

Community Seismic Network for Rapid Shakemap Notification

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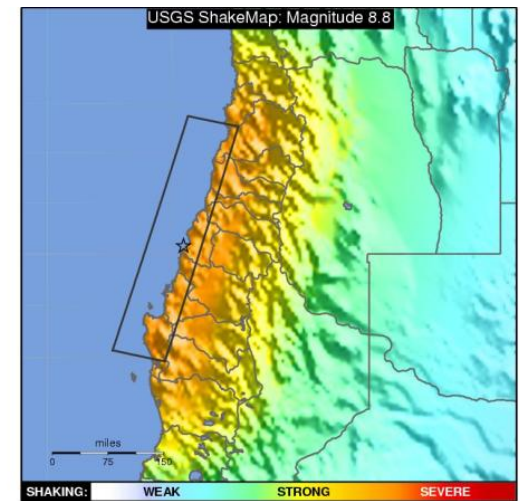
Outline

- CSN: Community Seismic Network
- Android Client
- App Engine Server
- New Progress
- Conference
- Demo

Community Seismic Network

A new earthquake monitoring system based on a dense array of low-cost sensors. The goal of the system is to produce block-by-block estimates of strong ground shaking.

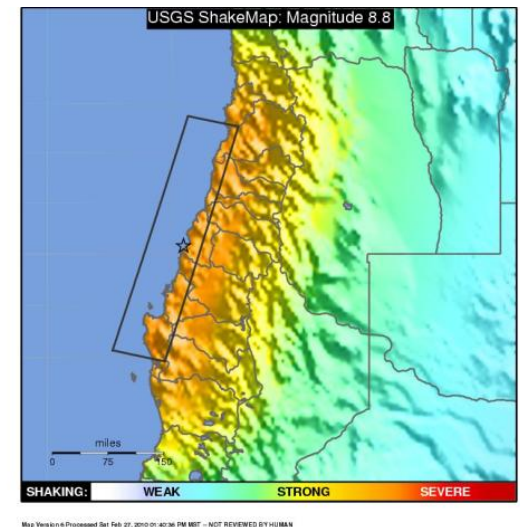
- Global distributed network
 - Rapid shakemap notification
- Citizen Science



Community Seismic Network

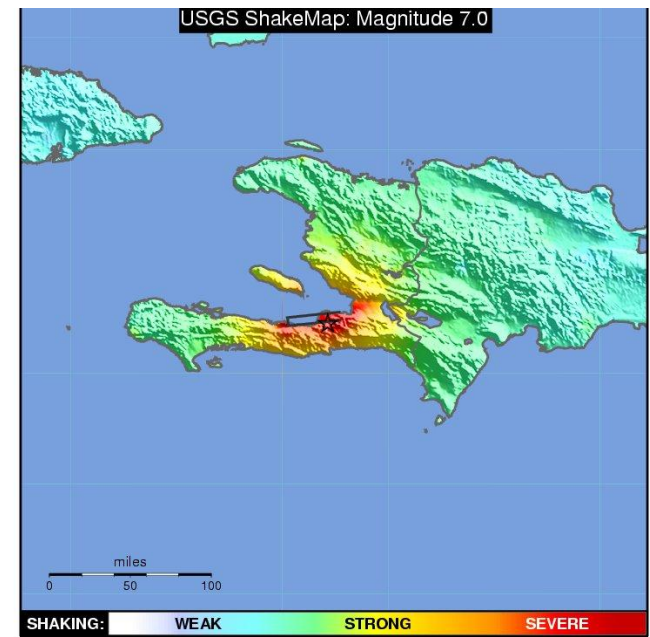
A new earthquake monitoring system based on a dense array of low-cost sensors. The goal of the system is to produce block-by-block estimates of strong ground shaking.

- Global distributed network
 - Rapid shakemap notification
- Citizen Science
- Analysis in the *cloud*
- Inexpensive USB & embedded cell phone accelerometers



Benefits & Target Users

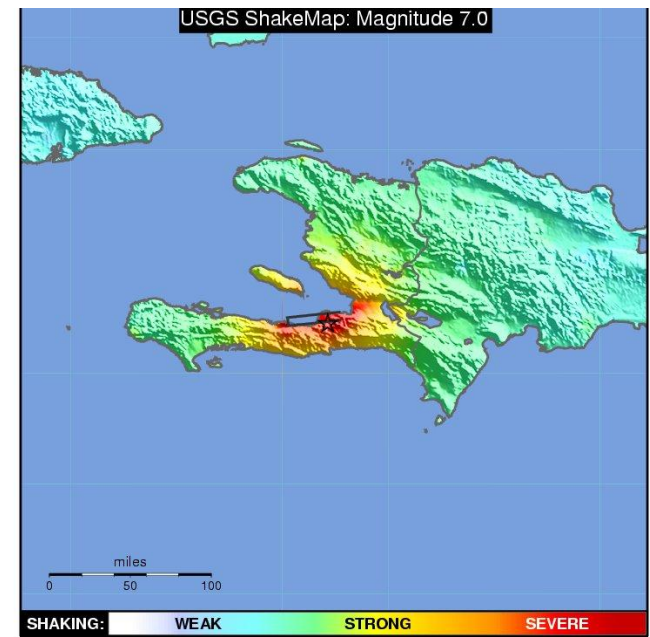
- Easy deployment in areas w/o seismic networks
 - Cell phones are prevalent
- Shakemap Notifications

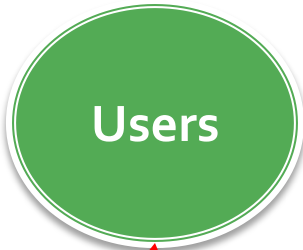
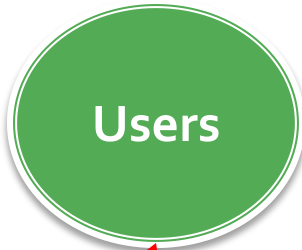


Map Version 8 Processed Thu Feb 25, 2010 11:56:00 AM MST - NOT REVIEWED BY HUMAN

Benefits & Target Users

- Easy deployment in areas w/o seismic networks
 - Cell phones are prevalent
- Shakemap Notifications
- Use by utilities (e.g. Edison)
- Identify hard-hit areas quickly
 - Direct first responders
 - Resource allocation





Cloud Computing
Google App Engine

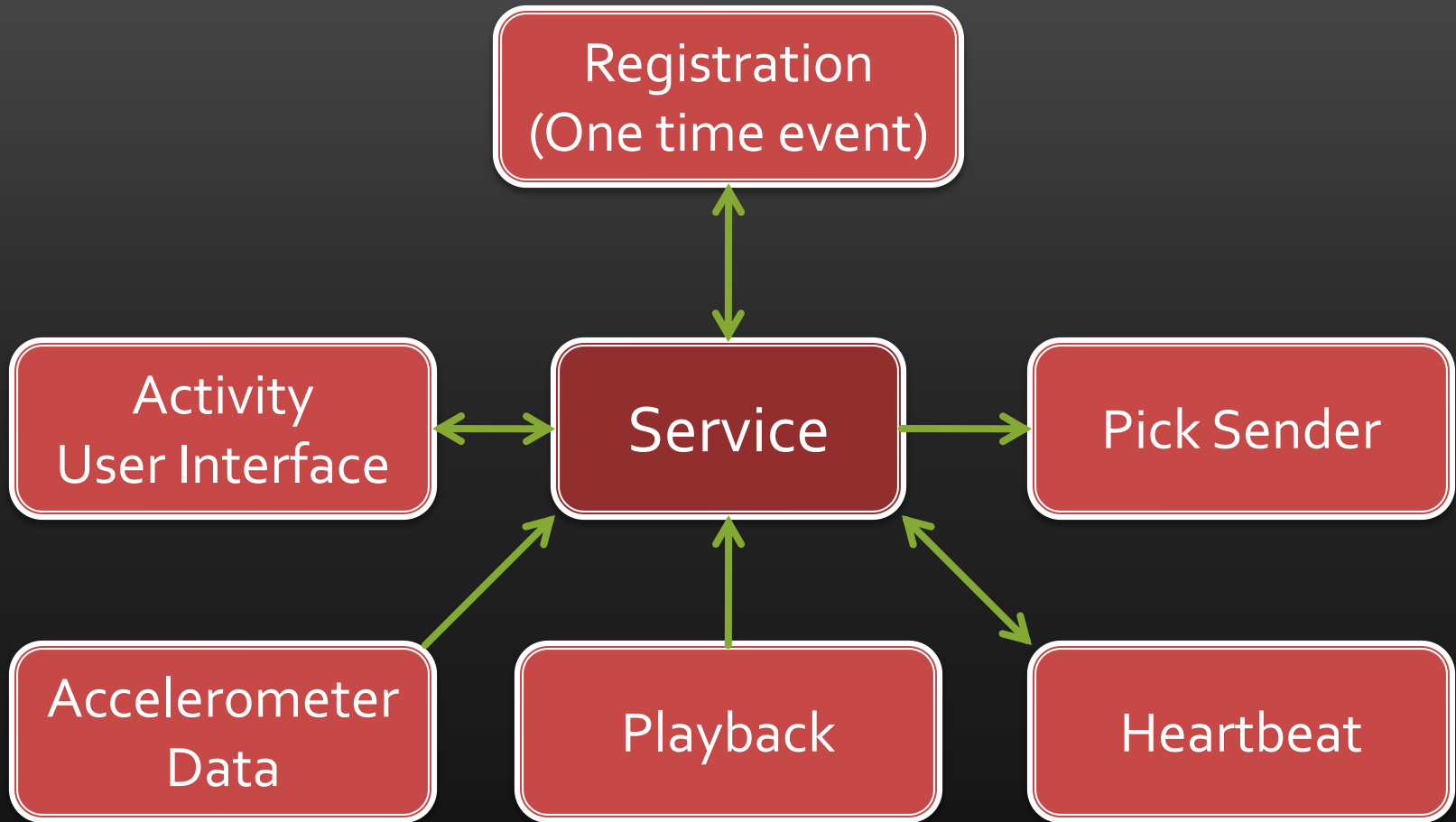


Android Client

- Android phones have accelerometers
- Need to eliminate noise
 - Tag data as “in pocket,” etc.
- Dense network

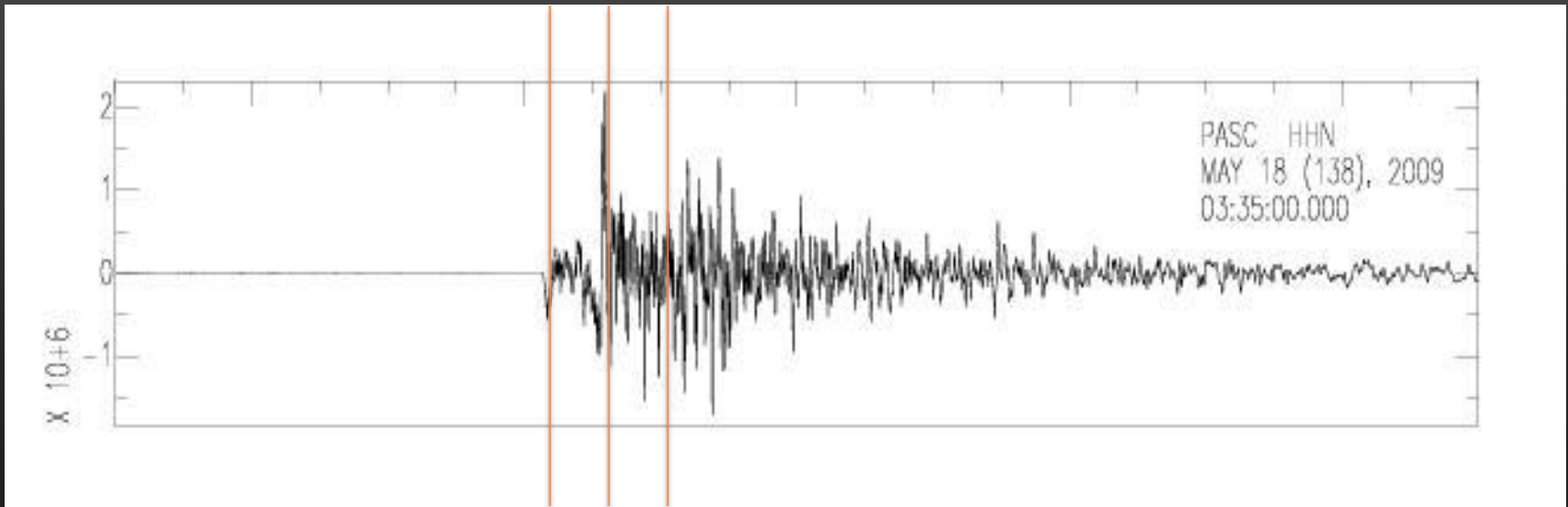


Android Client Overview



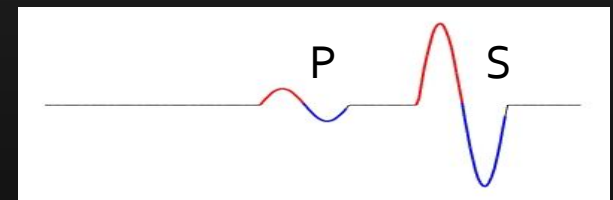
Picking Algorithm

1 2 3



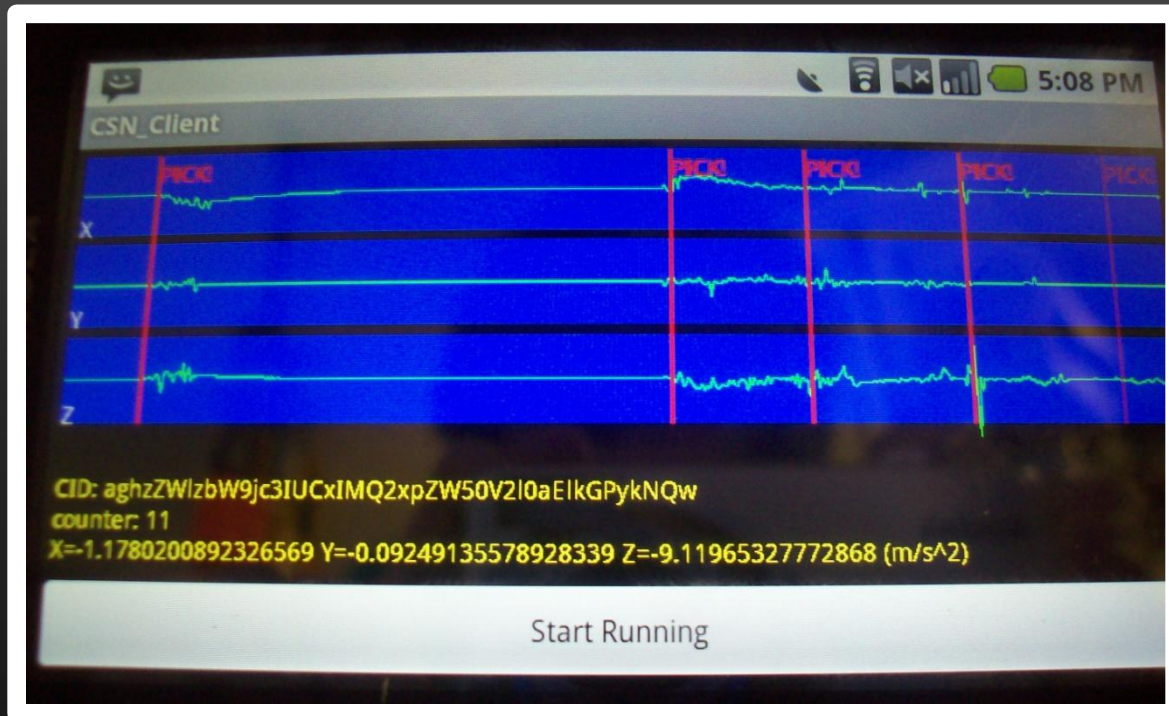
Pause for this length of time before sending a message to the server again.

1. Detected significant shaking
2. Maximum shaking
3. Sent message to server



STA/LTA > threshold

Android Application



(actual app)

New Android Client Progress

- Registers with App Engine server
- Background service collects and analyzes data
- Displays accelerometer data
 - Allows user to start and stop the program.
- Identifies Pick events
- Dedicated message sending thread to talk to App engine server

Server-side

- Client interaction
 - Registration
 - Pick messages
 - Heartbeat messages

Server-side

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 - Heartbeat messages
- Data interaction
 - Activity maps (pick + client)
 - Management console
 - Datastore API
 - Associator

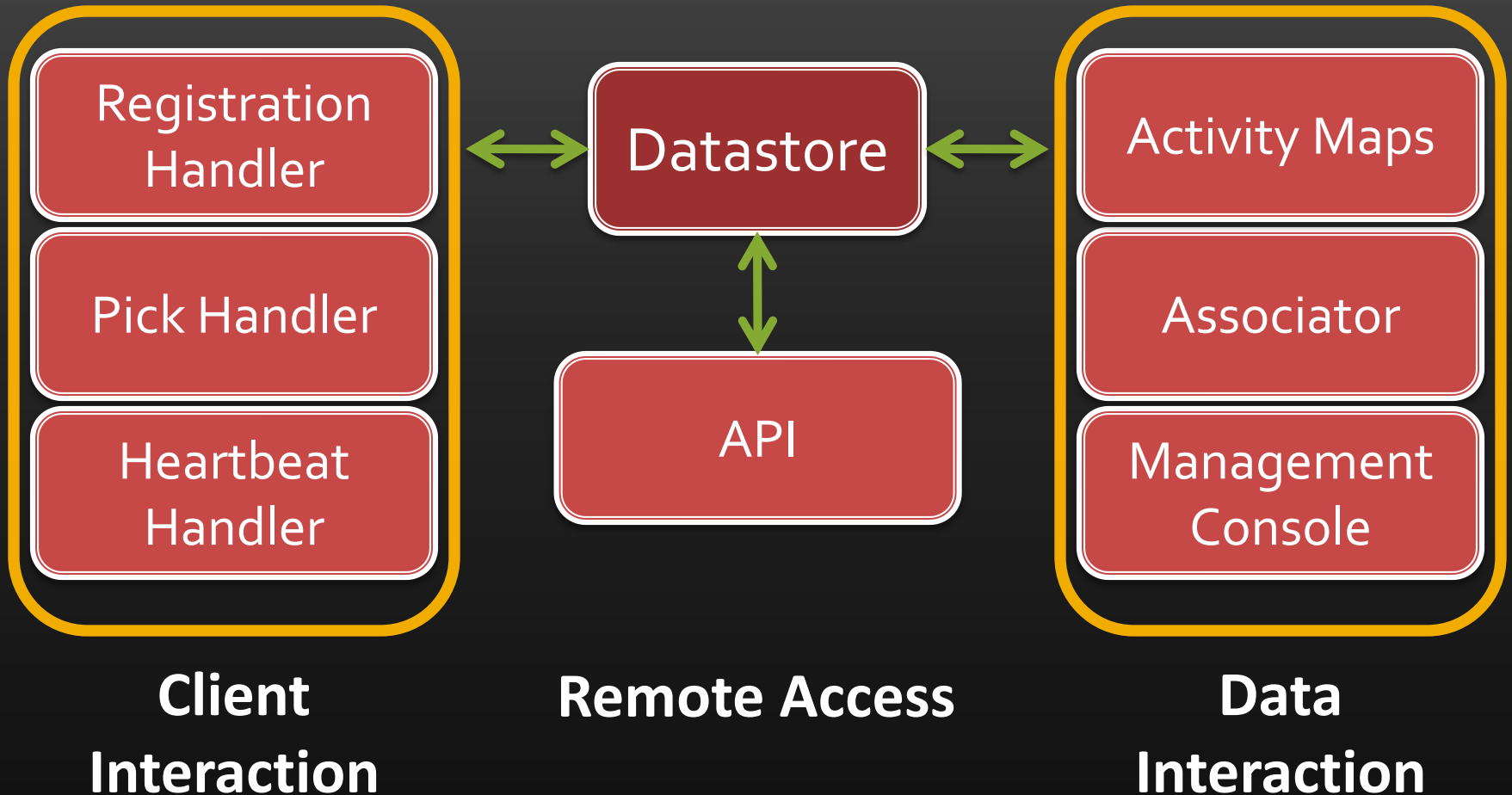
Server-side

- Client interaction
 - Registration
 - Pick messages
 - Heartbeat messages
- Data interaction
 - Activity maps (pick + client)
 - Management console
 - Datastore API
 - Associator
- Cloud Infrastructure
 - Google App Engine
 - Google Web Toolkit + Google Maps (web interface)



Google™
App Engine

Server-side Overview



New Server-side Progress

- API for Datastore access
- Streamlined visual style
 - Integrated pick and client maps
- Heatmap (relative acceleration)

Future Work: Server

- Management interface
- Map improvements
- Basic associator on App Engine

Future Work: Android

- Automatically identify when phone should collect data.
 - Currently controlled in user interface
 - Professor Krause + Jonathan & Manuel
- Smarter picking algorithm
- Heartbeat and playback support

Conference

- 5th IASME / WSEAS International Conference on GEOLOGY and SEISMOLOGY (GES '11)
 - Deadline for Paper Submission: NOVEMBER 30, 2010
 - Deadline for Registration Due: JANUARY 31, 2011

Acknowledgements



Dr. K. Mani Chandy
Professor of
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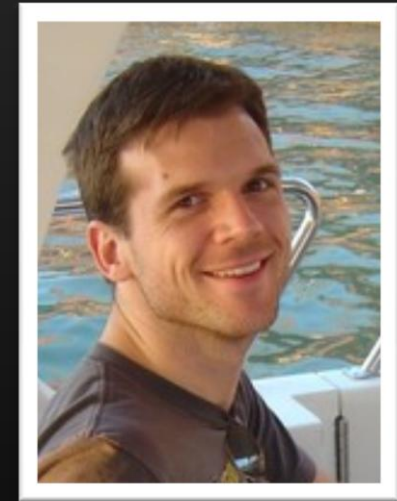


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Thank You

Demo

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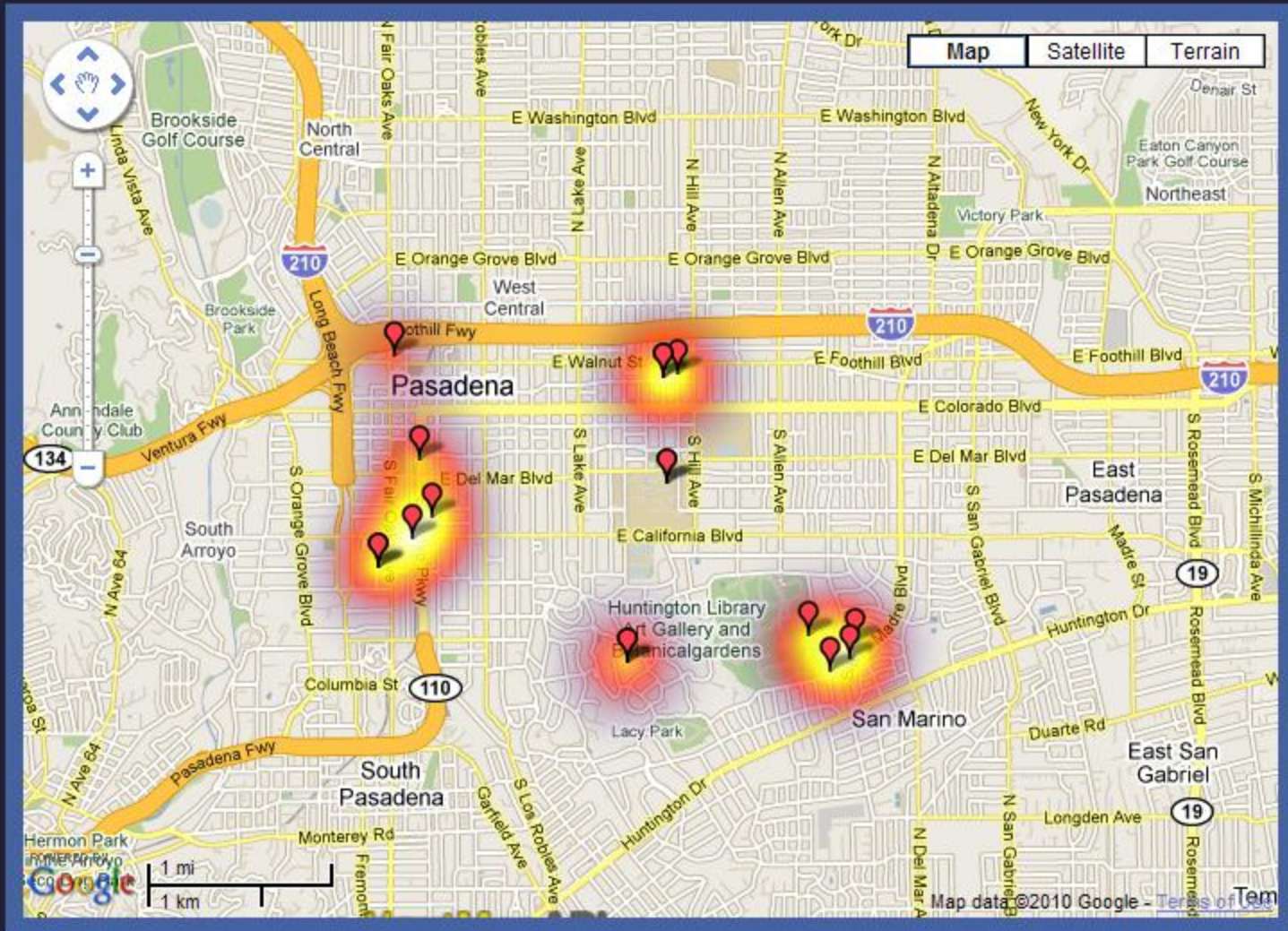
Q&A

CSN Map Prototype

Click the buttons below.

Pick Map

Client Map



CSN Map Prototype

Click the buttons below.

Pick Map

Client Map

