

Services Oriented Architectures and Just in Time Deployment of Ad-Hoc Health Surveillance Systems: Lessons from Katrina Relief Efforts

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OBJECTIVE

This paper presents lessons learned from leveraging Internet-based technologies(1) and Services Oriented Architecture (SOA)(2) in providing timely, novel, and customizable solutions, just in time and for preparedness against unprecedented events such as natural disasters (e.g., Katrina) or terrorism.

BACKGROUND

Timely outbreak detection, and monitoring of morbidity and mortality among Katrina evacuees, and needs assessment for better planning and response were urgent information intensive priorities during Katrina relief efforts at Houston, and called for immediate deployment of a real-time surveillance and needs assessment system ad hoc, in order to collect and analyze relevant data at the scene. Initial requirement analysis revealed the following capabilities as essential to sustain effective response within the shelters:

- The ability to securely collect and integrate data from evacuees seeking any form of health services from all care providers (academic, volunteers, federal, NGOs and international aid organizations, etc), including demographic information, vital signs, chief complaints, disabilities, chronic conditions, current and past medications, traumas and injuries, exposure to toxic materials, clinical laboratory results, past medical history, discharge notes and diagnoses, and ability to collect free text entries for any other information (similar to a full-blown electronic medical records system).
- Proactive survey of demographic profile, physical and mental health status, as well as special needs assessment (e.g., dialysis, medications, etc) from all evacuees.
- The ability to collect uniform information, using any network-enabled device available: PCs, tablets, and handheld devices (PDA).
- The ability to classify observations by processing sign and symptom, chief complaint, medication, and other diagnostic data (including free text entries) through ad-hoc definition of concepts such as (Gastrointestinal, Respiratory, Fever and Rash, etc)

METHOD

A distributed survey on demand system was post-coordinated through the ad hoc orchestration of Web Services, to enable information exchange,

information integration, natural language processing, UMLS terminology services, syndrome definition and syndromic case finding, online analytical processing (OLAP)(3), and interactive reporting.

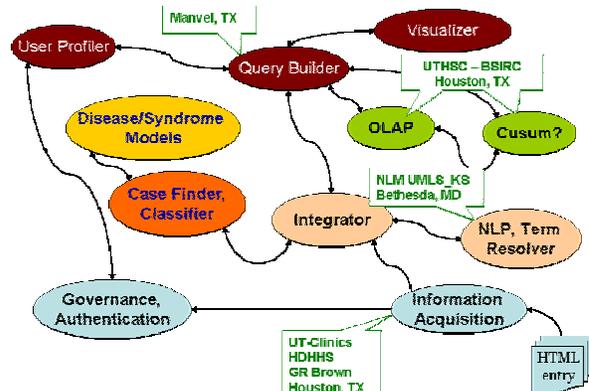


Figure 1: Service Orchestration for the Katrina relief efforts

RESULTS

The new internet-based information system was deployed through reconfiguration and orchestration of existing Web Services found from a network of collaborators (Figure 1). The system collected and integrated information from 3 different sets of Web-enabled survey forms that it made available to all clinics and HDHHS stations inside the G.R. Brown shelters, and recorded more than 8,800 patient encounters. It also enabled proactive PDA based needs assessment surveys throughout the city. All services were distributed over several remote Web locations throughout Texas and at the National Library of Medicine (UMLS-KS Servers at Bethesda, MD), all connected by broadband Internet. Implementation was accomplished in under twelve hours.

REFERENCES

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