WEB FIRST

OPEN SOURCE MHEALTH SOLUTION BASED ON DRUPAL 7

UMD HCIL Symposium

Electronic Health Record Informatics Workshop

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CURRENTLY WORKING AT:

WHY INTEGRATE A CONTENT MANAGEMENT FRAMEWORK INTO YOUR MHEALTH SOLUTION?

- Single Platform that can address an organization's ever-changing needs

- Data Quality:
  – High quality data, no duplicates, complete forms, low error rate/review

- Internationalization – working with ethnic communities (E.g. Latino, Asian languages), the ability to easily support multi-languages is a must

- Scalability – ramp up to support large # of records, modules

- Rich Query and Reporting Support

- Security / Authentication – Patient Data, De-identify records

- Supports multiple data collection devices: web, iPad, Android, Future?

BACKGROUND / USE CASES

USE CASES – PROTECT DATA / PUBLISH DATA

Poor medicine adherence leads to unnecessary disease complications, a lower quality of life, and even death.

A health agency is interested in:

• Promoting metformin adherence for a population of diabetes patients

• Registering patient information

• Securing patient identities/data

• Quizzes and text medication reminders to Patients

USING GIS / GEOSPATIAL

Pneumonia represents a significant public health burden in the US and Globally

A research organization is interested in:

- Spatial analysis of incidence at the County Level, including Rural areas

- Age, sex, and geo-location (lat/long), pt. picture

- Create hot spot maps" on the fly using GIS

DATA SHARING / SOCIAL NETWORKS

Childhood Obesity is an epidemic - with ~16% of children, 2 to 19 years old, classified as overweight.

A research organization is interested in:

- Measuring trends in obesity in primary school children

- Collecting cohort data

- Transparency: Share data with PI's, De-identify data, for Comparative Effectiveness Research

- Similar to data.medicare.gov, no licensing costs – fb, twitter, email

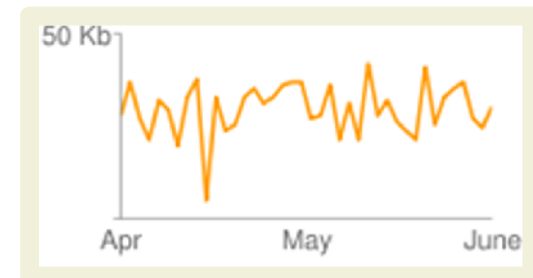# A STRONG OPTION FOR A CMS FRAMEWORK – DRUPAL!

- Standalone data collection platform (e.g. Rapidsms)
  - Can't easily publish data, extend functionality.

- Using a framework such as Drupal:
  - Collect data via web, SMS, android, iOS, tablets or future formats!
  - Publish data using role or user-based protection
  - View and download data quickly

- Proven, growing, well-supported platform to allow for scalability, and future growth – 880K user accounts, ~3,000 developers registered!

- 100% open-source based on PHP

- Secure platform (whitehouse.gov)
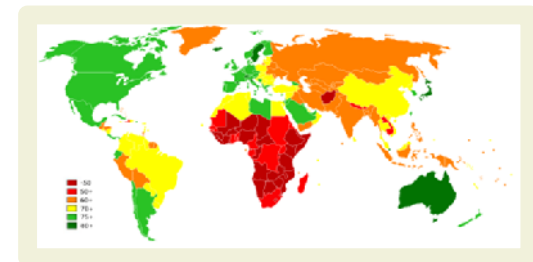
DRUPAL MODULES AVAILABLE TODAY

Data Visualization
Chart views – Integrates with Google
Charts API

Mapping / GIS products
Geo Gui, Mapbox, Gmap
(Google maps)

Social Networking
Facebook Share, Twitter, TwitterMiner
(mine tweets)

MHEALTH
DEMONSTRATION PROJECT

DRUPAL AND OPEN DATA KIT

- **Drupal** – A free and open-source Content Management framework we have leveraged for:
  - Defining dynamic data collection forms
  - Reminder systems
  - Content Management

- With **3rd party add-ons (e.g. Twilio)**, basic short message service (SMS) mobile phone technology is also available

- Voice-To-Text, Text-To-Voice capabilities

- **Open Source Solutions**
  - Emergency response monitoring
  - Nutritional surveillance
  - Supply chain management
  - Behavior Modification

- **Open Data Kit (ODK)** is a free and open-source set of tools that:
  - Helps organizations author, field, and manage mobile data

  - Health survey collection mechanism with ability to collect GPS locations and images

  - Creates decision support for clinicians and for building multimedia-rich nature mapping tools

  - Originally developed at the University of Washington
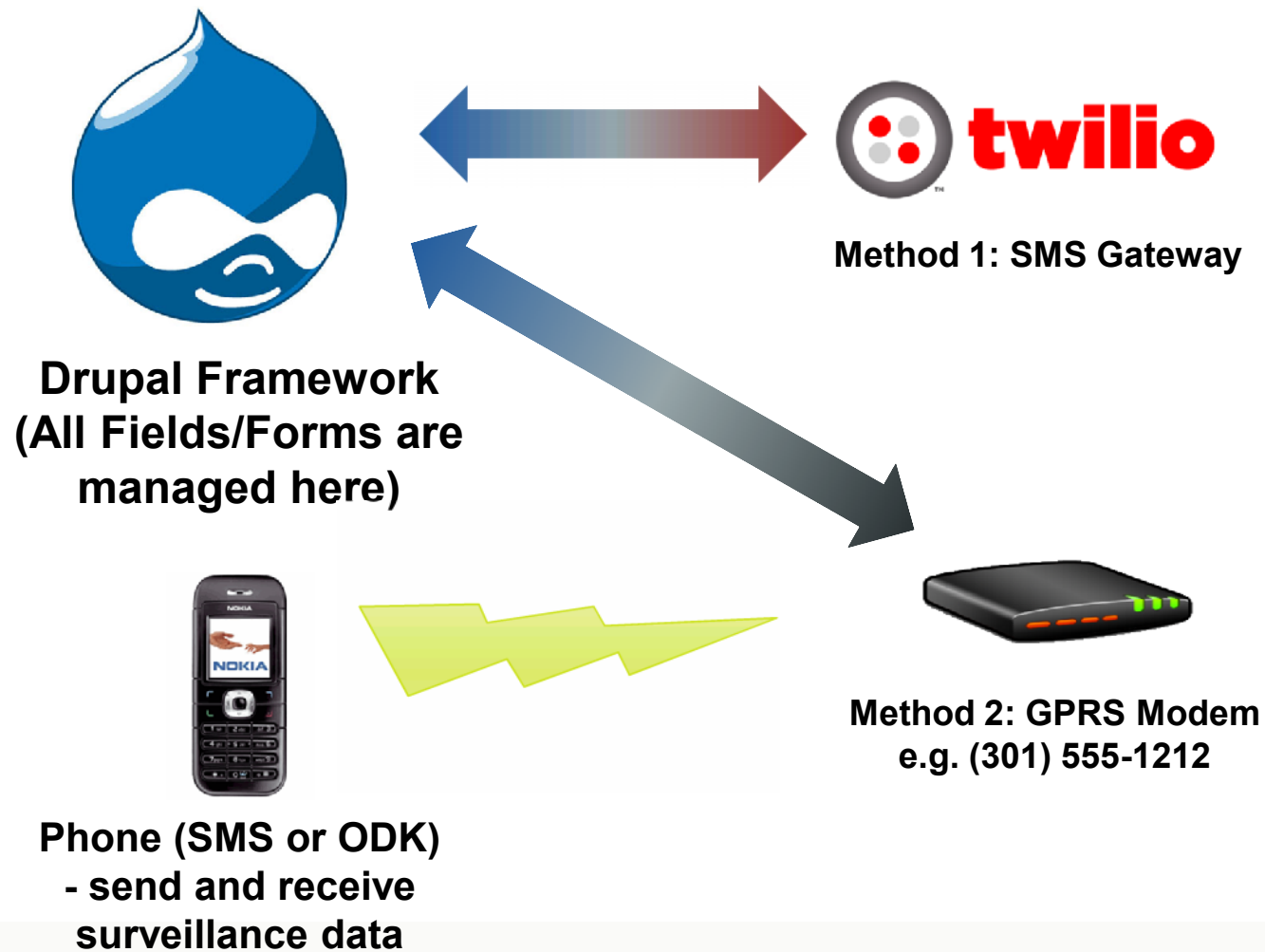
MHEALTH DEMONSTRATION

LOW COST / RURAL / GLOBAL HEALTH SOLUTION -

Specifications:

1. ASUS EEPC dual core Netbook (approx cost: $400)

2. MultiTech GPRS Modem ($300) or SMS gateway

3. For Rural Areas that have no 3G Coverage - Mobile Top up Card ($20 to start, $.10/text)

4. Internet connection (if you want to access the collected data remotely)

5. For SMS (any standard cell phone), or Xforms Android phone - $100

HIGH LEVEL SYSTEM ARCHITECTURE – DRUPAL + RAPID SMS COMPONENT

Method 1: SMS Gateway

**Drupal Framework
(All Fields/Forms are
managed here)**

**Method 2: GPRS Modem
e.g. (301) 555-1212**

**Phone (SMS or ODK)
- send and receive
surveillance data**

DATA COLLECTION METHODS – 2 METHODS OF DATA COLLECTION

1. Using SMS (Text Messages) as a method for data collection using a standard cell phone

DATA COLLECTION METHODS

2. Use an Android smart phone with Open Data Kit / XForms as a method for data collection

ODK is a powerful phone-based replacement for paper forms.

- Android platform

- Collect a variety of form data types: text, location, photos, video, audio, and barcodes

USE CASE – IMMUNIZATION REMINDERS

Our use case is where a health worker in the field may need to register a newborn in order to send immunization reminders to the parents.

DEMONSTRATION

1. We will demonstrate registering a newborn with the system via SMS and Android / XForms by collecting:

   - Child Birth Date

   - Child First name

   - Child Last name

   - Child Birth Weight

   - Child Birth Height

   - Parent's cell phone # (receive reminders)

DEMONSTRATION

2. Administrator in Drupal:

- Data View / Report (Data Row, Photo, GPS location)
- Download / Share Data via FB, Twitter
- GPS -> Google Maps
- Manage Fields
- Manage Alerts / Rules

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