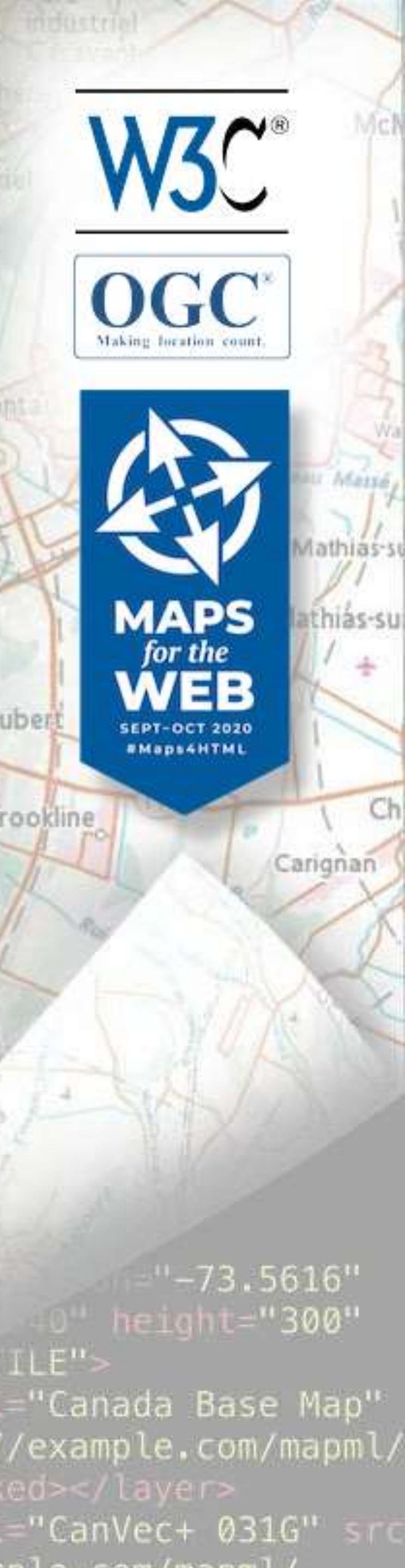


EXPRESSING GEOJSON AS LD 1.1

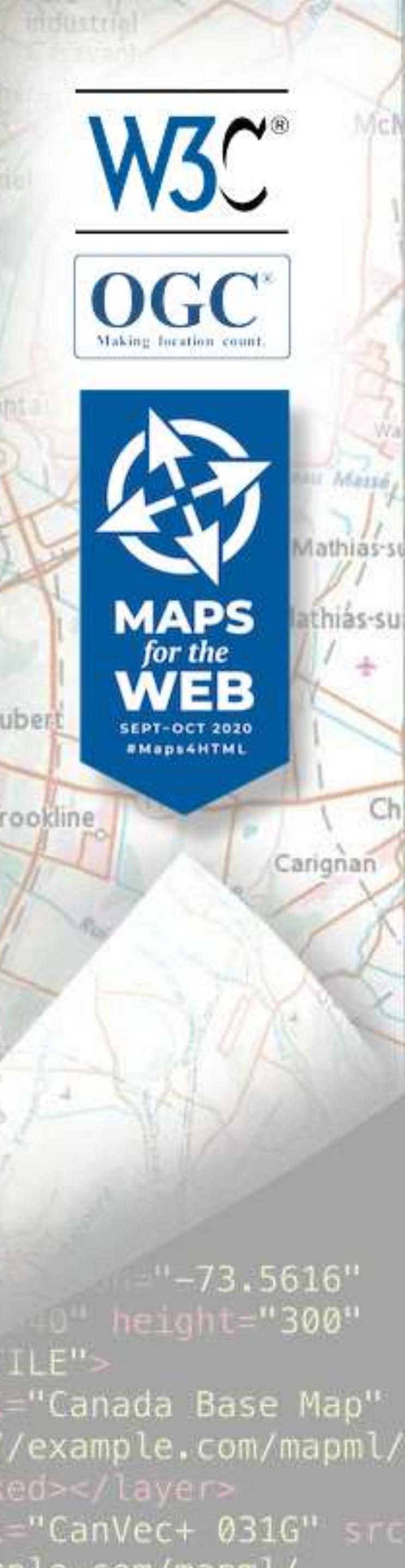
Bryan Haberberger

*Full Stack Developer, Walter J. Ong, S.J., Center for Digital Humanities at Saint Louis University
IIIF Maps Technical Specification Group Chair*

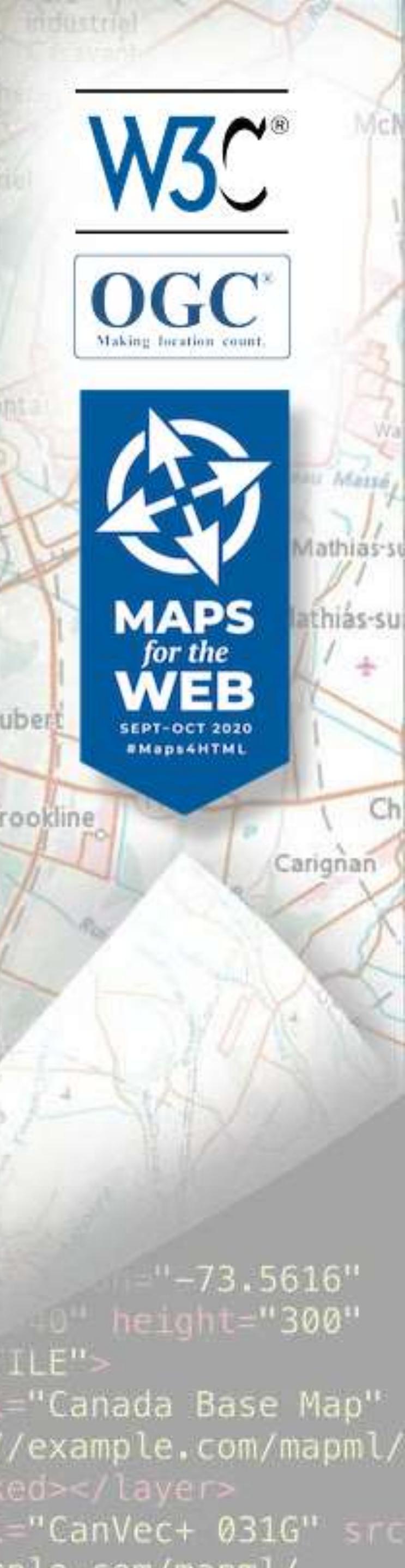


Why Linked Data

These semantics allow for interrelated datasets on the Web. Disparate but related datasets can link to each other. By providing those extra links, LD compliant applications may exploit knowledge from each other's datasets. By integrating several datasets, applications may provide a much better user experience that creates well encoded data for future use in the cycle.



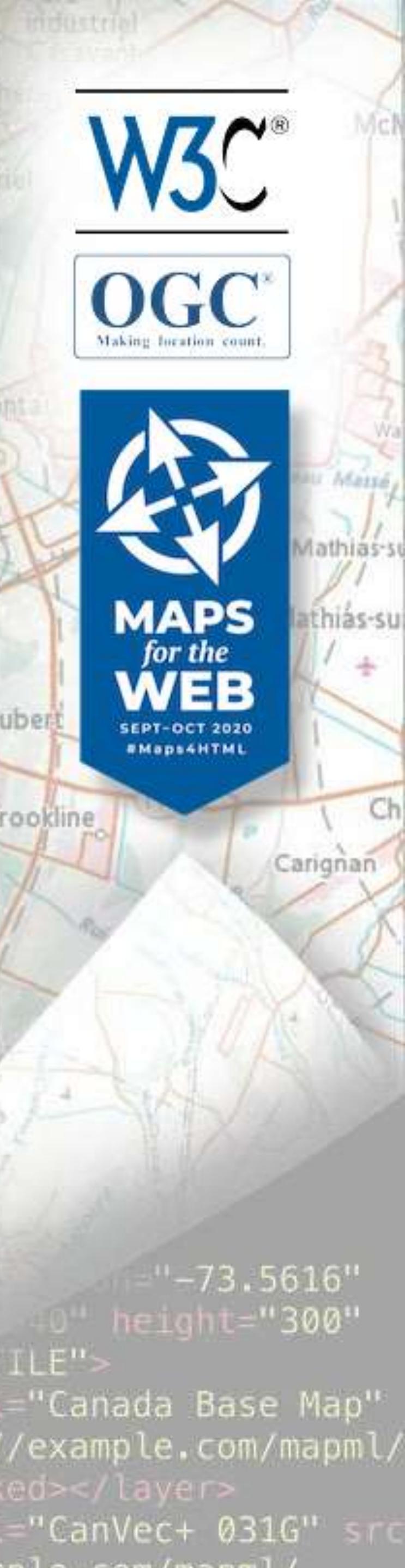
GeoJSON and LD context



A W3C specification exists for JSON-LD and has a recent version release ([JSON-LD 1.1](#)).

As you can surmise on your own, GeoJSON is JSON. It makes sense, then, that someone has already create a [GeoJSON-LD](#) vocabulary and context compliant with JSON-LD 1.0. This allows GeoJSON data nodes to be a part of the Linked Data system on the Web.

GeoJSON-LD Caution



Nested GeoJSON coordinate arrays are incompatible with the processing model of JSON-LD 1.0. Applications that process GeoJSON as JSON-LD using the GeoJSON-LD 1.0 context must take extra steps not defined here to ensure that geometric coordinates are processed appropriately. This means JSON-LD 1.0 cannot process Polygonal coordinates, and LD guides applications to ignore what they can't process.

The LD 1.1 release resolved this issue.

Playing Around With GeoJSON

```
{ "@context": "https://geojson.org/geojson-ld/geojson-context.jsonld",  
  "type": "Feature",  
  "properties": {},  
  "geometry": {  
    "type": "Polygon",  
    "coordinates": [  
      [  
        [  
          2.295873,  
          48.858309  
        ],  
        [  
          2.294506,  
          48.859149  
        ],  
        [  
          2.293245,  
          48.858231  
        ],  
        [  
          2.294500,  
          48.857440  
        ],  
        [  
          2.295873,  
          48.858309  
        ]  
      ]  
    ]  
  }  
}
```

We can see how it works (or doesn't) through the [JSON-LD 1.0](#) and [JSON-LD 1.1](#) playgrounds using our example. You will see that each key receives precise meaning and definition by being expanded, compacted or otherwise formatted by the integrated Linked Data dataset(s). You can see the [GeoJSON draw](#) through their [validator](#).

Web Annotation and Web Entities

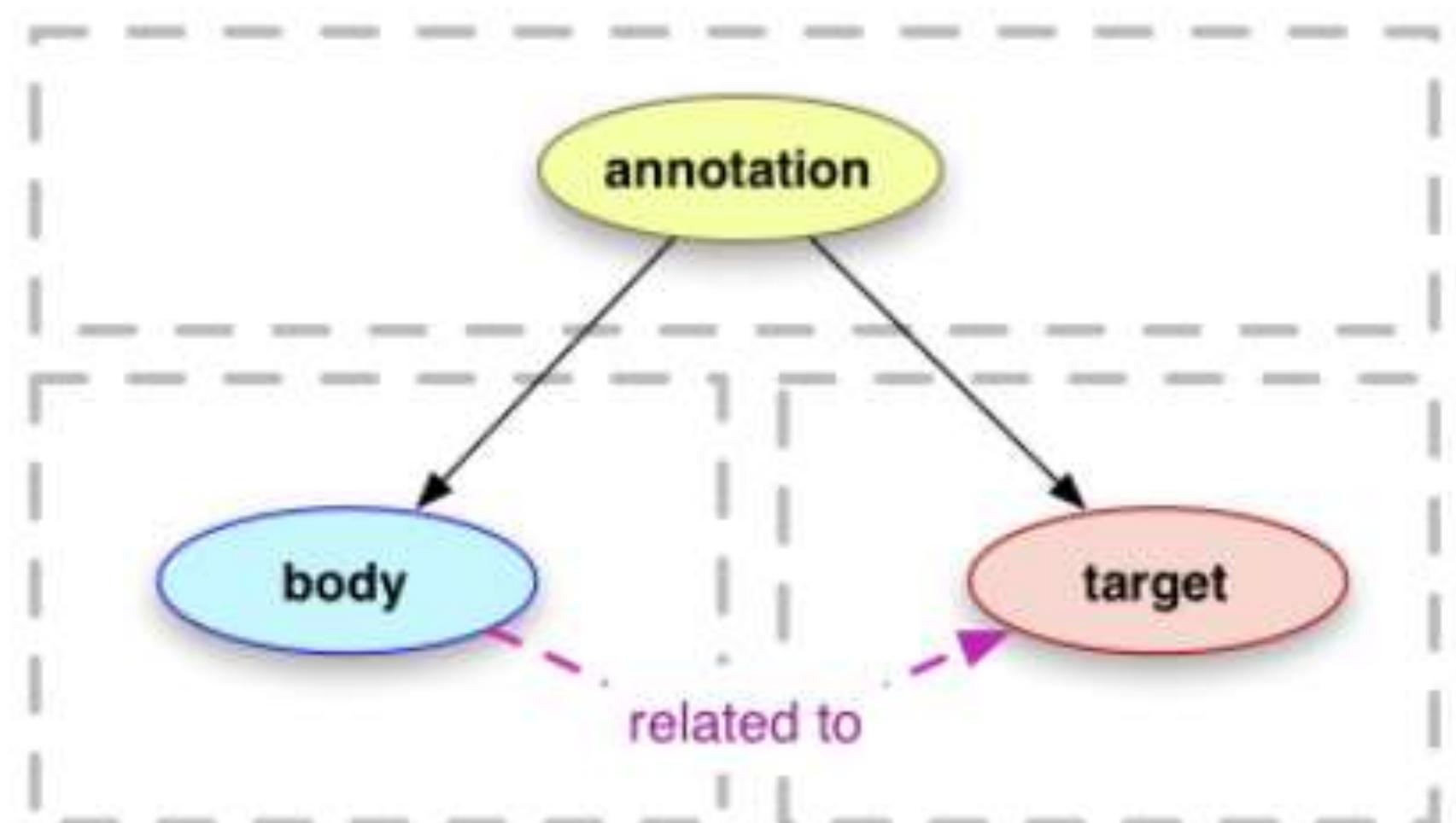
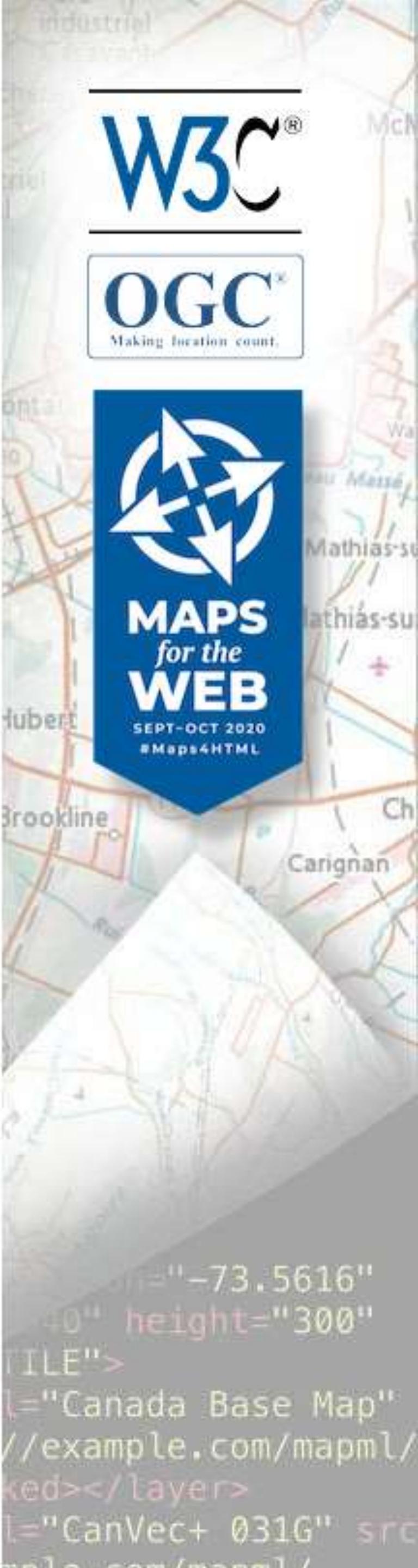


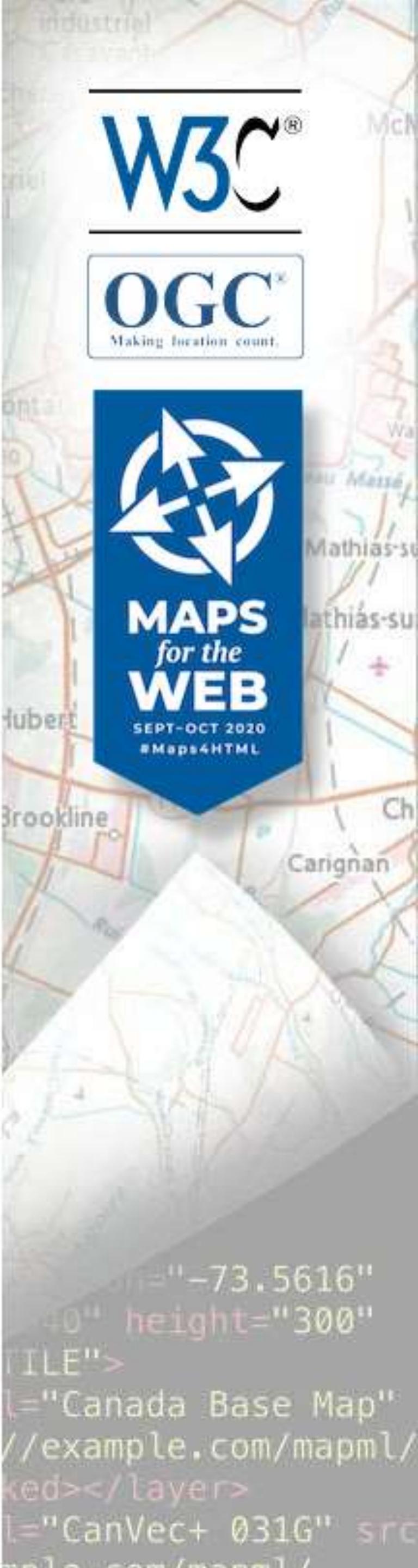
Figure 0.1. Annotation, Body and Target

Our use case as a development shop in digital humanities is to use existing standards to generate standardized assertions on the Web for cultural heritage resources we don't own. [Web Annotation](#) is a W3C Standard with a supplied Linked Data context created for this semantic. You can see this idea through a simple pipeline in [this demo](#). I can supply the URI of any Web entity and “target” it with geospatial information. The one I chose was a public IIIF entity from a [dataset at Stanford University](#)

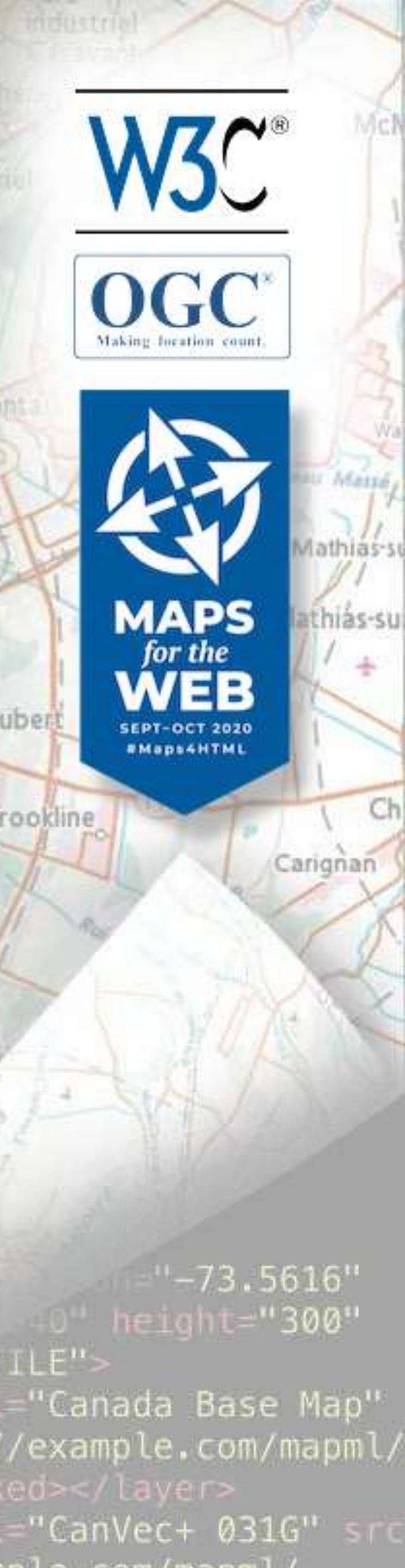


GeoJSON-LD Web Annotation

```
{  
  "@context": [  
    "https://geojson.org/geojson-ld/geojson-context.jsonld",  
    "http://www.w3.org/ns/anno.jsonld"  
  ],  
  "id": "https://www.example.org/bryan/web-annotation/1",  
  "type": "Annotation",  
  "motivation": "tagging",  
  "label": {  
    "en": [  
      "Crude encapsulation of the Eiffel Tower."  
    ]  
  },  
  "body": {  
    "type": "Feature",  
    "properties": {},  
    "geometry": {  
      "type": "Polygon",  
      "coordinates": [  
        [  
          [  
            [2.295873, 48.858309],  
            [2.294506, 48.859149],  
            [2.293245, 48.858231],  
            [2.294500, 48.857440],  
            [2.295873, 48.858309]  
          ]  
        ]  
      ]  
    }  
  },  
  "target": "https://www.example.org/bryan/web-resource/1"  
}
```

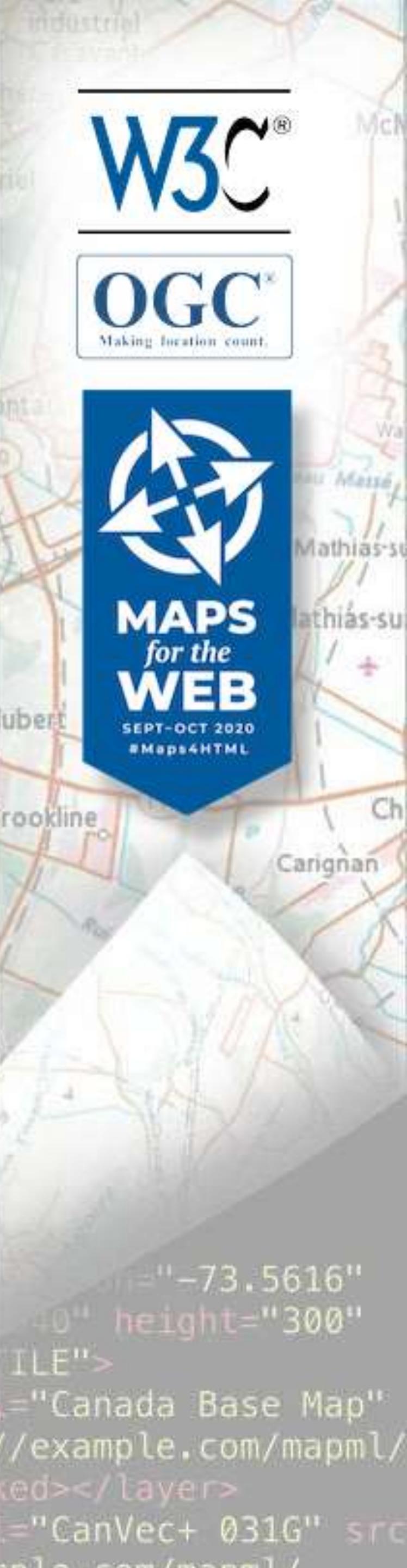


From Web Annotation to Web UI



I can ask datasets for all the coordinate assertions they have. The Web Application that generates these Web Annotations is following these standards. The viewer cannot draw the Web Annotation, but it can draw the Web Annotation bodies. This functionality was not free and required a small amount of scripting to feed the mapping system just the Web Annotation bodies instead of the entire Web Annotations.

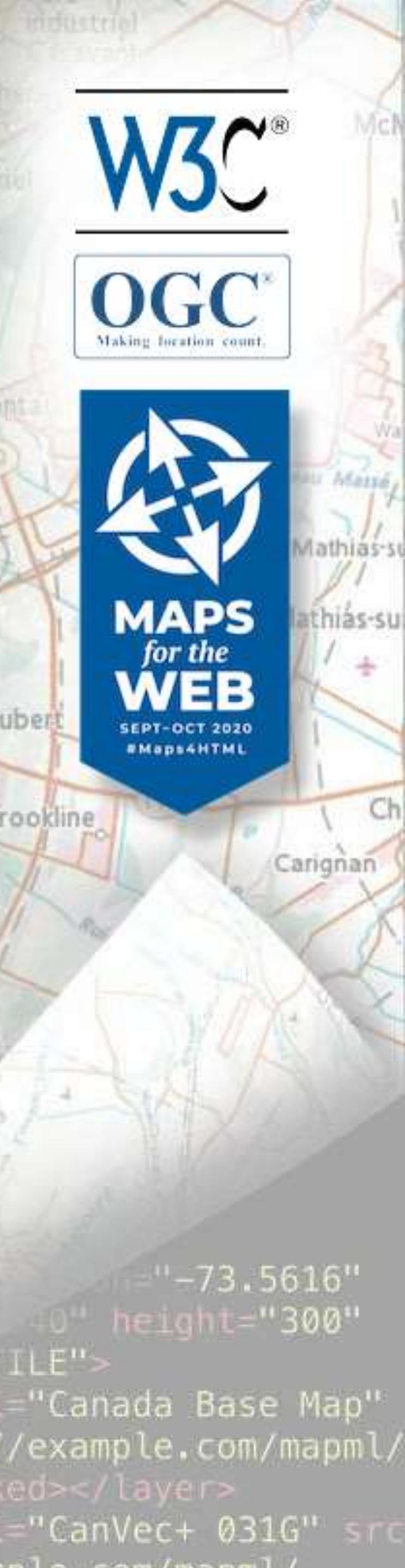
IIIF Maps Community Group



I am a chair of the IIIF Maps Technical Specification Group. We are looking to describe resources under the scope of the IIIF Presentation API 3.0 and have recently focused on Images of Maps. We are producing data recipes to accomplish our goals, which can be found in the [IIIF Cookbook](#). You can see [these recipes](#) use embedded Web Annotations to supplement resources, just like our example. The only difference is the context, which is for IIIF resources. The IIIF Presentation API 3.0 uses the W3C Web Annotation context to describe the Annotations used within the framework, so the LD functionality around resources and their annotations is the same as the functionality shown earlier.

Future of GeoJSON

At the moment, the context on its own is not JSON-LD 1.1. The context and vocabulary could also use some small enhancements. Most important is to [add the “@version” tag to the context to ensure it processes as LD 1.1.](#) The IIIF Maps Community Group is working to migrate the specification so that it can receive the attention it needs for this maintenance now and in the future. We anticipate GeoJSON will continue to be widely used and absorbed into standards like this workshop series is promoting and that a Linked Data specification should be maintained in favor of interoperability for the GeoJSON standard.

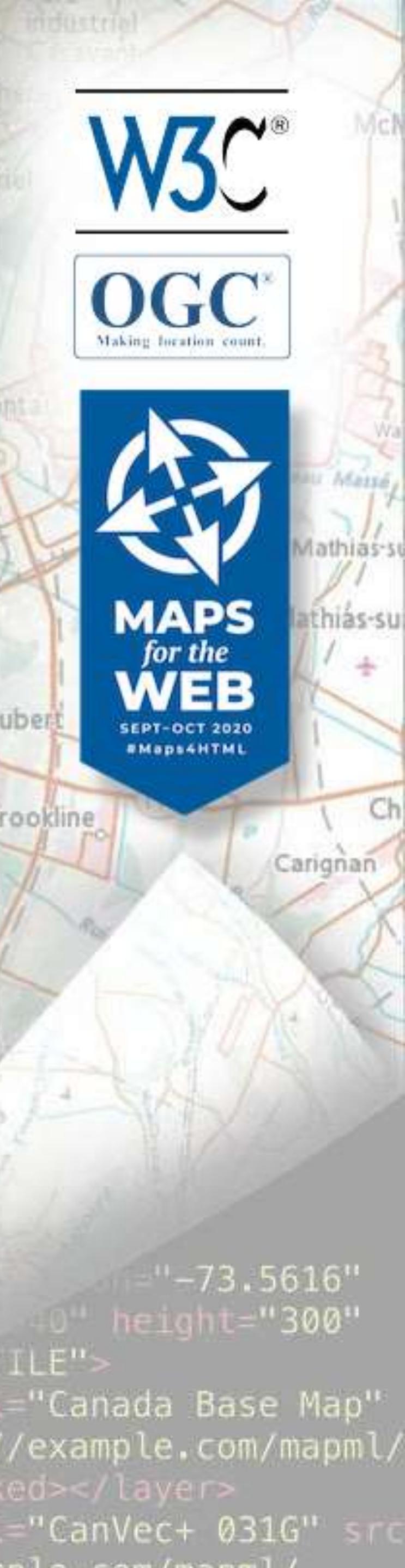


THANK YOU!

Bryan.j.haberberger@slu.edu

<https://github.com/thehabes>

<https://github.com/CenterForDigitalHumanities>



```
    = "-73.5616"  
    = "0" height="300"  
<FILE>  
l="Canada Base Map"  
//example.com/mapml/  
<layer></layer>  
l="CanVec+ 031G" src="http://example.com/mapml/
```

Links

- JSON-LD 1.0 : <https://www.w3.org/TR/2014/REC-json-ld-20140116/>
- JSON-LD 1.1 : <https://www.w3.org/TR/json-ld11/>
- Web Annotation : <https://www.w3.org/TR/annotation-model/>
- GeoJSON : <https://tools.ietf.org/html/rfc7946>
- GeoJSON Validator – watch out for ads -- : <https://geojsonlint.com/>
- GeoJSON-LD : <https://geojson.org/geojson-ld/>
- LD 1.0 Playground : <https://json-ld.org/playground/1.0/>
- LD 1.1 Playground : <https://json-ld.org/playground/>
- IIIF Maps Community Group : <https://iiif.io/community/groups/maps/>
- IIIF Maps Recipe Preview : <https://preview.iiif.io/cookbook/0195-geolocate-manifest-to-polygon/recipe/0195-geolocate-manifest-to-polygon/>
- IIIF Cookbook : <https://iiif.io/api/cookbook/>
- Try the Demo : <http://geo.rerum.io/>

