Sahana Alerting and Messaging Broker: Lessons Learned

“CAP on a Map” - Improving Situational-Awareness

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Outline

1. What is Situational-awareness
2. “CAP on a Map” Project
3. SAMBRO features and workflows
4. Evaluation methodology
5. Initial findings
6. CAP issues
Issues Around Disparate Systems

Number of Channels $M = \frac{N(N-1)}{2}; \mathcal{O}(N^2)$

Information Lost in relay and propagation

Redundant Data Collection / Sharing

Inconsistent Terminology

Manual Collation / Calculation

Delayed Situational-Awareness

Data standards, Information Communication Technology, and Situational-Awareness has proven to overcome these challenges
What is Cross-Agency Situational-Awareness?

“Cross-Agency Situational Awareness System is an information aggregation system that facilitates sharing situational awareness within the public safety community. Information shared relates to incidents and planned events. It includes public alerts, risks to responders, and community profiles.” - Canada’s Multi-Agency Situational-Awareness
Pillars of Situational-Awareness

Perception

What is happening?

Comprehension

Why do I care?

Projection

What do I do about it?
Effects of Situational-Awareness

1. Improves information sharing among first-responders (e.g. Common Alerting Picture)
2. Immediate collaboration in response and mitigation
3. Creates connected agencies for public safety
4. Manages resource more efficiently and cost effectively
5. Saving lives and Livelihoods
Sahana Situational-Awareness Scope

functions

Risk Mapping (GIS)
Alerting / Warning (EDXL-CAP)

Incident Reporting (EDXL-SITREP)
Resource Messaging (EDXL-RM)

architecture

keep it Simple
Project Focus on Alerting

scope

function

Alerting / Warning (EDXL-CAP)

architecture

keep it Simple
CAP on a Map Project

Myanmar, Maldives, & Philippines

- Analyze requirements
- Training of Trainers
- National training
- System evaluation
- Dissemination

United Nations ESCAP
AIT
Sahana Software Foundation
Current Alerting Practices in the Maldives

Weather advisories and warnings flow chart

Alert Message from Maldives Meteorological Service (MMS)

- **TVM** Hotline
  - Pass the message to the public via TV and radio

- **VOM** Hotline
  - Pass the message to the concerned Authorities.

- **NDMC** Hotline
  - Pass the message to the concerned Authorities.
  - Take necessary action

- **MNDF** Hotline

- **MPS** Hotline

- **LGA/NGO,s** SMS
  - Pass the message to the concerned sectors within their responsible organization
Current Alerting Practices in Myanmar

DMH

Cyclone
- Satellite map Observation Data

Flood
- Satellite map Observation Data
- FAX/Ph/SSB

Tsunami/Earthquake
- Information from Regional Tsunami Services Provider/Seiscomp3/Local Network

- President office
- Local Government
- Relief and Resettlement Dept.
- Ministry of Defense
- Fire Services Department
- Local DMH Office
- Ministry of Health
- Myanmar Red Cross Society
- NGO

Media
- TV/Radio/FM

Communities
Current Practice in the Philippines

NDRRMC OP Center

Warning

FAX

17 RDRRMO

Reg-1
Reg-2
Reg-3
Reg 4A
Reg 4B
NCR
CAR
ARMM

FAX

81 PDRRMO

provinces
provinces
provinces
provinces
provinces
provinces
provinces

FAX

1490 C/MDRRMO

cities/municipalities
cities/municipalities
cities/municipalities
cities/municipalities
cities/municipalities
cities/municipalities
cities/municipalities

FAX

Barangays (communities)
Barangays (communities)
Barangays (communities)
Barangays (communities)
Barangays (communities)
Barangays (communities)
Barangays (communities)

SMS

42,028 BDRRMO

Barangays (communities)
Barangays (communities)
Barangays (communities)
Barangays (communities)
Barangays (communities)
Barangays (communities)
Barangays (communities)
Summarizing the current alerting information flow
SAMBRO Simplifying Warnings

- Publisher and a Subscriber messaging broker
- CAP 1.2 compliant system.
- Efficiency gains through reduced traversal times
- Increased cost-effectiveness by complementing current practices
- Low-cost technology always on and ready to use (integrated into the daily lives)

EOC - Emergency Operation Center      RC - Red Cross (Society)      Community - community of practice
Authority - Alerting Authority        Hub - other relay and rendering agents       Media - TV, Radio, SocMed
Agency Line Agencies                  Emergency Services - Police/Fire/SAR/Health…
Evaluation through Controlled-Exercises

On the day of the exercise did the technology and the people work?

1. No Surprises, prior the the exercises
   a. Implementation should be complete (terminology, classifications, templates)
   b. Users should have been trained for originating / relaying messages
   c. Siltet-test should have been carried out

2. During the exercises
   a. Users defined a scenario, KPI, goals, intent, and actions
   b. Discuss the steps for issuing with SAMBRO
   c. Issue the alert with SAMBRO

3. Evaluation
   a. Observers record the user's' behaviour applying a complexity index
   b. Record the behaviour with screen capture software (CamStudio)
   c. Users indicate the gulf of execution; i.e. “achieved level of the goal, intent, and actions”)
   d. Users indicate their perception on the technology acceptance (usefulness, ease-of-use,

Carried out with both Publishers and Subscribers
1. Technical issues delayed the alert during the exercise

2. Some users were trained and competent others were not

3. Haven’t understood the CAP elements and policies
Philippines Mean Time To Completion

- Using PAGASA CAP Editor and feed interface with SAMBRO
- A cyclone update carried more CAP elements than the initial alert message
- For most users it was their first time
Myanmar Common CAP Coding Errors

Common mistakes:

- Understanding the difference between a “test” and an “exercise”
- Using acronyms and specific country context names (alien to others) - headlines, senderName, description, address,
- Incomplete descriptions and instructions
- Uncertainties in using Severity, Certainty, and Urgency
Common mistakes:

- Understanding the difference between a “test” and an “exercise”
- Using acronyms and specific country context names (alien to others) - headlines, senderName, description, address, areaDesc
-Incomplete descriptions and instructions
- When geocodes are used the polygon data was not provided
Ease use, usefulness, and attitude

Myanmar

Ease of Use
- Publishers: 3.72
- Subscribers: 3.76

Usefulness
- Publishers: 3.62
- Subscribers: 3.63

Philippines

Ease of Use
- Publishers: 3.95
- Subscribers: 3.73

Usefulness
- Publishers: 4.04
- Subscribers: 4.06

Attitude Towards Using
- Publisher: 5.73
- Subscribers: 5.76

Attitude Towards Using SAMBRO
- Publishers: 6.17
- Subscribers: 5.97
CAP Specific issues

1. “Cancel” vs. Cancel & Delete, from a data privacy and security perspective what is CAP’s take on it? (e.g. if the alert originator - the data owner - wants alert hubs to remove that data)

2. What about <status/> "Ack”, is it fading off in Errata/2.0? Should we be using a CAP message in the first-responder acknowledgements? (i.e. too bulky to manage CAP for each person acknowledging)

3. Use of the term Event Type and <event/> in the specifications but we introduced an auxiliary attribute to classify the the logic? Should we have used Event instead?

4. <msgType/>"All-Clear” makes more sense than <responseType/>"All-Clear” (i.e. naturally fits the msgType state transition: alert, update, clear)

5. What is the level of ambiguity that CAP can tolerate? (i.e. acronyms and special names are not intuitive)

6. When <geocodes/> were used by external feeds, SAMBRO was not receiving the polygon (although optional), which crashes several other functions (e.g. location and user intersections for targeted alerting)
Some interesting findings

1. Risk maps in the countries are very limited or unavailable to implement impact-based alerting (i.e. defining event-type, warning priority, and predefined area polygon in SAMBRO)

2. No institutional program that fosters routine design, build, test, redesign approach (i.e. none of the lead organizations took the initiative for frequent team meetings and testing, 1 or 2 persons involved from the lead Organization)

3. Although NDMOs (e.g DMC) are mandated with warning dissemination they don’t have the same experience as NWCs (e.g. Met); SAMRBO offered originate and relay approach works

4. None or very few users had read the CAP 1.2 specifications document to understand the structure, elements, values, options (“how about a self-assessment quiz?”)

5. Myanmar meteorological (cyclone, strong winds) warning classification based on location (urgency + certainty); while Philippines and Maldives is based on intensity (severity)

6. One-to-one relationship between event type, description, and instructions to be made available in the templates for efficiency gains
Thank You
Register of Alerting Authorities

Organisation 1
2.49.0.0.0.0

Create

Branch 1
2.49.0.0.0.1

Branch 2
2.49.0.0.0.2

Branch 3
2.49.0.0.0.3

Branch n
2.49.0.0.0.n

Unique Identifier = prefix(eg. DHM) - oid - datetime(now) - alert_id - suffix(e.g. Alert)
[eg. DHM-2.49.0.0.104.0-20160823-087-Alert]
Implementations for CAP elements

Event Types

Filter

Template
Predefined templating alerts

Warning Classifications
severity certainty urgency

Predefined Areas
areaDesc polygon
Relaying Message

Branch 1

Organisation 1

Branch 2

Alert 1

Relay

Alert 2 (external)

Alert Hub

Organisation 2

Alert 3

sender
senderName
contact
severity
certainty
urgency
areaDesc
polygon

sender
senderName
instruction
contact
severity
certainty
urgency
areaDesc
polygon