

Prototype Extension to NWS AWIPS II in Support of Collaboration with External Partners using Web Technologies

Dan Schaffer (CIRA)

Herb Grote (CIRA)

Xiangbao Jing (CIRES)

Joe Wakefield (NOAA)

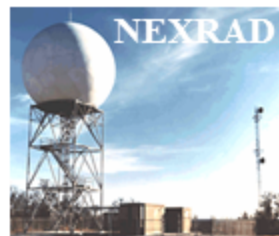
Outline

- AWIPS/Collaboration Overview
- Architecture
- Challenges
- Technologies
- Software Engineering
- Future directions
- Demo

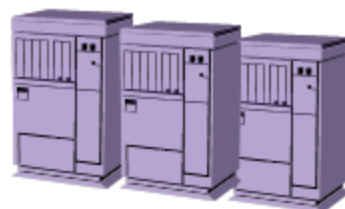


AWIPS Functions

The Critical Link to NWS Forecasters



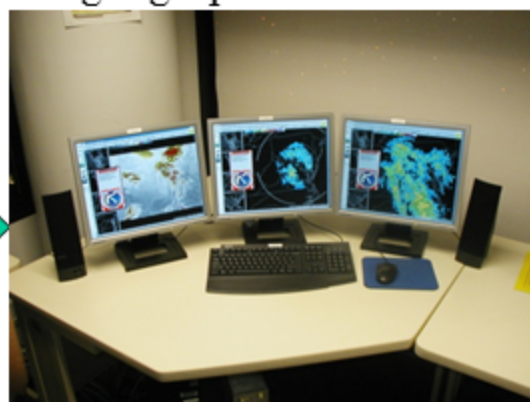
GOES/POES



NCEP
Models

AWIPS
Communications

169 separate AWIPS systems at
137 geographical locations



**AWIPS Workstations and
Servers**

~900 Workstations (total)
~1200 Servers (total)

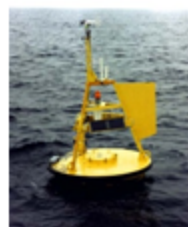
Warnings

Watches

Advisories

Forecasts

Service provided
to
3066 US Counties
24 hrs/day,
365 days/yr

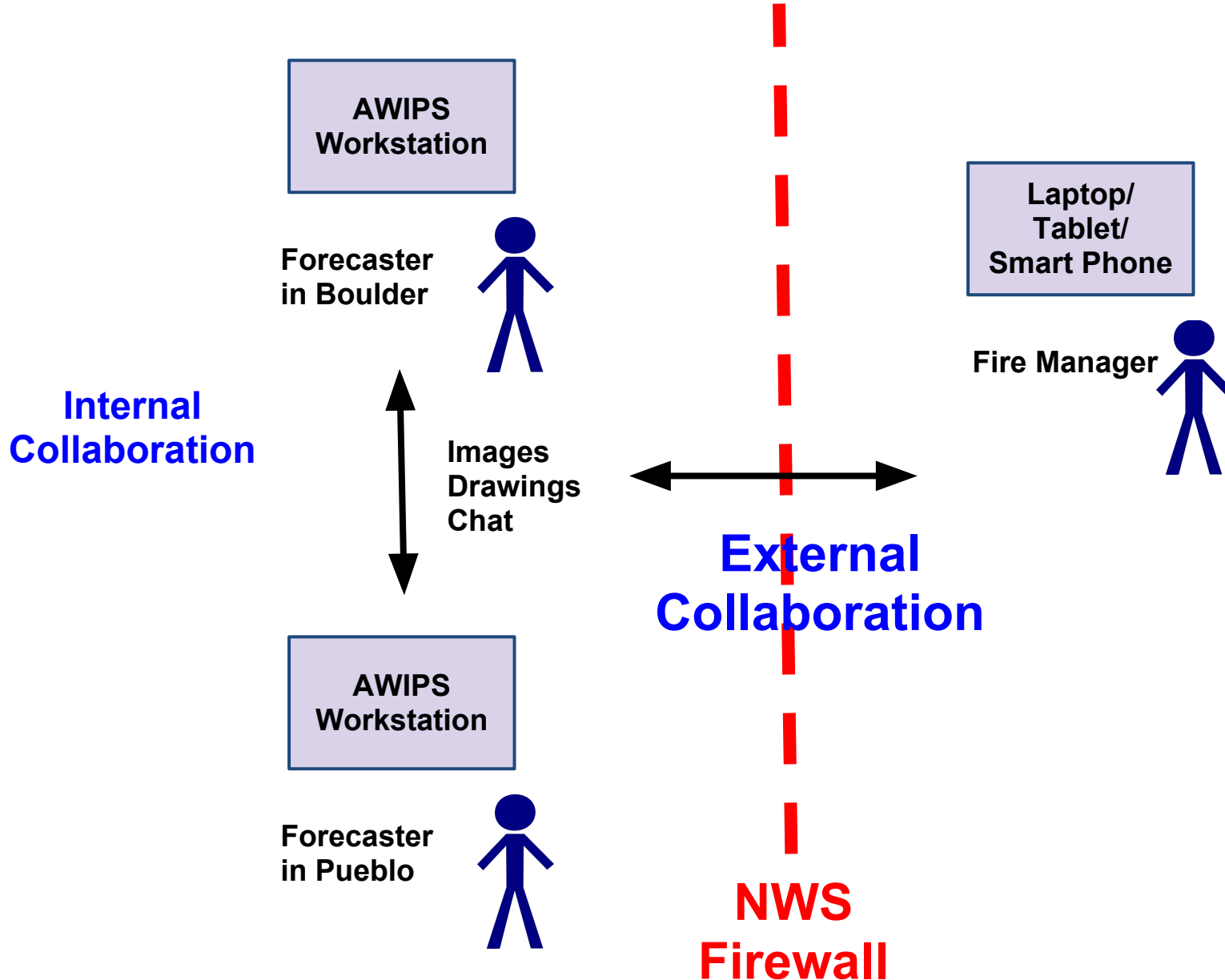


Buoys,
River Gauges

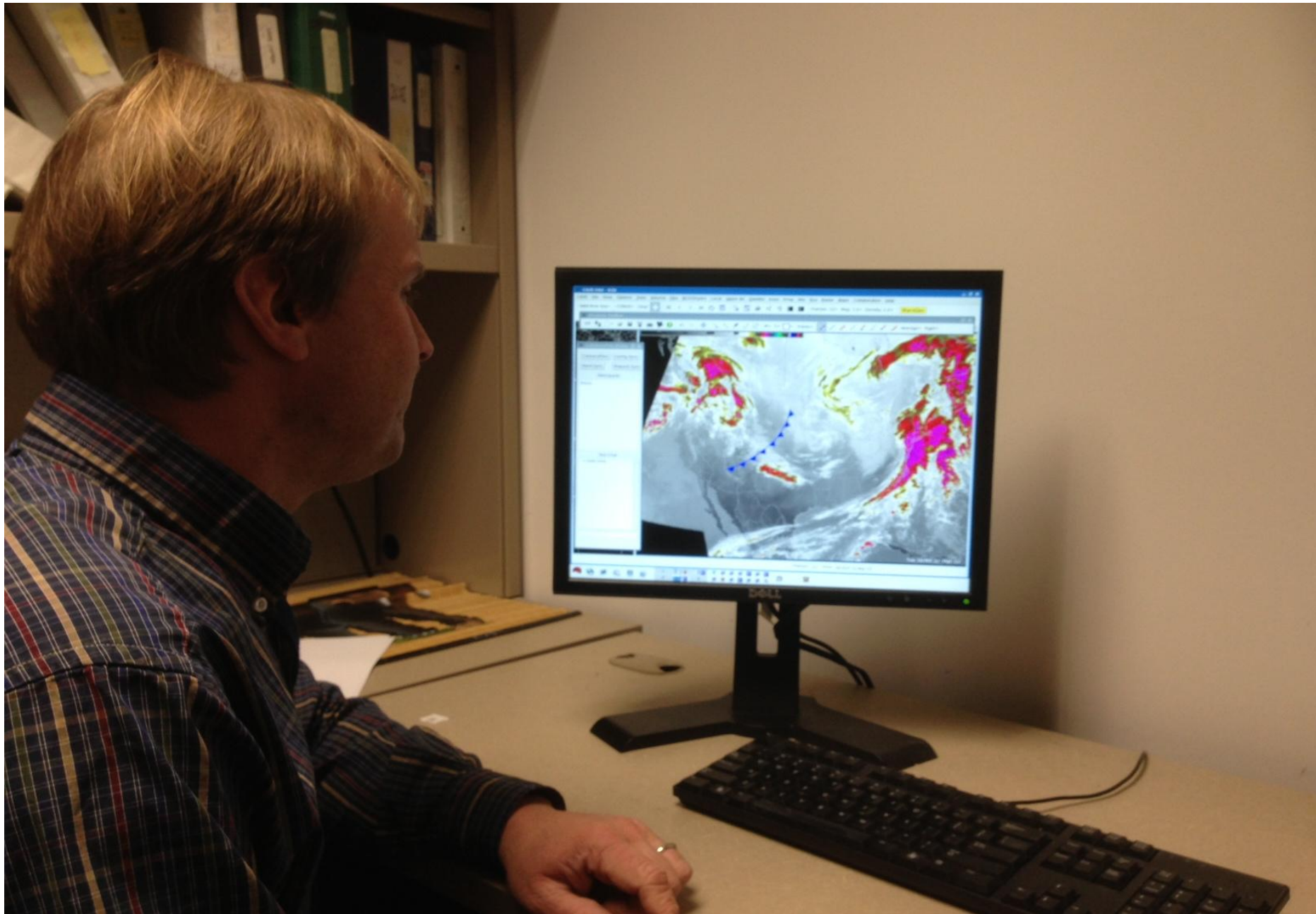


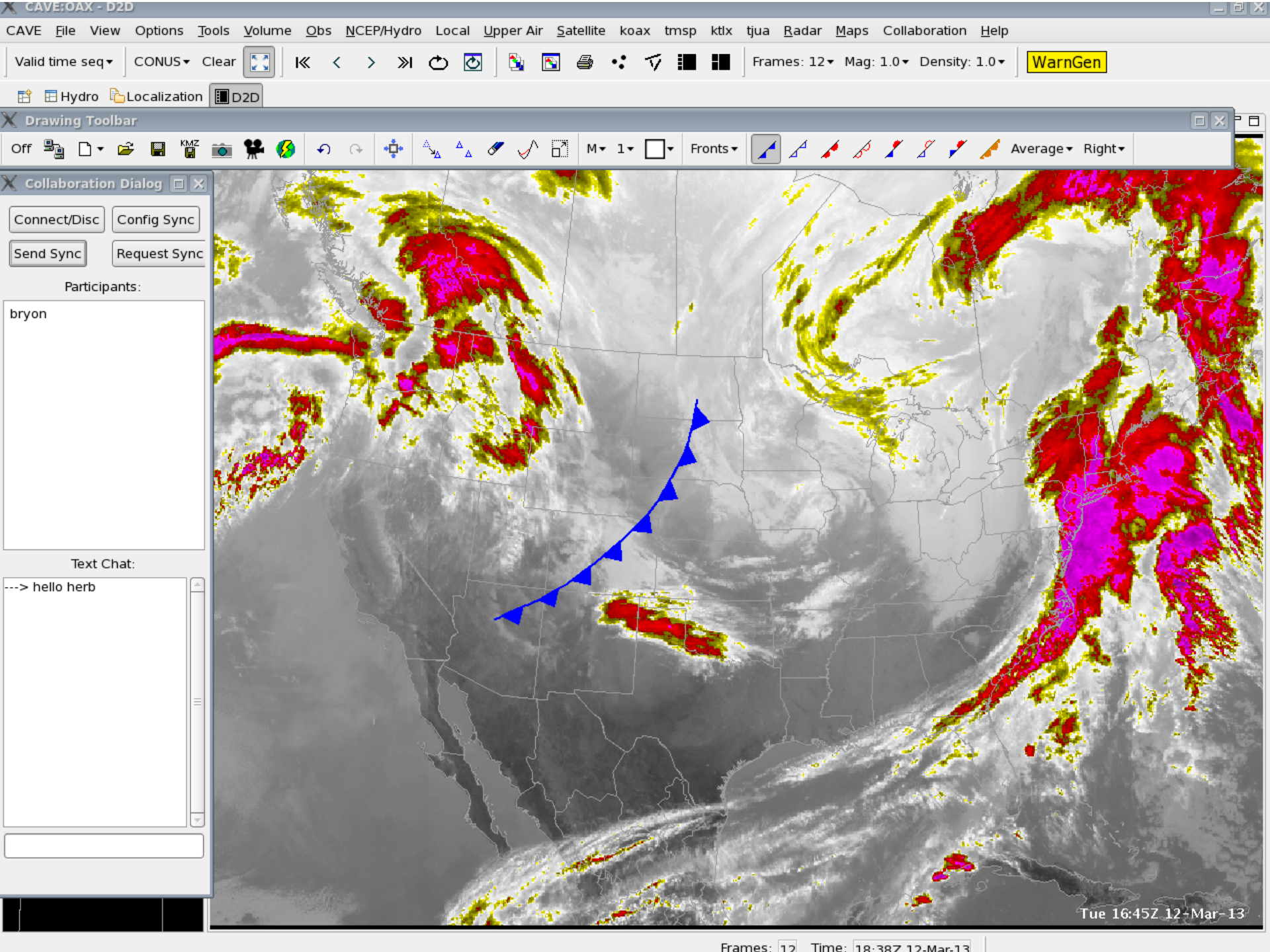
ASOS

AWIPS II Extensions

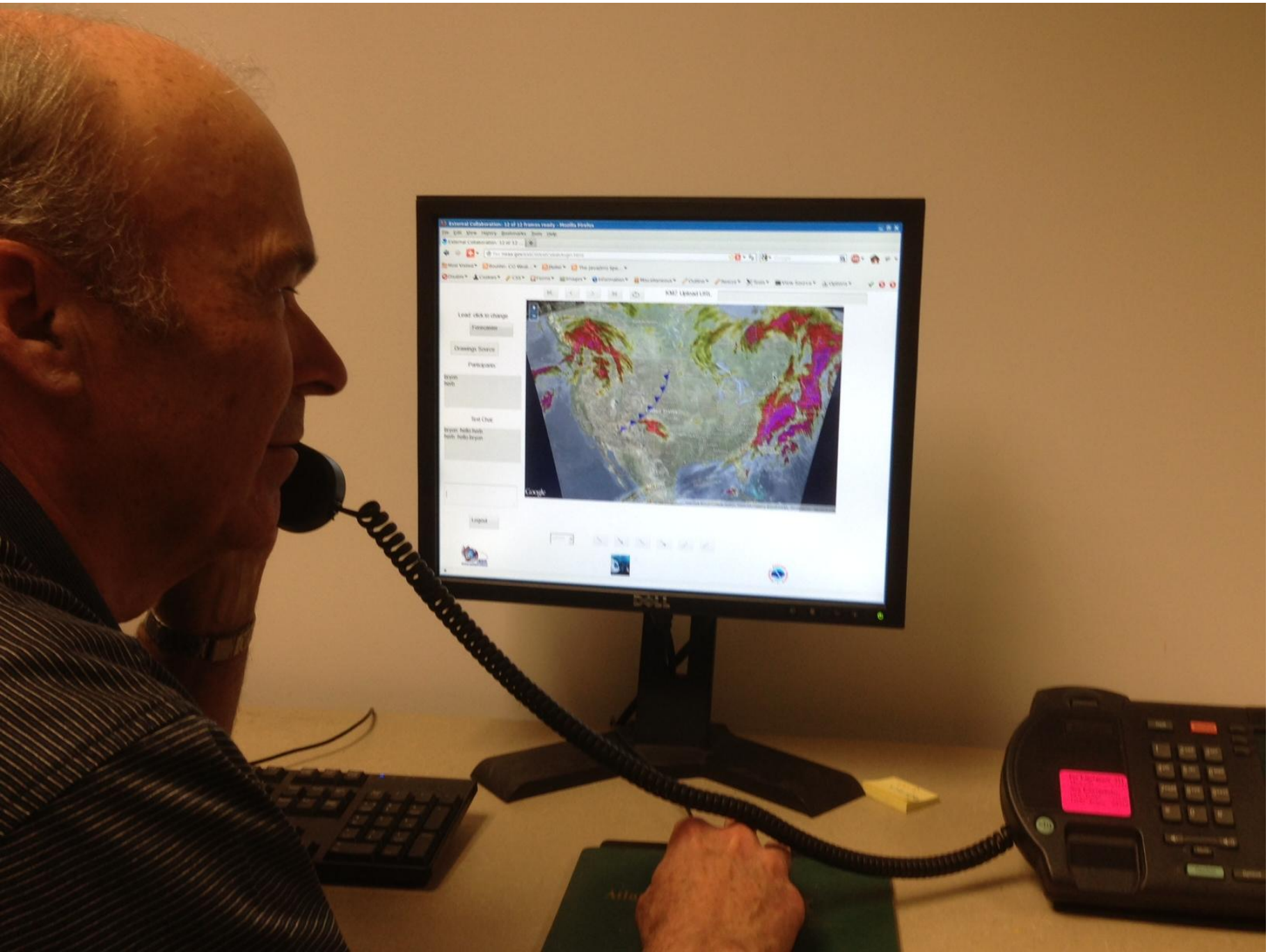


NWS Forecaster





Fire Manager



Navigation icons: Previous, Back, Forward, Next, Refresh

KMZ Upload URL

Lead: click to change

Forecaster

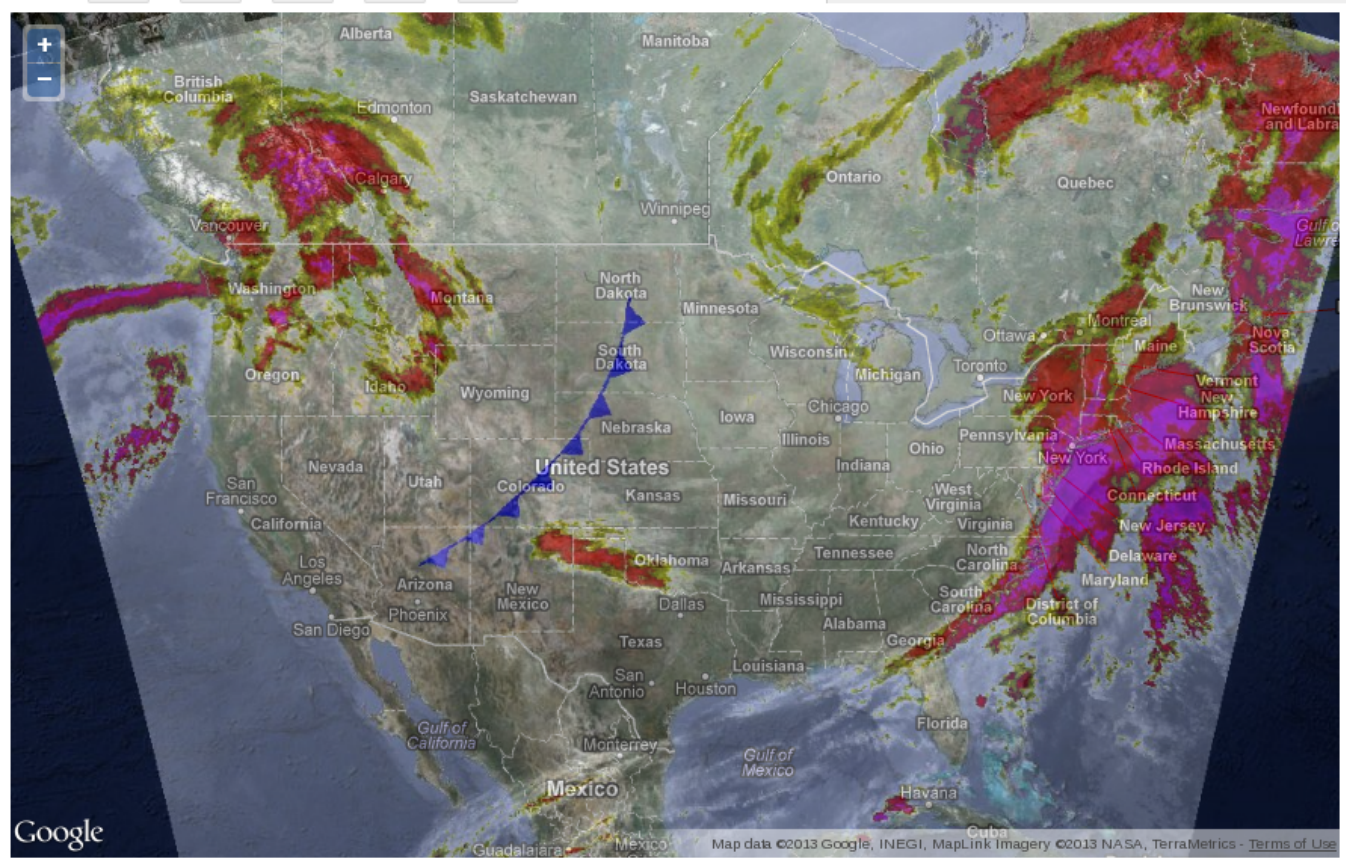
Drawings Source

Participants:

bryon
herb

Text Chat:

Logout

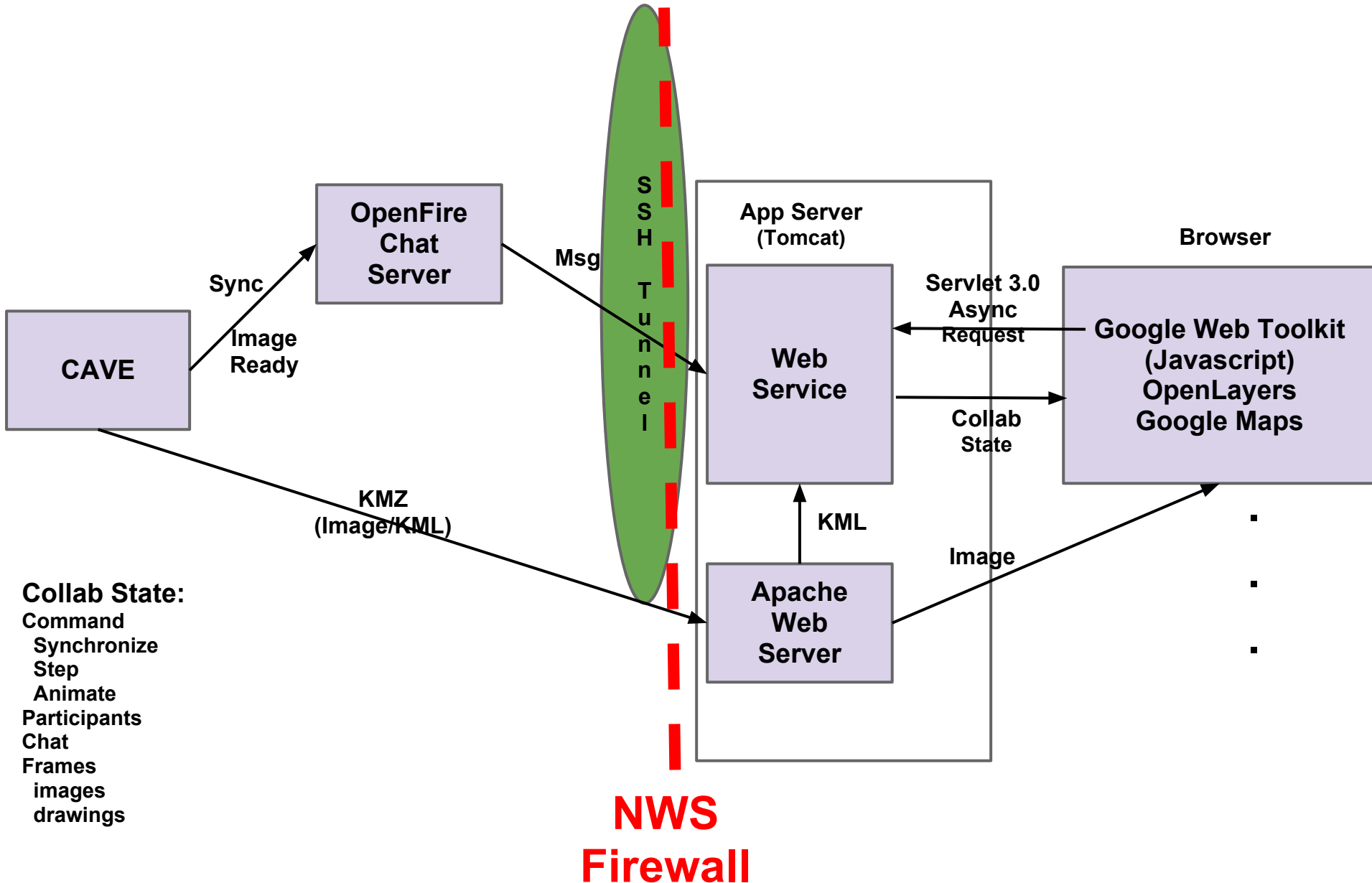


Lines ▾

Navigation icons: Line, Arrow, Curve, S-curve, Zigzag, Staircase



Architecture



Challenges

Security - navigating the NWS Firewall

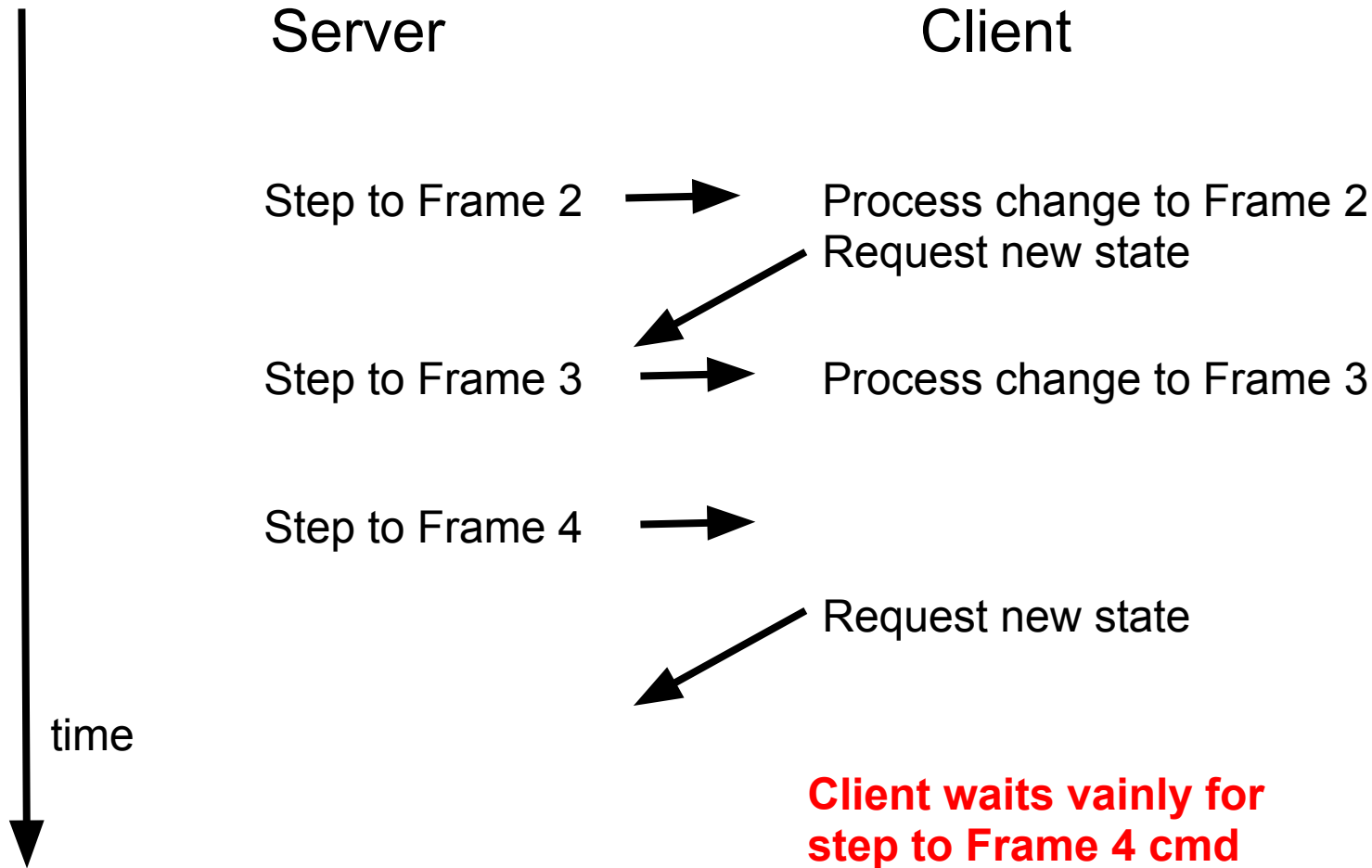
- SSH Tunnel chat server/http traffic
- By itself, tunneling is not sufficient to ensure security
- Need to
 - Secure the OS - SELinux
 - Isolate disk access - CHROOT jails
 - Secure Tomcat - via configuration
 - Follow coding standards (sanitize user input)
 - Authenticate/Authorize
 -

Challenges

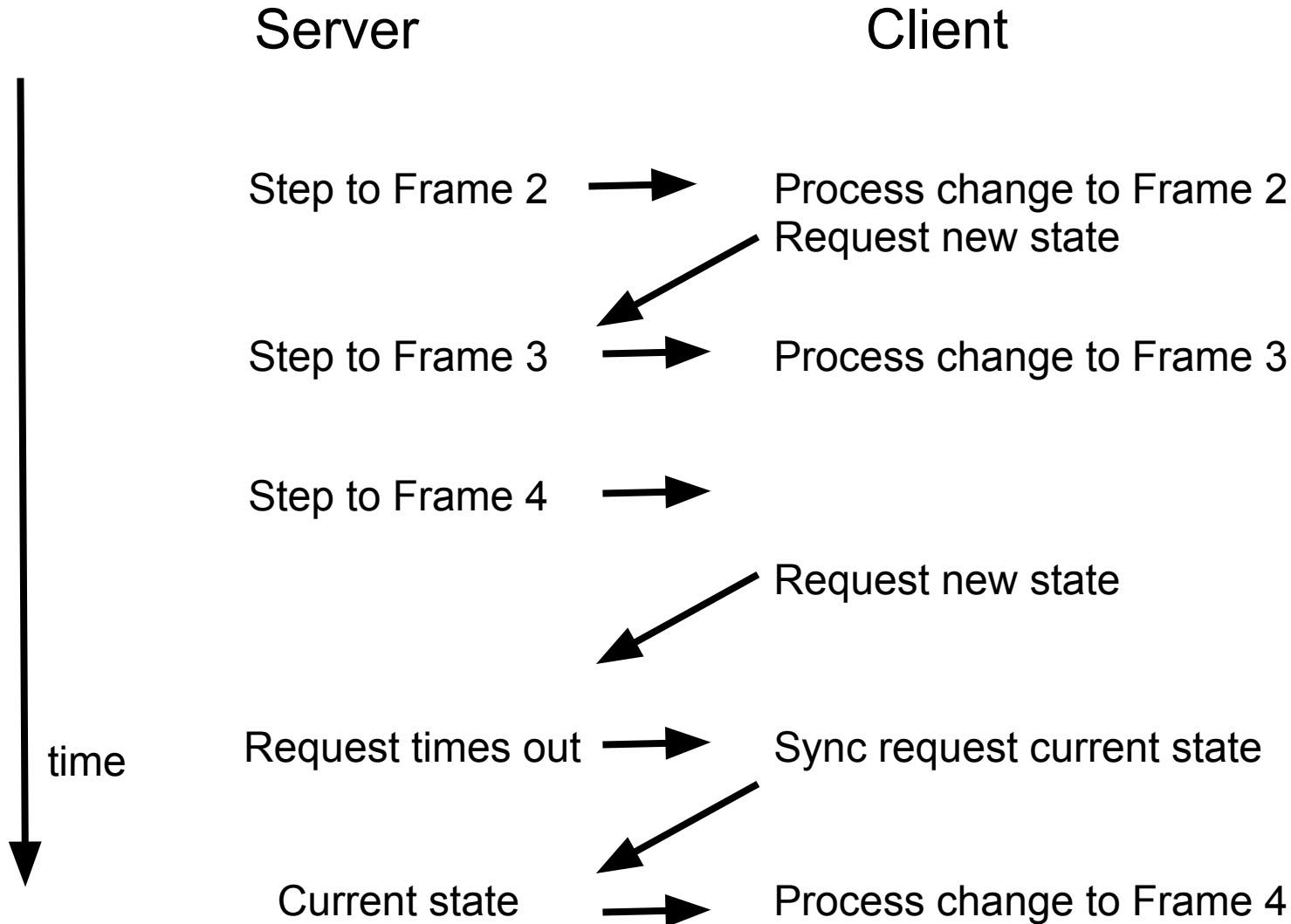
Simulating server-driven commands

- Servlet 3.0 Long-polling
- Good conceptual approach
- Issues in practice

Missed Command



Soln: Server-side timeout with exponentially increasing interval

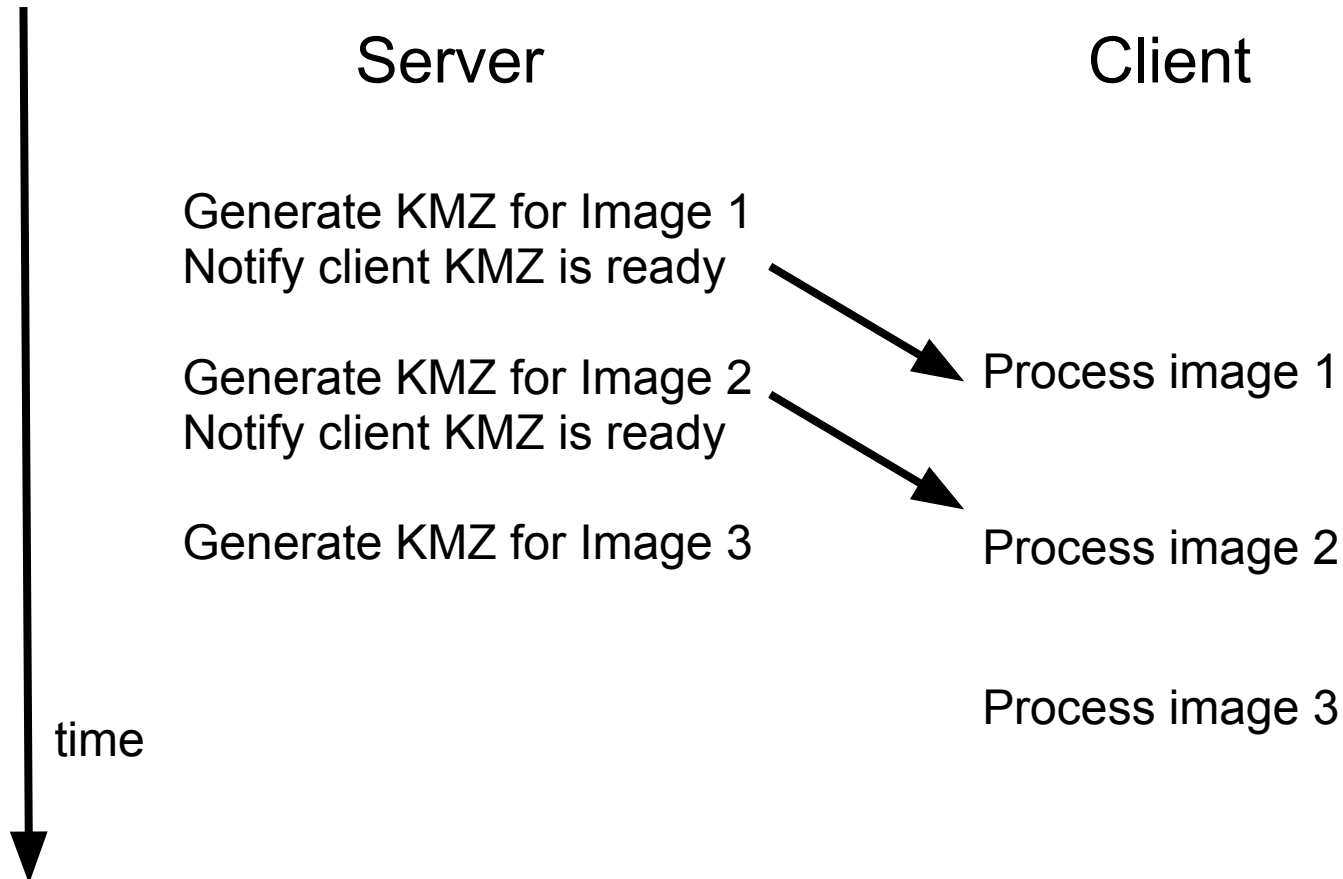


Remaining problem: Help from Audience?

- Client handles response quickly
- But next request sometimes delayed in arriving back to server
- So if forecaster steps through frames every second or two, some clients can experience a stuttering effect

Challenges

- Syncing many images can be slow
- Part of solution: Pipelining



Challenges

KMZ wrapped images/drawings

- Works fairly seamlessly in Google Earth
- Google Maps requires unpacking/massaging
- More investigation needed

Technologies

Client Side

- **Google Web Toolkit**
- **OpenLayers**
 - **Javascript library for rendering generalized layers**
- **GWT-OpenLayers**
 - **GWT wrapper for OpenLayers**
- **Google Maps**
 - **Is the "Base" OpenLayer**

Server Side

- **RESTeasy Web services**

Google Web Toolkit

Pros

- **Code in Java, generates browser-independent Javascript**
- **Can debug Java code in Eclipse before you deploy to app server**
- **Can mix in raw Javascript code/libraries**

Google Web Toolkit

Cons

- **Can be incompatibilities between GWT-generated and raw Javascript**
- **Sometimes Javascript not really browser independent (chat problem on firefox)**
- **What will happen if Google drops Javascript in favor of Dart? Will they abandon GWT?**
- **New options gaining traction (PLAY web framework)**

Software Engineering

- **Git version control**
 - **Challenging but very powerful**
- **Software builds with Gradle**
 - **Declarative approach**
 - **Uses Maven repos**
 - **Without the ugly XML syntax**
- **Model/View/Presenter (MVP) design pattern**
 - **Separates client business logic from GUI**
 - **Facilitates unit testing**
 - **Advocated by GWT folks**

Future Directions

- **Operational version**
 - **Work with Raytheon to leverage operational internal collaboration solution**
- **Support for smart phones**
- **HTML5**

Demo

- Scenario
 - Fire in the hills west of Boulder
 - Forecaster located at NWS in Boulder is briefing fire personnel (us) on broad synoptic situation and local wind forecasts

<http://fxc.noaa.gov/extCol/extCollab/login.html>

Demo

<http://fxc.noaa.gov/extCol/extCollab/login.html>

- Live test of scalability! (tested with at most 7 clients previously)
- Various browsers/versions (don't even think about using Internet Explorer!)
- Macs? (only Windows/Linux so far)
- Smart phones
- Wireless network
- The unknown unknowns (Donald Rumsfeld)
- **What could possibly go wrong?**