BUT IT WORKS FOR ME! HOW TO SHARE RESEARCH CODE

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SCSN

Brown Bag Seminar

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INTRODUCTION

How can this seminar help you?

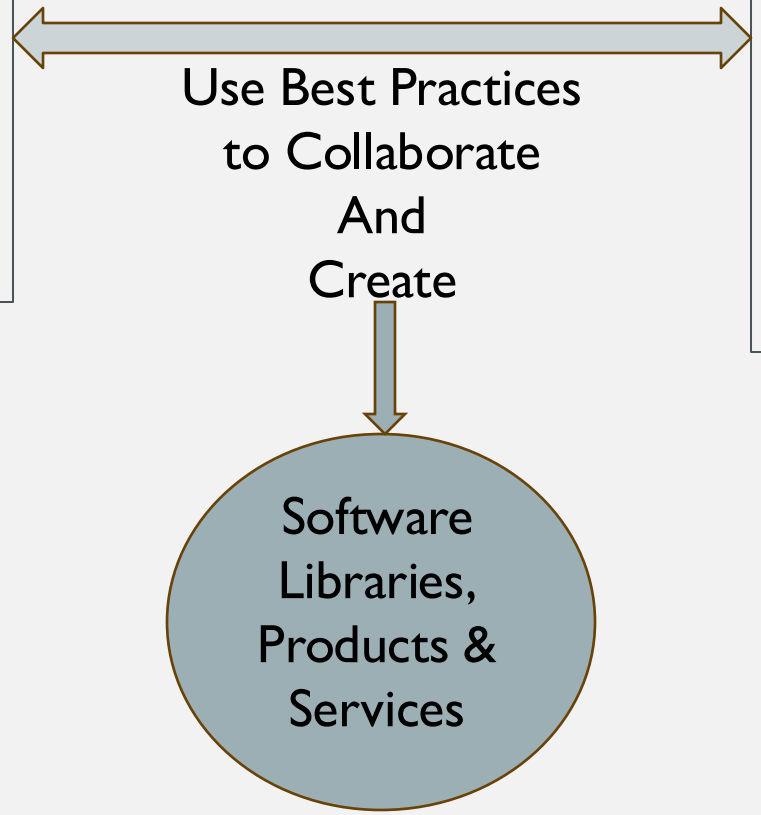
- Our experience is in creating software, using software created by others, maintaining software and deploying in production environment
- We will share best practices that you can employ in your coding projects:
  - to develop and maintain your code
  - to share your work
  - to collaborate with others

  And ensure it lives and continues to evolve after your thesis/research paper is completed!

BENEFITS TO THE SEISMOLAB COMMUNITY

SeismoLab Students, PostDocs and Faculty

- Research ideas
- New algorithms



SCSN Developers

- Create software
- Maintain and deploy in production environment

AGENDA

Defining the project requirements

Code development workflow

Applying to Southern California Seismic Network operations

REQUIREMENTS

Should be required!

- Define the project goal
- Define what success looks like

REQUIREMENTS: WHY DO IT?

Defines the problem and the expected outcome

Defines scope: informs everyone what is going to be implemented and what is not

Guides design, coding and testing

Helps users, development team, your present self and your future self

SOME COMMON EXCUSES

Tedious

The effort is not worth the time

Somebody else's problem

No idea what to include in it

Never wrote one, why do it now?

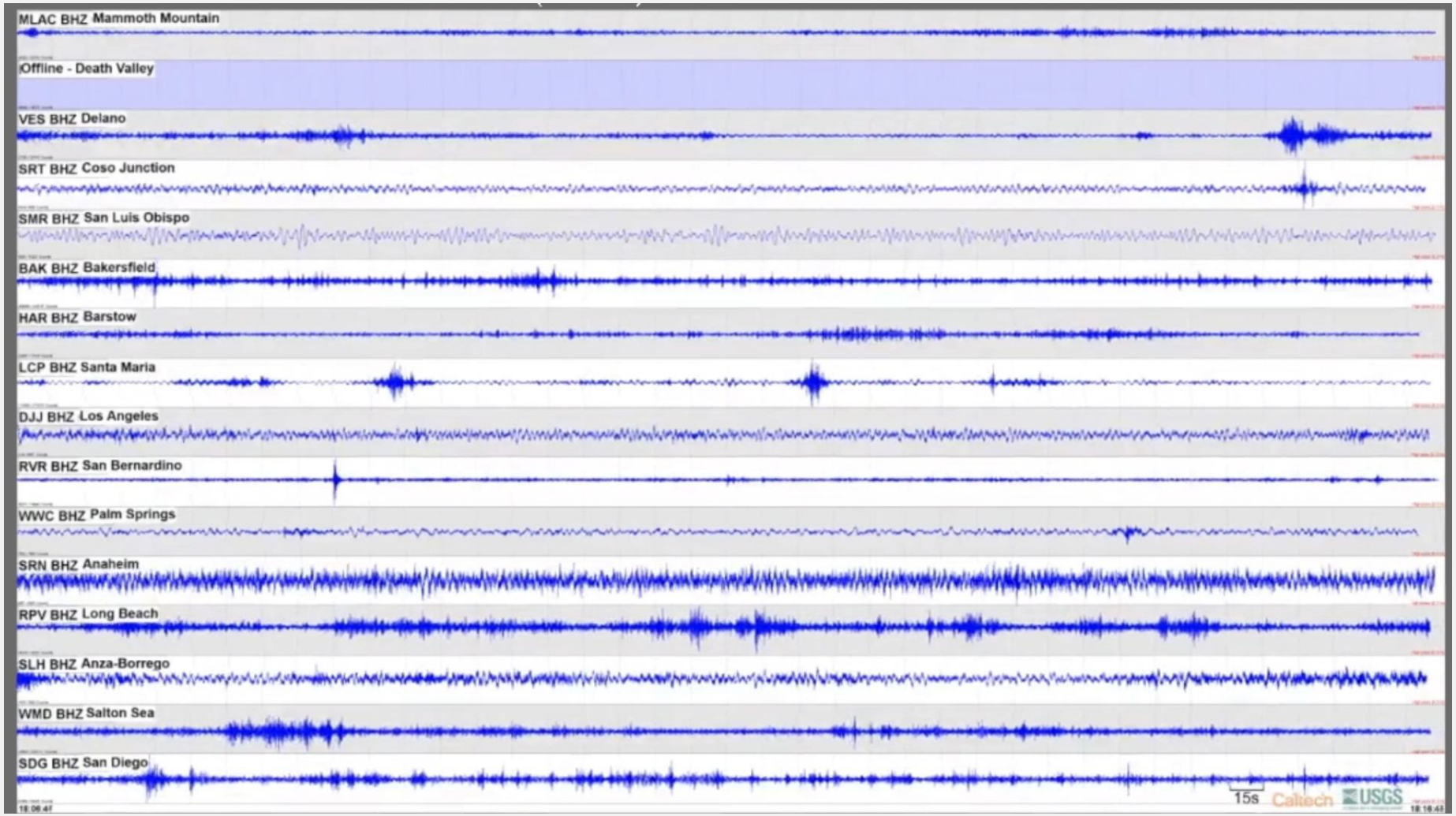
JUST DO IT!

- Start writing for what you are currently working on; no need to backfill
- Ok to start small: a module or a feature request
- Pick a template that you like and add/modify sections that interest you
- Feel free to add in developer specific notes/hints
- Update the document as you receive answers to your questions
- Review the document with your users

CASE STUDY: SCSN LIVE ON THE HALLWAY DISPLAY

Photo by Zack Newman

OLD DISPLAY: SWARM

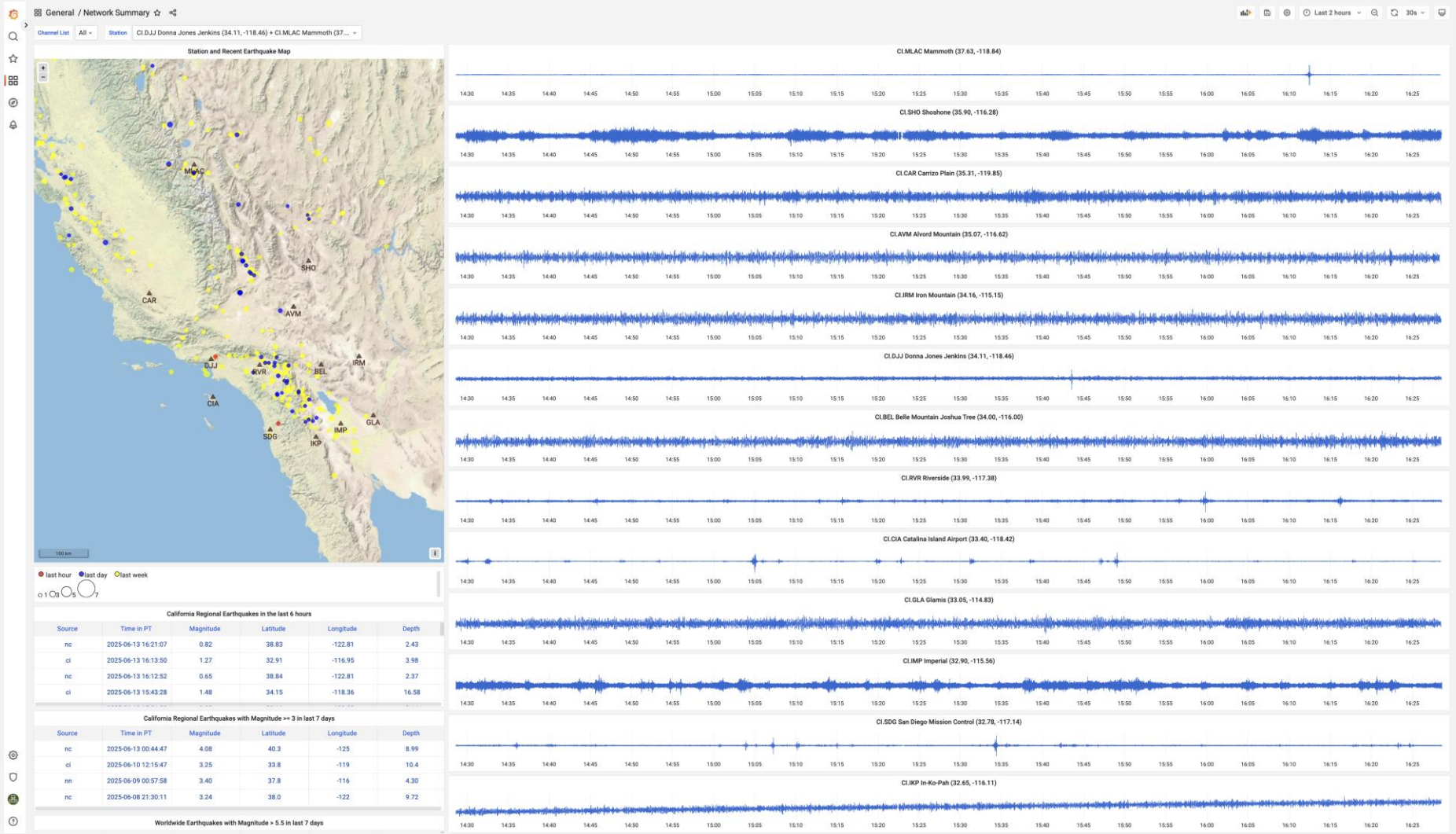


PROJECT GOALS

VISUALIZE HOW THE SOUTHERN CALIFORNIA SEISMIC NETWORK (SCSN) DETECTS EARTHQUAKES IN REAL TIME

Key Items to Display	Realtime Seismic Waveform Data
	Station Locations on Map
	Event Locations on Map
	Event Picks on Waveforms (Added later)
Expectations	Fast. Should display streaming data with as little delay as possible
	Leverage existing infrastructure and minimize making copies of the data
	Browser based application; use Grafana

FIRST VERSION: USING GRAFANA

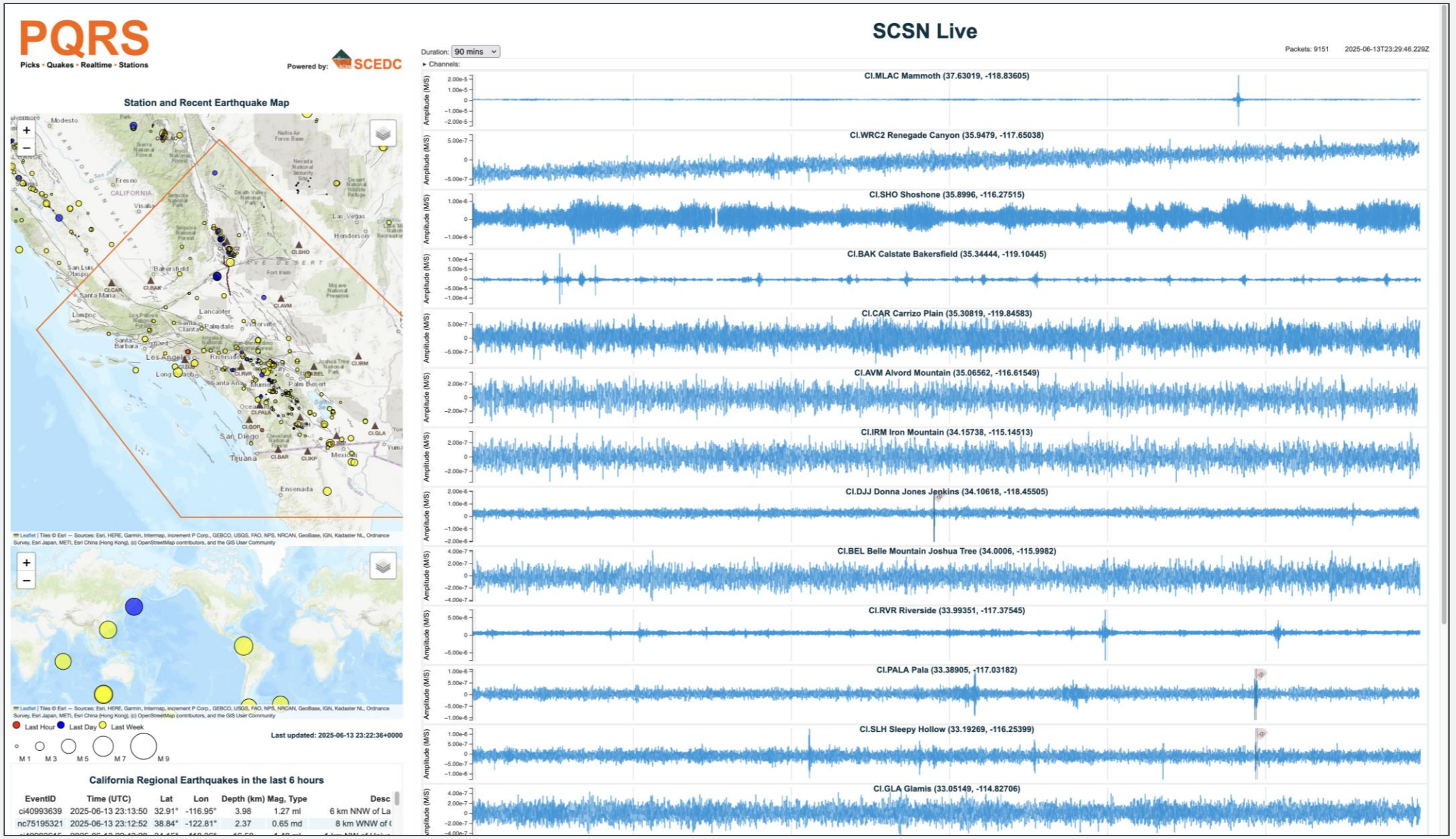


ARE THE PROJECT GOALS MET?

VISUALIZE HOW THE SOUTHERN CALIFORNIA SEISMIC NETWORK (SCSN) DETECTS EARTHQUAKES IN REAL TIME

Key Items to Display	✓ Realtime Seismic Waveform Data
	✓ Station Locations on Map
	✓ Event Locations on Map
	✗ Event Picks on Waveforms
Expectations	✗ Fast. Should display streaming data with as little delay as possible
	✗ Leverage existing infrastructure and minimize making copies of the data
	✓ Browser based application

LATEST VERSION: USING JAVASCRIPT



Built on seisplotjs http://crotwell.github.io/seisplotjs/

ARE THE PROJECT GOALS MET?

VISUALIZE HOW THE SOUTHERN CALIFORNIA SEISMIC NETWORK (SCSN) DETECTS EARTHQUAKES IN REAL TIME

Key Items to Display

- ✓ Realtime Seismic Waveform Data
- ✓ Station Locations on Map
- ✓ Event Locations on Map
- ✓ Event Picks on Waveforms

Expectations

- ✓ Fast. Should display streaming data with as little delay as possible
- ✓ Leverage existing infrastructure and minimize making copies of the data
- ✓ Browser based application

AND MORE!

Scales for many more channels

Scales for multiple users

Allows users can select channels

Can be extended to include more data sources

Code can be used by another network with minimal setup

REQUIREMENTS ARE NOT SET IN STONE

- Ok for requirements to evolve as project progresses
- Confidently take feedback without going down a rabbit hole or losing sight of what you want to achieve
  - Accept changes that enhance the goal

    Example: Add Picks. Show global events
  - Reject ones that detract from the goal

    Example: Dynamically update channel list based on picks for latest event

TEMPLATE FOR REQUIREMENTS

- **Problem Statement**
  - Visualize how the Southern California Seismic Network (SCSN) Detects Earthquakes in Real time
- **Goals/Outcomes**
  - Show real time seismic waveforms, station locations, event locations and event picks with as little delay as possible
- **Out of Scope**
  - Alarms and notifications
- **Use Cases**
  - Hallway display monitor
- **Requirements**
  - Fast. Should display streaming data with as little delay as possible
  - Leverage existing infrastructure and minimize making copies of the data
  - Browser based application

THINKING POINTS / Q&A

What kind of software documentation have you found useful?

What kind of software documentation have you done?

THANK YOU