+MedLink

Linking Patients to the Medical Supplies and Services They Need, When They Need Them

Project Volunteers: San Francisco Day of Civic Hacking

- Daniel Aranibar: San Francisco USA; Student at SFSU; MedLink database design and API documentation; daranibar84@gmail.com
- Nancy Donnell: San Francisco USA; Librarian; MedLink user interface and experience (UI/UX) design; nancy.donnell@gmail.com
- Aimee Edmondo: South Africa; Peace Corps Volunteer (PCV) South Africa; MedLink initial idea posted to Peace Corps Innovation Challenge, Lead for South Africa testing; aedmondo@gmail.com
- Amran Gaye: Silicon Valley, USA; Student at UMBC; MedLink lead developer and systems administrator; amran@kismetworldwide.com
- Suri Samson: San Francisco USA; Student at SFSU; MedLink database schema design and developer documentation; sjsamson86@gmail.com
- Mikhail Selitrin: San Francisco USA; Student at SFSU; MedLink database schema design and developer documentation; miksel9@gmail.com
- Mr. Lie Njie: Silicon Valley, USA; Founder & CEO, Kismet World Wide Consulting; RPCV The Gambia 2005-2008; MedLink lead cheerleader and project manager; Info@KismetWorldWide.com

Project Volunteers: The Gambia Random Hacks of Kindness & Beyond

- Latirr Carr: Bakau, The Gambia; Engineer; MedLink presentation at RHOK The Gambia hackathon; freddy_el@hotmail.com
- Serign Jobe: New York, USA; Programmer; MedLink SMS integration; serignjobe@gmail.com
- Allison Lacker: San Francisco, USA; Software Engineer; RPCV Cameroon 2010-2012; MedLink quality assurance (QA) lead and server developer; alacker@gmail.com
- Rachel Mendy: North Carolina, USA; Graphic Designer; MedLink logo design and content reviewer; rachmendy@gmail.com
- Ala Ndure: Wisconsin, USA; Web Developer; MedLink website designer; alagiboy@gmail.com
- Fatou “Cherry” Njie: The Gambia; Law Student, University of The Gambia; MedLink quality assurance (QA), research, and documentation proofreader; cherry.njie@gmail.com

Motivation / Problem Statement

- Save the time and distance that patients need to travel to find out if a particular medical provider has a particular item or service
- Provide an easy-to-use service to link people in developing countries who need medical supplies and services with the suppliers of those services
- Provide tools to medical health professionals and community health volunteers to accept requests for supplies and services and respond to those requests with the locations that have those supplies and services and when they will be available
- Help medical providers manage requests for supplies and services and integrate those requests into their existing inventory control and purchasing systems

Project Goals

- World-Wide Applicability across Multiple Countries
- Immediately Useful in Developing Countries
- Extensible: Can Work with Any Inventory System
- Internationalized: not just English
- Multiple Interfaces: Web, Smart Phones, SMS, Email
- One piece of a larger whole
- Reusable across other domains (schools, businesses, …)
- Deployable in July 2013

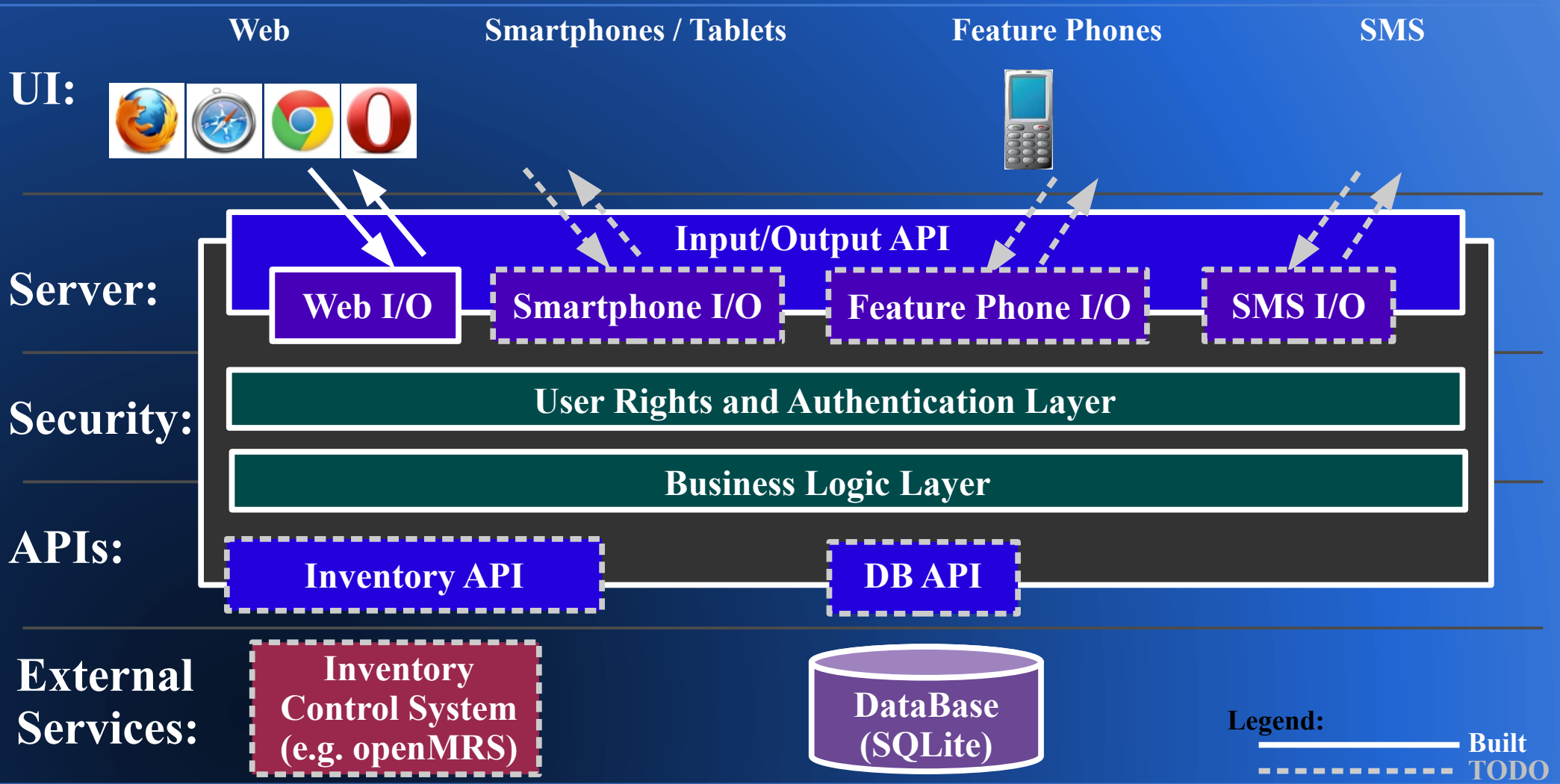
Product Implementation

- Server:
  - Receive requests via Email & SMS for supplies and services
  - Manage requests for supplies and services
  - Notify when and where those supplies and services are available
- Multiple Interfaces: SMS, Email, and Web-Based
- Extensible APIs: Link to existing inventory control systems, SMS and Email services, etc...
- Reporting: help medical providers plan their purchasing based on the community needs

Vision: Long Term

- Links into existing Inventory Control Systems
- Automated ordering of supplies
- Multiple UI front-ends for different domains (medical, schools, businesses, etc...)
- Offline Usage and Synchronization
- Multiple, Independent, Decentralized servers (vs. single server for all users)
- Heavy usage of images (replacing text) to reduce language comprehension requirements

Product Architecture Diagram



Work Completed: Server

- Basic server written and running (Ruby on Rails), available from:

  http://www.KismetWorldWide.com/MedLink/
- Initial Authentication system built and working (users: Super User / Admin, Field Agent, Patient / User)
- Initial Database designed and deployed (SQLite)
- Initial Web-based, smartphone-friendly interface built and working
- Requests can be submitted by Patient or Field Agent via web-based interface and replied to by Field Agent
- Email output system integrated, responses can be sent via email

Work Completed: APIs

- Input and Output API:
  - Input and Output API to support Email/SMS/others documented
  - Initial implementation of Output API supporting Email built and works
  - Documentation for how to integrate SMS written
- DB API:
  - Initial DB built and working using SQLite
  - Easy to switch to other DB engines (MySQL, MariaDB, etc...)
  - Documentation written for how DB is built with TODOs/Next Steps
- Inventory Control API: How to link to an existing Inventory Control System
  - Documentation written for how to link in an existing Inventory Control system, with specific discussion for linking to OpenMRS

Work Completed: Documentation

- Website: http://www.KismetWorldWide.com/MedLink
- Project Overview and Technical Description Slides written (this document)
- Technical Documentation written for hand-off to Gambian team, including:
  - Database Design and DB API
  - Input/Output API, including details on how to integrate with a SMS service
  - Authentication system described
  - Inventory API
  - HOWTO: extend the system to support multiple sites each with their own Admin (currently the system has a single Admin user for all sites)
- Still TODO: Patient Usage HOWTO, Field Agent HOWTO, Admin User HOWTO, System Installation and Administration HOWTO

Work Completed: Open Source Code

- Code written with OSI-approved, MIT License:

  `http://opensource.org/licenses/MIT`

- Code and documentation currently available on GitHub:

  `https://github.com/kwwcode/medlink`

- Working implementation provided by Kismet World Wide:

  `http://www.KismetWorldWide.com/MedLink`

Next Steps

- Working Implementation provided to Peace Corps Volunteer in South Africa and Project Volunteers in The Gambia, West Africa, for testing and provide feedback
- Finish integration with SMS
- Design and build a UI for Feature Phones
- Extend Data Model and Authentication to support multiple sites on a single server (currently only supports a single site per server)

Next Steps: Work TODO

- Reporting: Output Usage Reports and Supply Purchase Orders
- Inventory Control: Develop APIs and initial example integration with existing inventory control system (openMRS?)
- User Interfaces: Develop interfaces for other problem domains (schools, businesses, etc...)
- Data Model and Database: generalize to support other problem domains (currently too specific to the medical domain)
- SMS: Finish integration into SMS system for data input/output
- Email: Update current output-only system to support input
- Feature Phone UI: Add interface for feature phones

+MedLink

Linking Patients to the Medical Supplies and Services They Need, When They Need Them