



# SEPHTML5

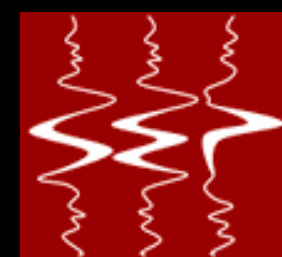
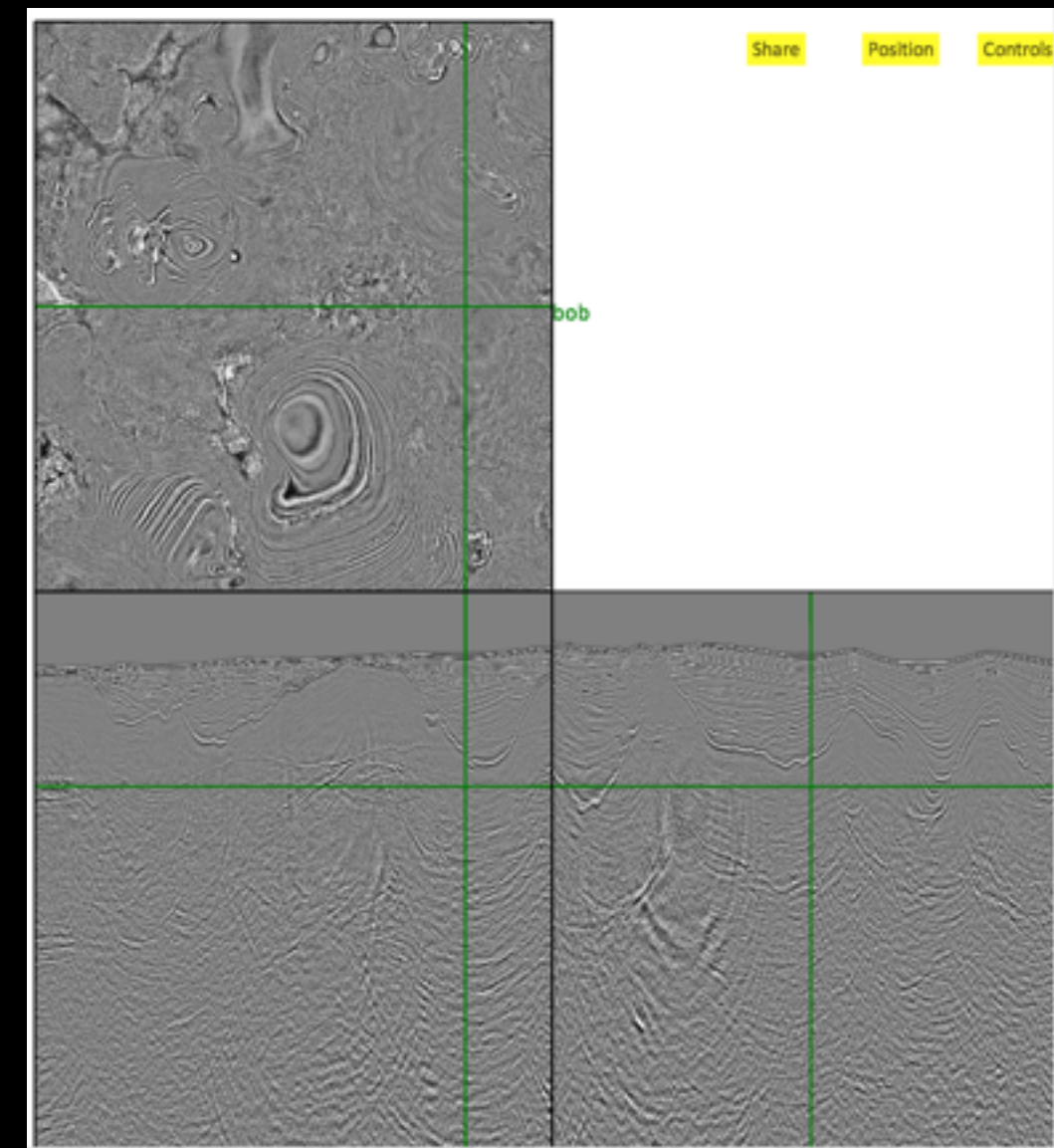
HTML5 and interactive visualization

SEP Meeting 2014

Bob Clapp

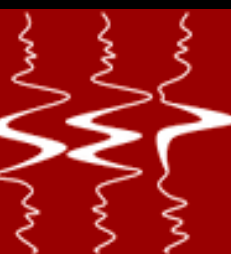
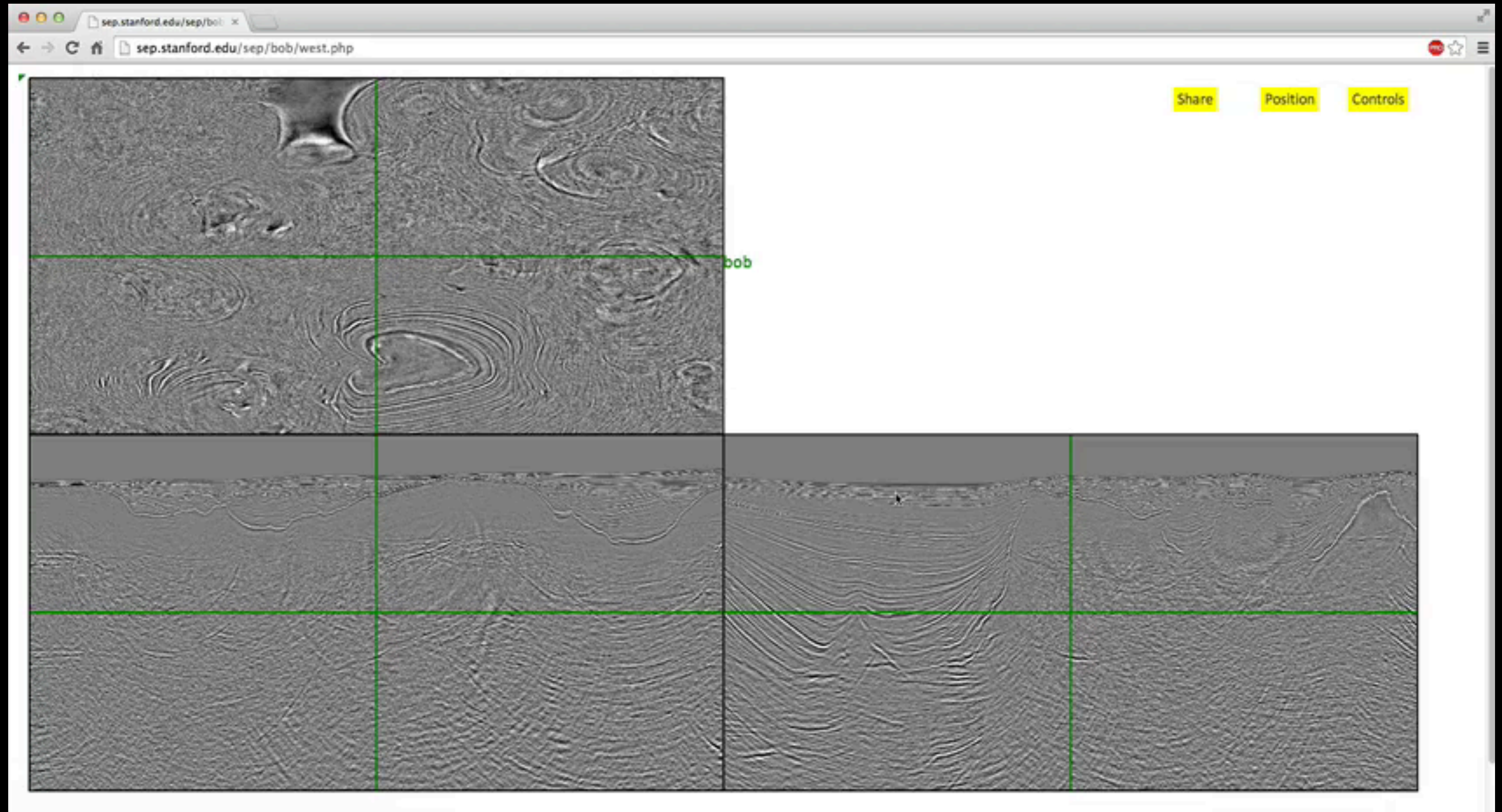
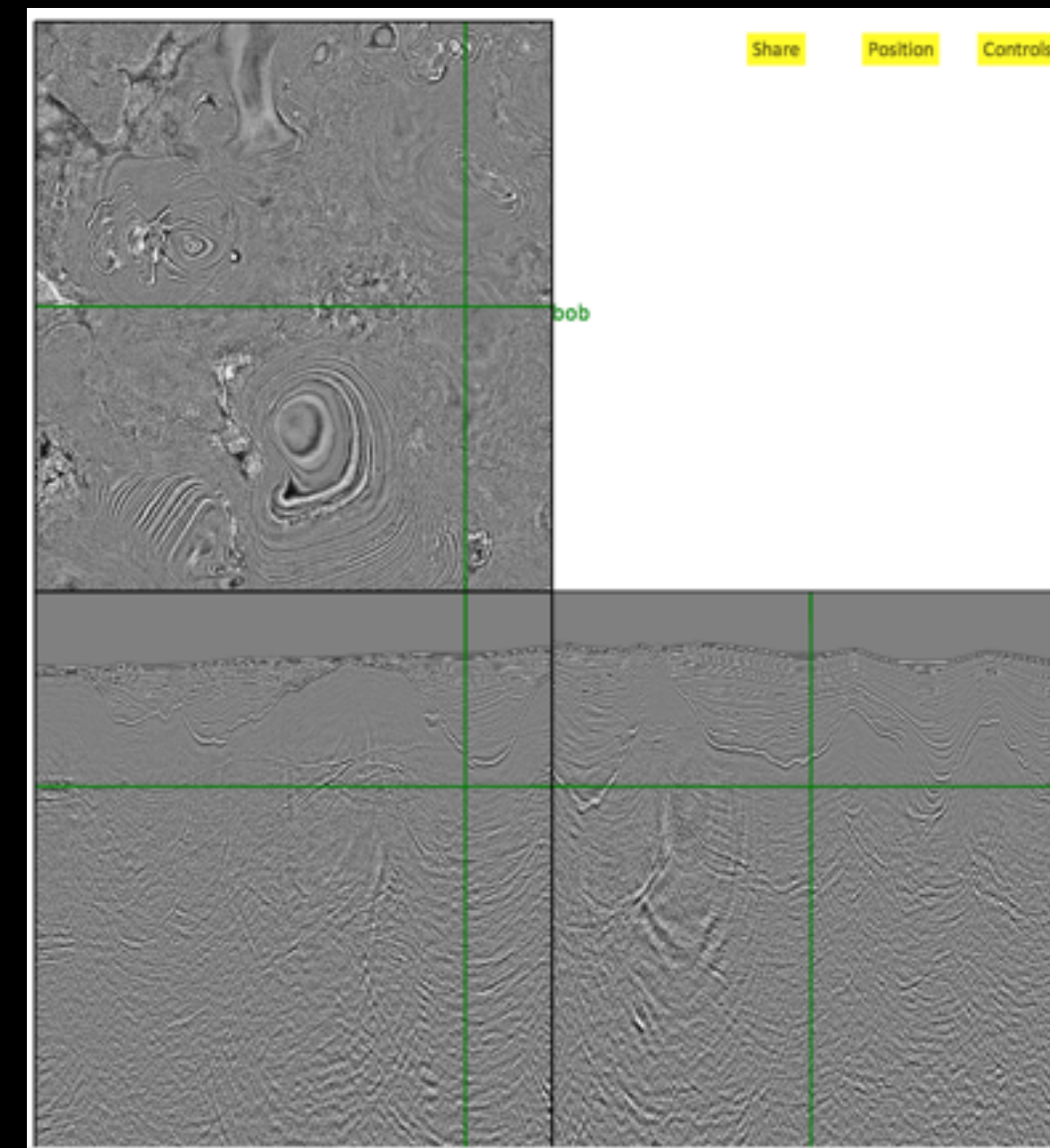






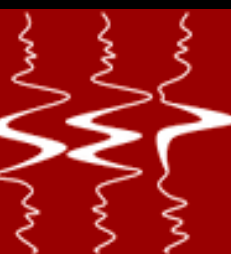
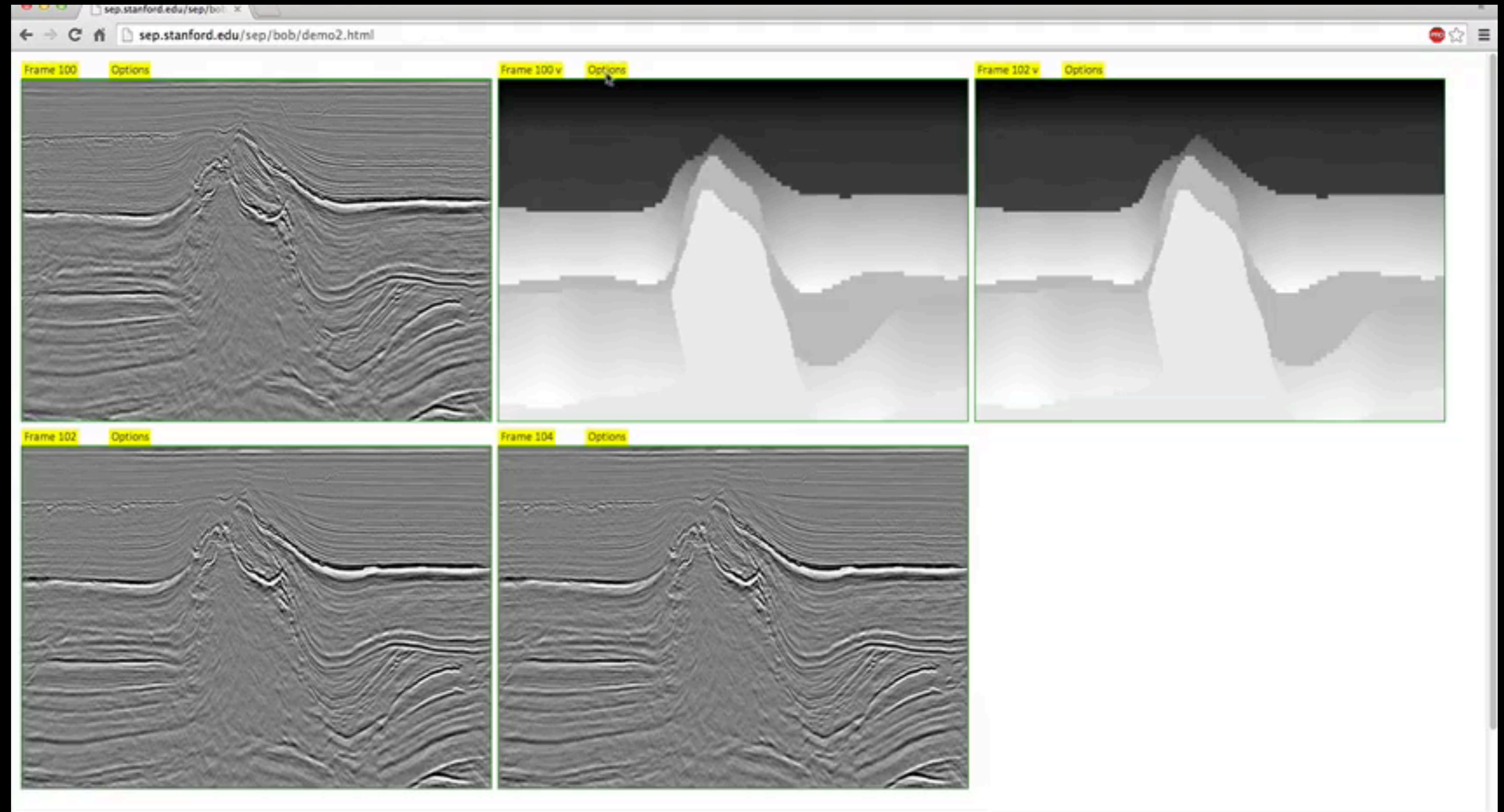
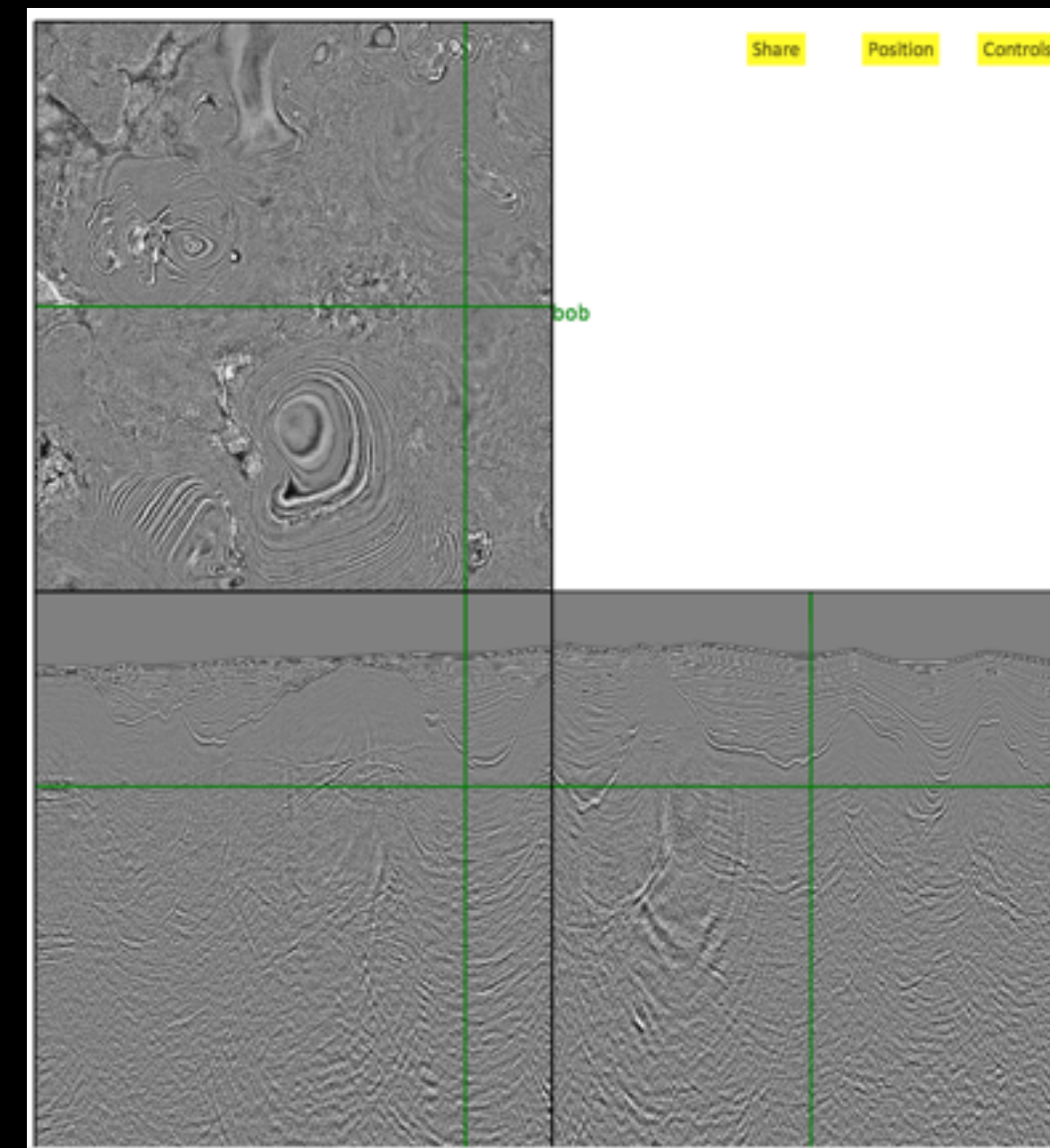


# Seismic data visualization over the web



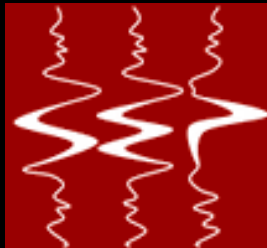
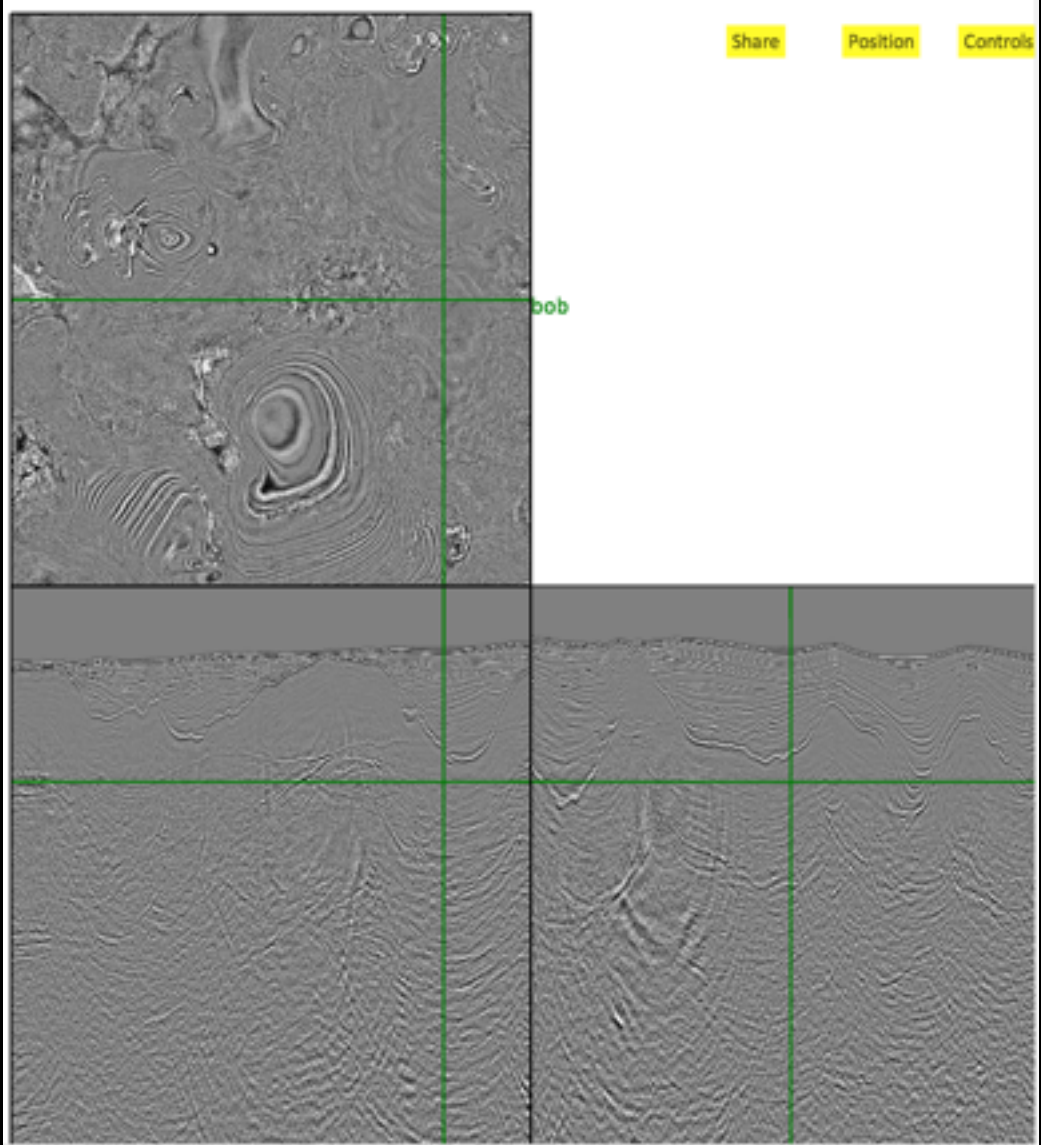


# Seismic data visualization over the web



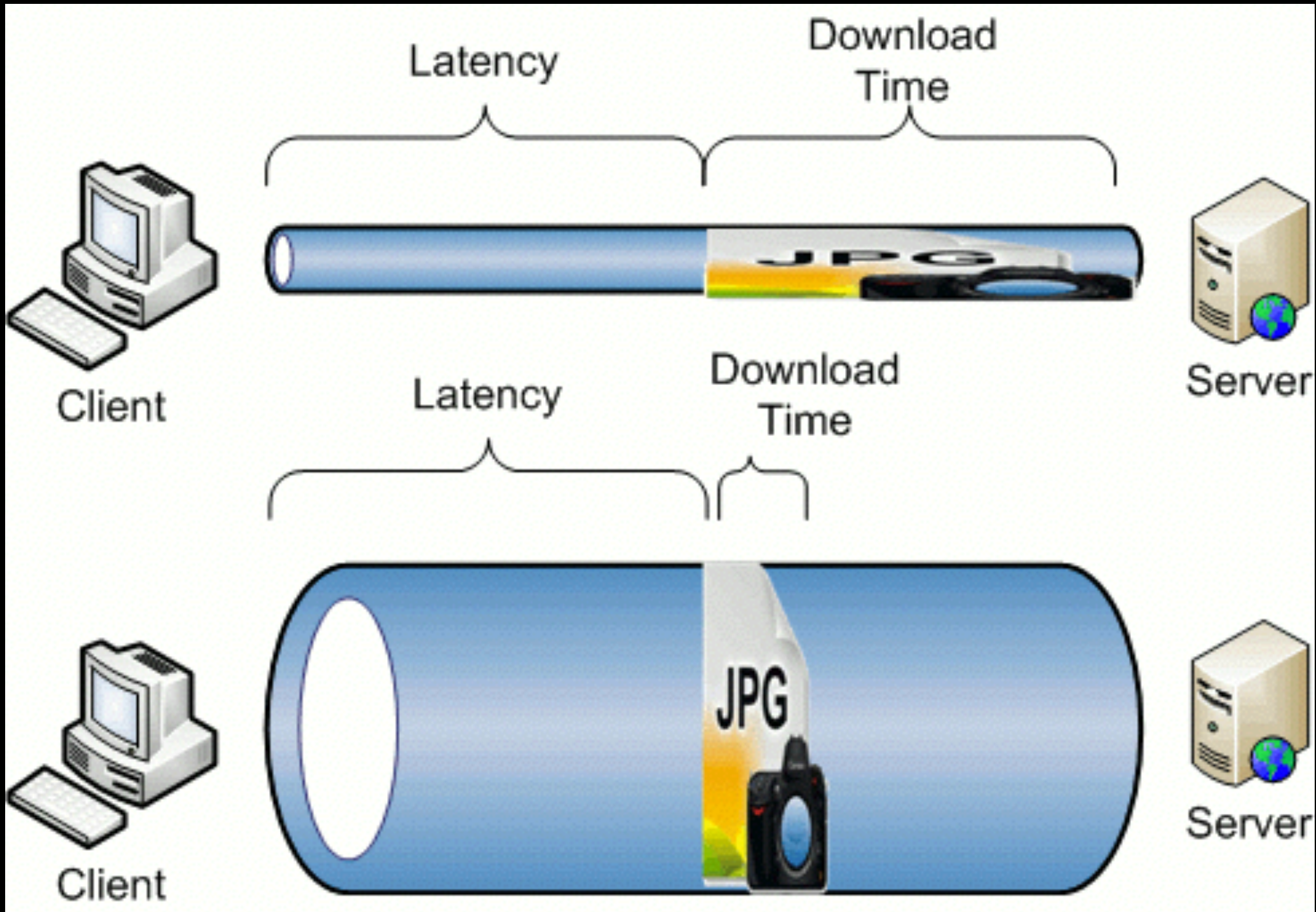
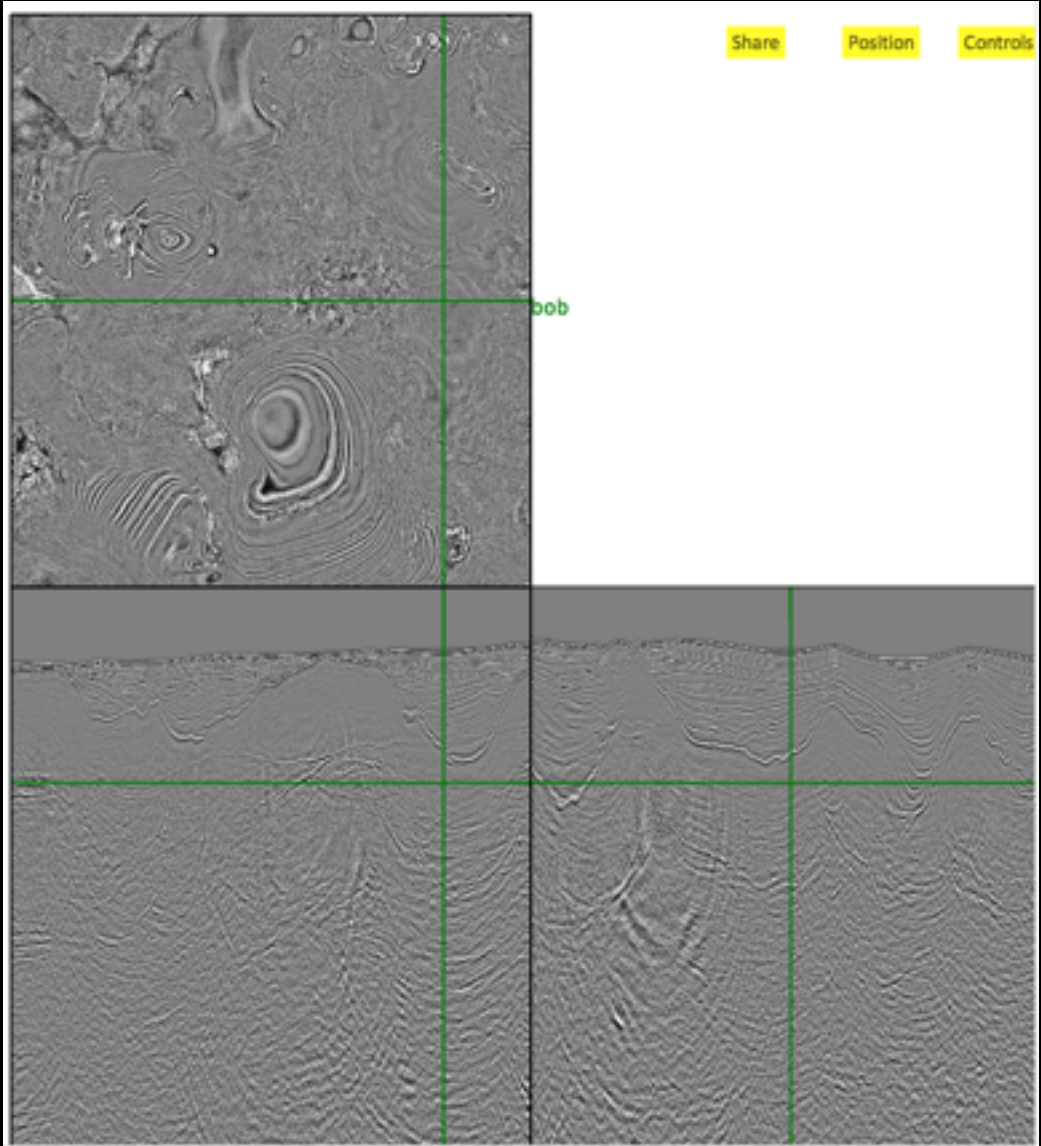


# Why part 1: Latency



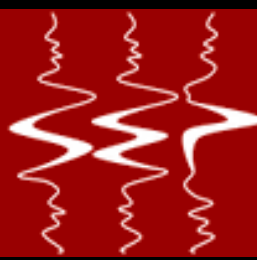


# Why part 1: Latency



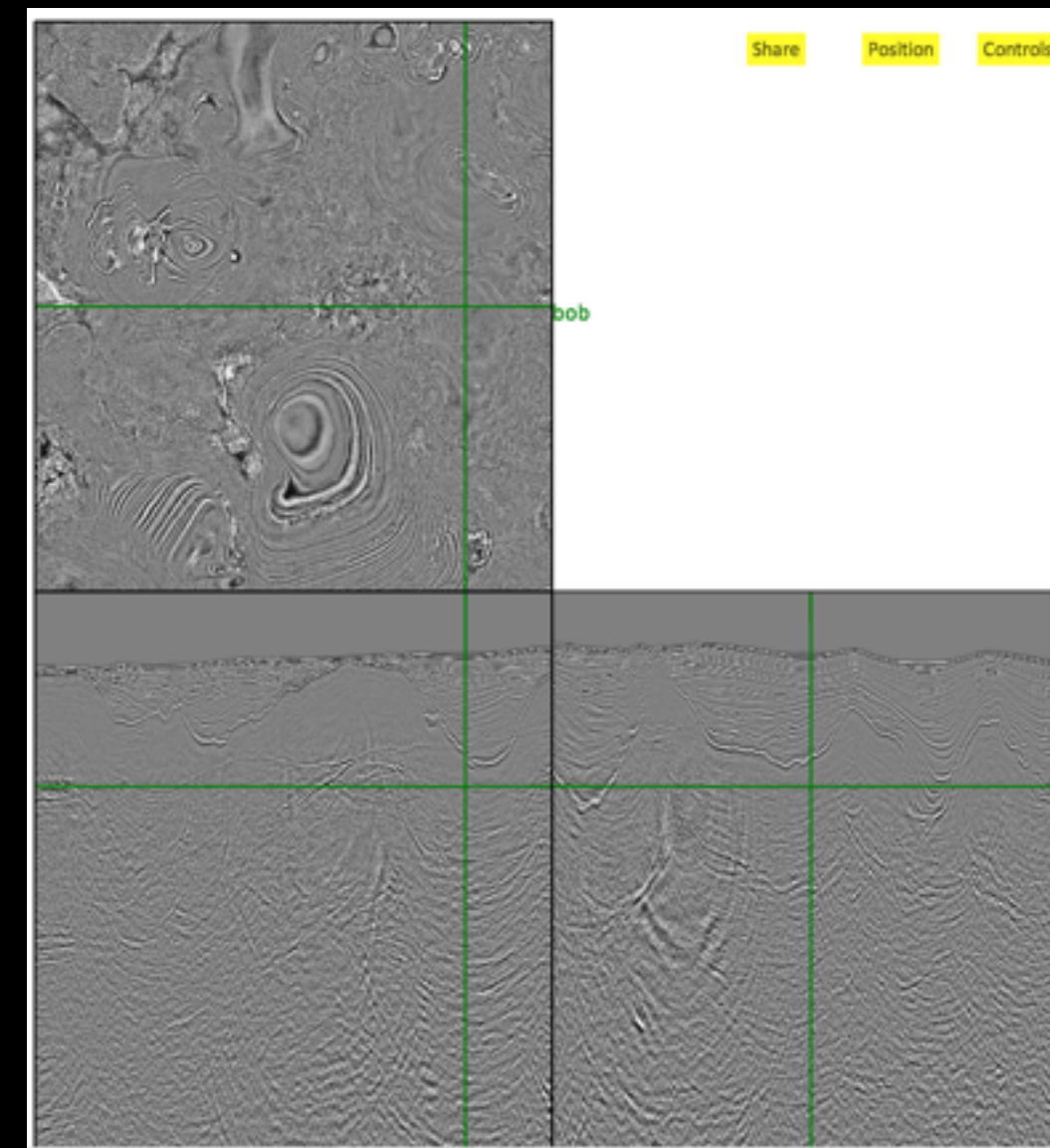
1995

2014



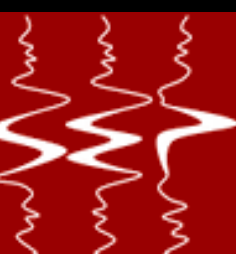


# Why part 1: Latency



Action	SSH	VNC
Establish connection	n/a	≈11s
Start Matlab (-nosplash)	9.6s	4.9s
Open edit window	2.9s	1.3s
Activate File menu	0.6s	0.1s
Activate Edit menu	0.6s	0.1s
Activate Text menu	0.5s	0.2s
Close edit window, redraw main window	1.5s	0.4s
Close matlab	0.5s	0.6s

<http://www.vis.lbl.gov/Events/SC08/RemoteX/index.html>





# Why part 2:

## Seismic data processing over time

Workstations

Cloud computing



1980s

1990s

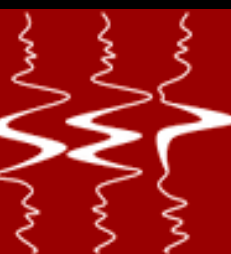
2000s

2010s



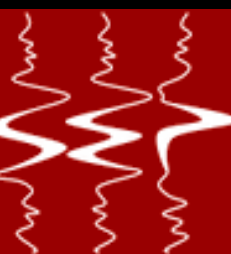
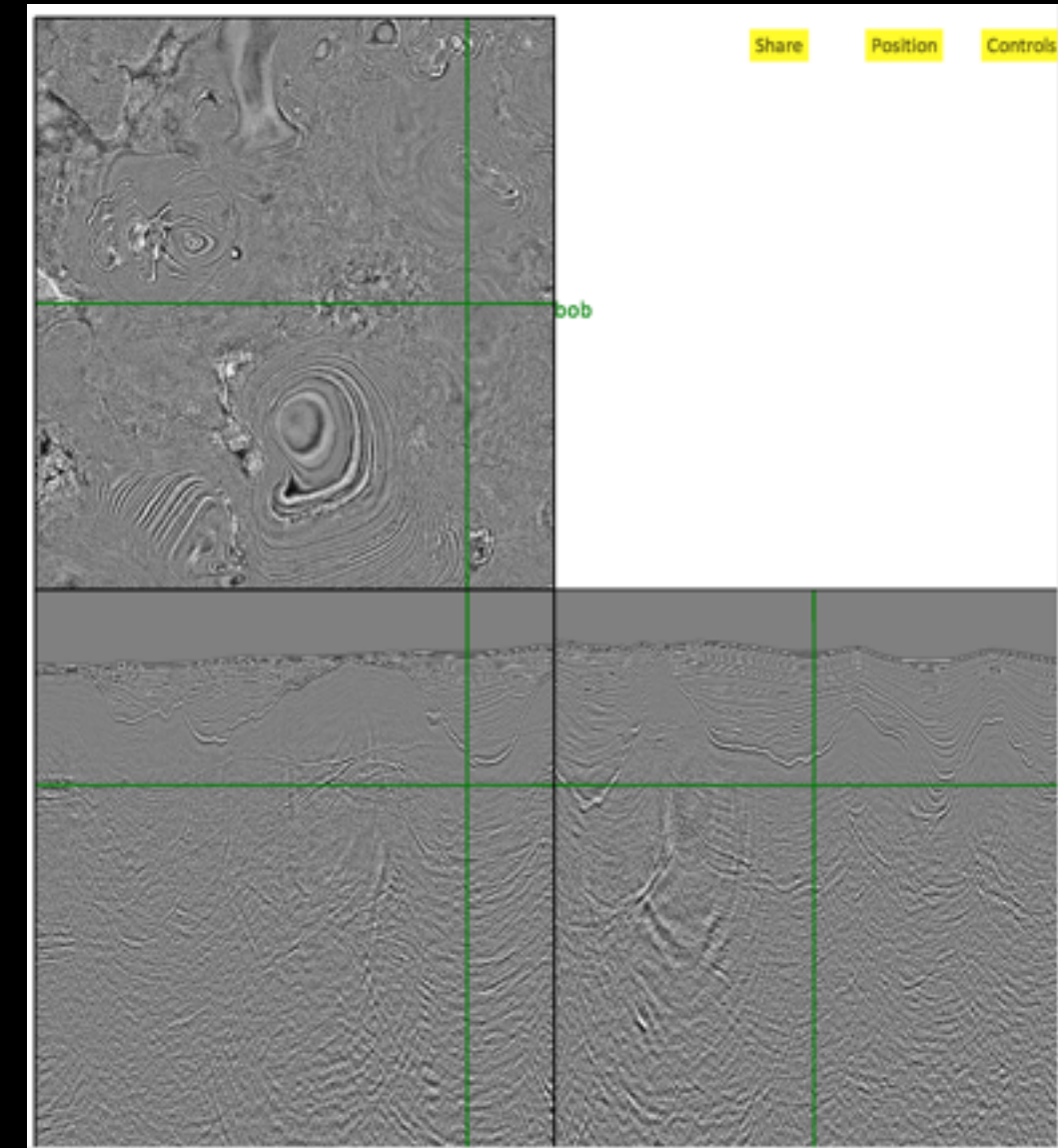
Mainframes

Linux clusters



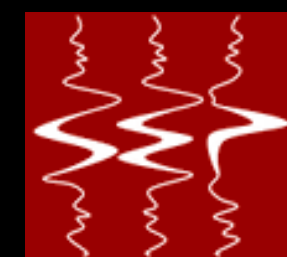
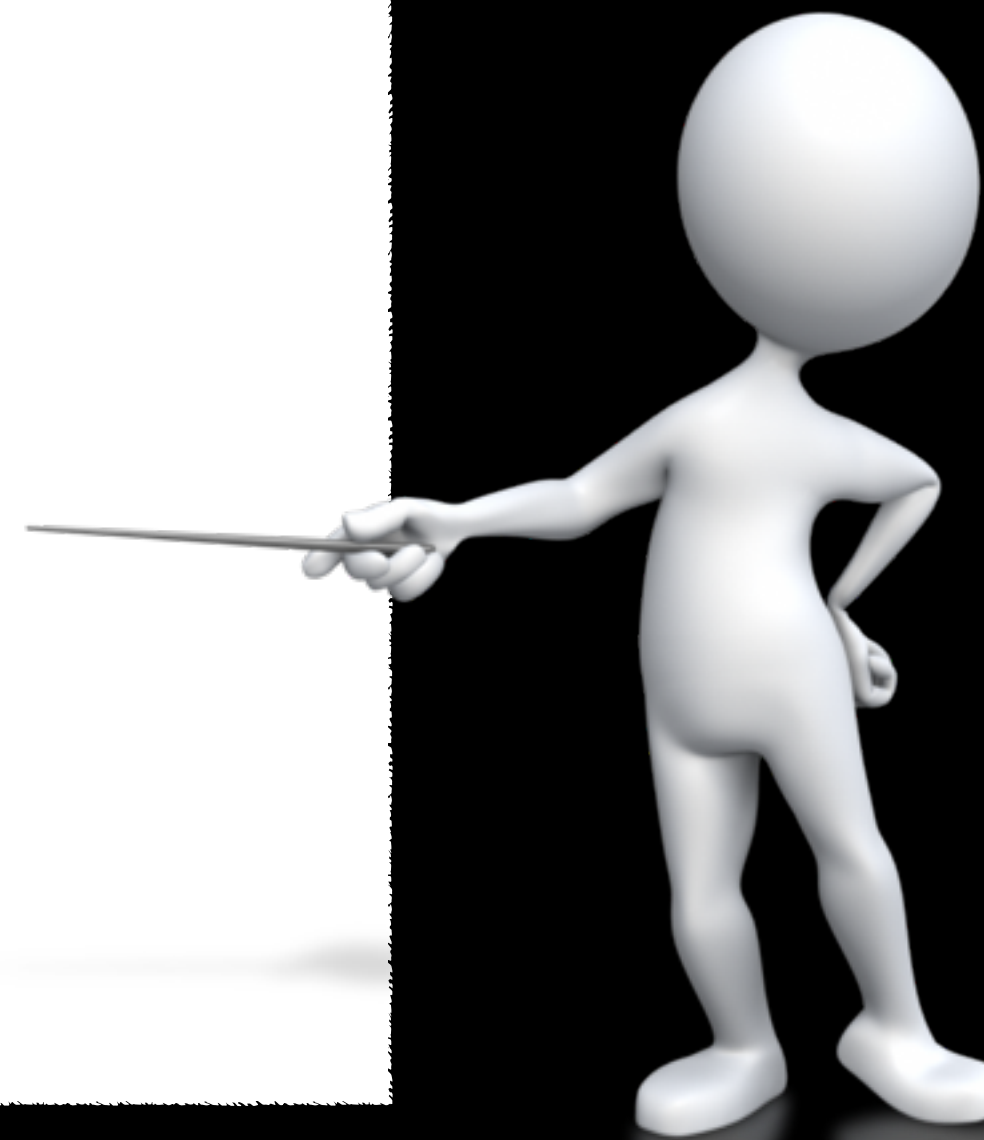
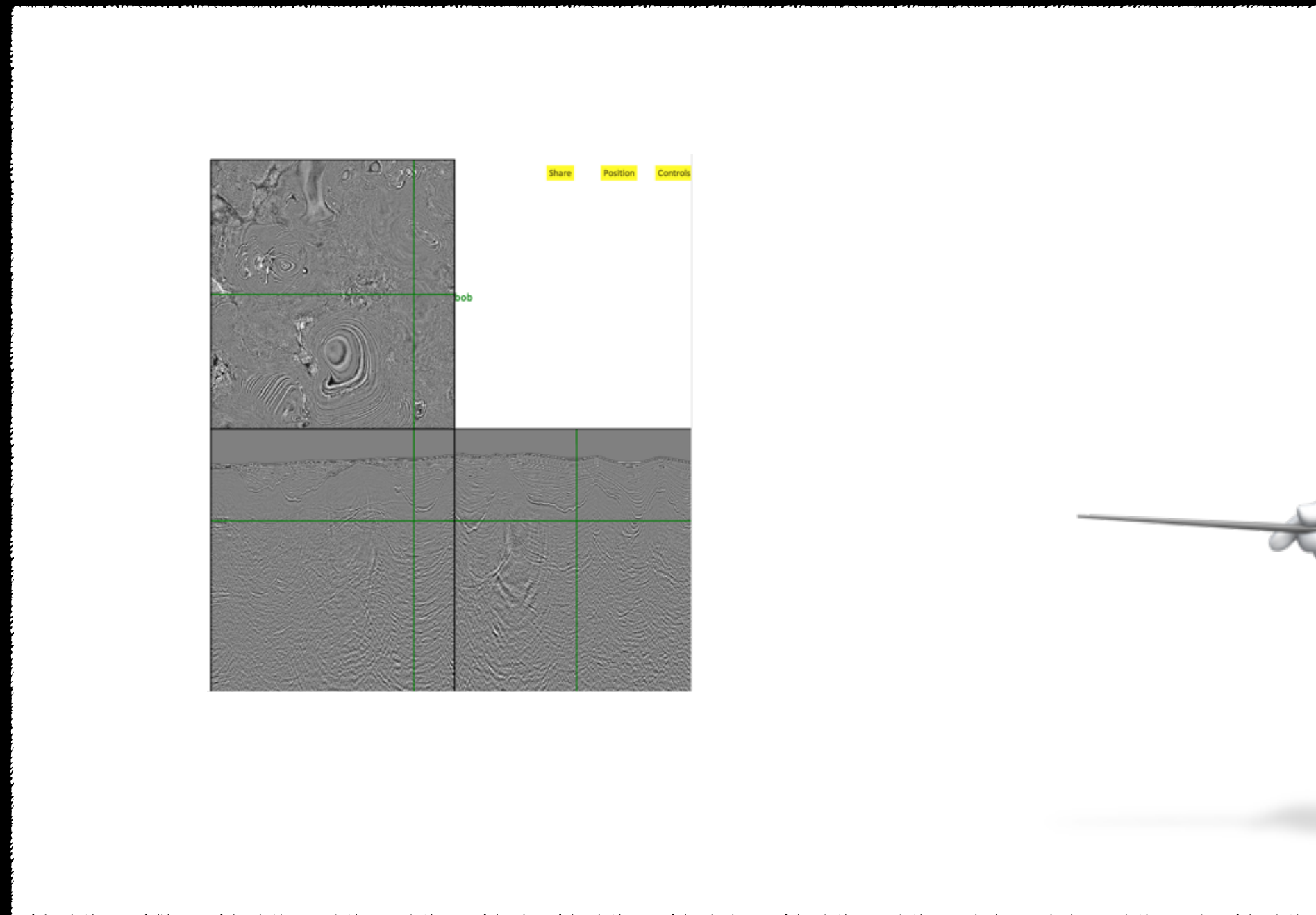
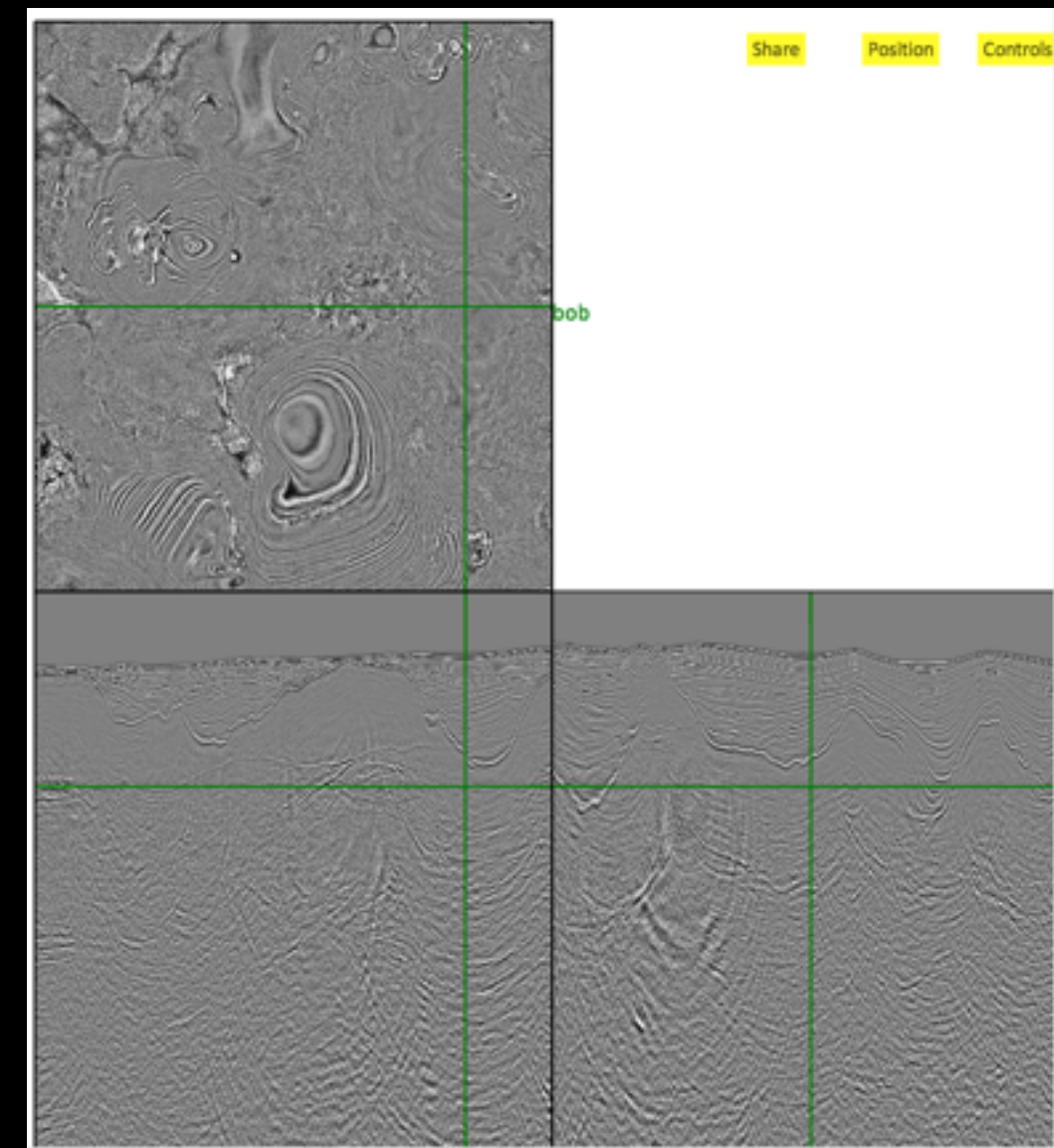


# Why part 3: Sharing results



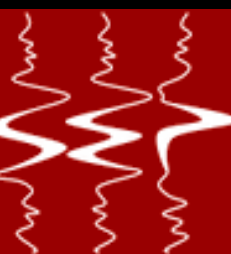
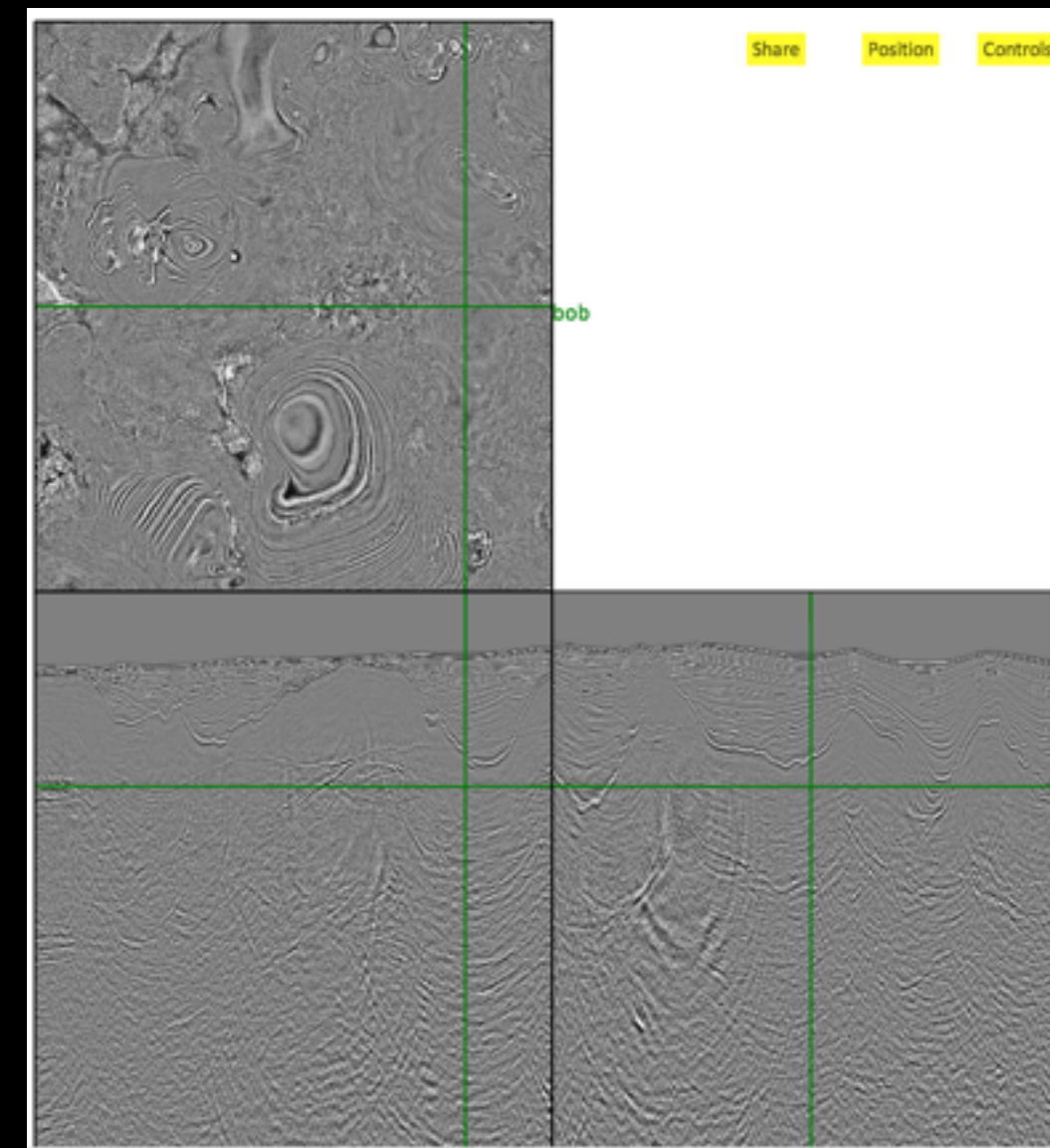


# Why SEP Past Seminars





# Why part 5: Computer devices have changed

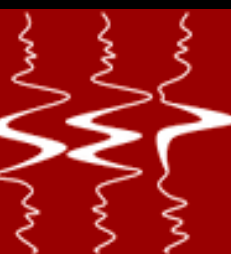




# HTML5



- Standard that allows browser independent development
- Hundreds of frameworks built on top of it for a variety of applications
- Support for video, two-way communication, touch devices





# Web based programming models



Server

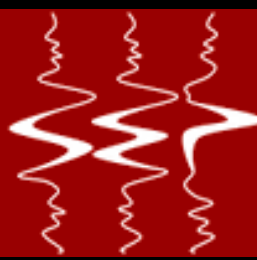


Client

Server



Clients





# Client vs Server

Advantages

Scalability

GUI responsiveness

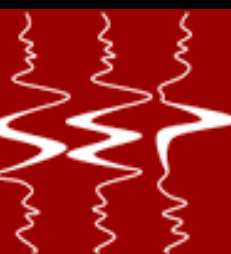
Security

Limited memory

Limited processing power

Data transfer speed

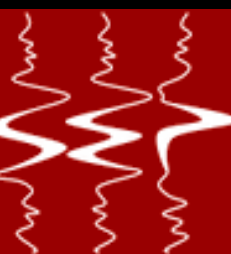
Disadvantages





# Server

- Handles security (later)
- Loads data into memory on client request
- Tells client about data
- Returns data slices based on client requests

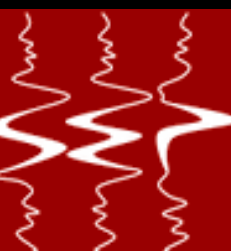




# Client

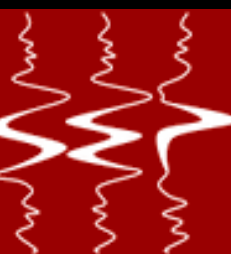
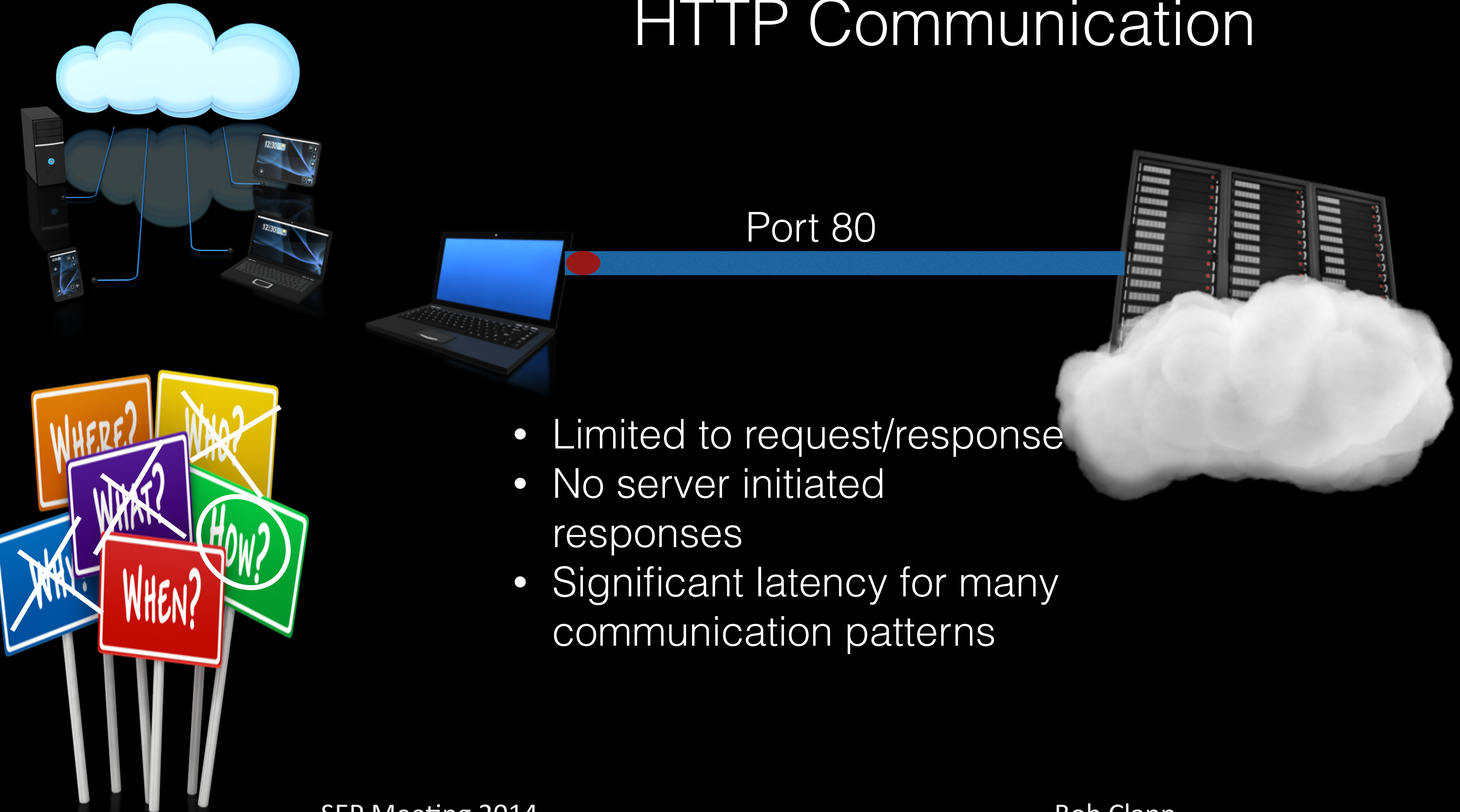


- Requests specific dataset
- GUI built based on dataset parameters
- Tells server what slice(s) it wishes to view of the data



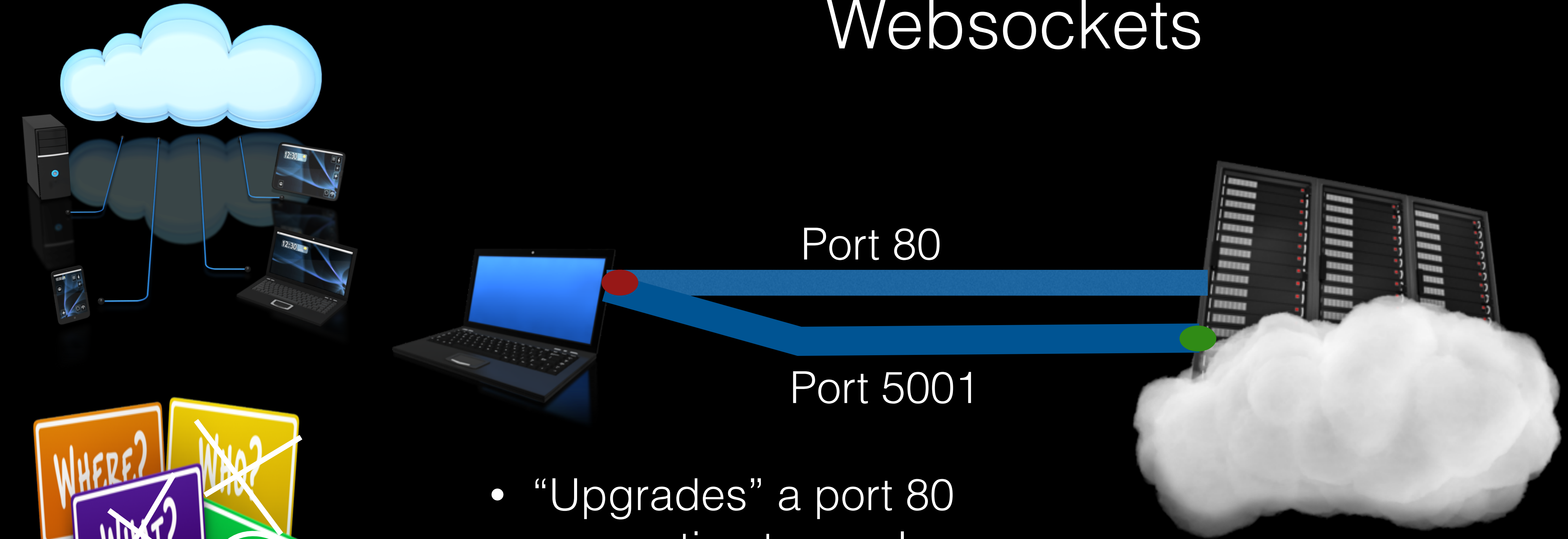


# HTTP Communication

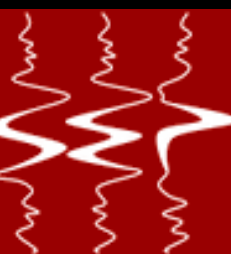




# Websockets



- “Upgrades” a port 80 connection to an always open pipe
- Allows bi-directional communication

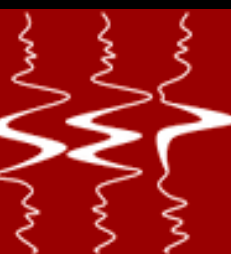




# Security

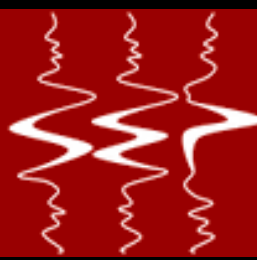
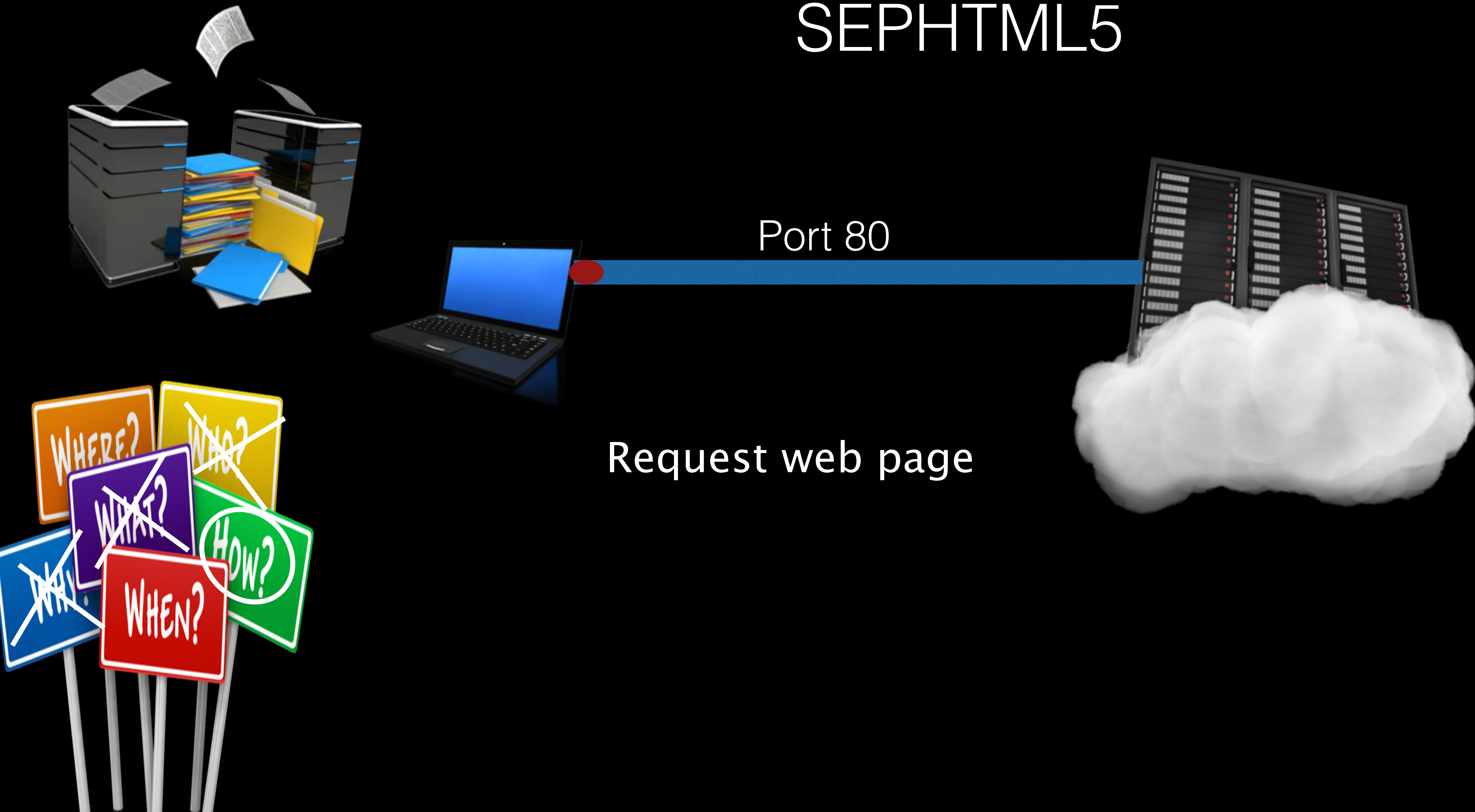


- User based login that returns a null page with incorrect credentials
- Login name is linked to a database that gives access to specific datasets based on username



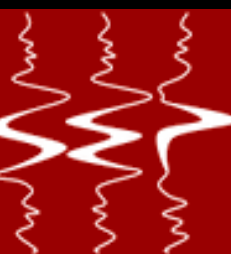
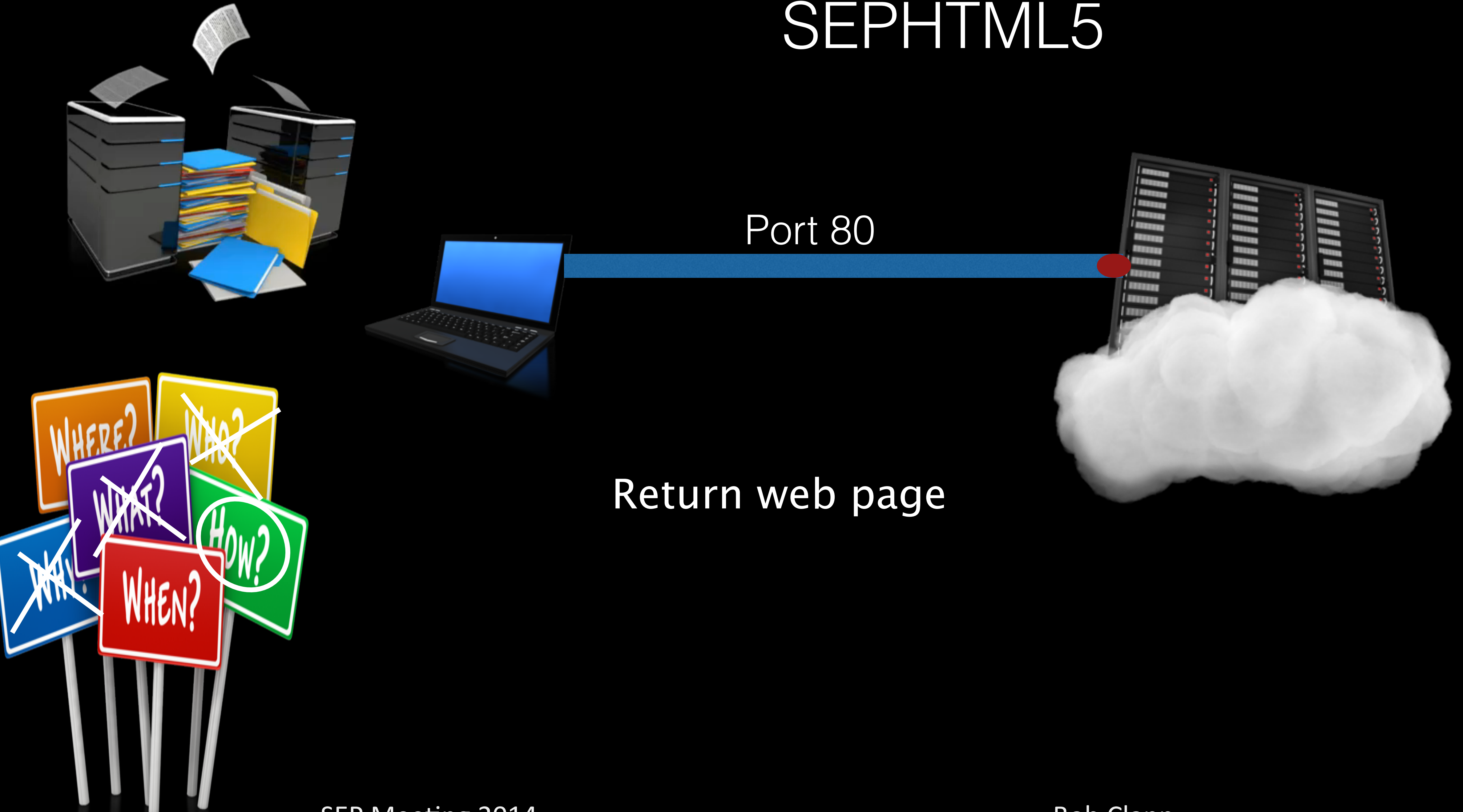


# SEPHTML5



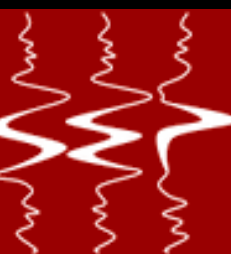
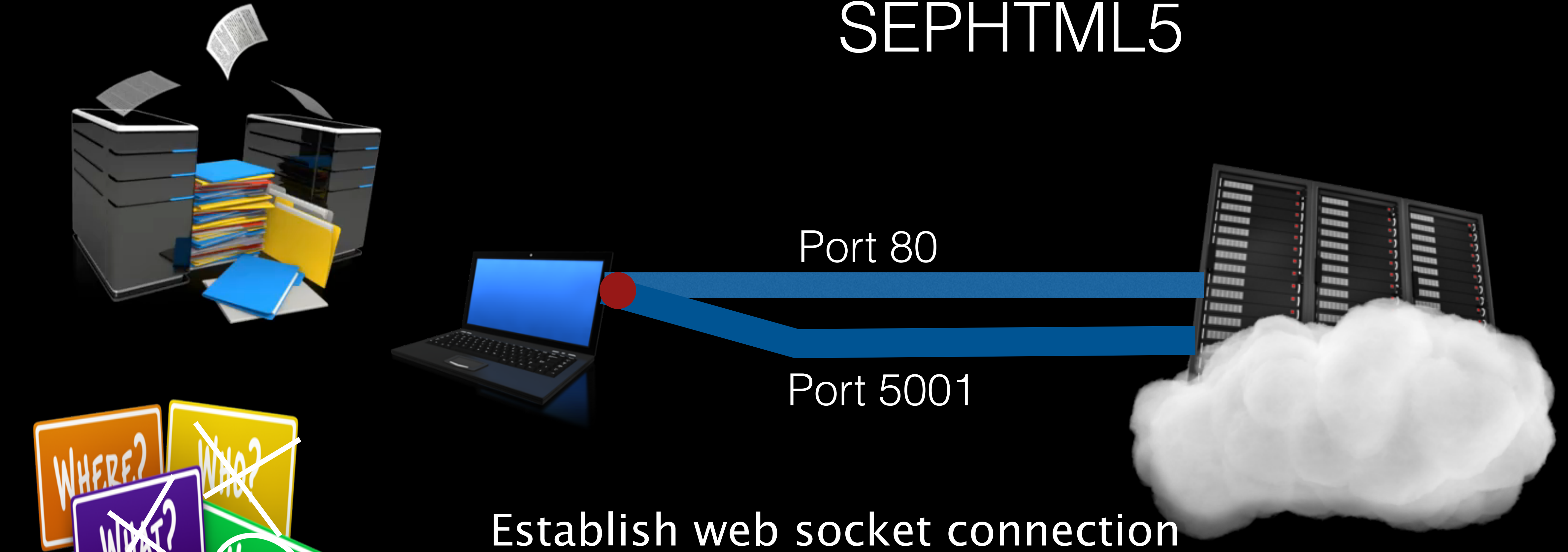


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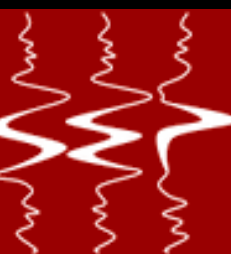
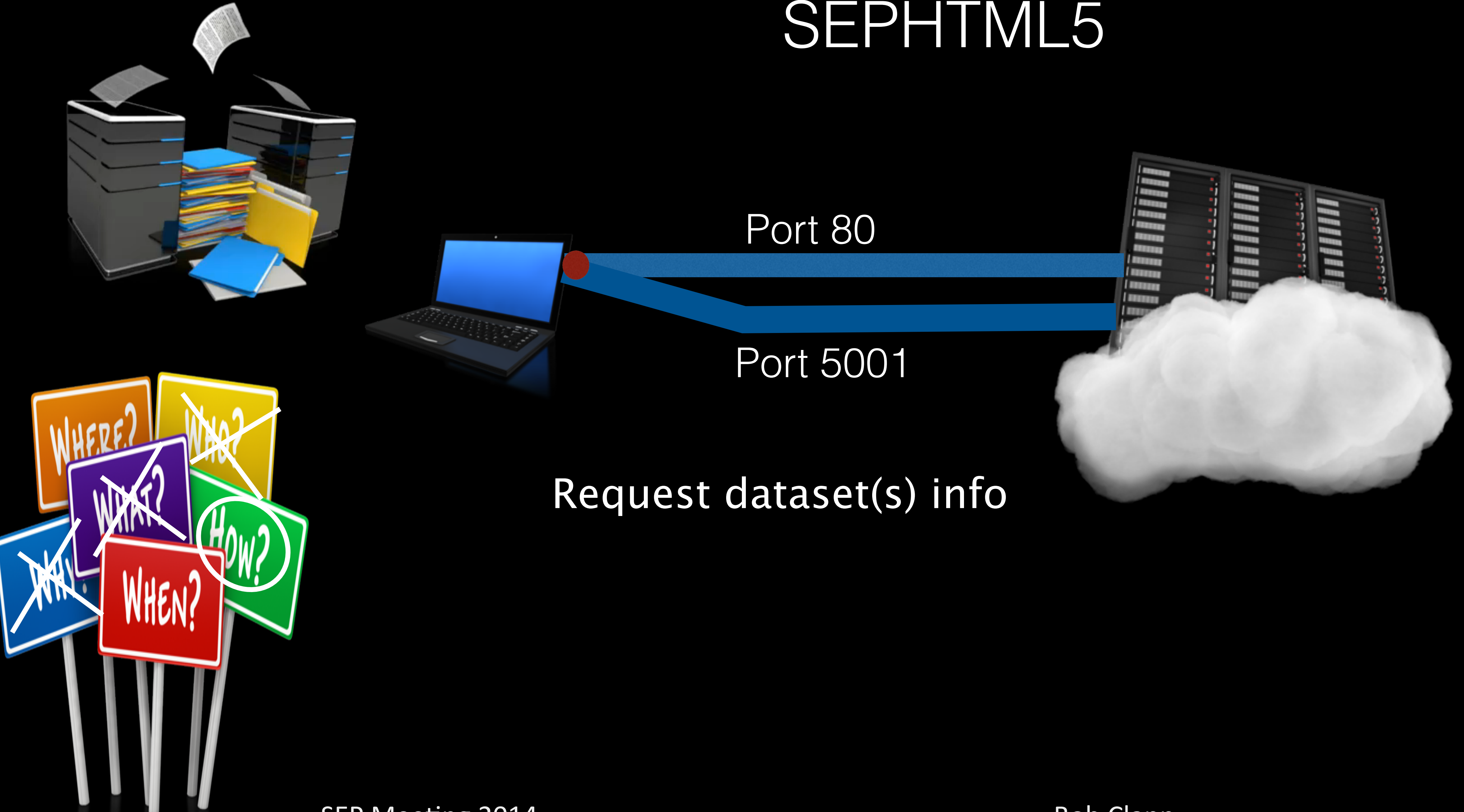


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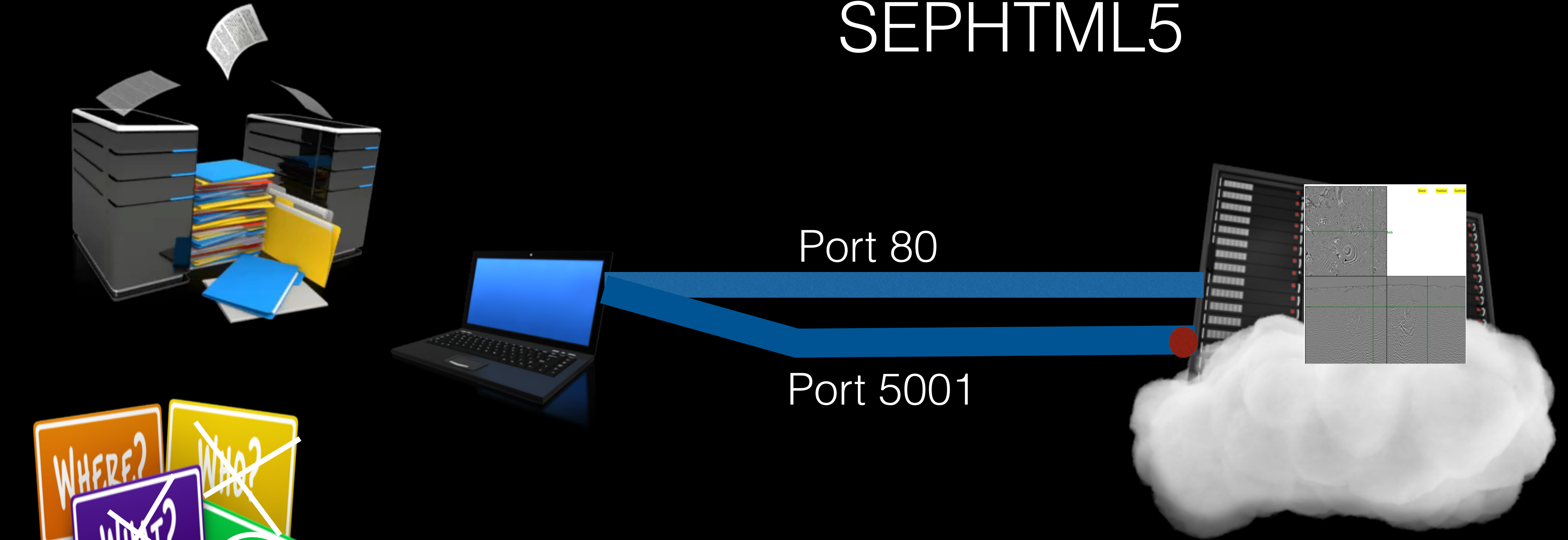


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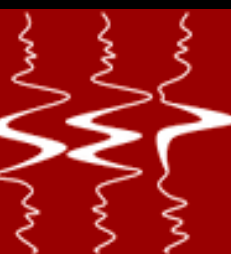




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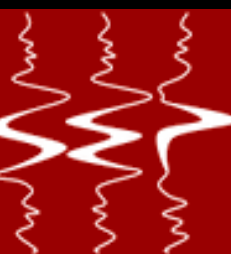
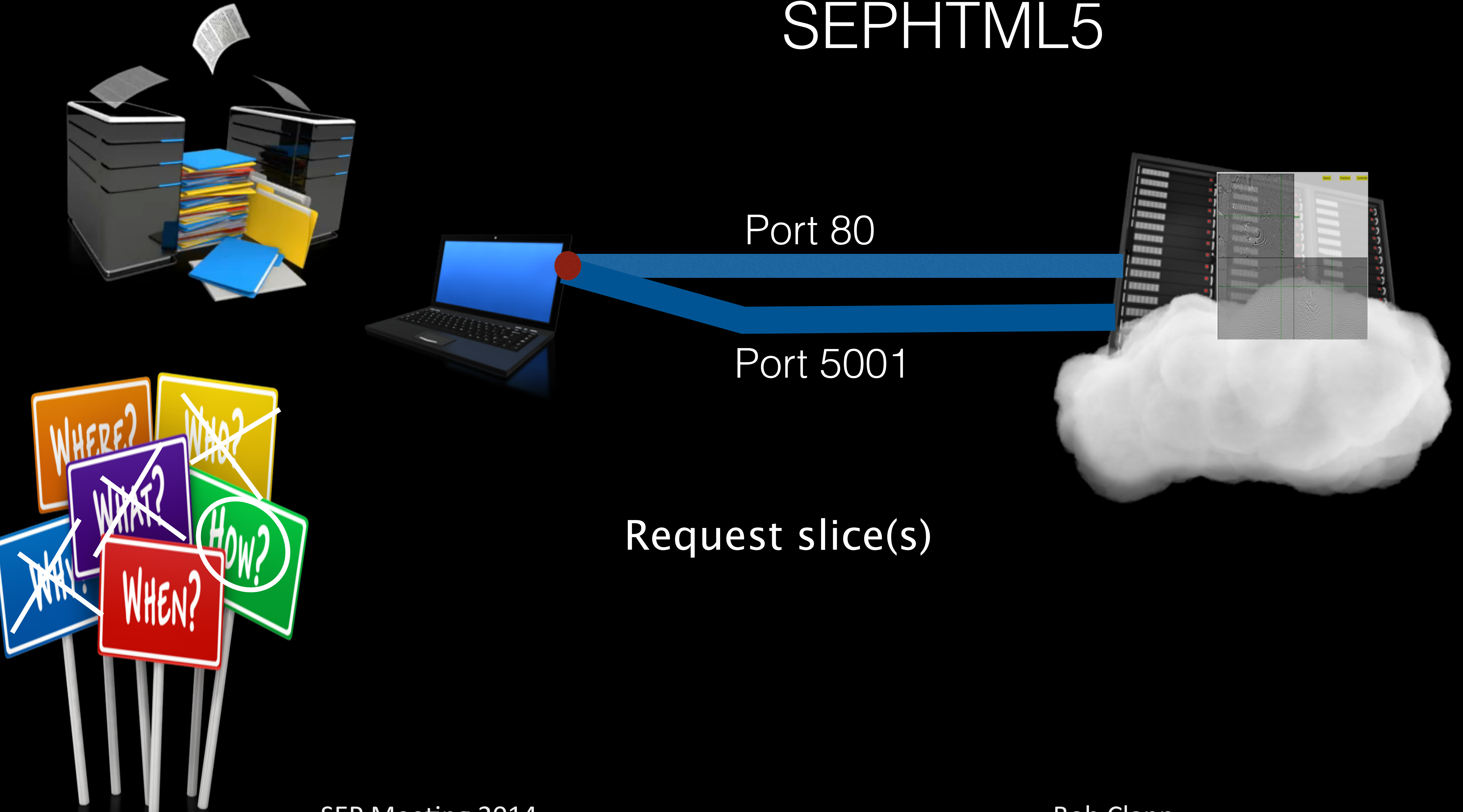


Load dataset(s) and return description



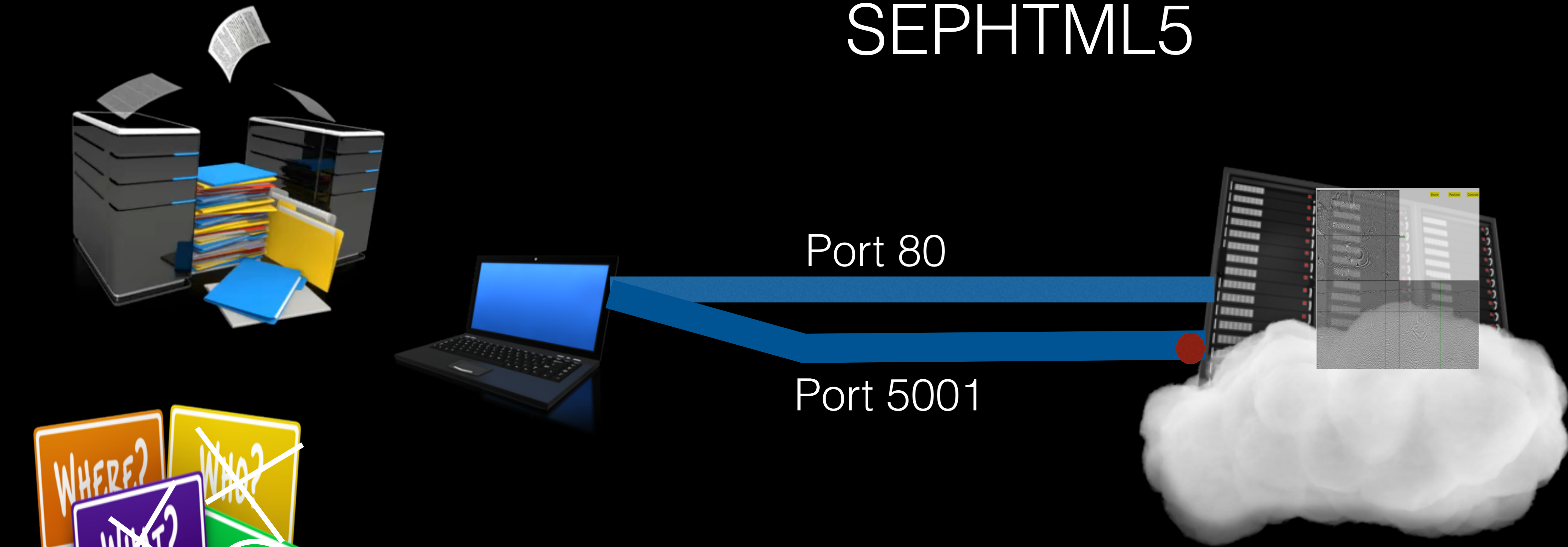


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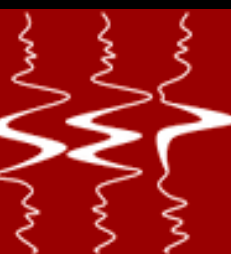




# SEPHTML5



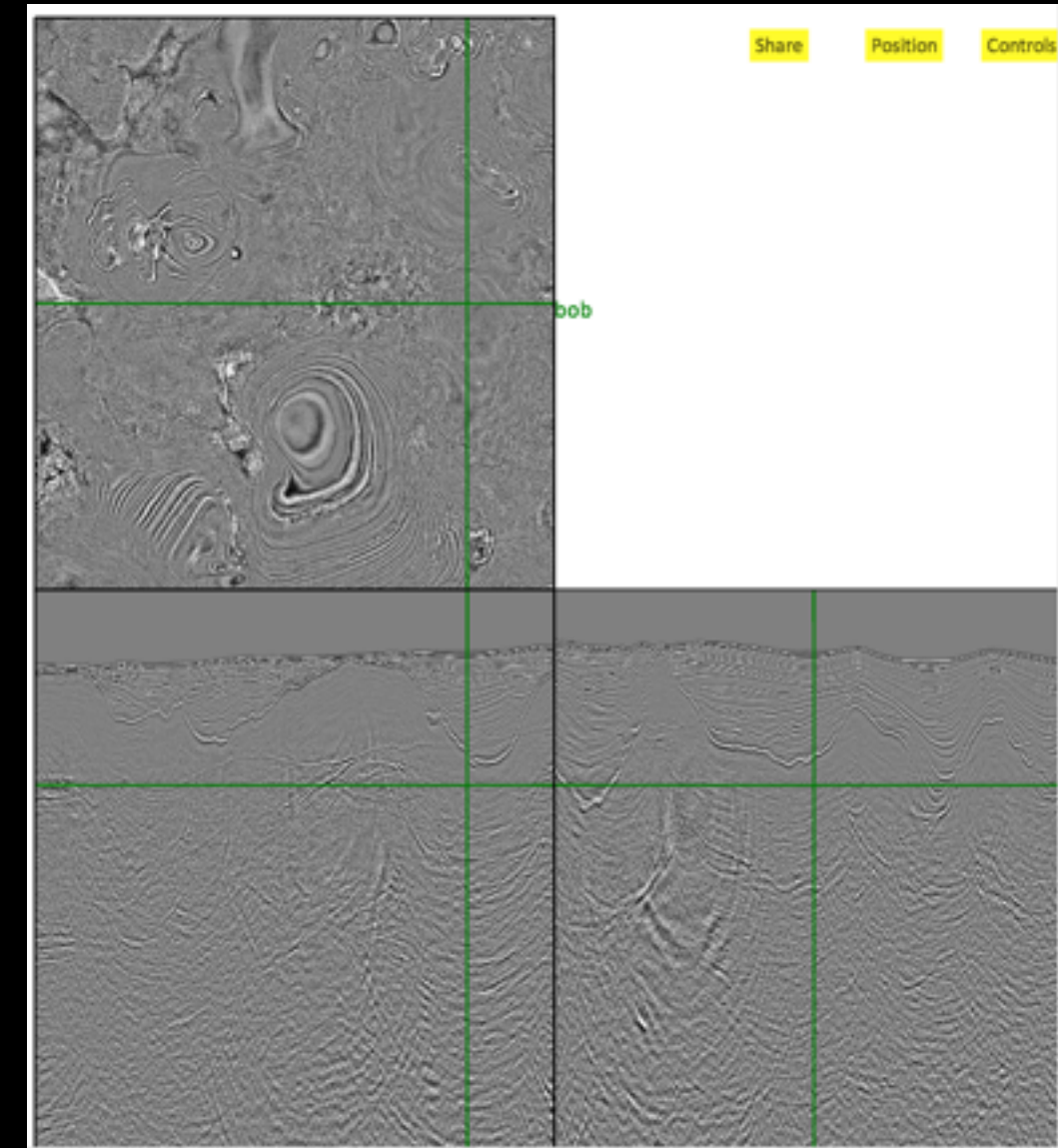
Convert slice(s) to jpeg  
Send slice(s) to client





# Movie program

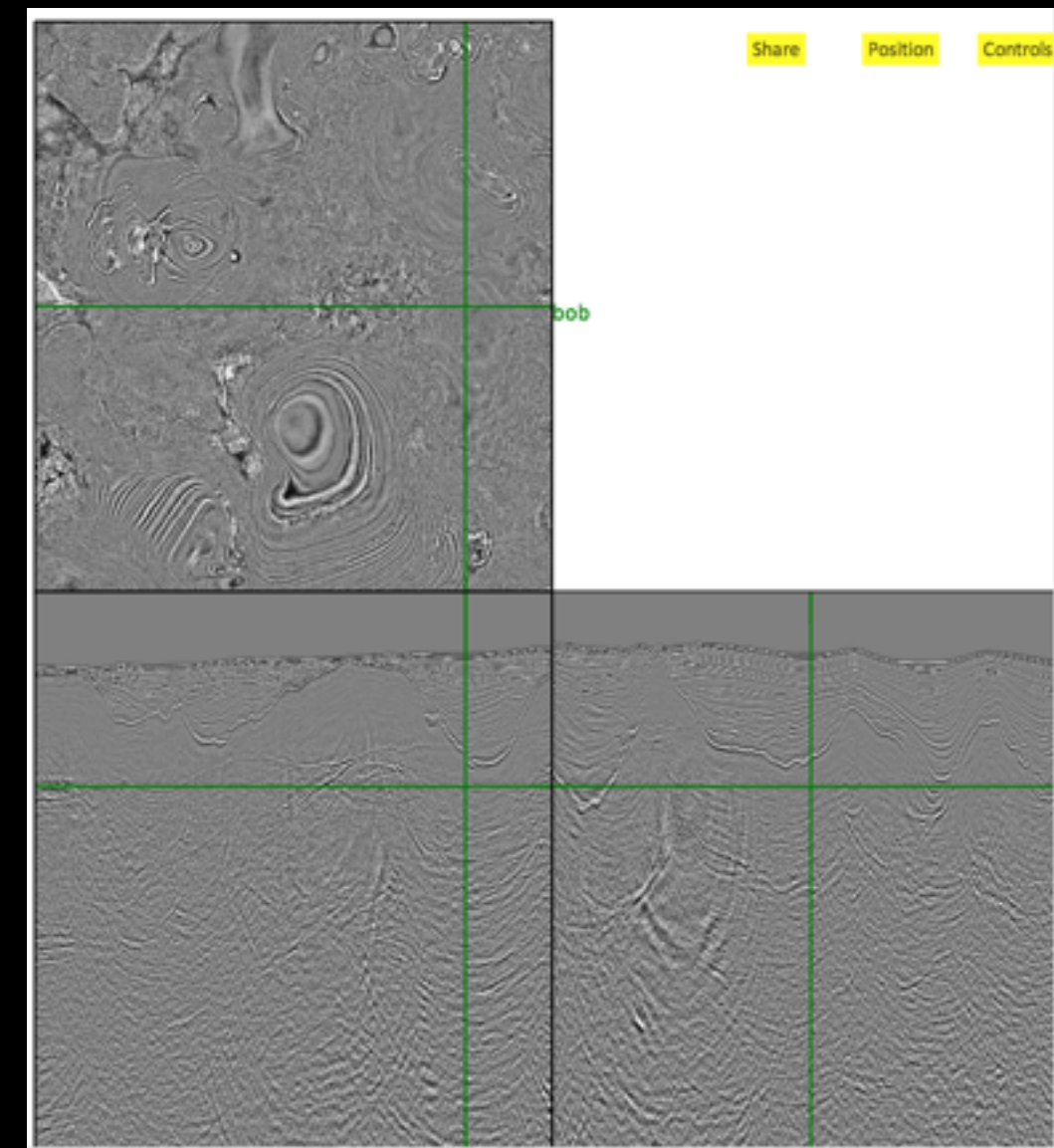
- Support more than 3-D
- More data formats
- Transposing
- Picking
- Send video rather a series of images for movies





# Frame viewer

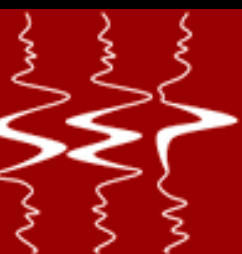
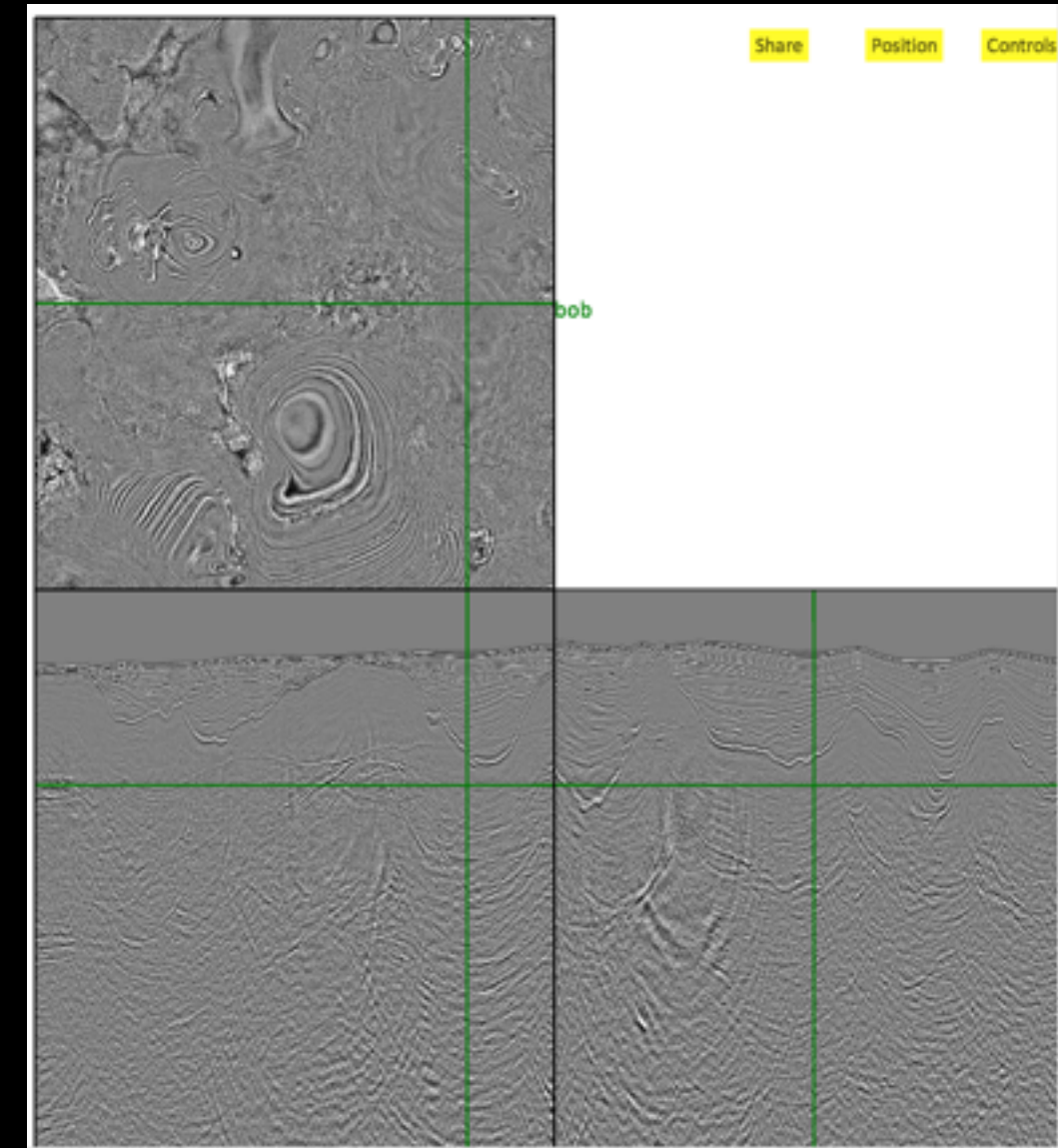
- Zooming
- Interactive clipping
- 3-D cubes





# Sharing

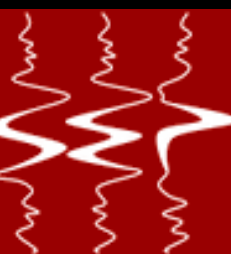
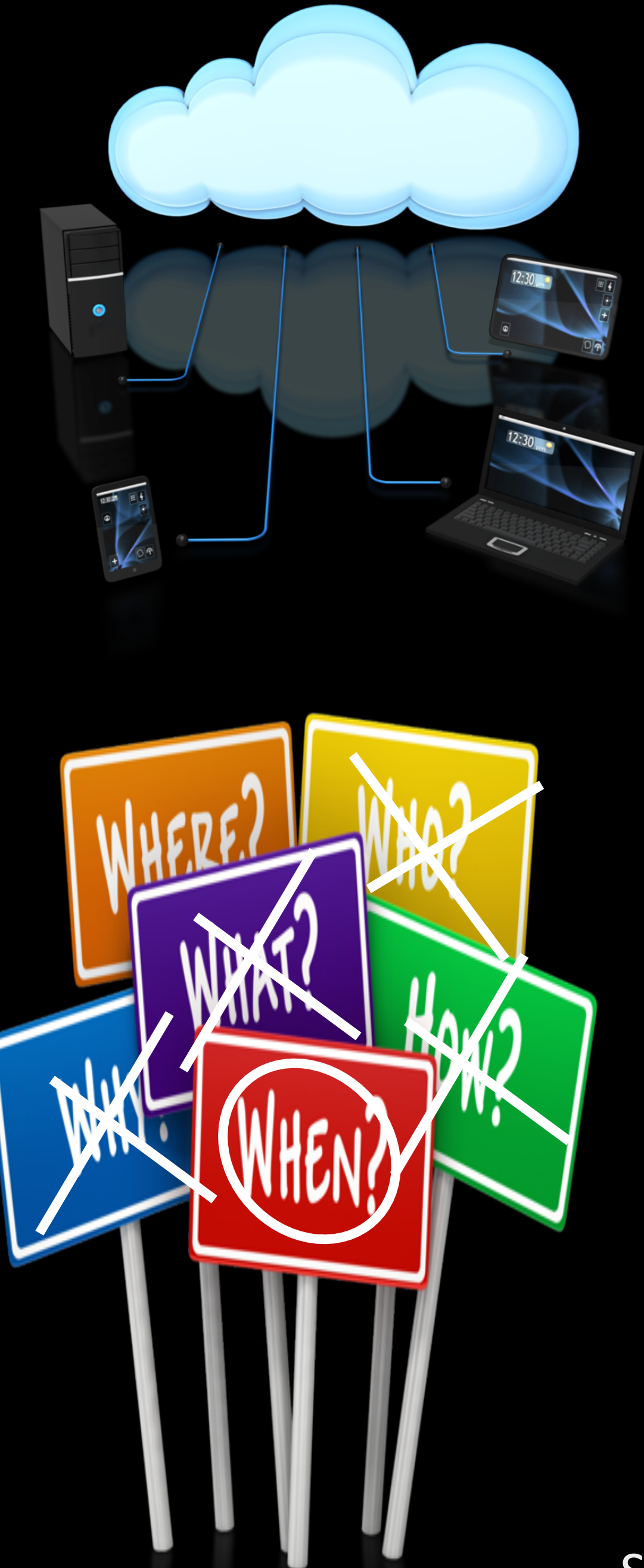
- Allow user to broadcast display
- Allow other users to choose to link to master display (see changes automatically)





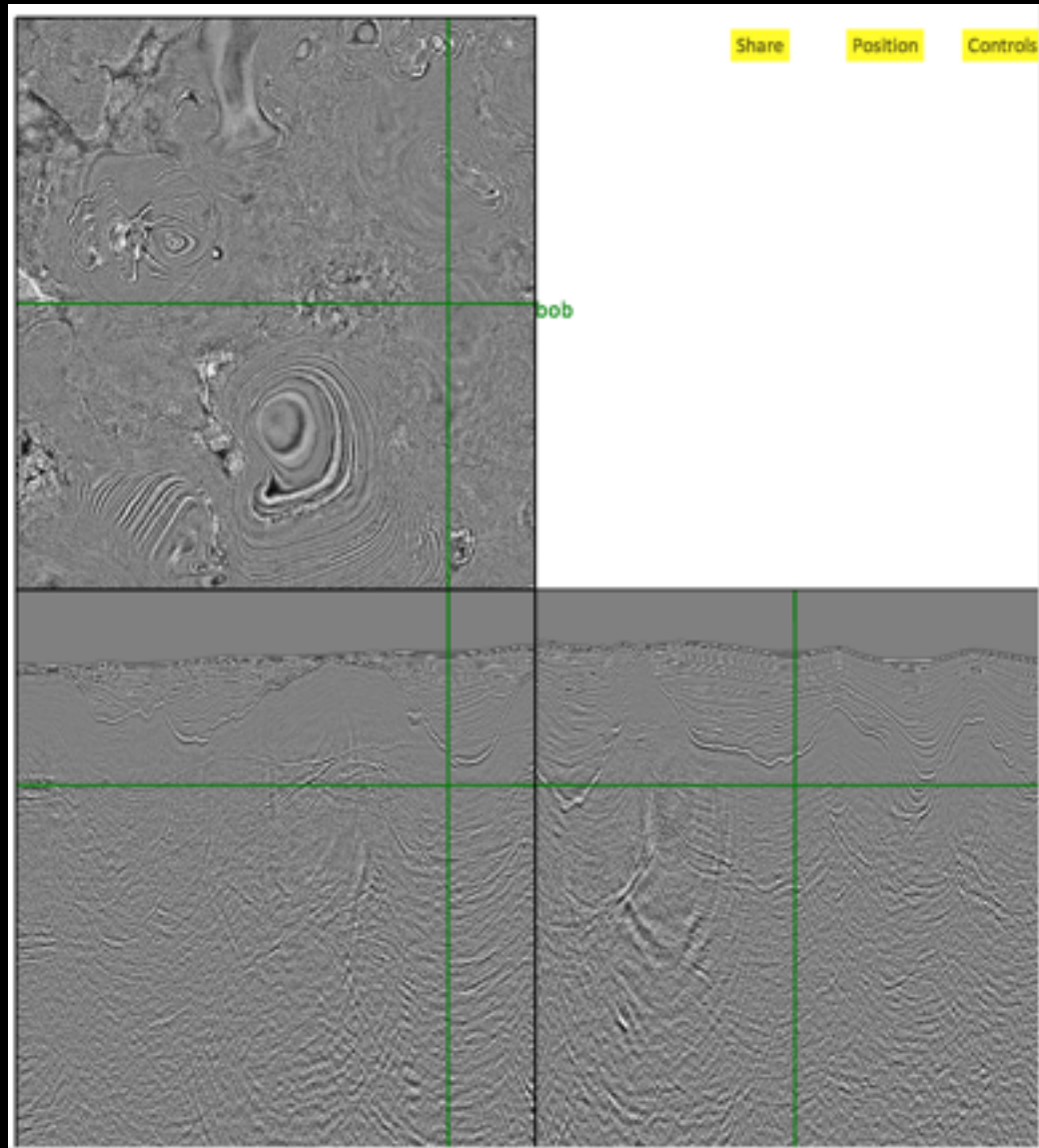
# Interactive processing

- View based (only update what is needed for current display) processing
- Heavy processing possible given cloud based back end
- First example Hessian based regularization





# Example



<http://sep.stanford.edu/sep/bob/demo.php>

