Simulating Markers with a Tile Layer

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This discussion is aimed at those who understand advanced mapping techniques and have a good knowledge of server side languages and the Google Maps v3 JavaScript API.

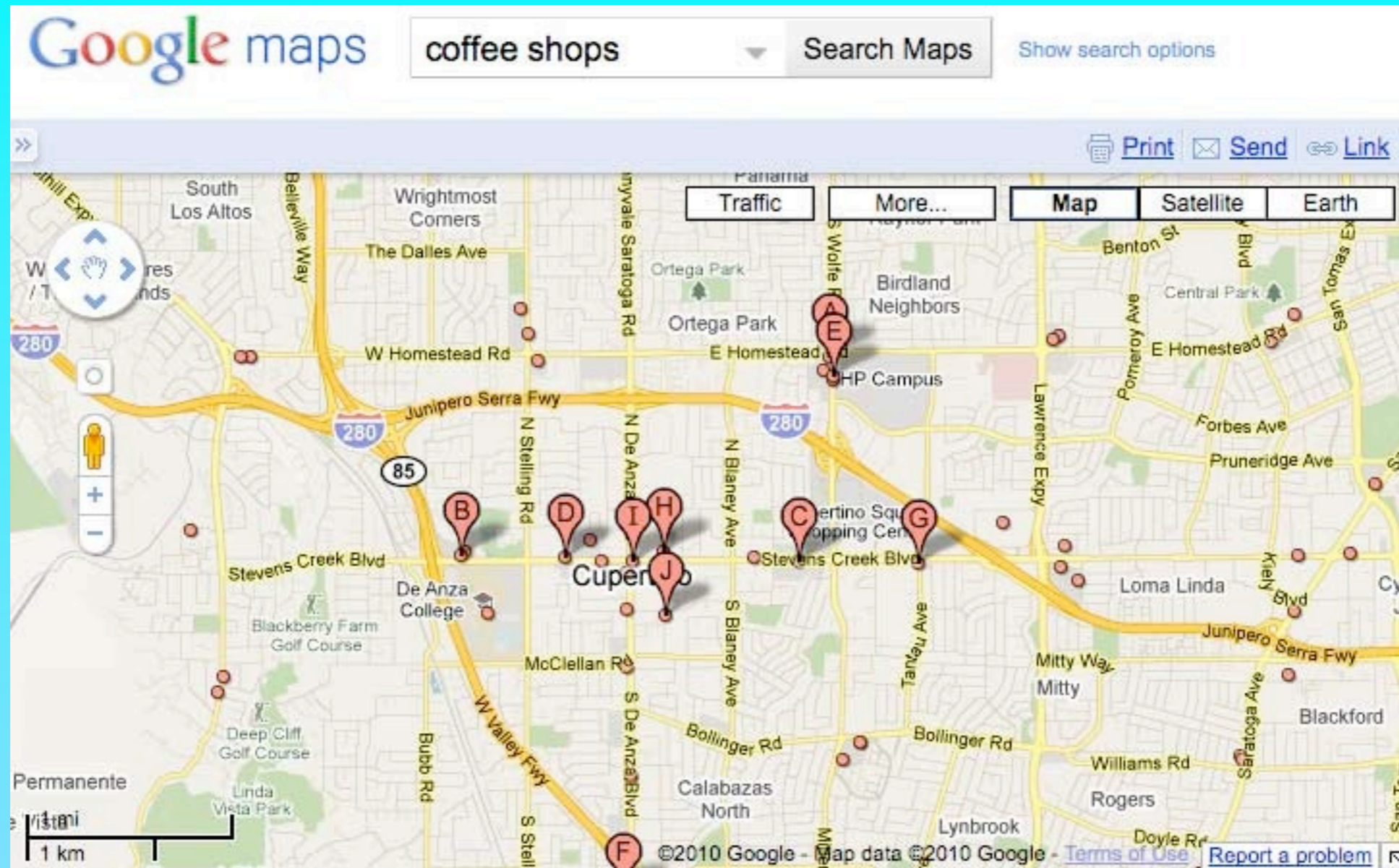Presented by:

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USNaviguide LLC

http://www.usnaviguide.com/ws-2010-08

Prerequisite:

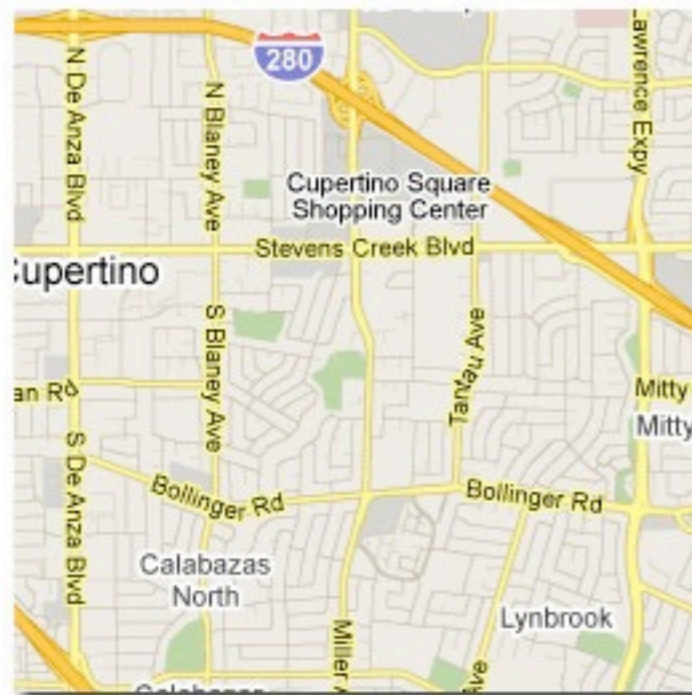# Producing Custom Maps with Google Maps API

http://www.usnaviguide.com/ws-2008-02

Simulating Markers with a Tile Layer

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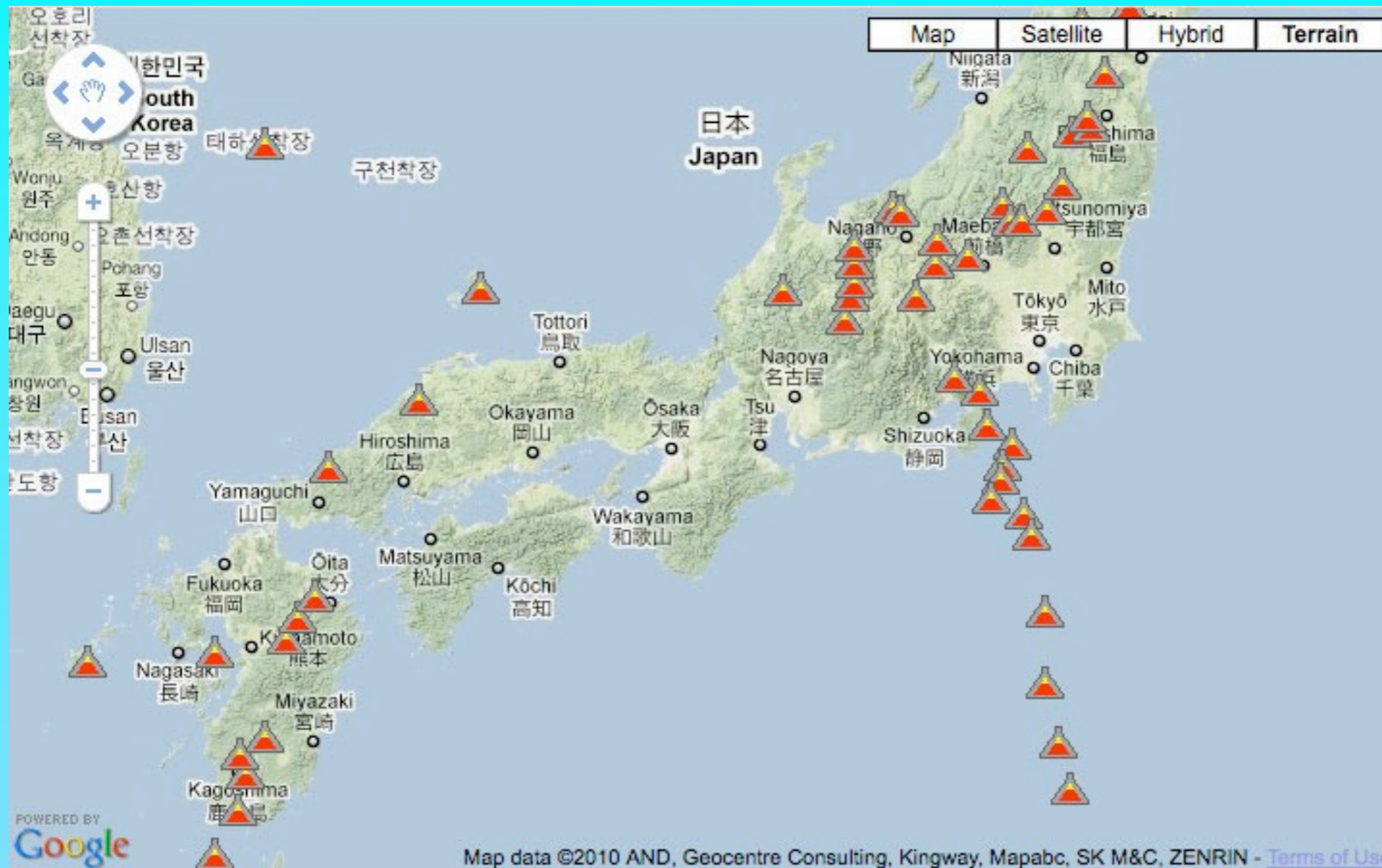
Advantages:

- Fast and efficient
- No JavaScript objects required
- No limit on number
- More secure

Disadvantages:

- Requires more bandwidth
- Requires round trip to server

Simulating Markers with a Tile Layer

http://www.usnaviguide.com/ws-2010-08/volcano.htm

Data Source: Smithsonian Global Volcanism Program

Complete Project

Demo

http://www.usnaviguide.com/ws-2010-08/volcano.htm

Useful Perl Module

USNaviguide_Google_Tiles.pm

Calculate all tiles for a bounding box and zoom

Calculate a single tile features from a tile name and zoom

Calculate tile name to pixel

Calculate coordinate to pixel

Calculate pixel to coordinate

Calculate a tile name from a pixel location and zoom
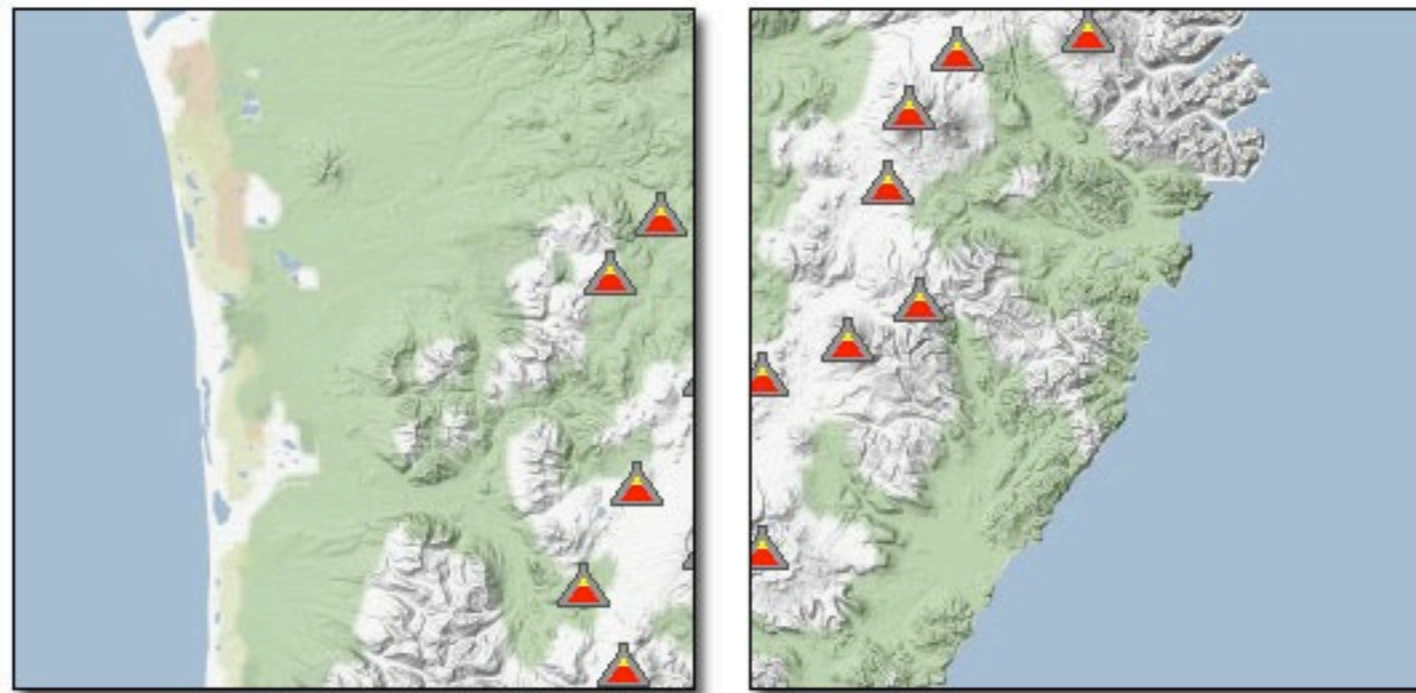
Simulating Markers with a Tile Layer

Steps:

1. Calculate tiles required.
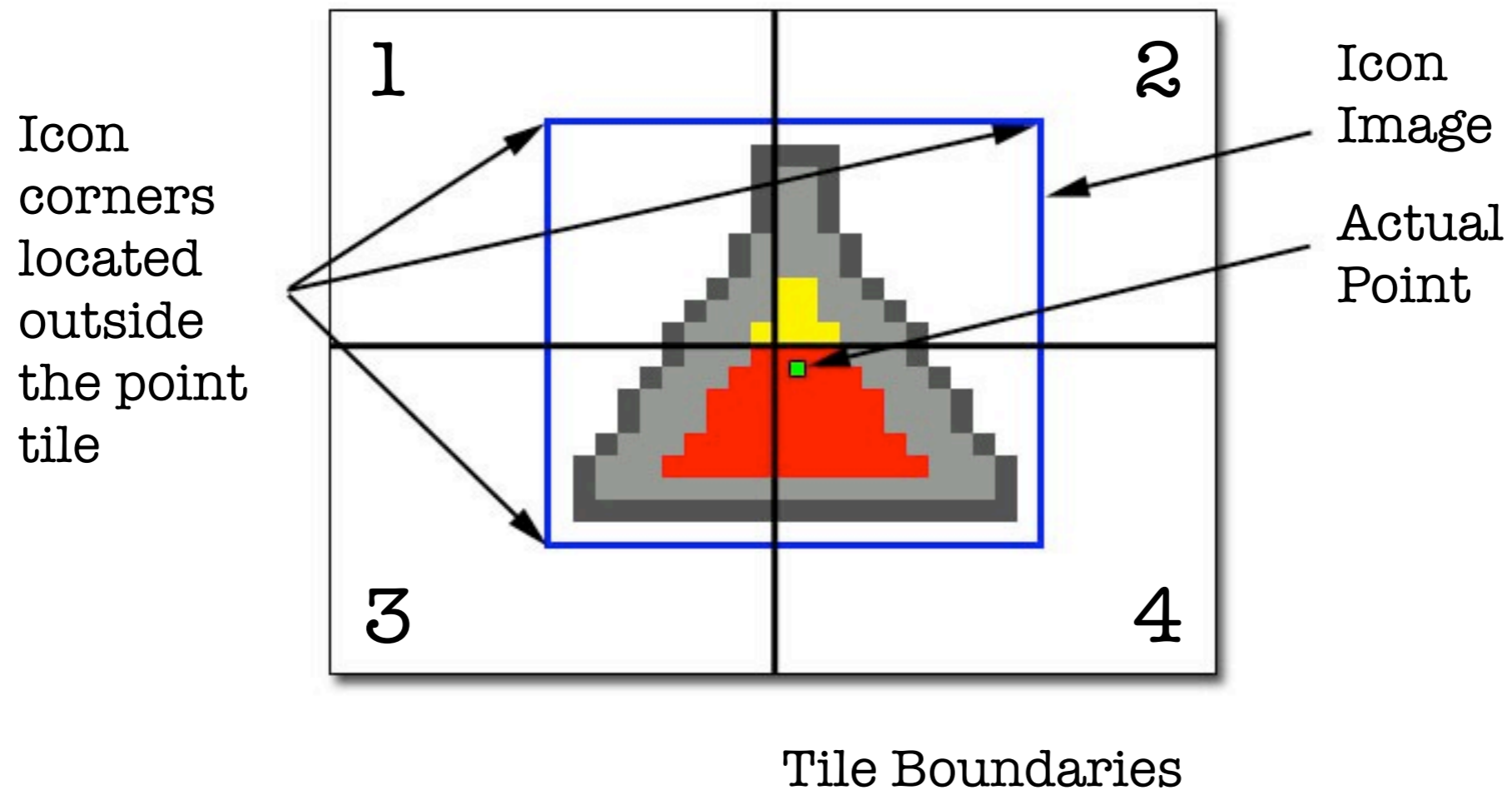
2. Draw tiles.

Sounds simple!

Calculate Tiles Required

Icons can overlap tiles

Overlapping Problem

Up to four tiles per point

1   2

Icon corners located outside the point tile

Icon Image

Actual Point

3   4

Tile Boundaries

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Overlapping Problem

Two methods to handle overlap:
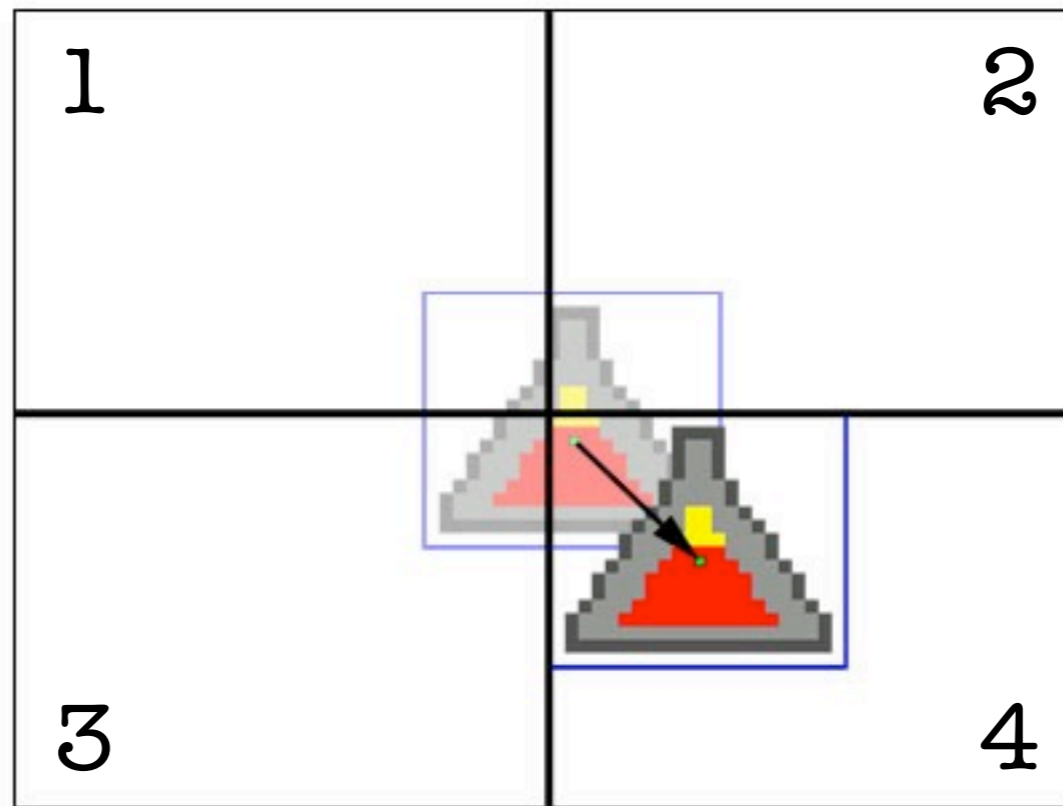
1. "Fudging"
   One point = One tile.

2. "Exact"
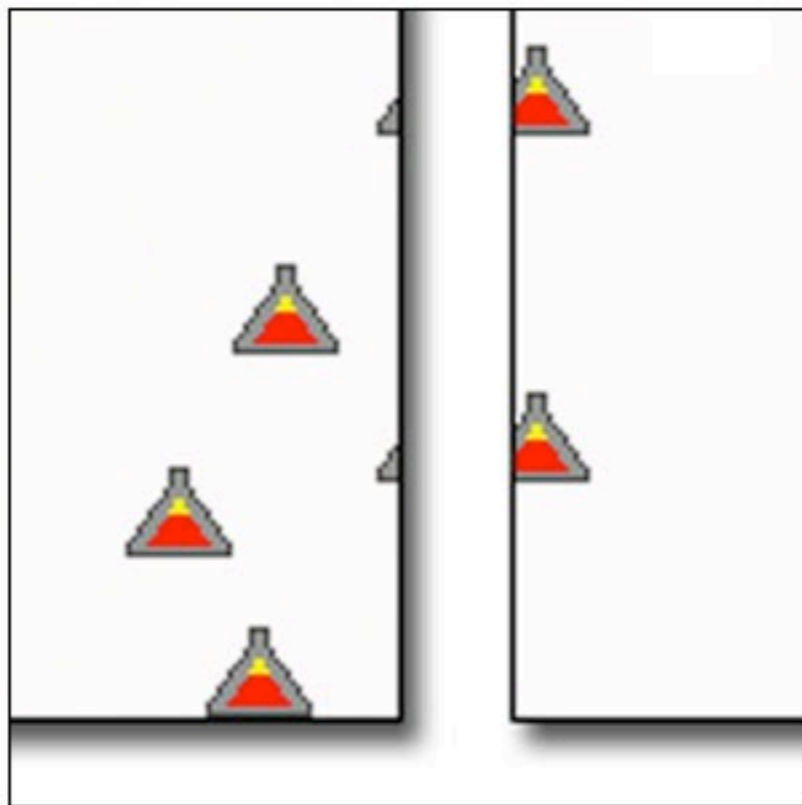   One point = Up to four tiles.

Fudging Method

Shift point to encompass icon
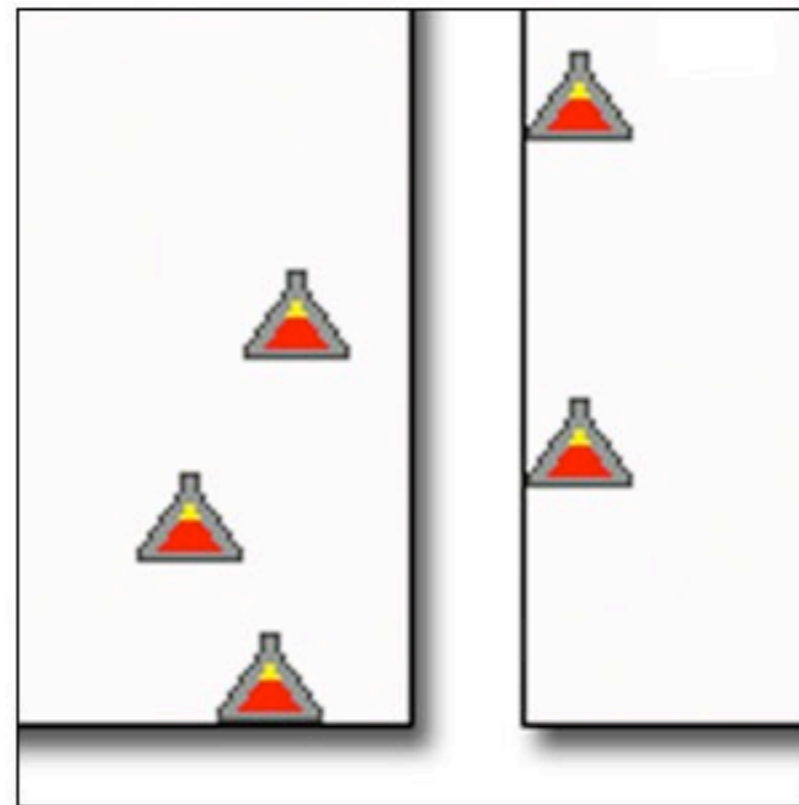

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Fudging Method
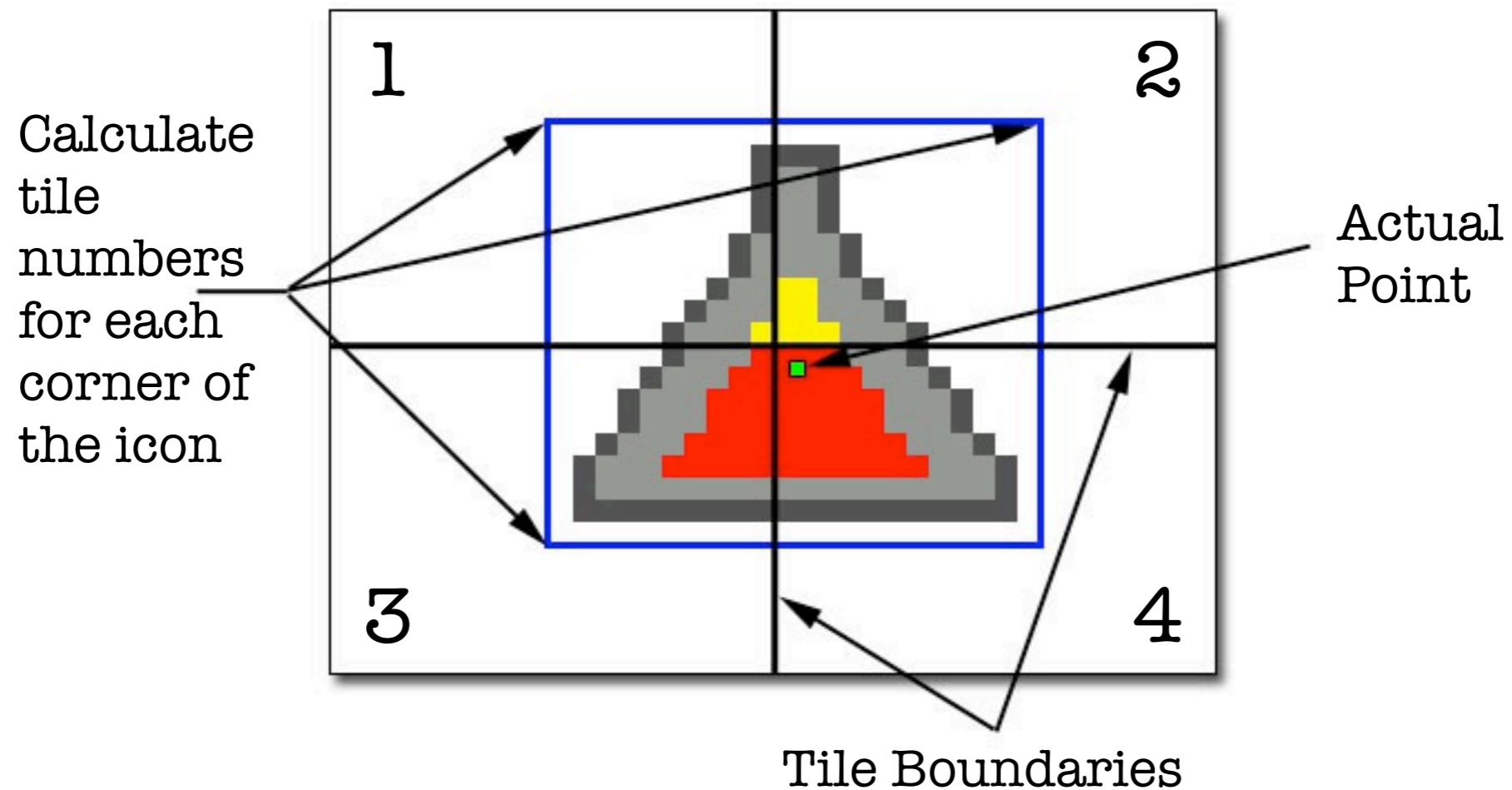

Before Fudge   After Fudge

Exact Method

Up to four tiles per point

Drawing Tiles

Steps:

1. Select list of tiles required

2. Gather points for the tile

3. Merge icon images into tile

4. Output tile

Creates a "sparse" tile set

Simulating Marker Clicks

Process:

- Client sends coordinate and zoom

- Server selects the closest point to the click

- Server checks tolerance

- Server sends XML to client

- Client displays results

Using a Tile Server

Best reason: Prevent 404 errors

```
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_4_6.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_4_5.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_2_7.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_5_6.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_3_4.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_5_5.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_4_4.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_1_6.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_1_5.png
File does not exist: /www/usnaviguide.com/docs/voltiles/4/v_5_4.png
```

Resources

- tiles.pl - Calculate and draw tiles using the "exact" method

- volcano.htm - v3 page used in this presentation

- volcano.pl - Click handler for volcano.htm

- tileserver.pl - Tile server used in this presentation

- volcano.sql - PostgreSQL dump for data used in this presentation

- USNaviguide_Google_Tiles.pm - Calculate tile factors (perl module)

- ws-2010-08.pdf - Slides used in this presentation

- ws-2010-08-article.pdf - A synopsis of this presentation

- download.zip - All the above in a zipped format

  All the above materials are available under the Apache license.

  Link: http://www.usnaviguide.com/ws-2010-08