OpenLayers Vector Mayhem

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FOSS4G 2009

OpenGeo

What is OpenLayers?

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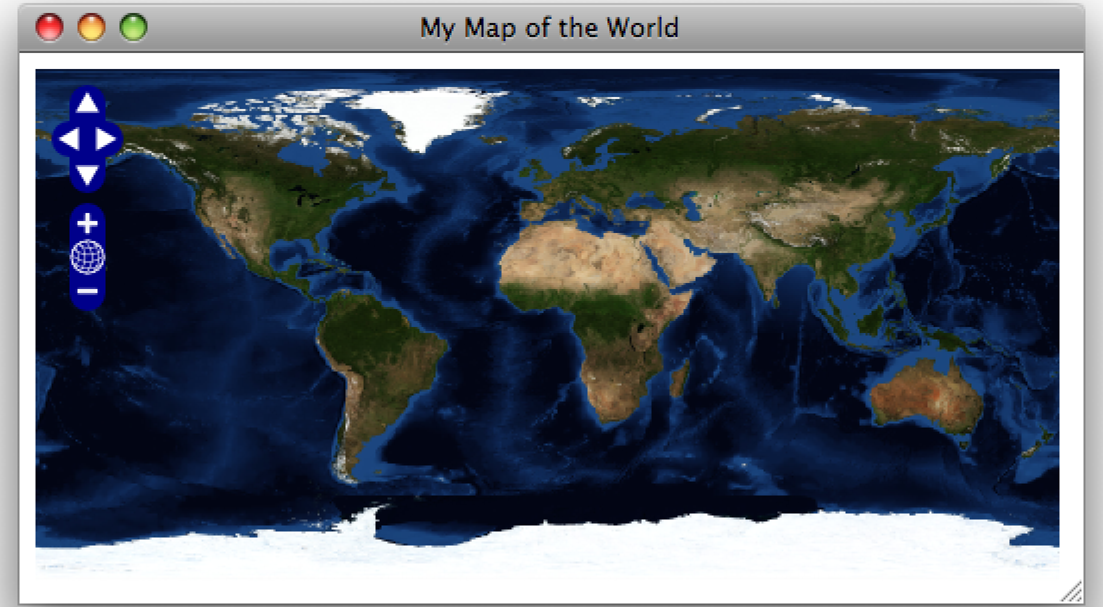

Library for adding maps to web pages.

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OpenLayers does...

provide a slippy interface for map tiles,

OpenLayers does...

render vector
features client
side,

OpenLayers does...

deal in many standard and commonly used protocols & formats,

OpenLayers does...

and much,
much more.

OpenLayers doesn't...

aim to be a
general purpose
widget framework,

OpenLayers doesn't...

read from or
write directly to
your filesystem,

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OpenLayers doesn't...

or make requests
to other origins.

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OpenLayers History

In the beginning...

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OpenLayers History

http://vimeo.com/7126247

Layers

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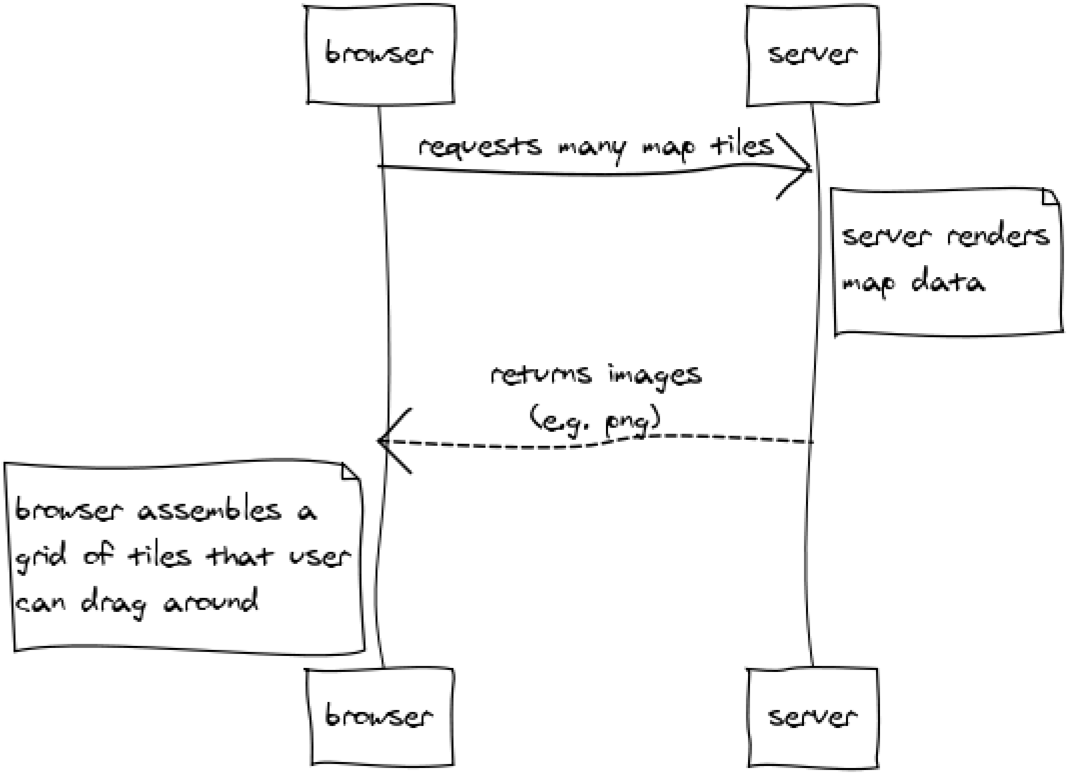
Raster Layers


browser
server
requests many map tiles
server renders map data
returns images (e.g. png)
browser assembles a grid of tiles that user can drag around
browser
server

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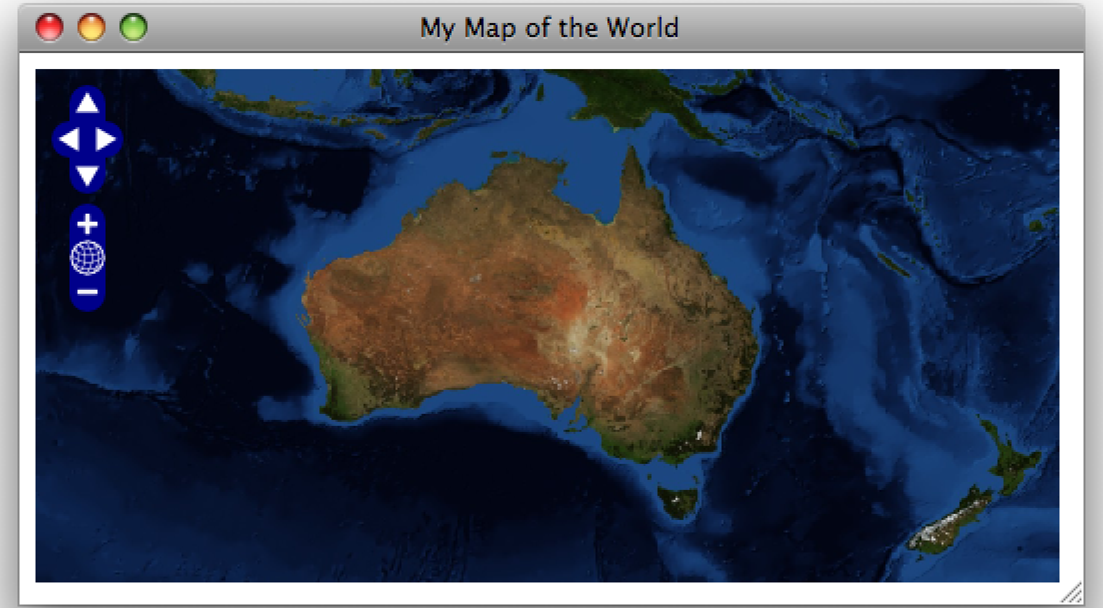
Raster Layers



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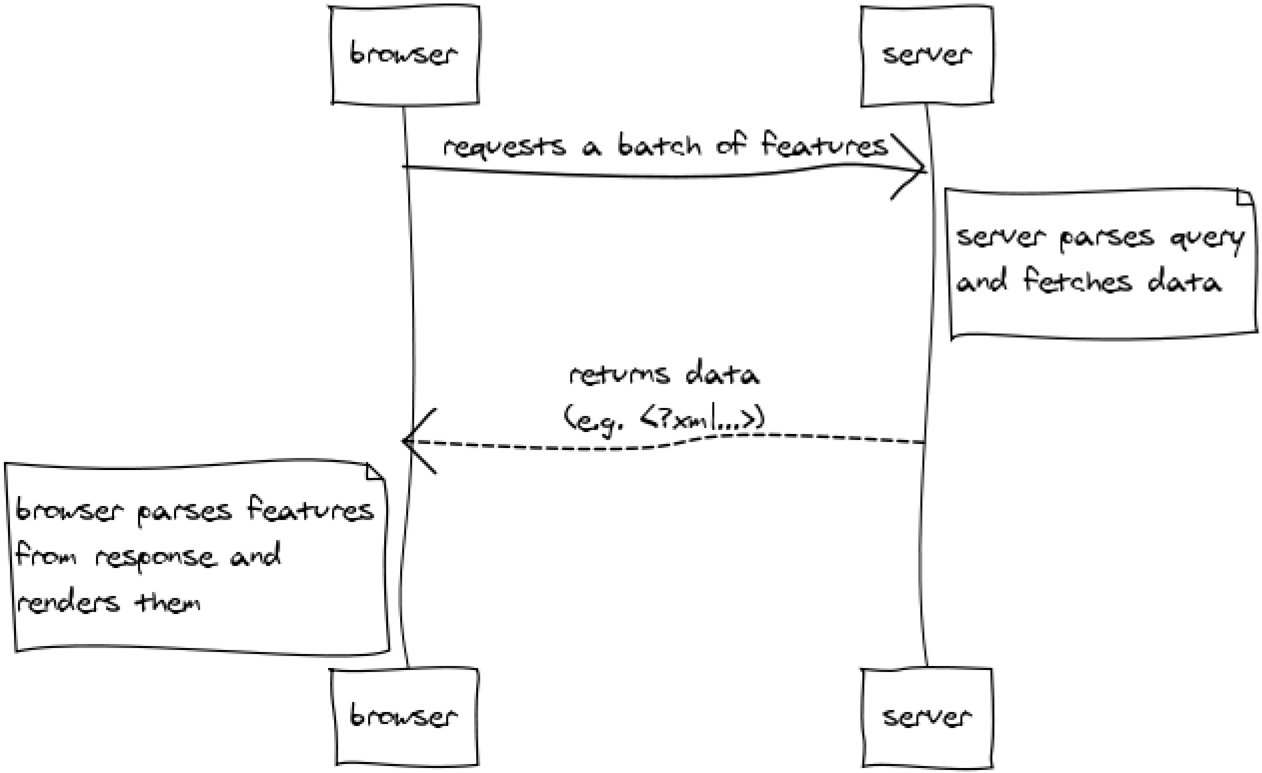
Vector Layers


browser
server
requests a batch of features
server parses query and fetches data
returns data
(e.g. <?xml...>)
browser parses features from response and renders them
browser
server

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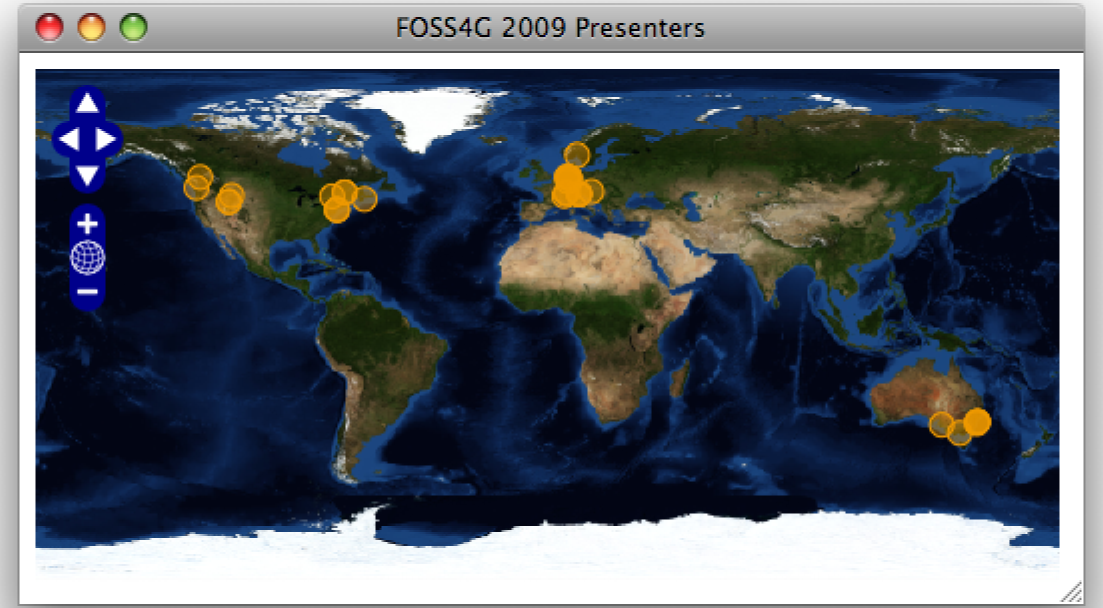
Vector Layers



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Vector Layers

Orange, huh?

We've Got Style

```
var symbolizer = {
    pointRadius: 5,
    fillColor: "olive",
    fillOpacity: 0.75,
    strokeColor: "white",
    strokeOpacity: 0.5,
    strokeWidth: 1
};
```

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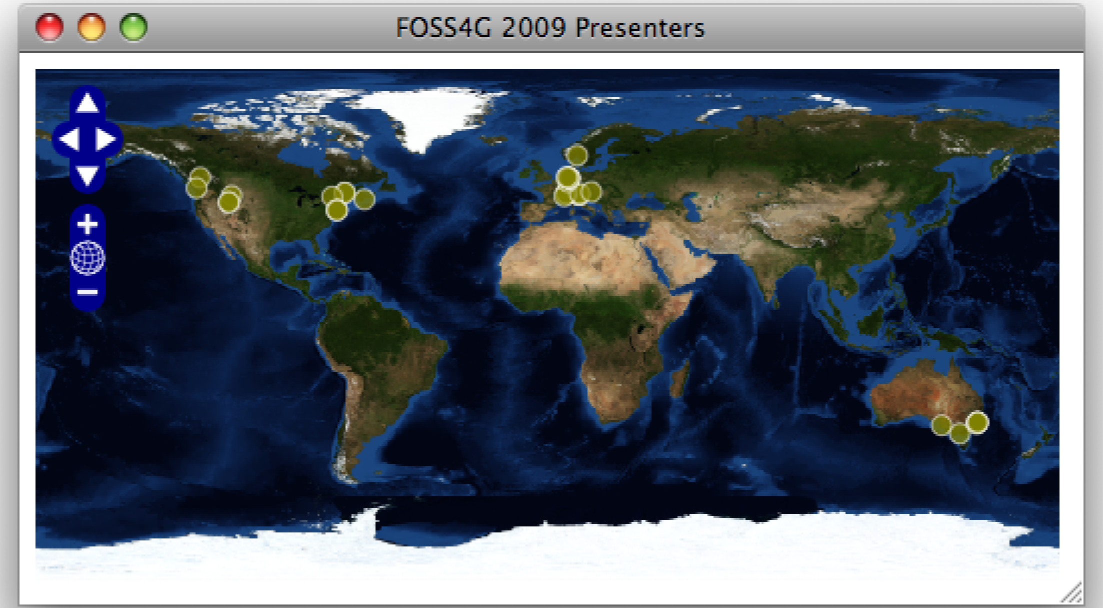
We've Got Style



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We've Got Style

How about different symbolizers for different points?

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Rule Based Styling

```
var aussie = new OpenLayers.Rule({
    filter: new OpenLayers.Filter.Comparison({
        type: OpenLayers.Filter.Comparison.LIKE,
        property: "location",
        value: "Australia"
    }),
    symbolizer: {
        fillColor: "red"
    }
});
```

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Rule Based Styling

```
var other = new OpenLayers.Rule({
    elseFilter: true,
    symbolizer: {
        fillColor: "olive"
    }
});
```

Rule Based Styling

```
var style = new OpenLayers.Style({
    strokeColor: "white",
    strokeWidth: 1,
    pointRadius: 5
});


style.addRules([aussie, other]);
```

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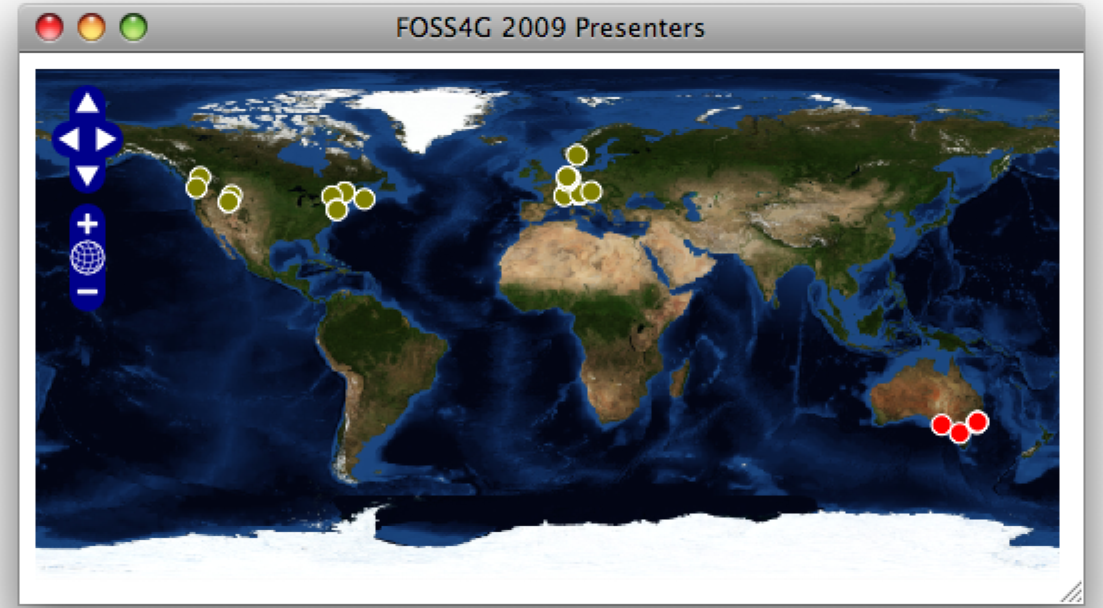
Rule Based Styling



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Quick Style Overview

A vector layer gets a style map (`OpenLayers.StyleMap`).

The style map maintains a relationship between render intent and style (`OpenLayers.Style`).

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Quick Style Overview

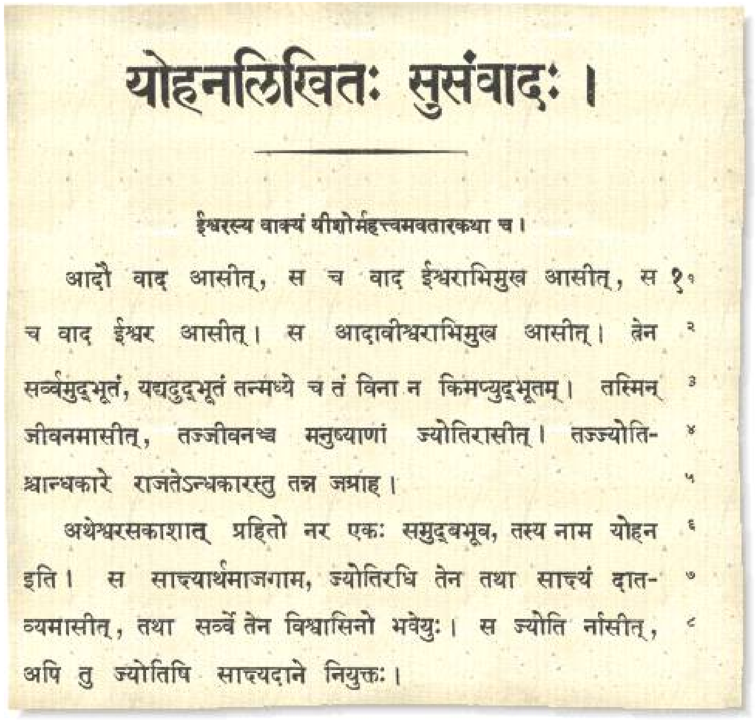
A style object (`OpenLayers.Style`) has a base symbolizer and any number of rules (`OpenLayers.Rule`).

Rules have a symbolizer (object literal) and may have a filter (`OpenLayers.Filter`) and scale constraints.

Vector Formats, Protocols, and Strategies

Time for a metaphor.

Consider
postal
delivery.



योहनलिखितः सुसंवादः।

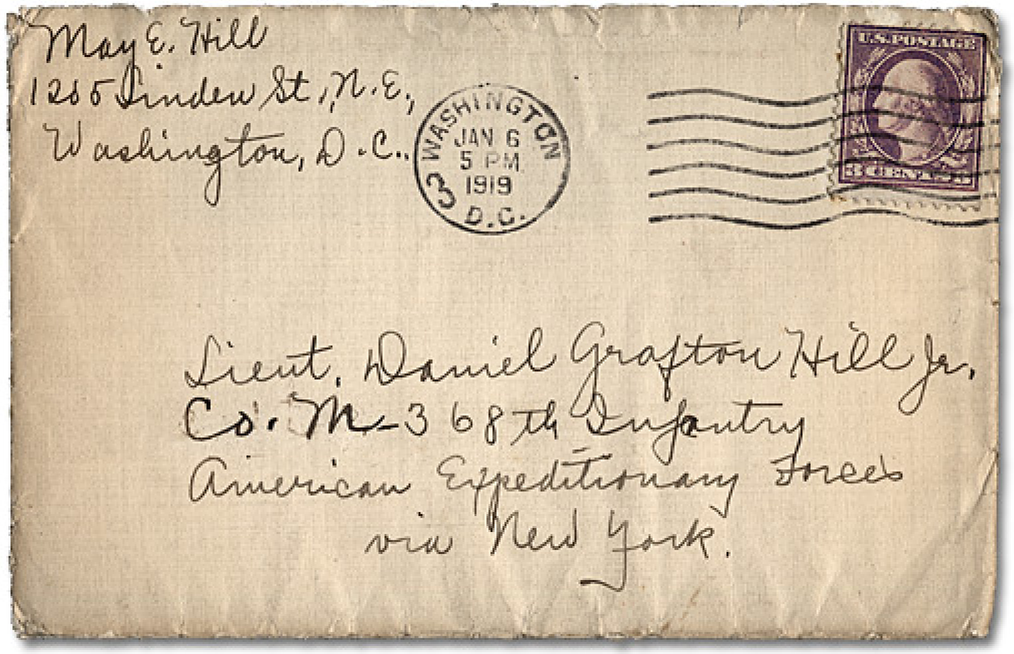
ईश्वरस्य वाक्यं यीशोर्म्महत्त्वमवतारकथा च।

आदौ वाद आसीत्, स च वाद ईश्वराभिमुख आसीत्, स १ १
च वाद ईश्वर आसीत्। स आदावीश्वराभिमुख आसीत्। तेन २
सर्व्वंमुद्भूतं, यद्यदुद्भूतं तन्मध्ये च तं विना न किमप्युद्भूतम्। तस्मिन् ३
जीवनमासीत्, तज्जीवनञ्च मनुष्याणां ज्योतिरासीत्। तज्ज्योति- ४
श्चान्धकारे राजतेऽन्धकारस्तु तन्न जग्राह। ५

अथेश्वरसकाशात् प्रहितो नर एकः समुद्बभूव, तस्य नाम योहन ६
इति। स साक्ष्यार्थमाजगाम, ज्योतिरधि तेन तथा साक्ष्यं दात- ७
व्यमासीत्, तथा सर्व्वे तेन विश्वासिनो भवेयुः। स ज्योति र्नासीत्, ८
अपि तु ज्योतिषि साक्ष्यदाने नियुक्तः।

You choose a language for your letter based on what your recipient can understand.

Let's call this your "format."



May E. Hill
1205 Linden St, N.E.,
Washington, D.C.

WASHINGTON JAN 6 5 PM 1919 3 D.C.

U.S. POSTAGE 3 CENTS

Lieut. Daniel Grafton Hill Jr.
Co. M - 368th Infantry
American Expeditionary Forces
via New York.

appropriate postage

correctly formatted addresss

These things make up the "protocol."

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Finally, you decide when to go to the mail box. If you have mail to pick up, you also decide what to do with the stuff you recieve.

These are your "strategies."

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Vector Behavior

A format (`OpenLayers.Format`) is used to serialize and deserialize vector feature data.

A protocol (`OpenLayers.Protocol`) manages communication with the data source.

Strategies (`OpenLayers.Strategy`) determine how to initiate communication and what to do with the results.

Back to the Code

```
var presenters = new OpenLayers.Layer.Vector(
    "Presenters",
    {
        strategies: [
            new OpenLayers.Strategy.Fixed()
        ],
        protocol: new OpenLayers.Protocol.HTTP({
            url: "path/to/presenters.json",
            format: new OpenLayers.Format.GeoJSON()
        }),
        styleMap: new OpenLayers.StyleMap(style)
    }
);
```

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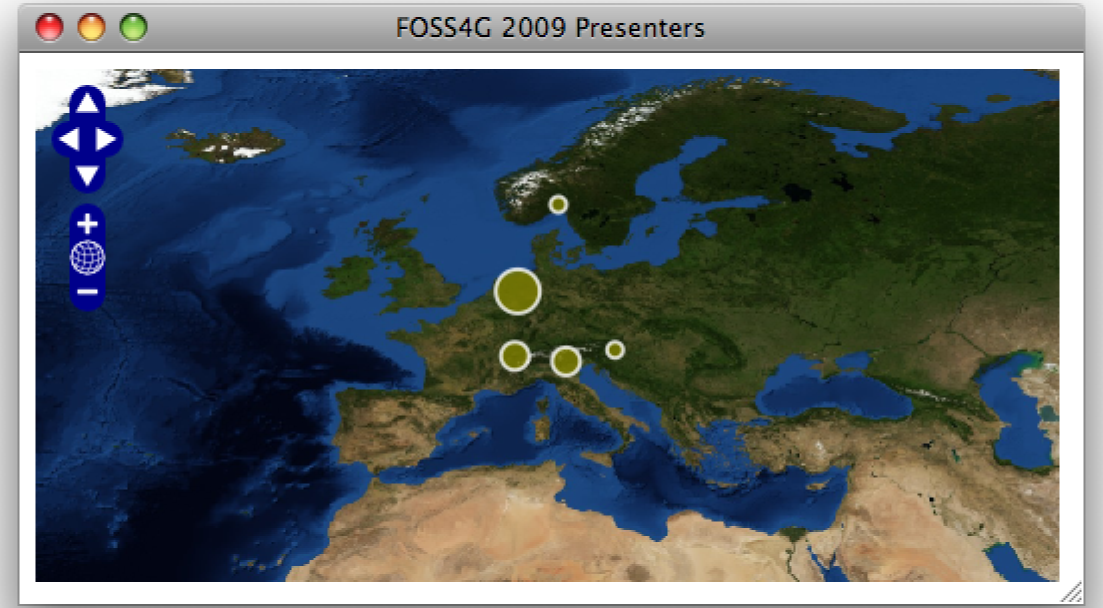
The Cluster Strategy

```
var presenters = new OpenLayers.Layer.Vector(
    "Presenters",
    {
        strategies: [
            new OpenLayers.Strategy.Fixed(),
            new OpenLayers.Strategy.Cluster()
        ],
        protocol: new OpenLayers.Protocol.HTTP({
            url: "path/to/presenters.json",
            format: new OpenLayers.Format.GeoJSON()
        }),
        styleMap: new OpenLayers.StyleMap(style)
    }
);
```

The Cluster Strategy



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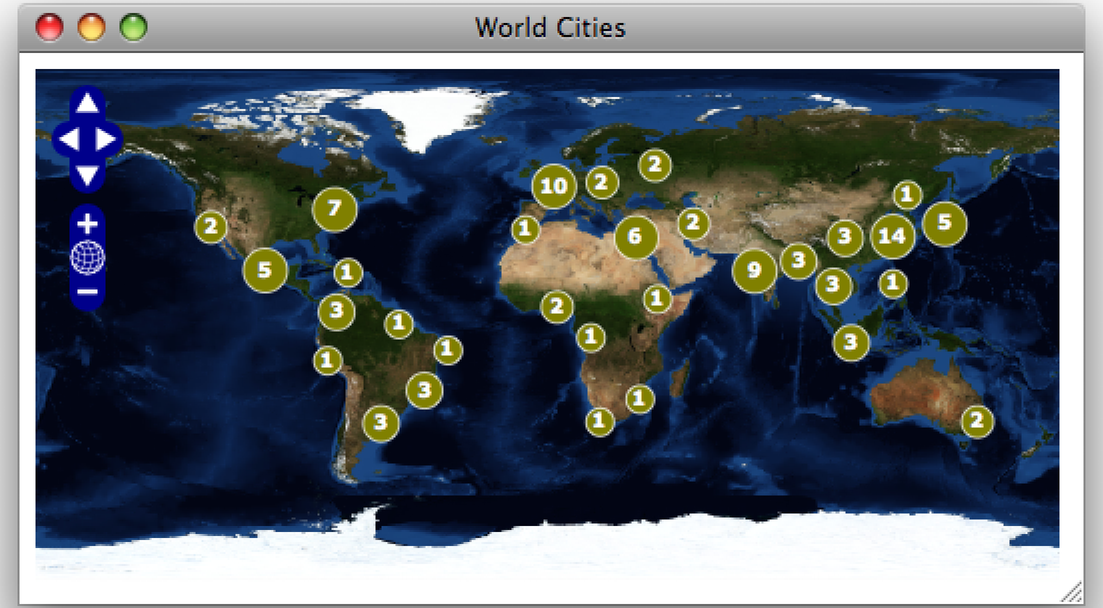
The WFS Protocol

```
var cities = new OpenLayers.Layer.Vector("Cities", {
     strategies: [
         new OpenLayers.Strategy.BBOX(),
         new OpenLayers.Strategy.Cluster()
     ],
     protocol: new OpenLayers.Protocol.WFS({
         url: "/geoserver/wfs",
         featureType: "cities",
         featureNS: "http://opengeo.org/#world"
     }),
     styleMap: new OpenLayers.StyleMap(style)
});
```

The WFS Protocol



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Demo Time

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Credits

Thanks to the community of OpenLayers developers and users for making this a great project.

Thanks to OpenGeo for supporting open source development.

Sanskrit image from http://mattstone.blogs.com/photos/asian_icons/bible-in-sanskrit.html.

Envelope image from http://www.archives.gov.on.ca/english/on-line-exhibits/dan-hill/papers/big_010_may-letter-env.aspx.

Mailbox image from http://www.secondstpres.org/sspc/about-us-mainmenu-61/diaconate-mainmenu-48.

http://tinyurl.com/vector-mayhem

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