Sahana Alerting and Messaging Broker: Lessons Learned

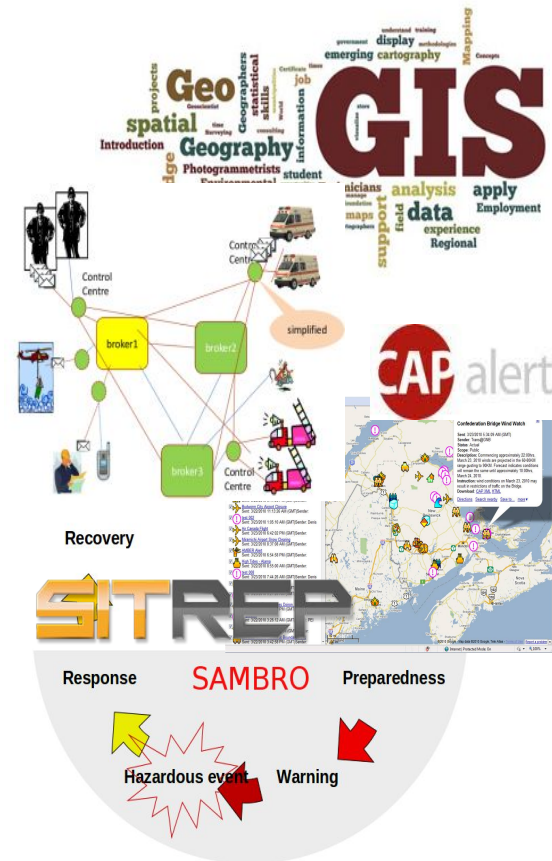## "CAP on a Map" - Improving Situational-Awareness

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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 = N(N-1)/2; $O(N^2)$

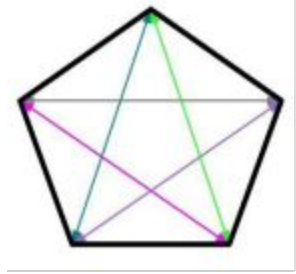N = 5; M = 10

Information Lost in relay and propagation

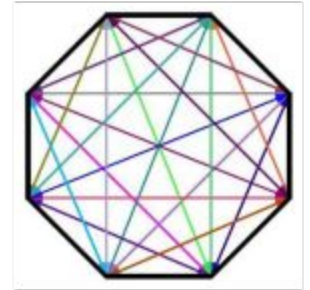Redundant Data Collection / Sharing

Inconsistent Terminology

N = 8; M = 28

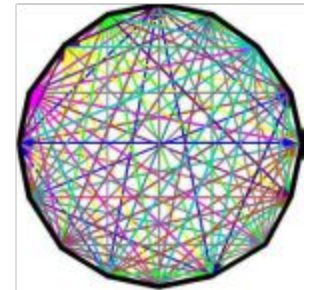Manual Collation / Calculation

Delayed Situational-Awareness

N = 20; M = 45

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

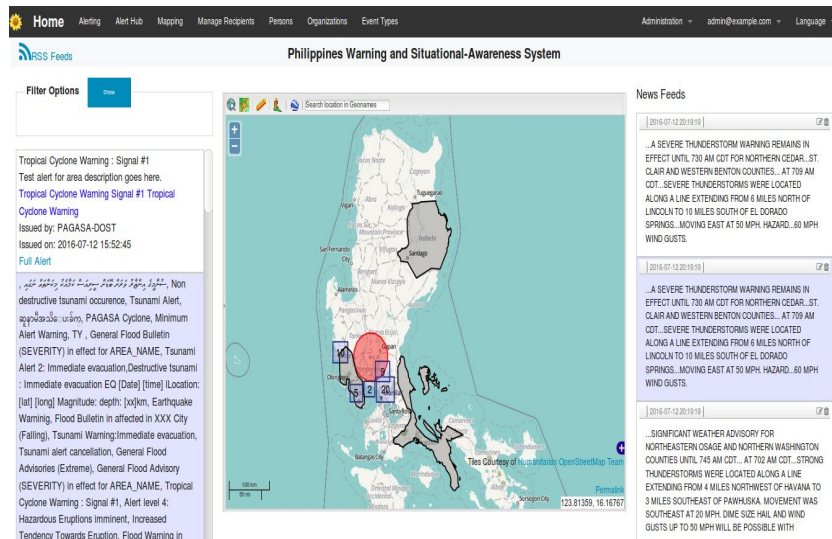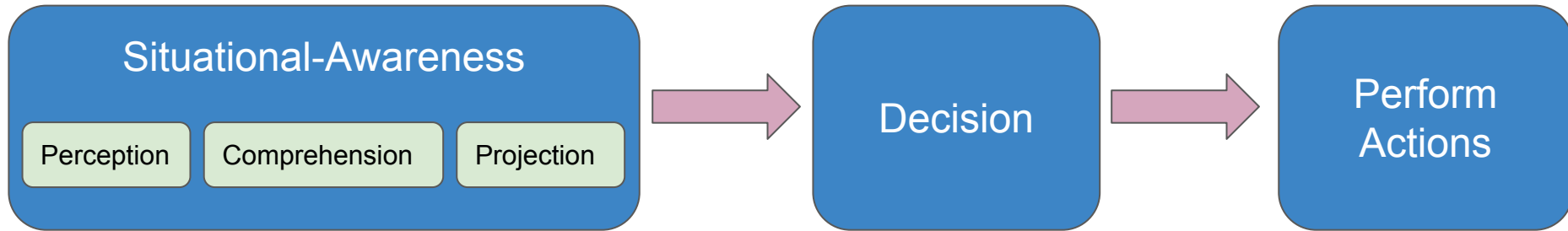Perception → Comprehension → Projection

What is happening?

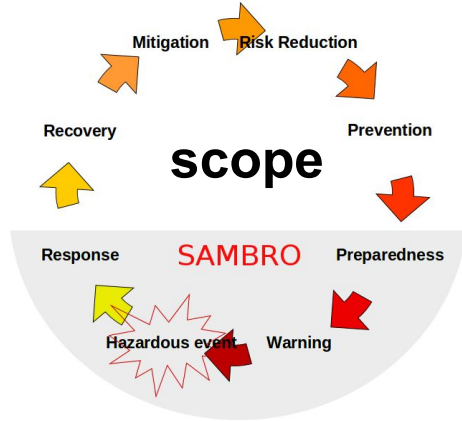Why do I care?

What do I do about it?

Effects of Situational-Awareness

Situational-Awareness
- Perception
- Comprehension
- Projection

→ **Decision** → **Perform Actions**

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

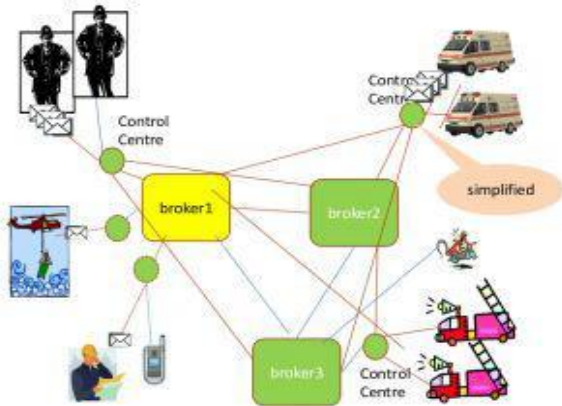5. **Saving lives and Livelihoods**

Sahana Situational-Awareness Scope

scope

Mitigation — Risk Reduction

Recovery — Prevention

Response — Preparedness

SAMBRO

Hazardous event — Warning

functions

Risk Mapping (GIS)	Alerting / Warning (EDXL-CAP)
Incident Reporting (EDXL-SITREP)	Resource Messaging (EDXL-RM)

architecture

Control Centre

broker1   broker2   broker3

Control Centre

simplified

keep it Simple

Diyathalawa
Last Updated by Gnewy 6 minutes ago

landslide blocking railroad

Directions   Search nearby   Save to map   more ▾
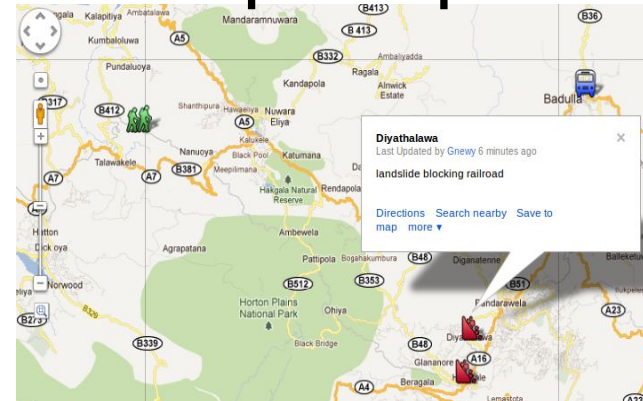
Project Focus on Alerting

scope

Mitigation   Risk Reduction

Recovery   Prevention

Response   **SAMBRO**   Preparedness

Hazardous event   Warning
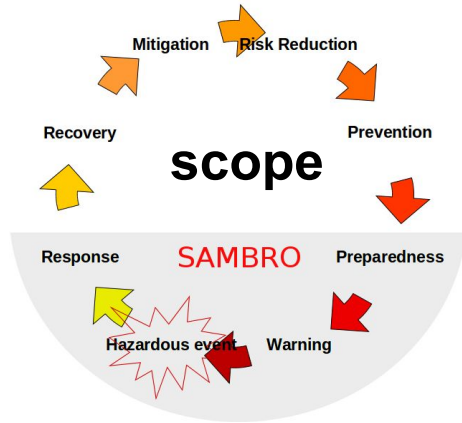
function

Alerting / Warning
(EDXL-CAP)

architecture

Control Centre

Control Centre

broker1   broker2

simplified

broker3   Control Centre

keep it Simple

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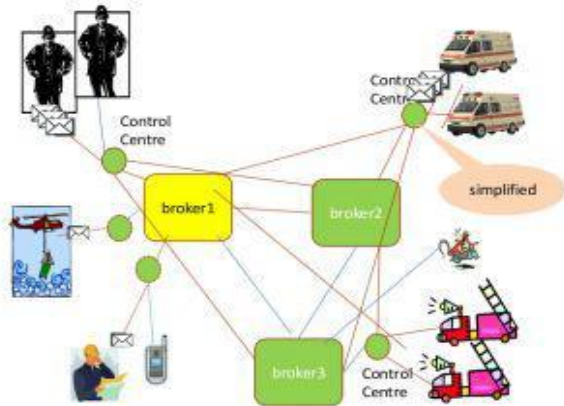
Directions   Search nearby   Save to map   more ▼
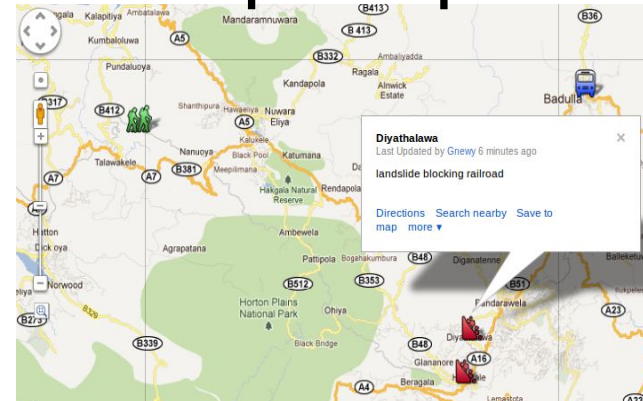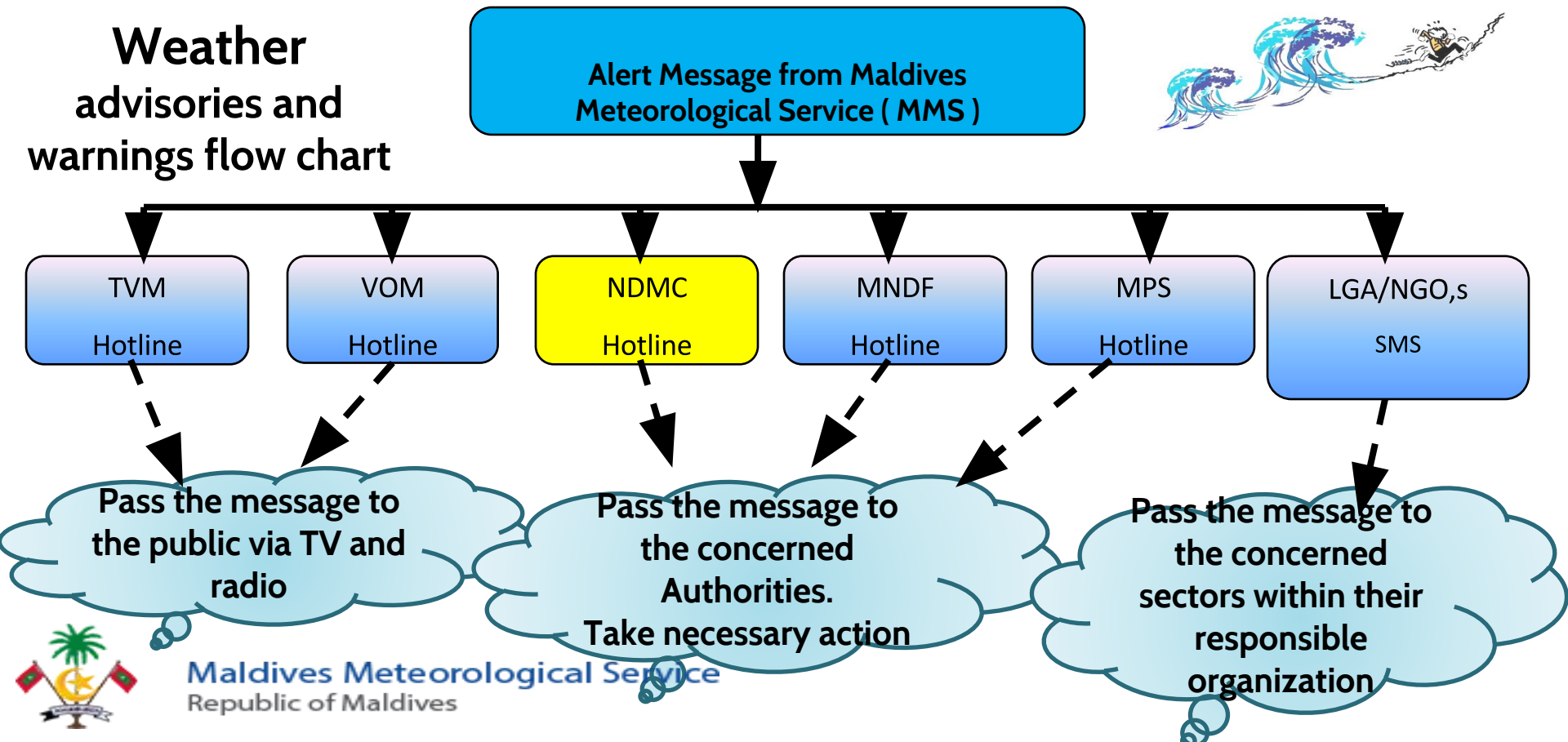
CAP on a Map Project

Myanmar, Maldives, & Philippines

- Analyze requirements

- Training of Trainers

- National training
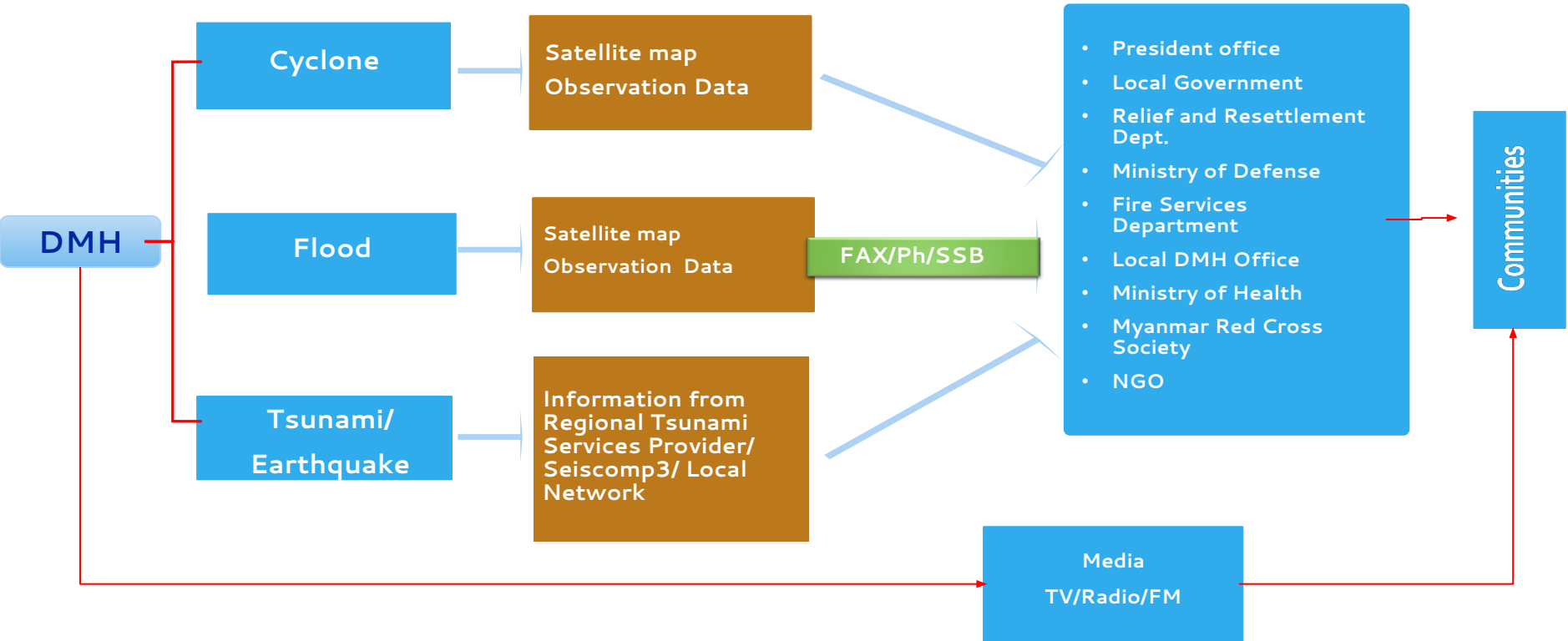
- System evaluation

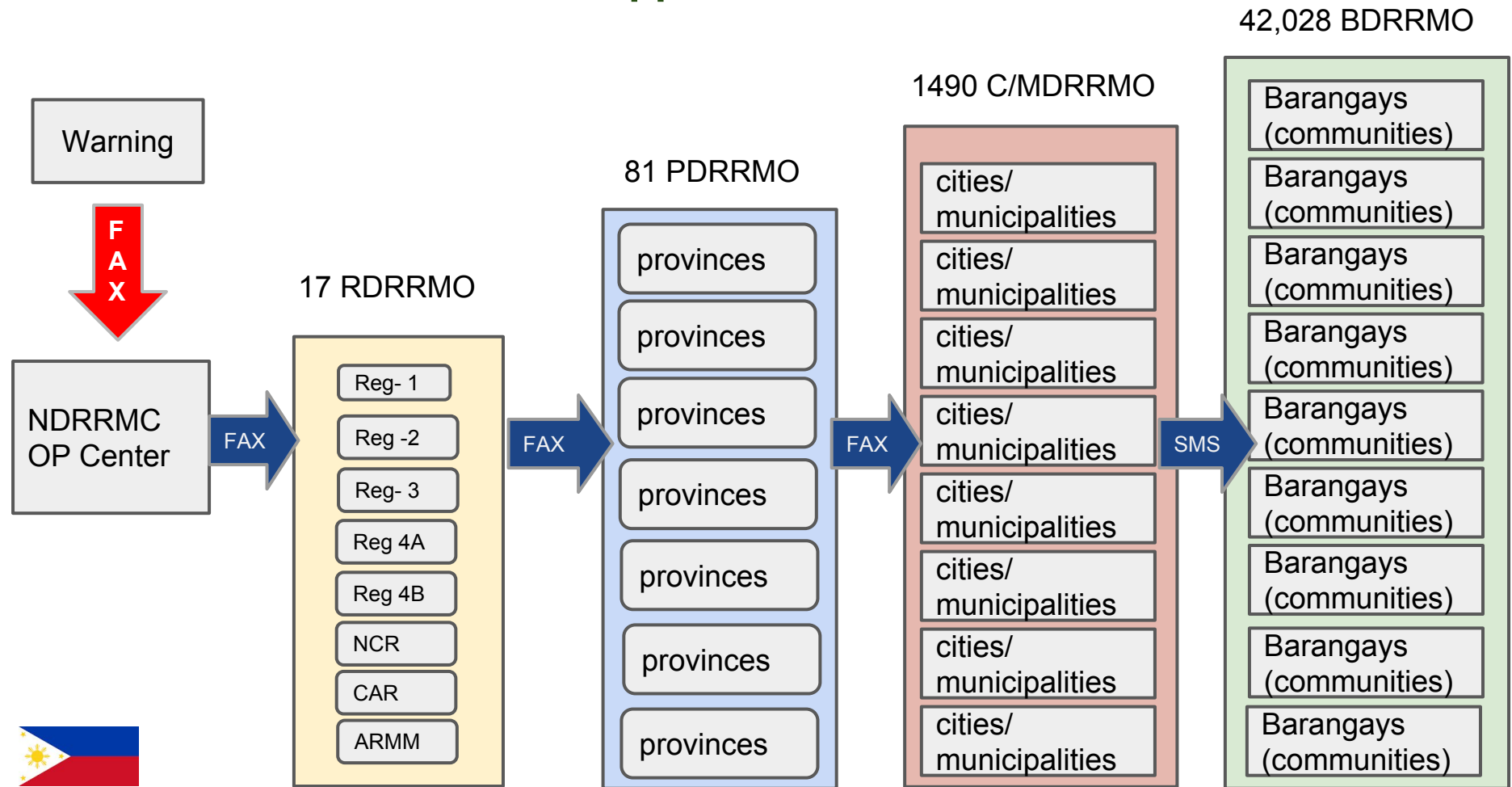- Dissemination

Current Alerting Practices in the Maldives

Weather advisories and warnings flow chart

Alert Message from Maldives Meteorological Service (MMS)

| TVM Hotline | VOM Hotline | NDMC Hotline | MNDF Hotline | MPS Hotline | LGA/NGO,s SMS |

Pass the message to the public via TV and radio

Pass the message to the concerned Authorities. Take necessary action

Pass the message to the concerned sectors within their responsible organization

Maldives Meteorological Service
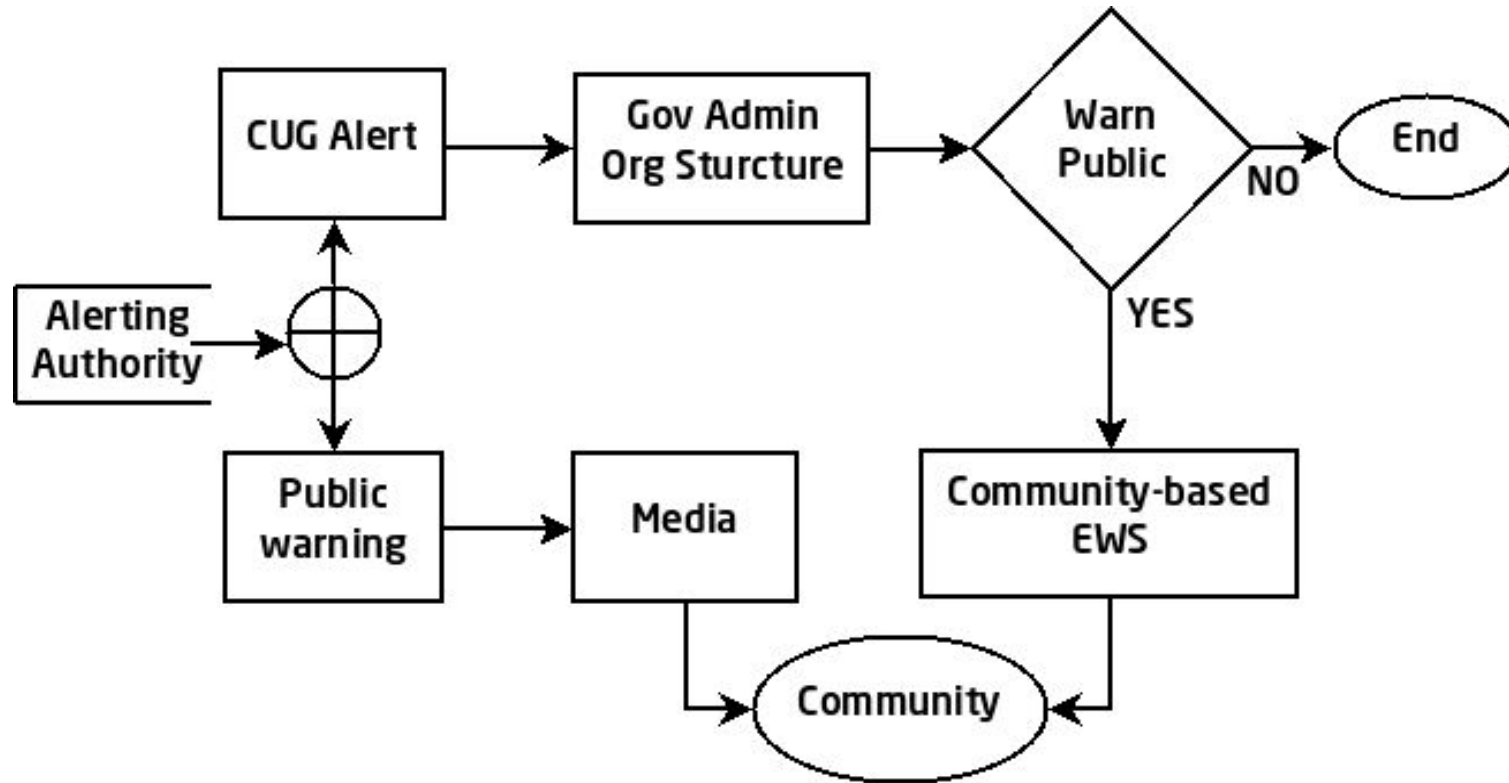Republic of Maldives

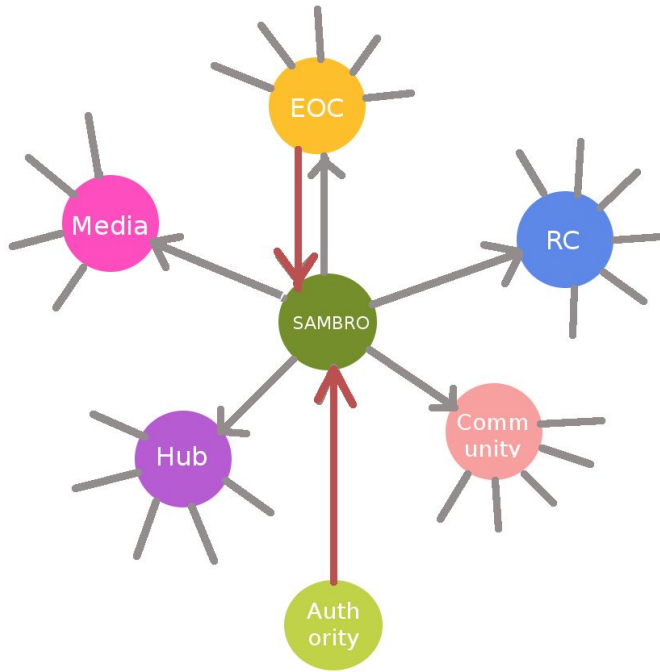# Current Alerting Practices in Myanmar

Current Practice in the Philippines

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
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 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

Myanmar Mean Time To Completion

## Time to Complete Task (Alert, Update, All-Clear)
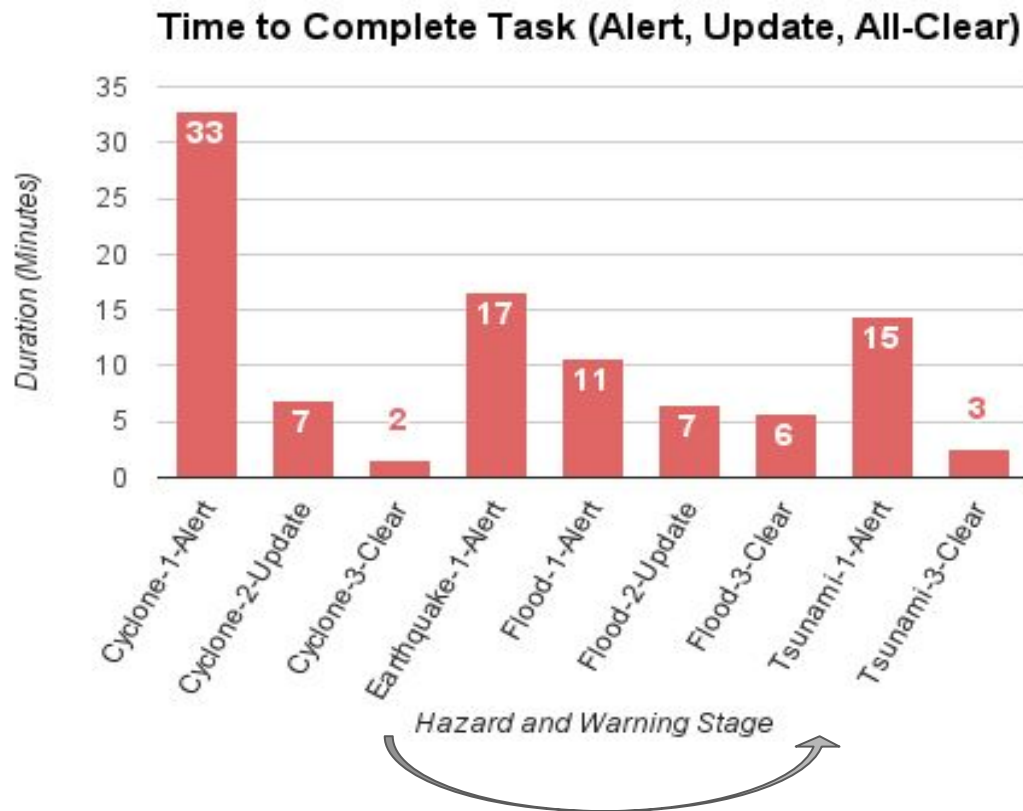
1. Technical issues delayed the alert during the exercise

2. Some users were trained and competent others were not

3. Haven't understood the CAP elements and policies

Philippines Mean Time To Completion

Average Time to Complete Task (Alert, Update, All-Clear)
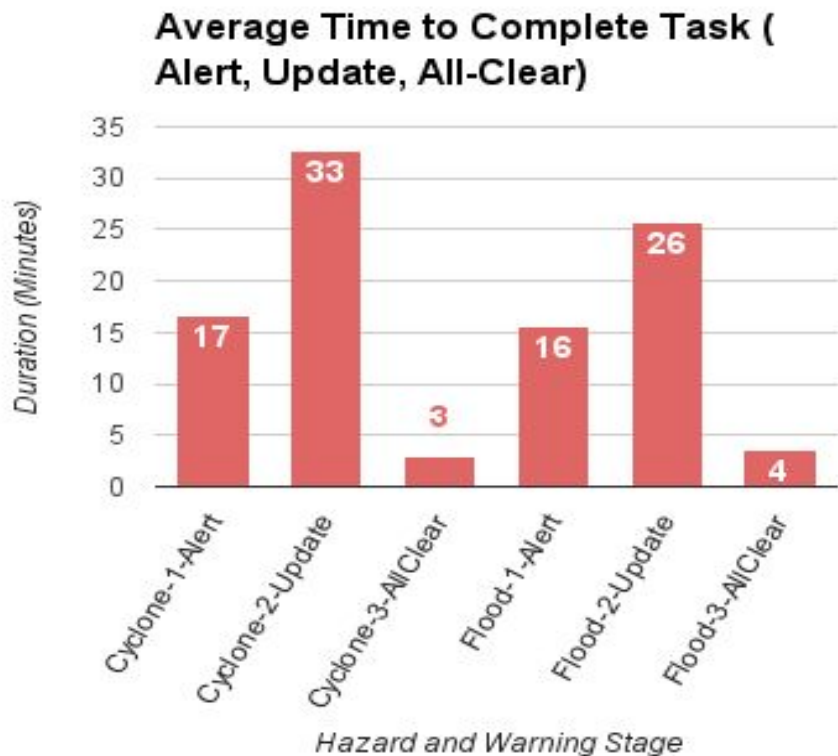
- Using PAGASA CAP Editor and feed interface with SAMBRO

- 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
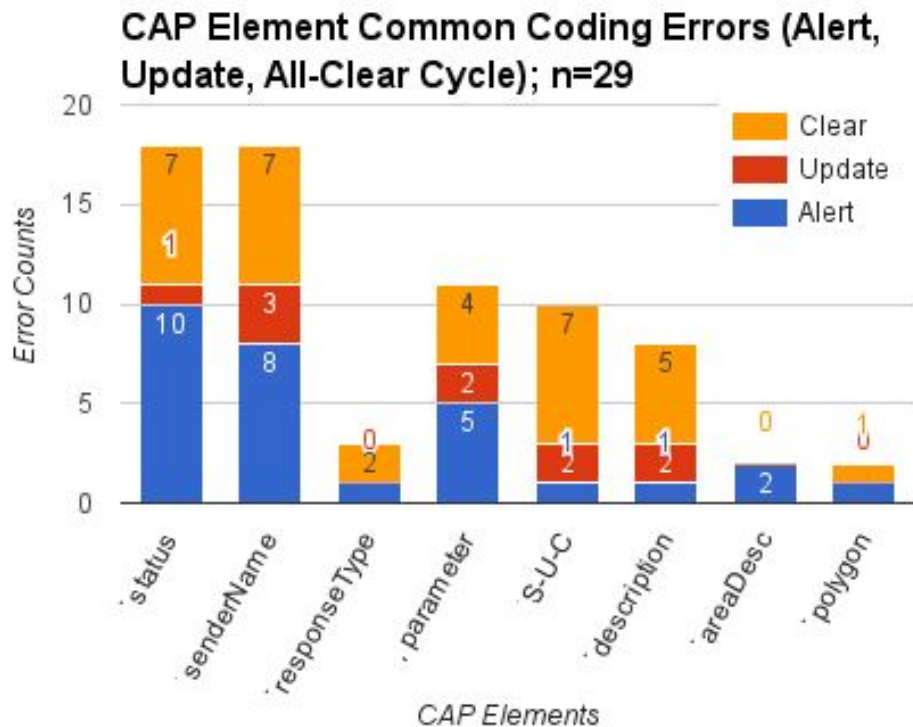
CAP Element Common Coding Errors (Alert, Update, All-Clear Cycle); n=29

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

Philippines Common CAP Coding Errors
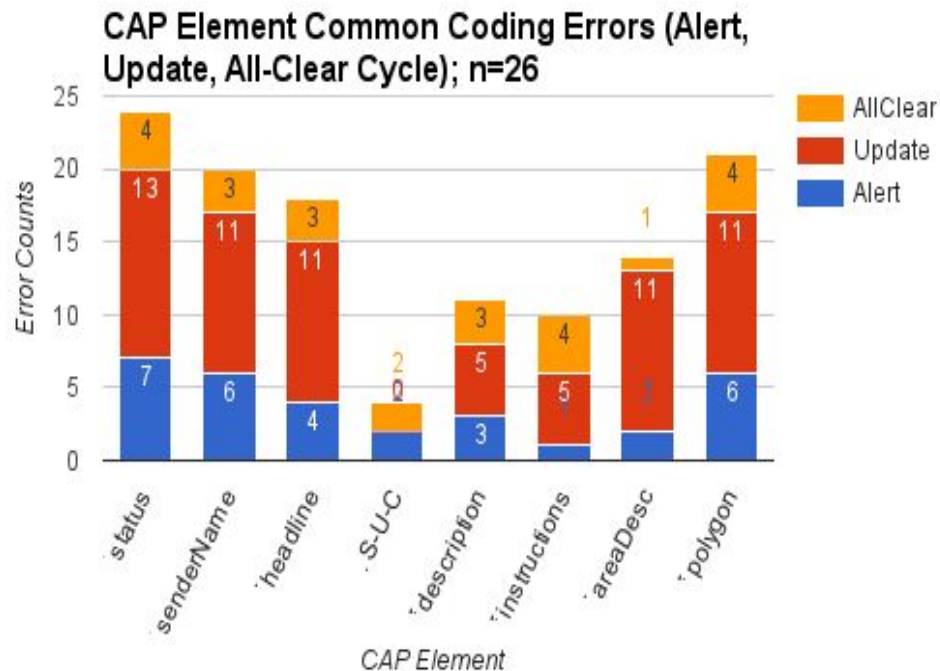
CAP Element Common Coding Errors (Alert, Update, All-Clear Cycle); n=26
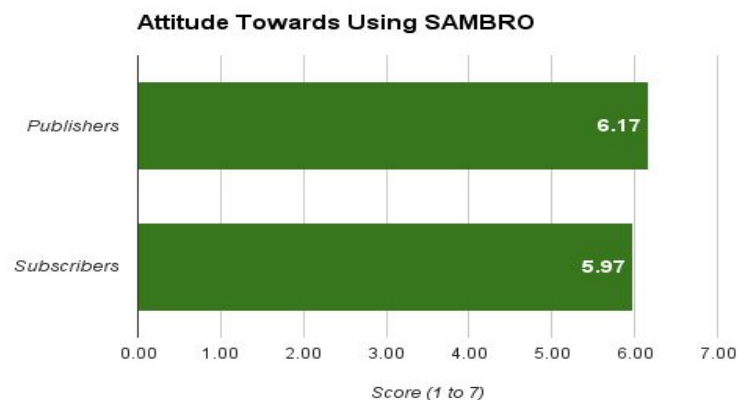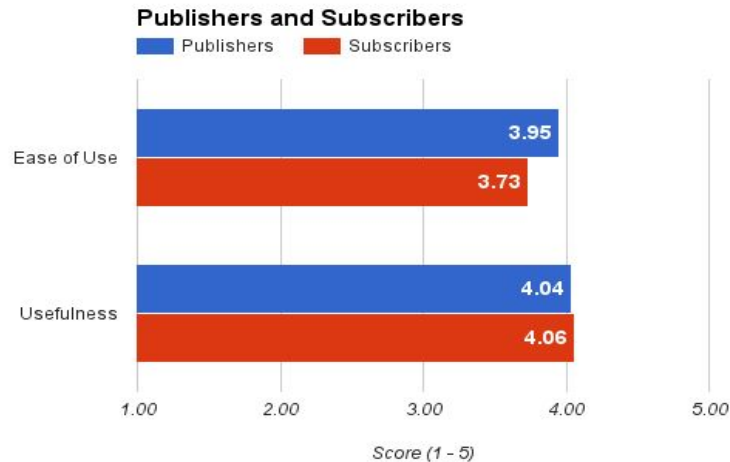
Common mistakes:

- 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
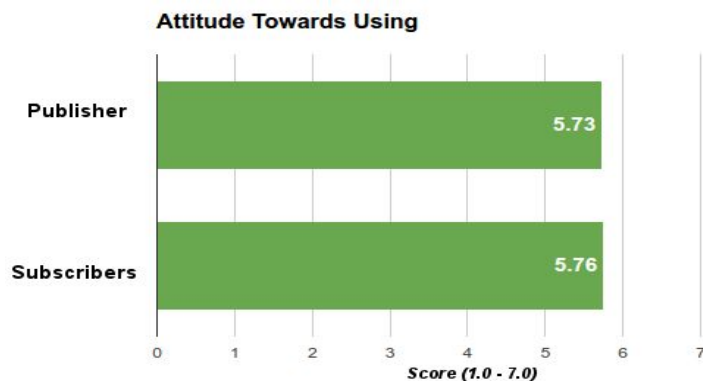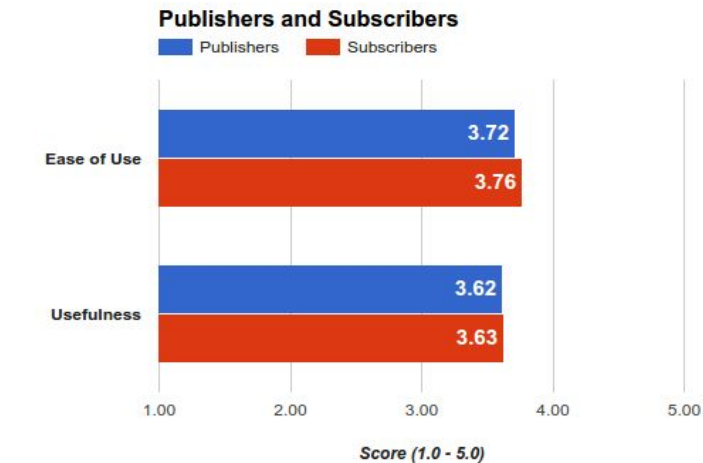
CAP Specific issues

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
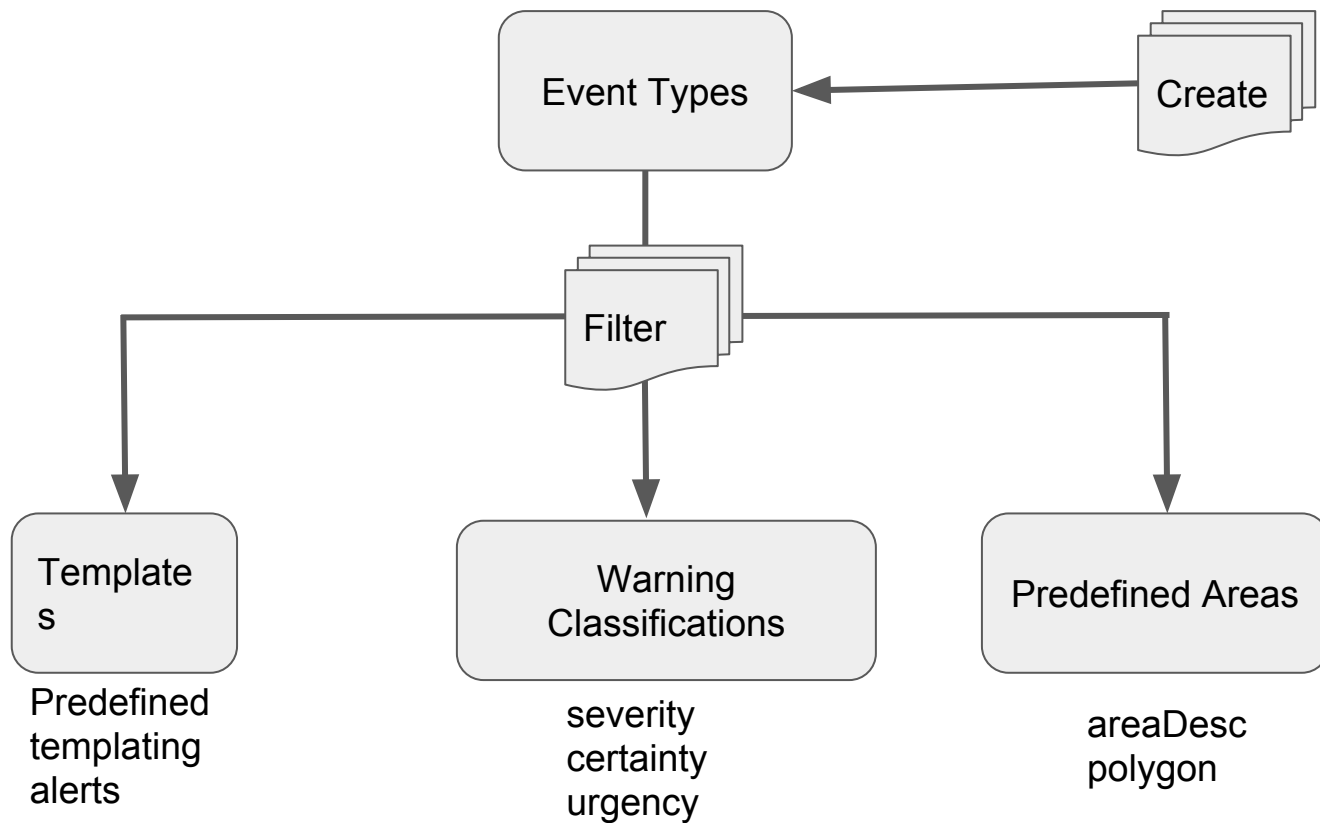
Thank You

Register of Alerting Authorities
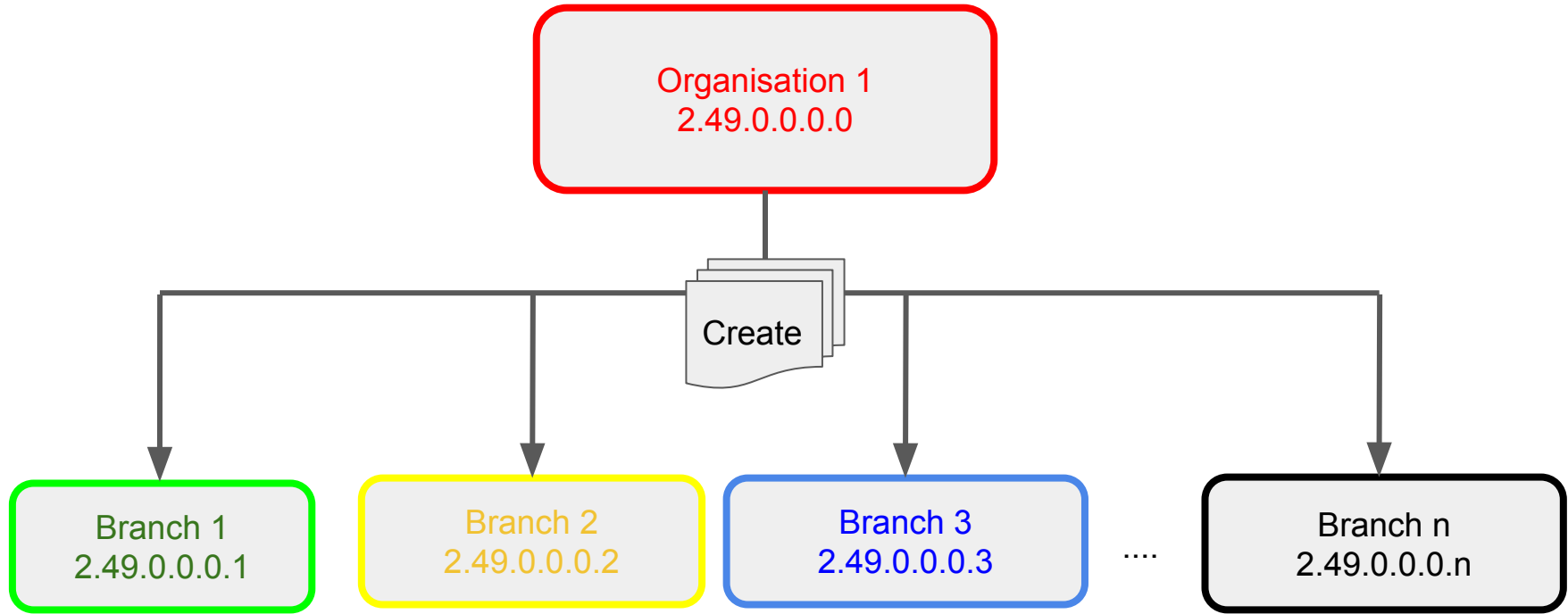
Unique Identifier = `prefix(eg.DHM)-oid-datetime(now)-alert_id-suffix(e.g.Alert)`
`[eg. DHM-2.49.0.0.104.0-20160823-087-Alert]`

Implementations for CAP elements

Relaying Message