Common Web Mapping and Mobile Device Framework for Display of NASA Real-time Data

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Motivation

SPoRT and other NASA scientists produce data that can be used by others, such as the National Weather Service (NWS) and Federal Emergency Management Agency (FEMA). Two groups at MSFC are engaged in supporting disaster response:

• The ingest system dramatically reduced the level of effort and time it takes to ingest and process data.
• The system supports time dimension of data delivery (Fig. 2).

Server Architecture

1. The main focus of the ingest server is to provide a system easy to configure and ingest data, and to provide output in open standards (Fig. 2).
2. We use WMS, widely used across the internet to server spatial data.
3. The ingest system is configured using Extensible Markup Language (XML) files.
4. XMLs control the control the flow of data within the server system.
5. Once configured, XMLs allow the data to be ingested, properly registered, and discoverable.

Benefits of a Mobile Device Framework

• Supports web, mobile, and GIS within one system
• Enables easy ingest of new datasets
• Enables science for decision making
•-century storm Sandy of 2012
• Moore, Oklahoma Tornado of 2013.
• Control application maintenance costs by using a common web framework
• Open source reduces building and licensing costs.
• Provides data in open standards for easy integration.
• Web Mapping Service (WMS)
• Supports static and animated imagery
• Supports location based services
• iOS and Android supported for mobile at a minimum.

Client Architecture

Mobile applications supporting Android, iOS, and other platforms represent significant effort and cost. The client architecture was developed by wrapping a JavaScript client inside a simple shell application using a webview in each supported client. This method has several benefits:

• use of standard web development tools
• faster development cycle
• easier to maintain and develop
• styling using web standards such as Cascading Style Sheets (CSS)

Case Study of Web Mapping Service Applications

• Typhoon Haiyan (Yolanda) impacted the Philippines in November 2013.
• As a proof of concept, the SPoRT Disaster Team was able to easily deliver imagery to web and mobile clients with use of the system described here.
• A system dramatically reduced the level of effort and time it takes to provide NASA data in response to the disaster event.

Figure 1. Sample mobile phone (left) and web browser (right) based application based on the framework. Data displayed is Day/Night Band difference from the Superstorm Sandy before and after the storm.

Figure 2. Overview of the common web mapping and mobile device framework for display of NASA real-time data, including ingest server, distribution to WMS for dissemination and tiling, and end-user applications.

Figure 3. Sample web browser and smartphone interface.

Figure 4. An example of post-event imagery displayed in a common web mapping framework. Here, an ASTER false color image from 11/13/2013 at 0322Z, after Typhoon Haiyan with damage analysis (inset).

Conclusions and Future Work

Continued use of common web mapping service application

Continued uses include the SPoRT Disaster Team analysis of events such as the Illinois/Indiana Tornado Outbreak November 2013, the delivery of the SPoRT real-time imagery display, and integration of WMS-hosted imagery within the NOAA/National Weather Service Damage Assessment Toolkit.

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