Rapidly Building Linked APIs

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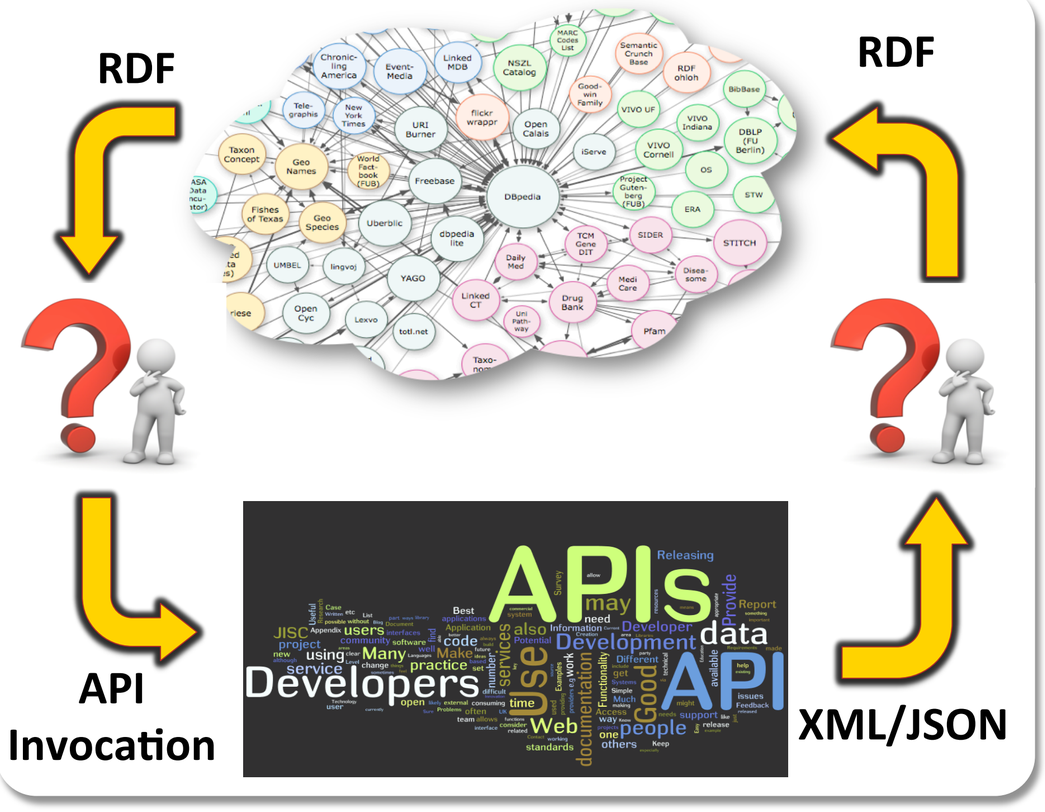
ISI

The Problem



Example

RDF Input

```
<http://geonames/5145067/>
        a gn:Feature ;
        wgs84:lat "40.78343" ;
        wgs84:long "-73.96625".
```

Linked RDF

```
<http://.../5145067/>
    gn:neighbour [
        a gn:Feature ;
        gn:name "Woodside";
        ...
```

Lowering

Lifting

Neighbourhood / reverse geocoding

The neighbourhood for US cities. Data provided by Zillow

Webservice Type : REST

Url : api.geoname

Parameters : lat,l

Result : returns the neighbourhood for the given latitude/

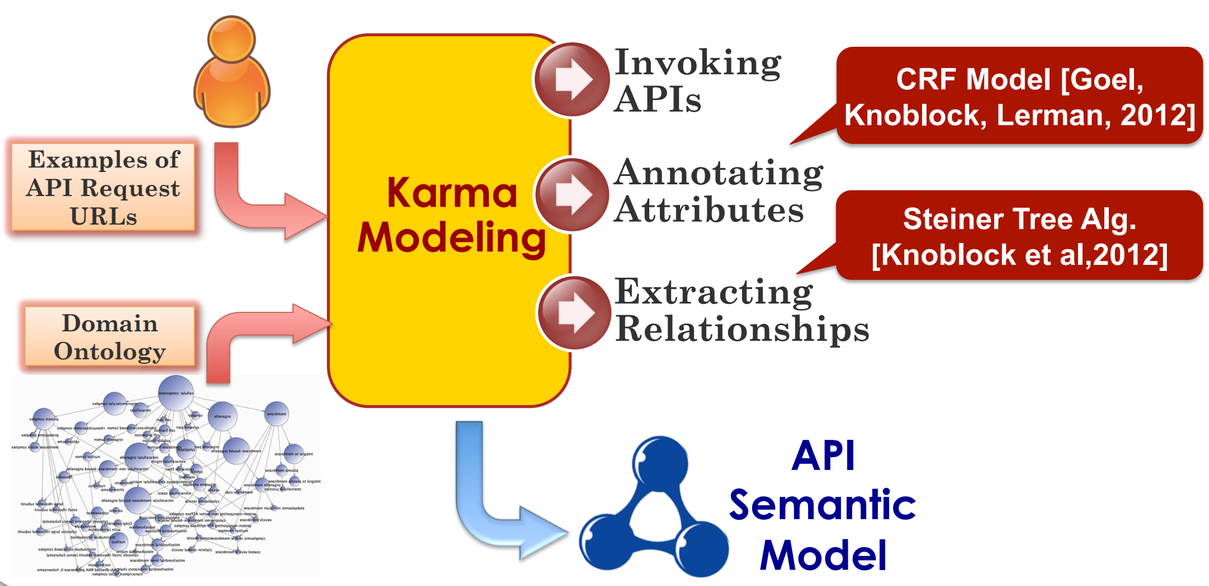
Example http://api.geonames.org/neighbourhood?lat=40.78343&lng=-73.96625&username=demo

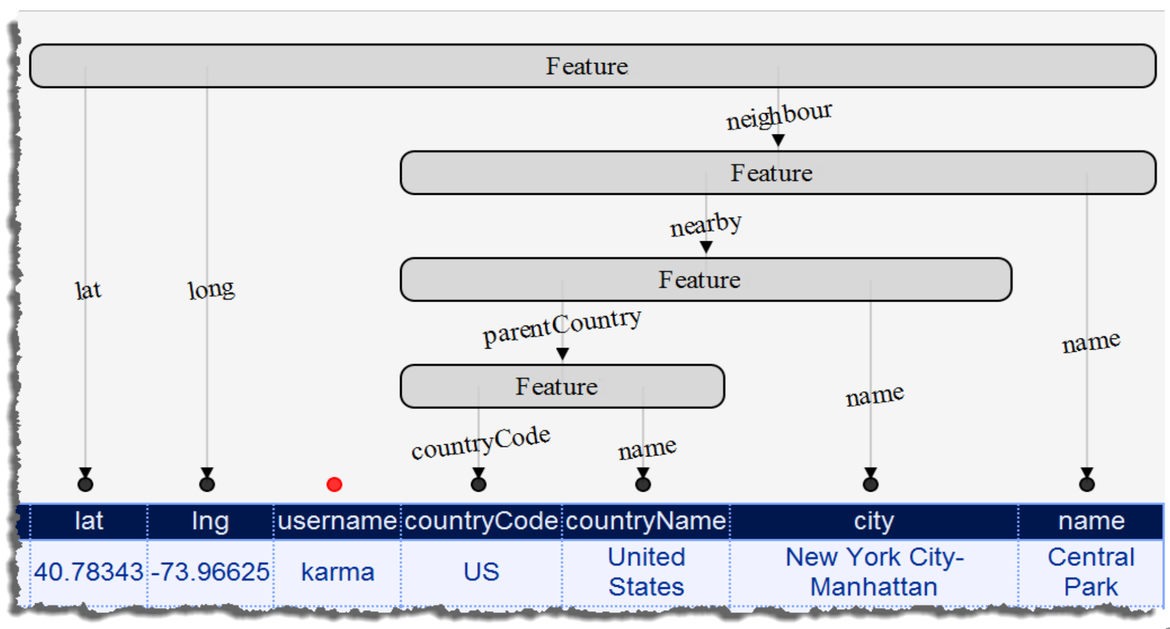
Invocation Example

```
▼<geonames>
  ▼<neighbourhood>
    <countryCode>US</countryCode>
    <countryName>United States</countryName>
    <adminCode1>NY</adminCode1>
    <adminName1>New York</adminName1>
    <adminCode2>061</adminCode2>
    <adminName2>New York County</adminName2>
    <city>New York City-Manhattan</city>
    <name>Central Park</name>
  </neighbourhood>
</geonames>
```

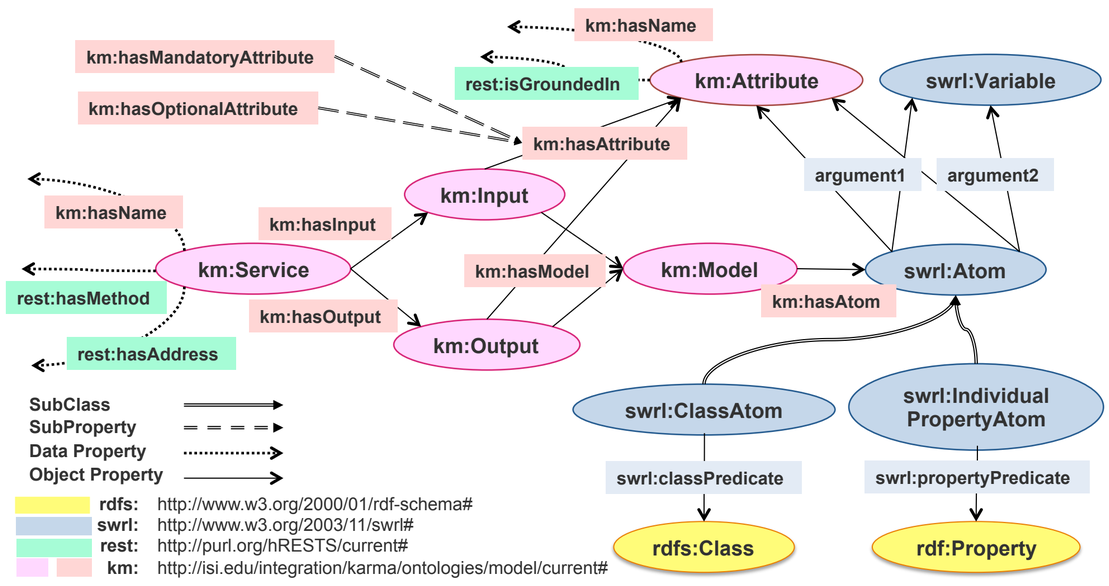
XML Response

Semi-Automatically Modeling APIs





Representing APIs

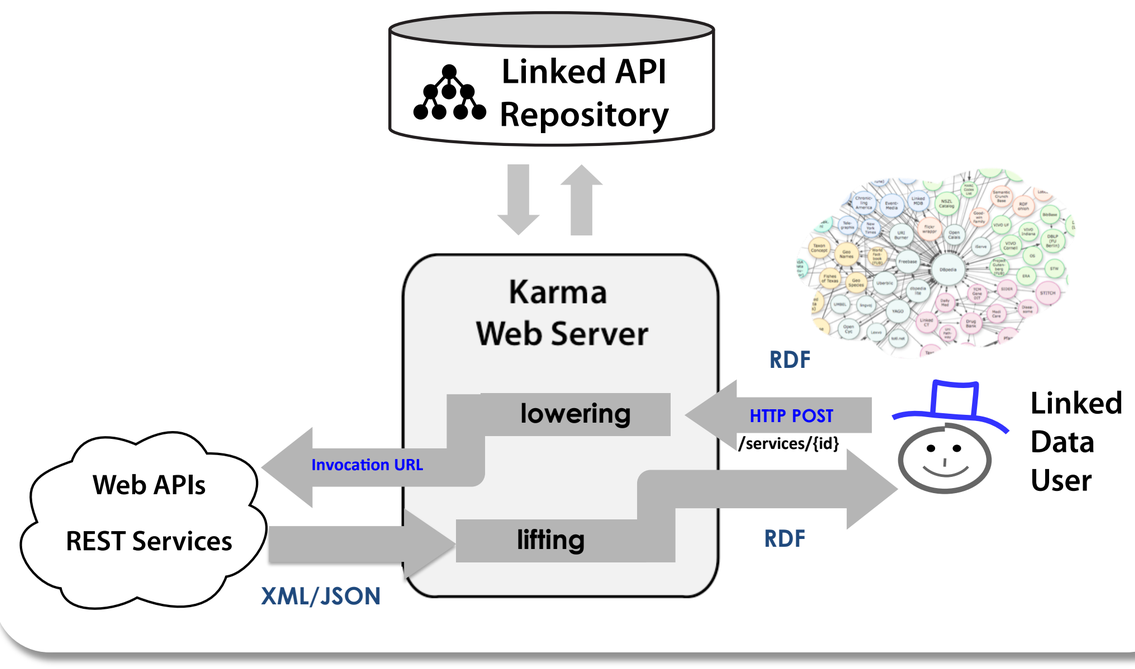


Service Discovery

Find services that return the neighbor feature given the latitude and longitude

```
SELECT ?s WHERE {
        ?s km:hasInput [km:hasAttribute ?i1, ?i2].
        ?s km:hasOutput [km:hasAttribute ?o1].
        ?s km:hasInput [km:hasModel [km:hasAtom
                [swrl:classPredicate gn:Feature; swrl:arg1 ?f1],
                [swrl:propertyPredicate wgs84:lat; swrl:arg1 ?f1; swrl:arg2 ?i1],
                [swrl:propertyPredicate wgs84:long; swrl:arg1 ?f1; swrl:arg2 ?i2]]].
        ?s km:hasOutput [km:hasModel [km:hasAtom
                [swrl:classPredicate gn:Feature; swrl:arg1 ?f2],
                [swrl:propertyPredicate gn:neighbour; swrl:arg1 ?f1;
swrl:arg2 ?f2]]]}
```

Invoking Linked APIs



Evaluation

Geonames API	#Examples	#Columns	Time (min)
neighbourhood	3	10	6
neighbours	2	9	5
children	2	10	3
sibling	1	9	3
ocean	2	3	1
findNearby	3	11	3
findNearbyPostalCodes	3	11	7
findNearbyPOIsOSM	3	7	3
findNearestAddress	3	14	6
findNearestIntersectionOSM	3	8	3
postalCodeCountryInfo	1	5	2
Total	**26**	**97**	**42**

Average 4 minutes to build a linked API

Karma enables non-expert users to rapidly build Linked APIs that directly consume and produce linked data