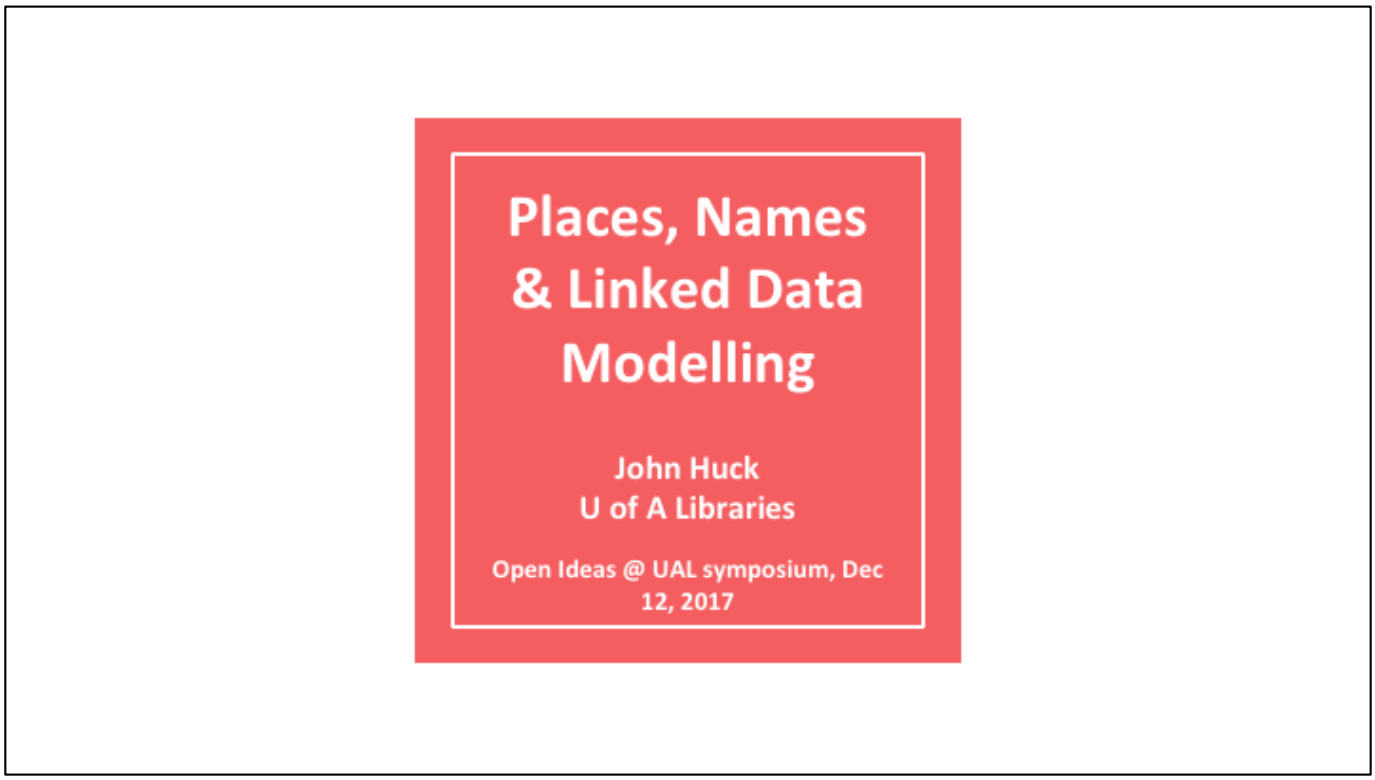
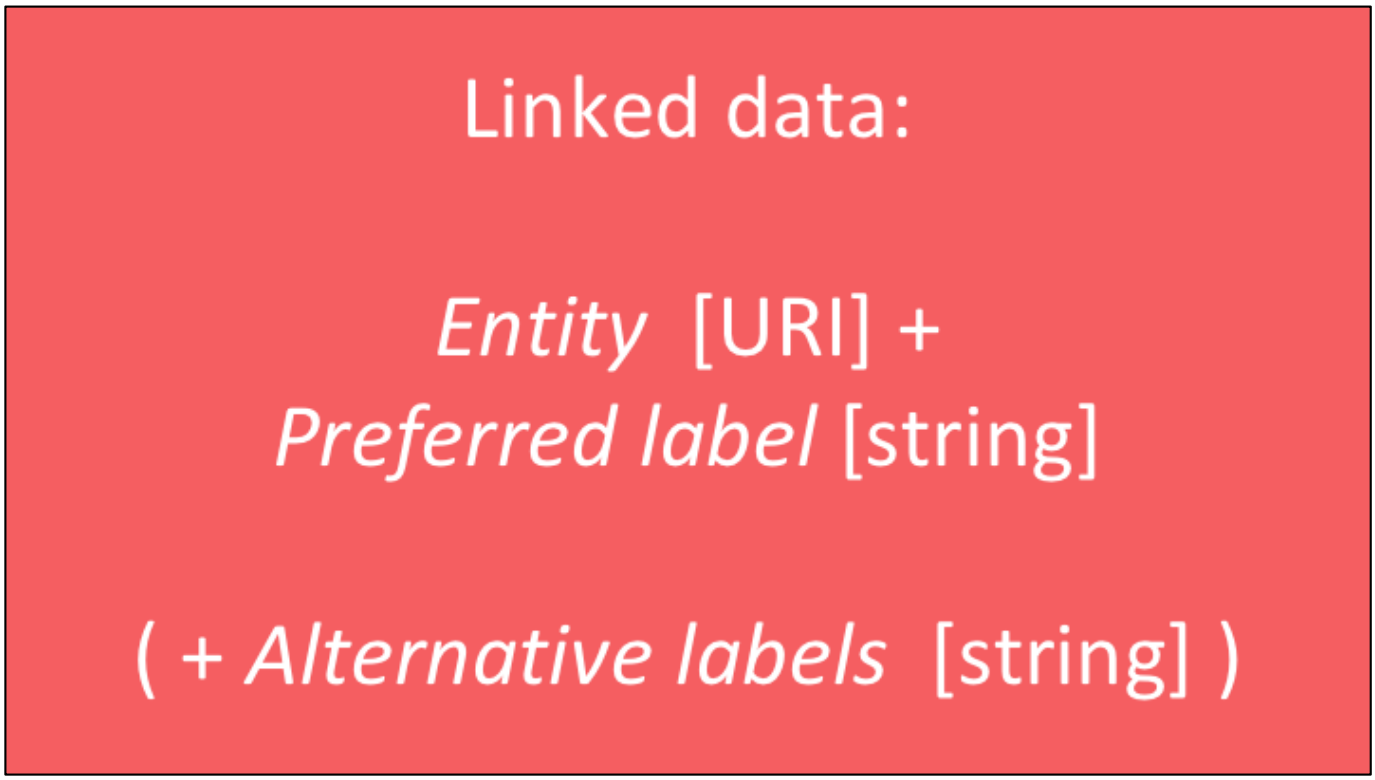


Author contact: john.huck@ualberta.ca A version of this talk was presented previously on Jan 30th, 2017, at geo4LibCamp 2017 at Stanford University. Square brackets indicate sections of the presentation notes not delivered on Dec. 12, 2017.

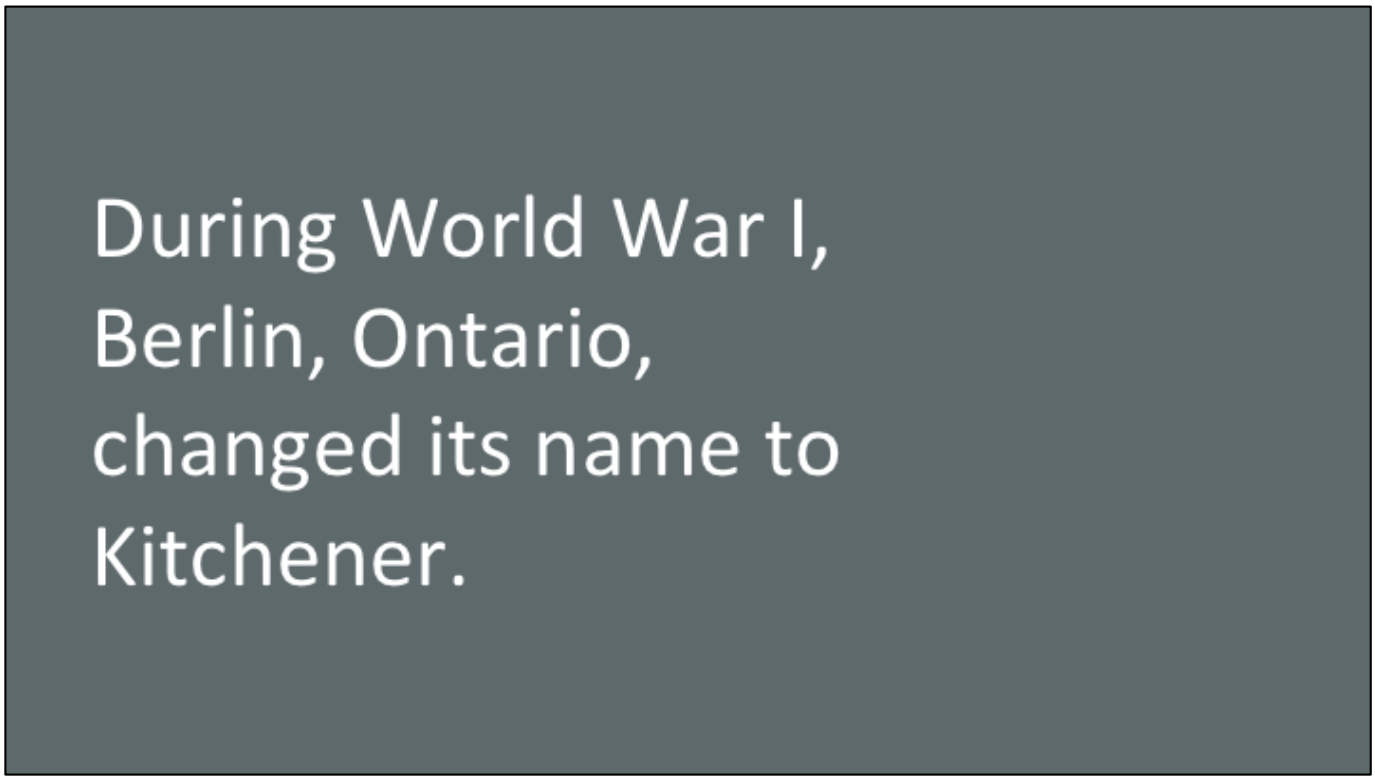


Linked data is designed to represent and disambiguate discrete entities. A URI represents the entity, and the name or label of the entity is recorded as a literal string, not a URI. In plain RDF, as well as in SKOS, an RDF standard for expressing thesauri, only one preferred label is allowed per language. It's meant to be a simple model.

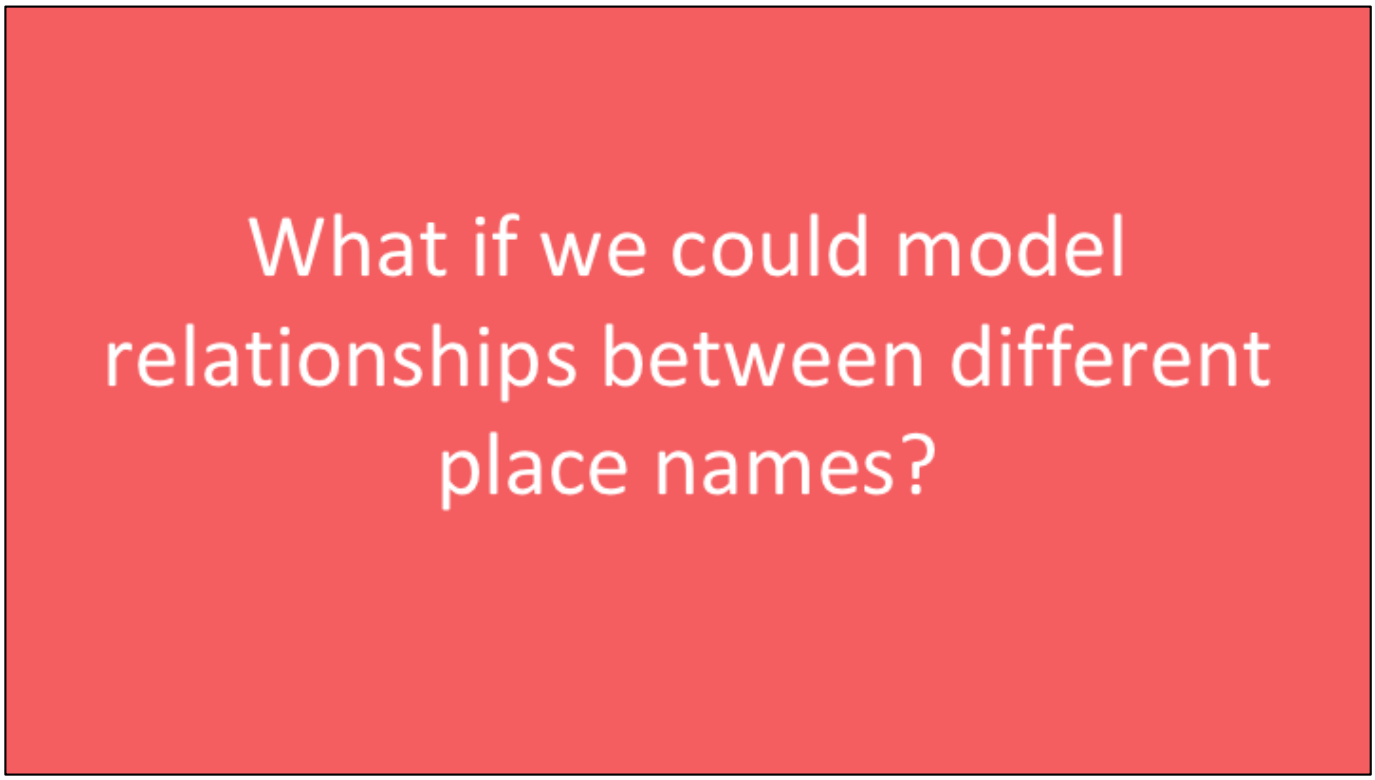
LC Subject Cataloging Manual – H708

"Assign as a subject heading [...] only the **latest name** of a political jurisdiction that has had one or more earlier names, as long as the **territorial identity** remains essentially unchanged"

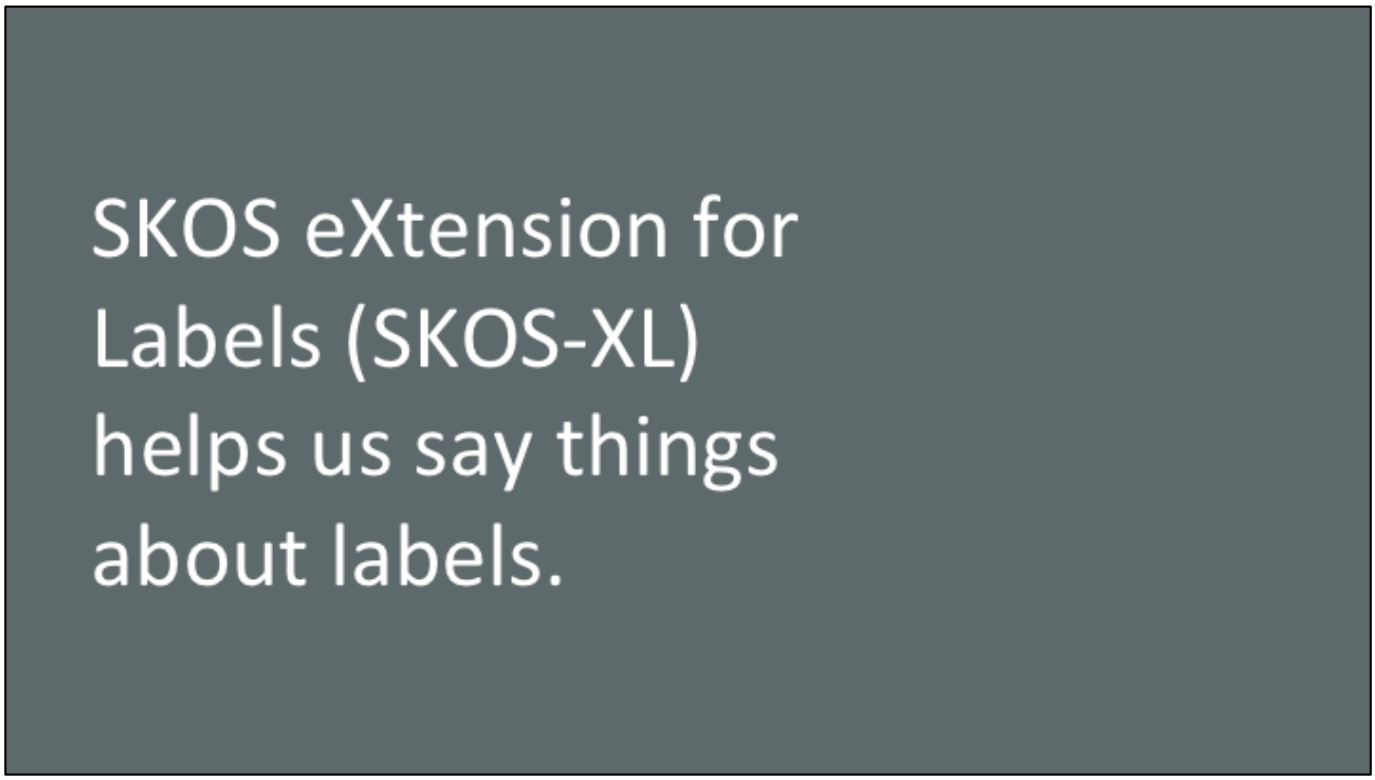
But the relationships between places and their names can be complicated. This cataloguing instruction nicely sums up the two ways that "place" can vary over time: the name can change, but the geographic extent can change as well.



To give an example, during World War I, the german community of Berlin, Ontario, narrowly voted to change its name to Kitchener, the name of a British general. More than just a different label, there is a particular relationship between the earlier and later names, a story about the community that is important to record. What do the names tell us about the experience of that community?



What if there were a way to express relationships between different names in linked data?

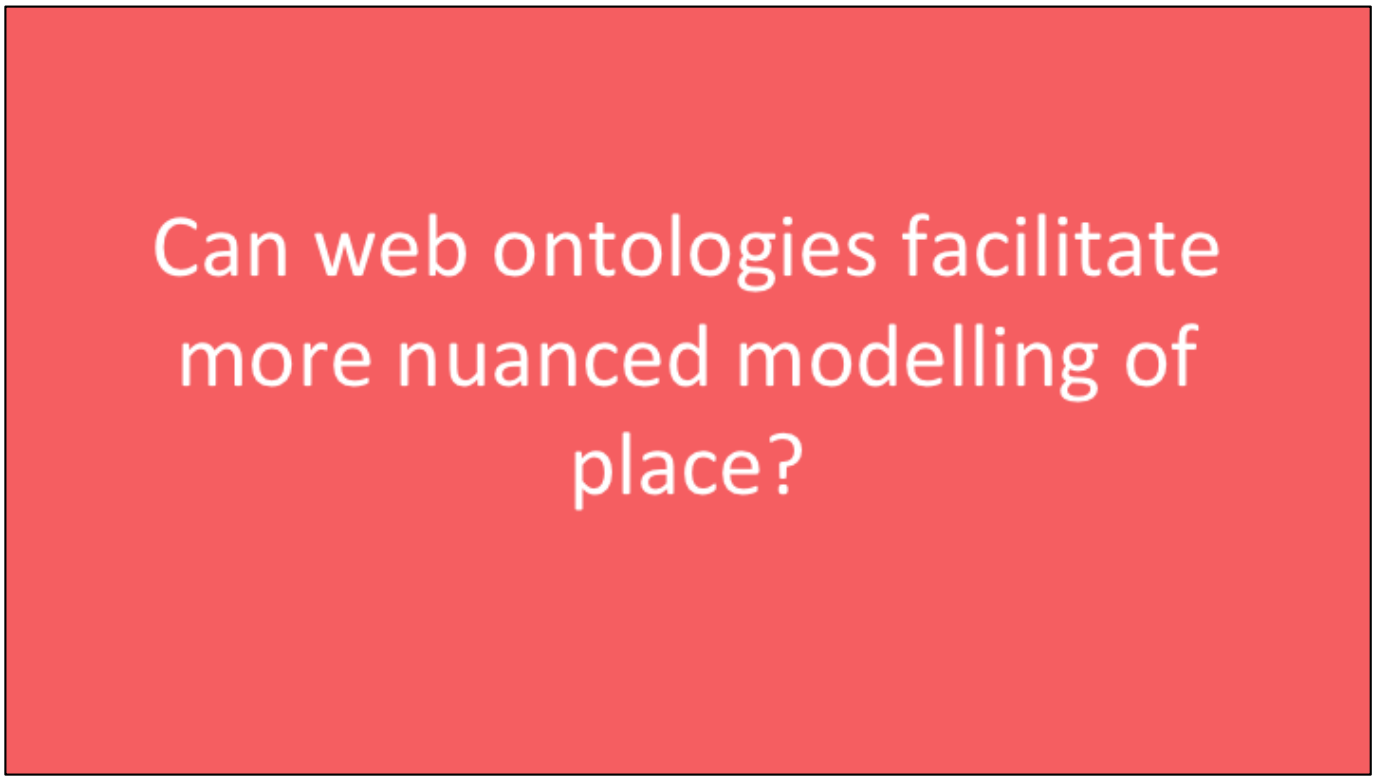


Right now, there is a way to do this with the SKOS-XL specification, which adds a layer to the SKOS schema that allows us to create relationships between labels or say things about the labels. It does this by turning each label into an entity with a URI (World Wide Web Consortium 2009).

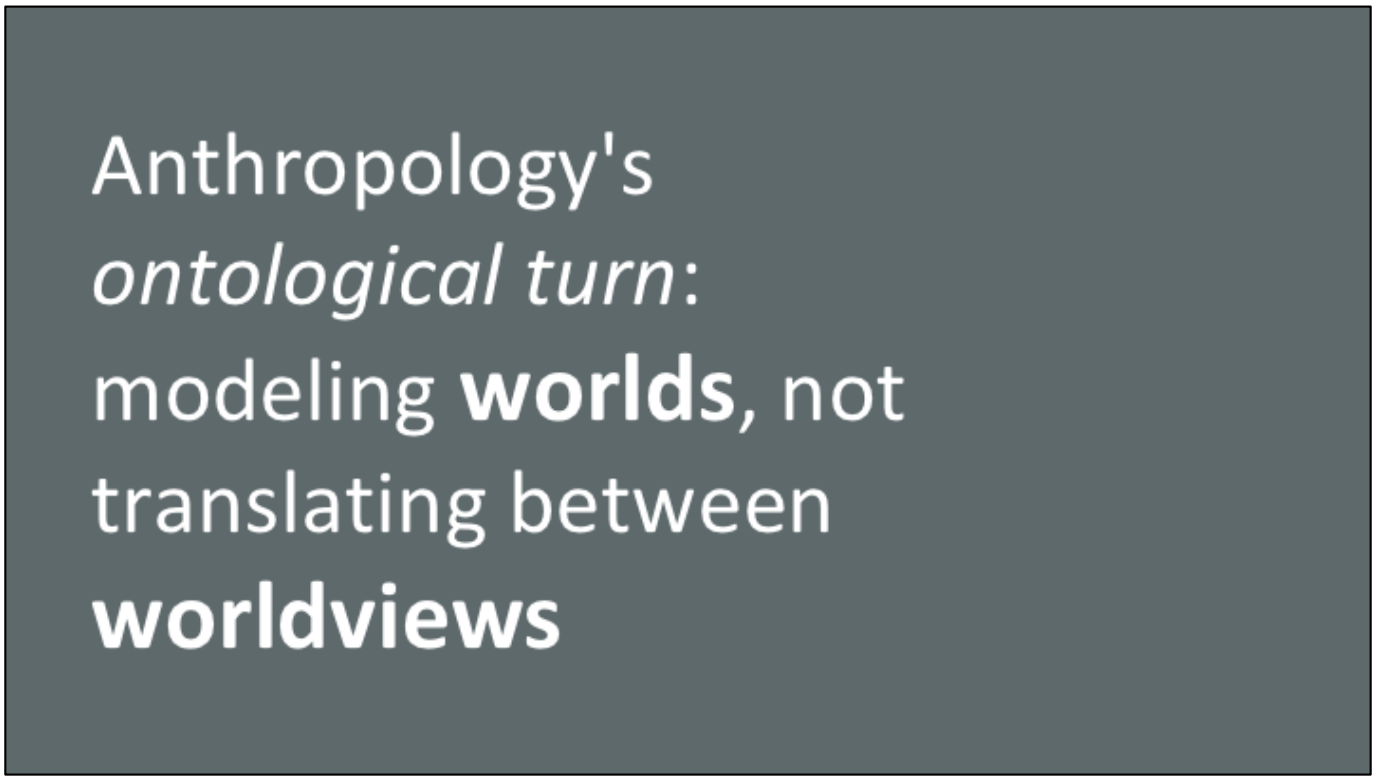
Berlin / Kitchener example in SKOS-XL

```
http://sws.geonames.org/5992996/    skosxl:prefLabel    <URI-A> .

http://sws.geonames.org/5992996/    skosxl:altLabel     <URI-B> .

<URI-A>    skosxl:literalForm    "Kitchener" .
<URI-B>    skosxl:literalForm    "Berlin" .

<URI-A>    [some relationship]   <URI-B> .

<URI-B>    [some property]       ...          .
```

To show an example, at the top I have two triples, expressing the preferred and alternative labels for Kitchener, but the objects of the triples are URIs instead of strings, which means they can be the subjects of further triples, allowing us to make statements about them, and create relationships between them.

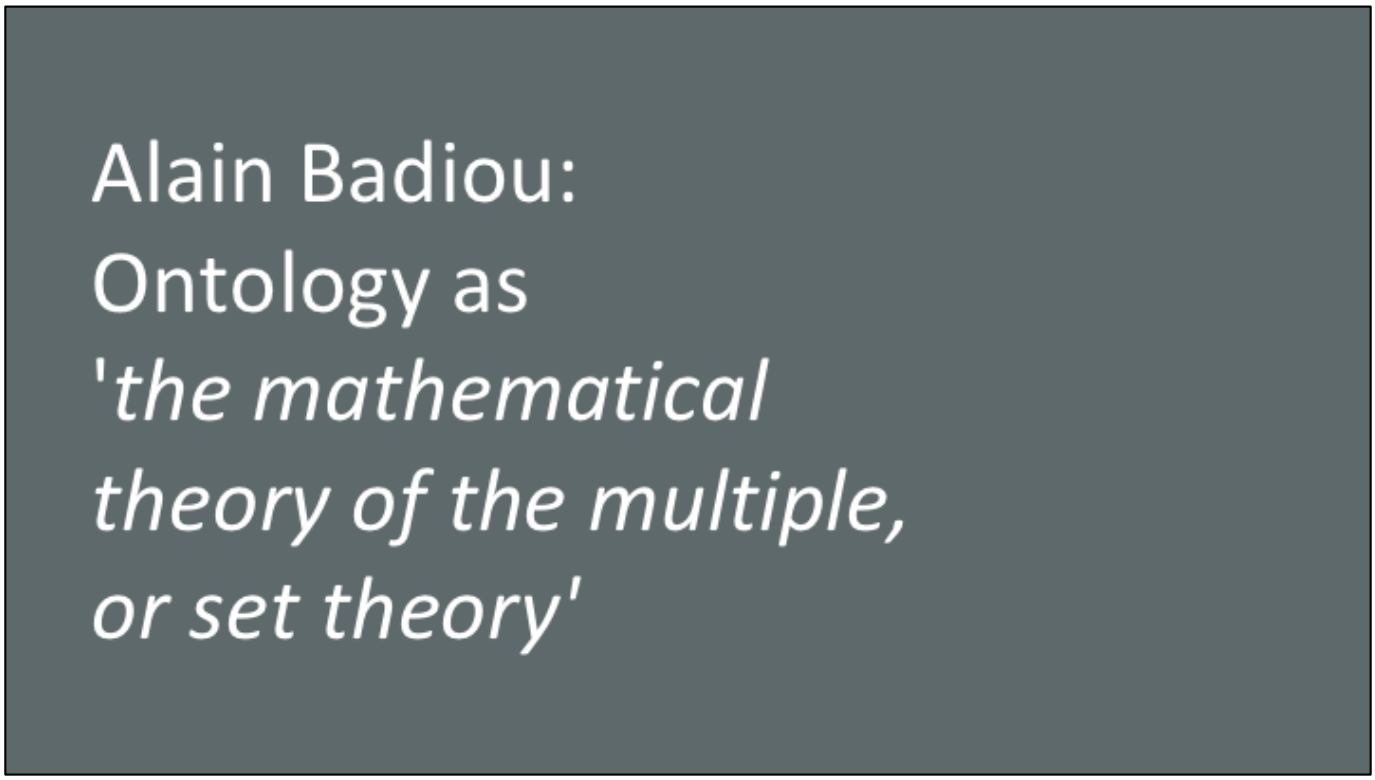


Now to take the second half of the problem, what about changes to the geographic extent of a place over time? The semantic web model assumes that entities represented by URIs are constant over time. In fact, the goal of linked data is to unify references to the same entity over time to make deep connections. We know that the actual geographic extent of a place, the "real-world" referent does not remain fixed, and it appears linked data is not flexible enough to represent this. But the semantic web is an exercise in ontological modelling. Could there be a solution to this problem in ontology?

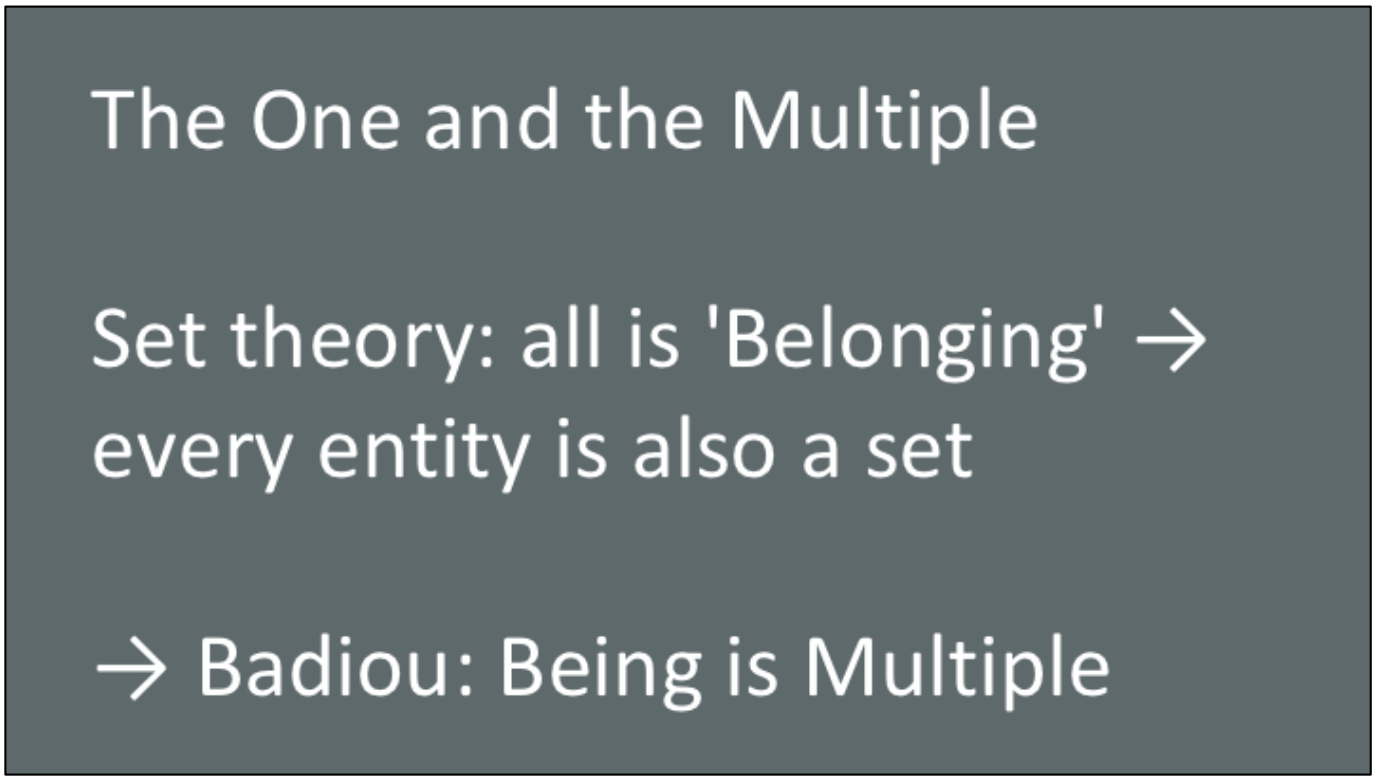


Ontology has provided new avenues for analysis in other disciplines. Some theorists in Anthropology have used ontology as a way to try to understand participant statements that make no sense in a "conventional" understanding of the world (Henare, Holbraad & Wastell 2007; Paleček & Risjord 2012). [The well known example is a powder used in certain rituals in Cuba, which the people who use it also call "power." It doesn't represent power, it's not like power; to them, it "is" power (Holbraad 2007).]

In anthropology, an ontological approach does not attempt to mediate between different views on a single world (worldviews), in part because it is difficult to avoid privileging one worldview over another, but rather it tries to model different "worlds" as they are experienced by different groups. [This relies, on, among other things, the notion of the "extended mind" hypothesis that says the world is not experienced passively, but actively, and so knowledge of the world is gained through interaction with it.]



Another stimulating line of thought comes from French philosopher Alain Badiou. The philosophical enterprise of Ontology is commonly understood as the study of "what is." In his book Being and Event, Badiou re-casts it as "the mathematical theory of the multiple, or set theory" (Badiou 2005).



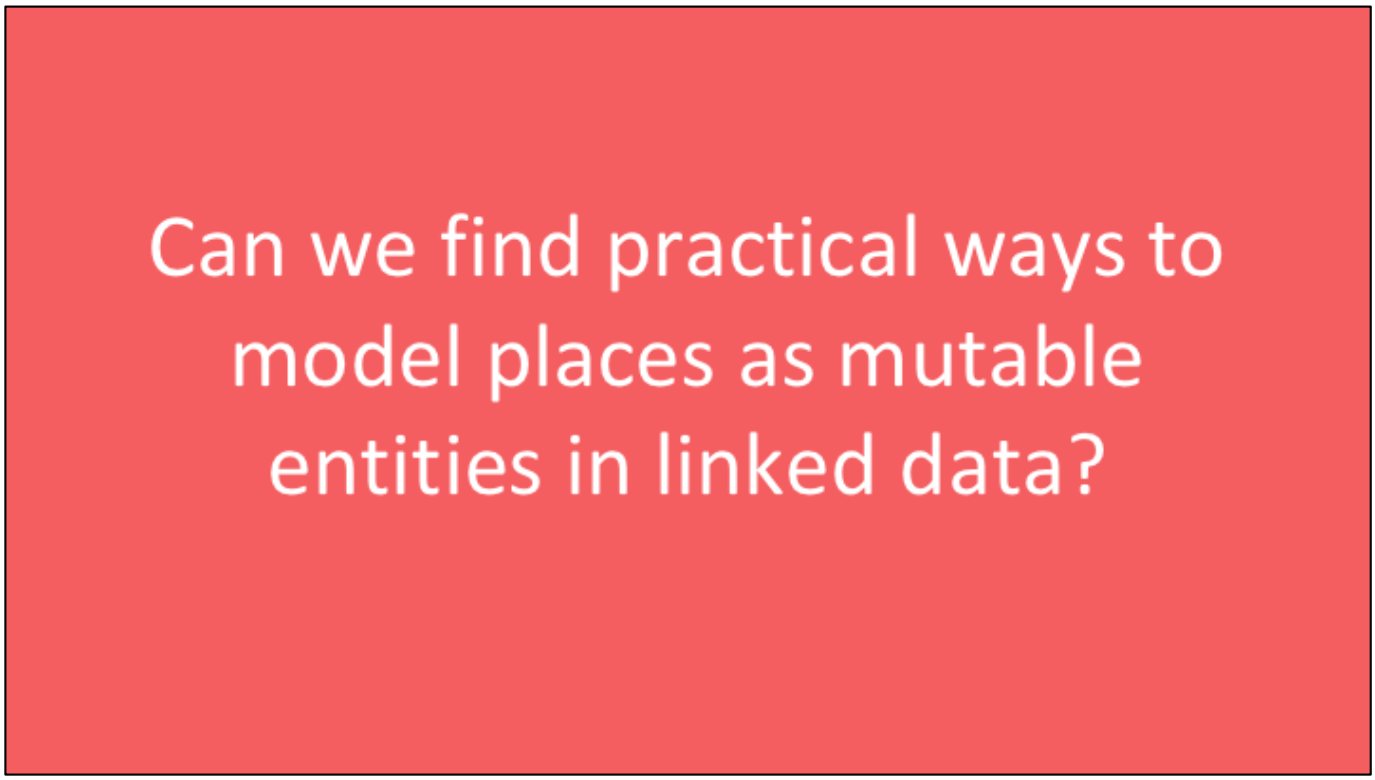
Taking up the ancient question of whether ontological primacy belongs to the one or the multiple, Badiou posits that the "multiple" is the basis of ontological existence. According to Cantorian set theory, there is only one type of relation, that of 'belonging'. Therefore, every element of or entity in a set is itself also a set. For Badiou, this means that every multiple is composed of multiples, which are composed of multiples, and so forth.

[Through an ontological operation Badiou calls "count-as-one," pure (inconsistent) multiple is grasped as "a" (consistent) multiple, an operation that is a precondition for ontological status, i.e. something we can talk about or grasp as a set.] The inconsistent multiple exceeds our ability to conceive of it. It is, in a sense "everything that is out there." There is an interesting parallel between the count-for-one operation of even pointing to "everything that is out there" and naming it thus, and the operation by which some feature of the world is indicated and named as a place.]

To be somewhat provocative, then, what if "place" is multiple?

[understood in this sense as a spatial "thing" that is indicated in some way, either by a name or some other definition, and which we represent with a URI in linked data,]

Place, as named and known by different groups of people over time, whose knowledge is gained through situated interactions?



If we accept the premise of place as multiple, does that lead to new possiblities for the modelling of places as mutable entities in linked data?

Could we model a place in linked data not just as an entity, but also as a class of entities that represent different "versions" of a place, which may themselves be classes of versions, nested liked Russian dolls, as we trace the history of a place back through time?

And can we find ways to do this that are both practical and accurate?

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