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Silicon Valley

Community / Agency Interoperability
Demonstration
Agenda

- Motivation
- Design Overview
- The Scenario
- The Demo
- Debriefing
- Next Steps
Motivation

Making Smart Communities Resilient

- Motivation
  - Feasibility study: an integrated system for real-time, resilient, rich data interchange

- Elements
  - Survivable Social Network – new
  - Silicon Valley Resilient Network (SVRN) – new
    - A collaboration between the City of Palo Alto and CMU-SV
    - Palo Alto MEOC
  - Hyperwall II – evolved
  - Open-interface database designed for scalability – new
Architecture

Networking Context: 
*Silicon Valley Resilient Network*

RESTful interface, JSON payloads

Database Server

Database

Gateway

Gateway

Gateway

Gateway

Survivable Social Network

Hyperwall II

Palo Alto MEOC

(future) Sensor Networks

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Survivable Social Network

- Focus on communities
  - Neighbors supporting neighbors
- Key idea: Social Network “in a box”
  - Familiar look and feel
  - No installation needed
  - Training-less
- Minimal infrastructure
  - A laptop computer
  - A garden-variety WiFi access point
  - Smartphones with HTML5 browsers
- Role in the demo
  - Incident reporting and community info dissemination
Hyperwall II

- Polls the database for “interesting” info
- Interactive, multimedia interface
- Real-time updates – AJAX-based
  - Messages / pictures as they are created
  - Selective tracking (breadcrumbs)
- Scalable interface – laptop to big screen
- Role in the demo
  - Triage reported problems (e.g., at CERT trailer level)
  - Escalate as necessary
Palo Alto MEOC

- Same functionality as Hyperwall II
- Different polling rules
- Role in the demo
  - Respond to escalations
Database

- API and underlying machinery to capture and share
  - Messages and Conversations
  - Media (photos, audio, video)
  - Sensor readings
  - ... and associated time/place
- Designed for scalability – many contributors and readers
  - Careful attention to distributed buffering
- Role in the demo
  - Provide reliable, shared repository to clients
Silicon Valley Resilient Network
An “internet” when all else fails

Level I
The Neighborhood “Bubble”
Local-only VoIP and core data services to smartphones

Level II
Limited Public Internet
Augment the bubble with satellite and QoS management

Level III
Neighborhoods Linked to City
Solar / battery-backed dedicated network infrastructure
The Scenario

Telecoms Outage

Database

Gateway

Gateway

Gateway

Database Server

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The Scenario

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The Scenario

Telecoms Outage

Survivable Social Network
Hyperwall II
Palo Alto MEOC
Major incident that disrupts telecoms

A citizen witnesses a dangerous situation.
The citizen uses SSN to report the incident.
The information is recorded and pushed to the database.
Hyperwall II notes the update and posts it.
On the Hyperwall

The Hyperwall operator engages the citizen in a conversation and asks for more info.

... Send help!

More Info
The citizen receives the request for more info.

NOTIFICATION

Can you please take a photo?

OK
The user sends more information.
Hyperwall operators

The operator decides to escalate to the MEOC.

Danger is real. Time to escalate.
Inside Palo Alto EOC

Alert
Building on fire – Godzilla suspected
Reported at 9:23am
By Sally Jones
Location (37.40, -122.05)

More information
Need aerial recon and decision re: evac

The Palo Alto EOC receives the alert and notifies the ANG.
ANG does a fly-over and takes photos.
ANG sends the photos back to the MEOC.
Back at the MEOC

Post

Fire close to CMU. Evacuate building.

- Logged In Users
- Group Members
- Public

Post

MEOC alerts FD and sends instructions to neighbors via SSN.
Neighbors receive the notification and begin evacuation.
Debrief

- Approach is community → authorities
  - Social networking concept
  - Inexpensive, resilient infrastructure
  - A “disruptive” approach
- Supports multiple levels of support and triage
  - Neighborhood, CERT district, city, county, ...
- Ultimate goal is neighborhood-level self deployment
  - Open source
  - Scalable
Debrief

- Future research possibilities
  - Antenna pattern auto-optimization
  - Integration with / extension of related work
    - Hastily Formed networks
    - CAP / UICDS
    - Offline mapping
    - Other COP solutions and technologies
Credits

- SSN
  - Jona Cali
  - Ryan Caney
  - Stu Kennedy
  - Vijay Raghavan
  - Bob Iannucci
- Database
  - Steve Ray
  - Yuan Ren
  - Mike Smith
- Hyperwall II
  - Senaka Buthpitiya
  - Clyde Li
- A/V
  - Dennis Tojo
  - Systems and Networks
    - Jazz Azvayan
    - Art Botterell
  - Semantic Geotagging
    - Charlie Li
    - Faisal Luqman
    - Steven Rosenberg
- Reportage
  - Martin Griss
- Palo Alto MEOC
  - Ken Dueker
  - Simon Williams
NOTE

Statement from PETD
(People for the Ethical Treatment of Dinosaurs)

No actual dinosaurs were harmed in the making of this disaster
Thank you!