
Protégé
Ontology
Inference/ consistency & validity (Pellet)
Workflow Server JBoss Tools
PostGIS
Data
Query
Web Services (Seam)
uDig, Eclipse Workbench
Plug-ins (e.g. Axios)

## How is all this useful?

- ALL domain knowledge (including processes) is together in an 'open world' format/container
  - Rather than spread across highly-coupled closed worlds
  - Separate from 'machinery'
  - Machinery is incidental

## Experience in Samoa

Successful land administration system but limited scope due to cost and other constraints:

- Poor linkage with parcel polygon data
- Issues of identity of persons, groups, parcels etc
- No support for evolution or integration