Common Alerting Protocol-enabled Sahana Alerting and Messaging Broker for Cross-Agency Situational-Awareness

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GSMA Capacity Building

ITU

ITUWTDC BUENOS AIRES 2017 9-20 October

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Presentation Outline

- Background
  - Why Cross-Agency Situational-Awareness?
  - What is an Early Warning System?
- Sahana Alerting and Messaging Broker
  - Design principles and architecture
  - Leveraging the power of CAP
- National Alert Hub
  - Publisher Subscriber Integration
  - Common Alerting Picture
- Conclusion

Why Situational-Awareness

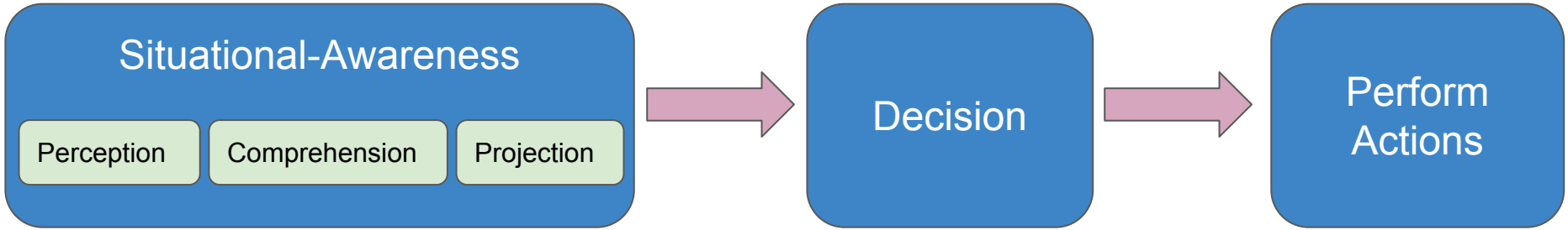
Perception → Comprehension → Projection

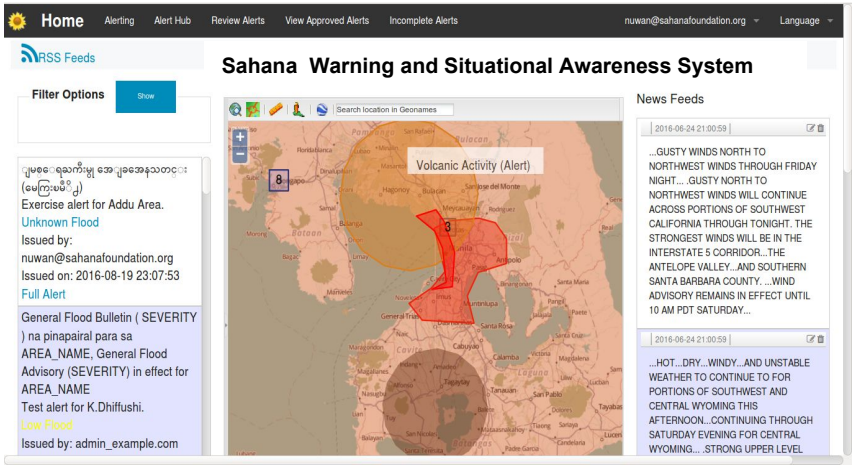
What is happening?

Why do I care?

What do I do about it?

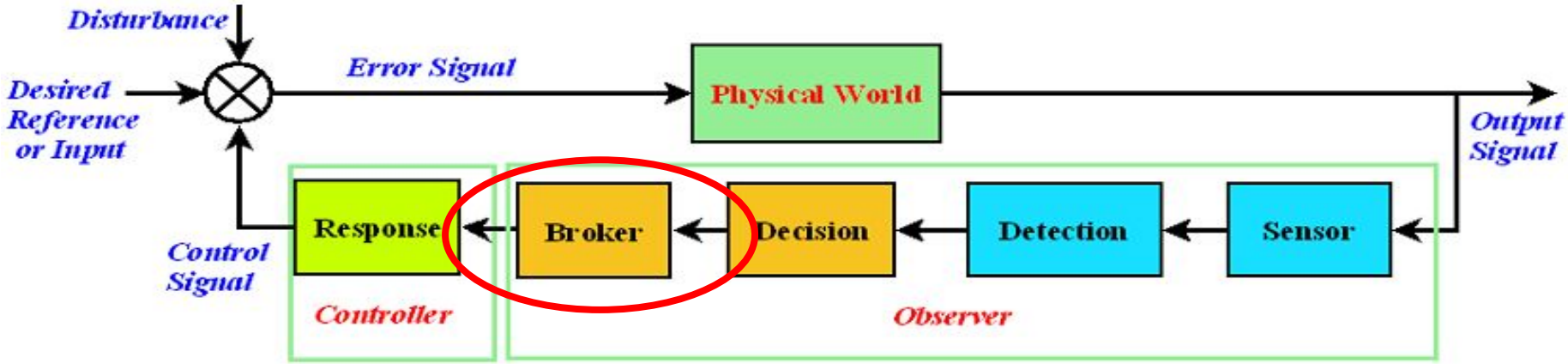
Effects of Situational-Awareness





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**

Early Warning Systems foster Situational-Awareness

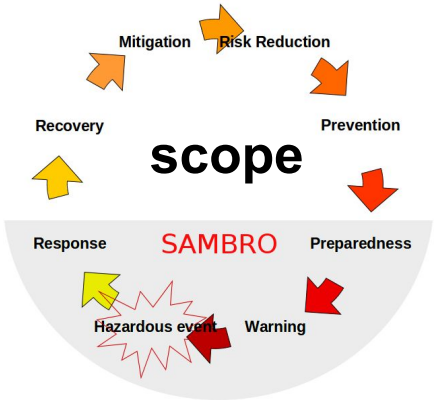


Definition: "*Early Warning System* (EWS)": A chain of information communication systems comprising sensor, detection, decision, and broker subsystems, in the given order, working in conjunction, forecasting and signalling disturbances adversely affecting the stability of the physical world; and giving sufficient time for the response system to prepare resources and response actions for minimizing the impact on the stability of the physical world.

- Waidyanatha, "Towards a Typology of Functional Early Warning Systems, 2010

Sahana Alerting and Messaging Broker (SAMBRO)

1

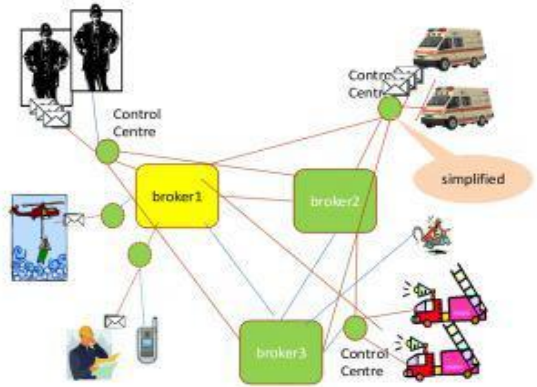


2 **function**

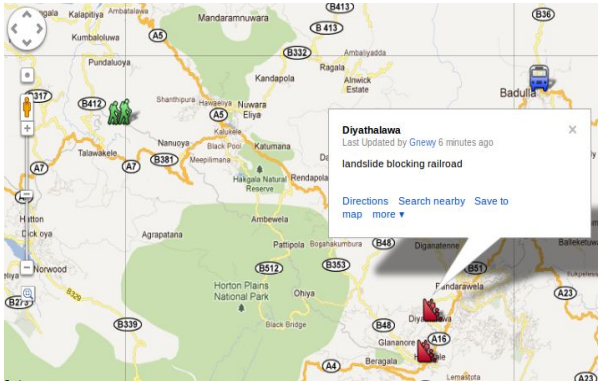
Alerting / Warning

CAP

3 **architecture**



4 **keep it Simple**



SAMBRO Principles

1. Application scope lies within disaster **response** and preparedness
2. Key function is to bring **efficiency** to Alerting / Warning dissemination
3. Apply a Messaging Broker architecture for improved **interconnection** and scalability
4. Keep it simple with Map-based visualization and interaction for improved **situational-awareness**

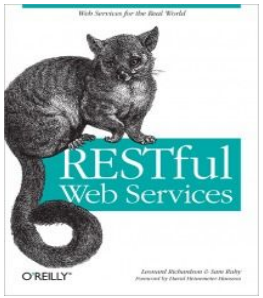
Open Source and International Warning Standards

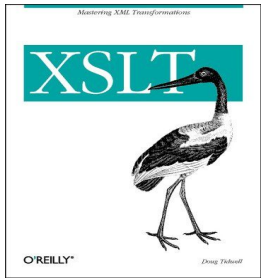
SAMBRO uses Popular Open Source Software Platforms

python™ WEB2PY

PostgreSQL

MySQL™





Definitive Open Data Standards for International Warning and Alerts

CAP

OASIS
The Organization for the Advancement of Structured Information Standards

Common Alerting Standard approved by **OASIS** Emergency Management Technical Committee

ITU

World Meteorological Organization

Recommended by the **ITU-T** (**X.1303**) and strongly advocated by the **WMO** Public Weather Services

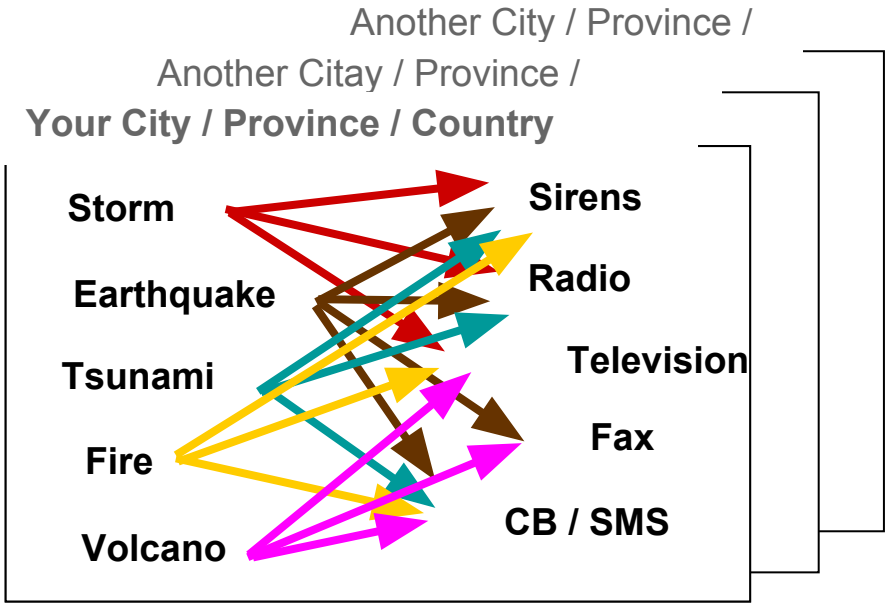
NSF

AccuWeather

Complies with the **US National Science and Technology Council** principles of alerting designed and used Used by international Organizations like Google, MeteoAlarm, AccuWeather, IFRC

SAMBRO Simplifies All-Hazard All-Media Warning

COMPLEX



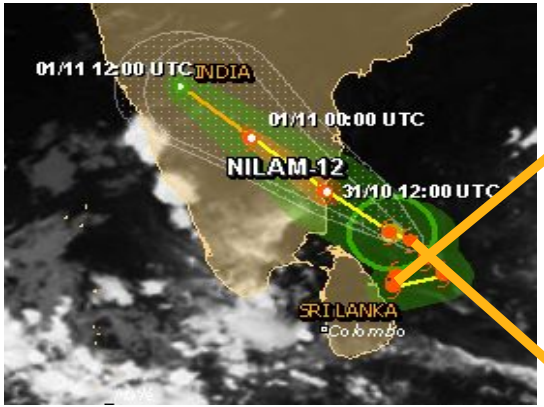
SIMPLIFIED

Single-entry of a message sent to through multiple channel

Complexities of managing multiple event types, jurisdictions, and warning channels are simplified by the CAP-enabled SAMBRO to foster an integrated and coordinated approach to managing early warnings.

Multi-lingual Multi-sequence Alerting

CAP



Cyclone NILAM-12
2012 October 31

<Alert> NILAM-12
LK Met Dept
Alert / Update /All-Clear

<AREA>

<INFO>
02:00 UTC

'si'
ඉහළ
කාලගුණ

'ta'
உயர்
வானிலை

'en'
HIGH
MET

North
Northeast
வடக்கு
வடகிழக்கு
උතුර
ඊශාන

<INFO>
12:00 UTC

'si'
ඉහළ
කාලගුණ

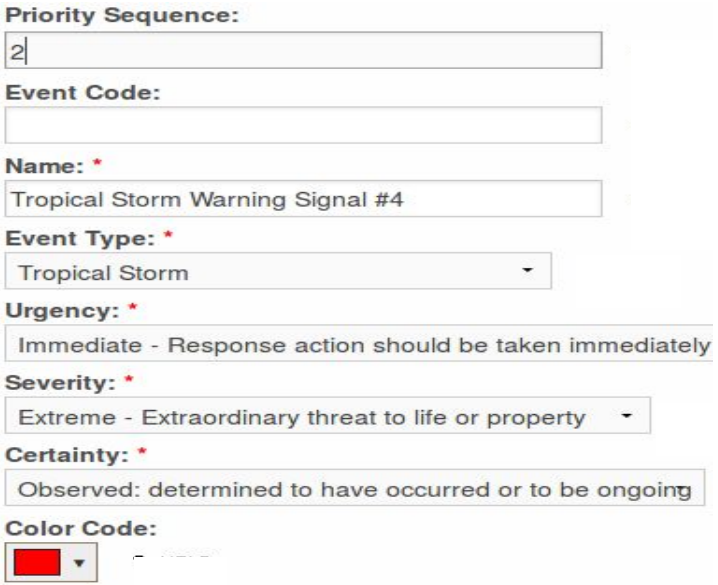
'ta'
உயர்
வானிலை

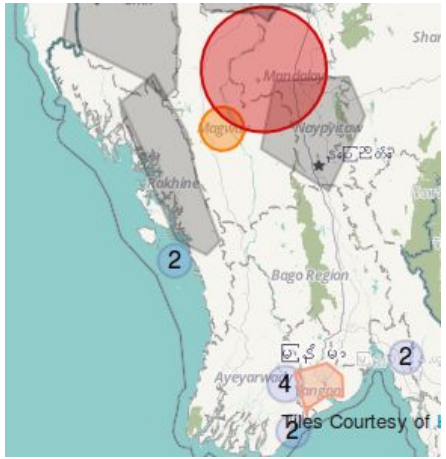
'en'
HIGH
MET

North
வடக்கு
උතුර

Warning Classification (or Relative Priorities)

Event Type	Color	Name	Rank
Tsunami		Warning Canecllation	4
Tsunami		Warning Information	3
Tsunami		Alert	2
Tsunami		Warning	1
Cold Wave		Significant Night Temperature Outlook	10
Earthquake		Slight	4
Earthquake		Moderate	3





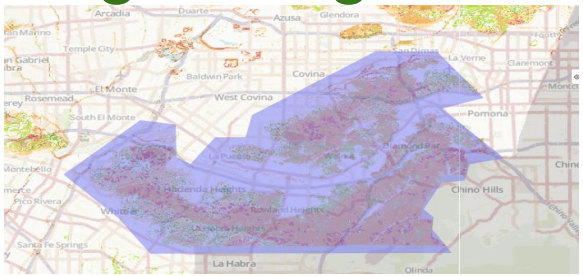
Alerting Authorities can predefine event type specific ranked and color coded warning priorities for each stage of the warning cycle.

Those priorities are mapped to CAP <urgency>, <severity>, and <certainty> values to auto fill when authoring a message.

Display alert area polygons on a map based predefined relative priority colors

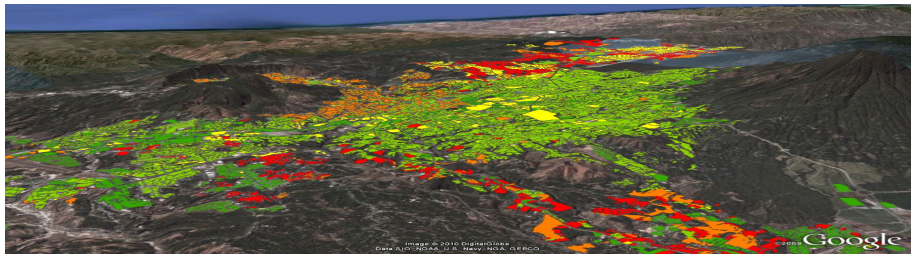
Impact-based Alerting through Predefine Alert Areas

SAMBRO provides tools to make us of hazard, vulnerability, and exposure maps to identify risk (e.g., landslide prone area).



Then develop risk-based predefined alert area polygons to use when authoring alerts. (e.g. landslide alert areas due to heavy rain > 72 mm/12 hrs).

You can overlay alert data with telecom signal coverage maps, for example, to ensure risk areas are covered by warning technologies.



- High risk
- Low risk
- No risk

Issue alerts based on severity, certainty, and urgency of the event (e.g. alert red areas first)

Integrates Publishers & Subscribers

Police
Civil unrest, accident, terrorism

Community Leaders
Local flooding

Fire
Search & Rescue

Health
Disease outbreak, public safety

Community
Emergency Response Teams & Households

Local Media
TV, Radio, Social Media

Medical
Emergency medicine & ambulatory

Police
Civil protection, search & rescue

Transportation
maritime, air, rail, bus, taxi

User Roles

Alert Publishers

Author, & Approve alerts with each Organization managing their own Users

Alert Subscribers

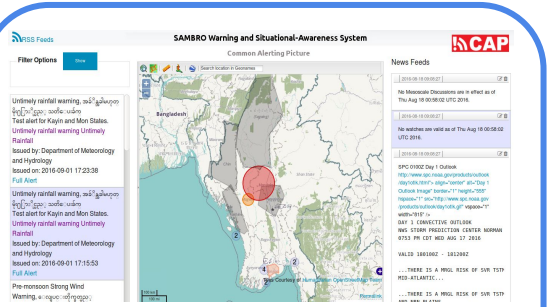
Receive event, priority, and location specific alerts; over SMS, Email, Mobile APP

SAMBRO

SAMBRO Server

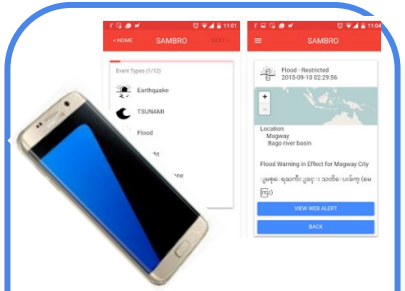
Cebu Common Alerting Picture

SAMBRO System-to-System Interfaces



BROWSER APP

REST API

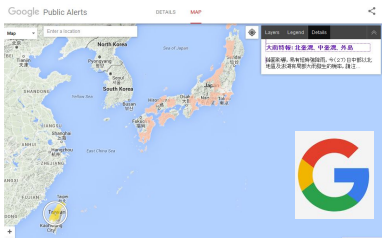


MOBILE APP

SAMBRO Server (Browser App) and Mobile APP talk to each other through RESTful **APIs**

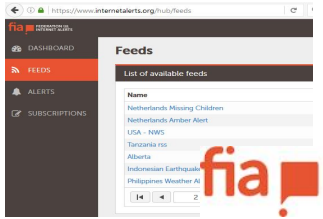
Google, IFRC, FIA, and any other CAP Alert Hubs can talk to SAMBRO through **RSS**

RSS Feeds



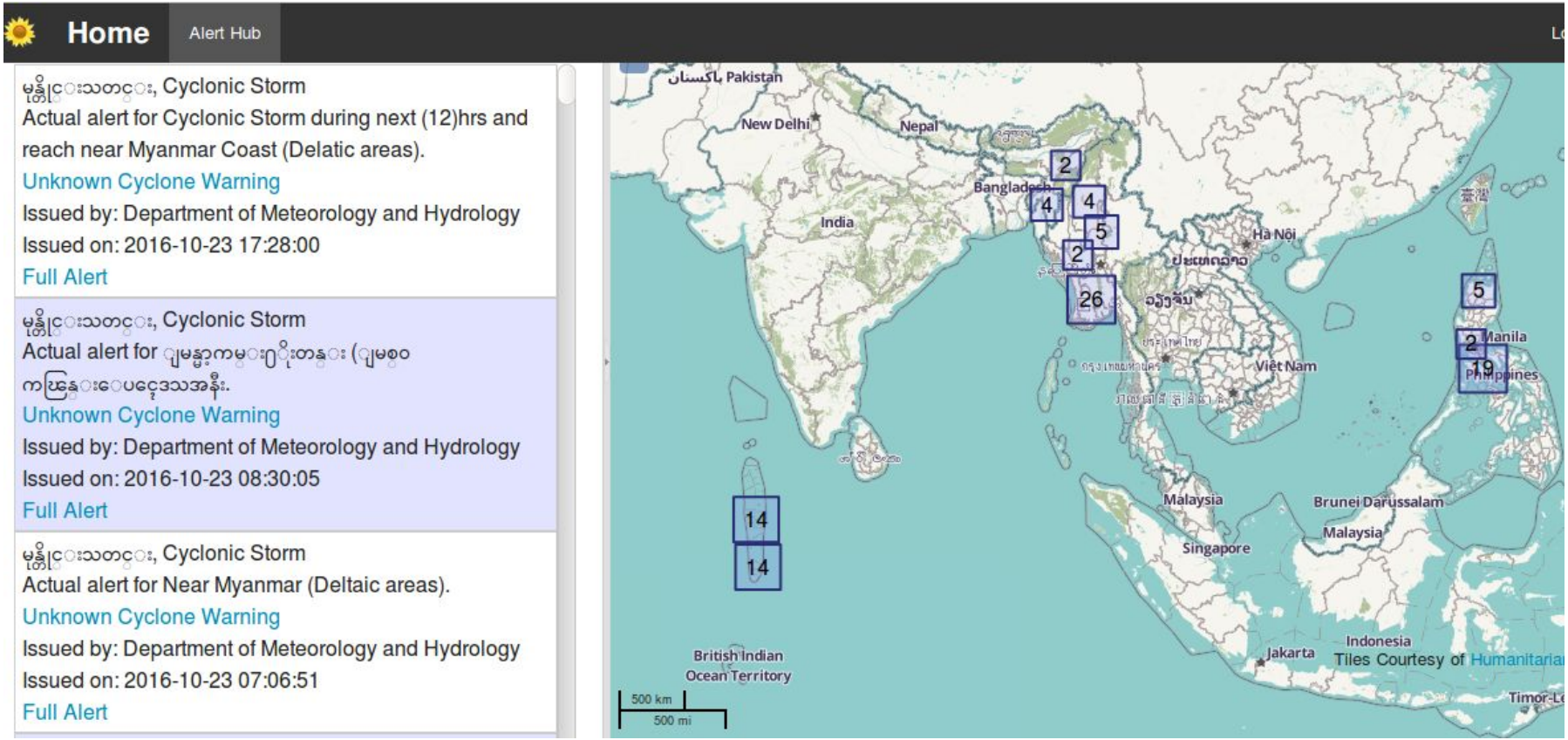
Google Public Alerts

Red Cross Hazard APP

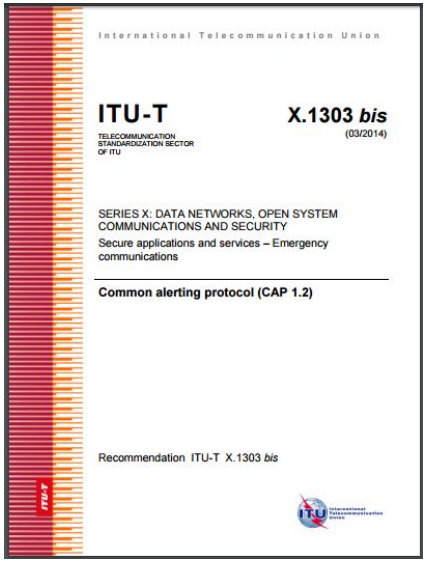


Federation of Internet Alerts

Alert-Hub and Common Alerting Picture



CAP + SAMBRO and SDGs


International Telecommunication Union

ITU-T

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

X.1303 *bis*

(03/2014)

SERIES X: DATA NETWORKS, OPEN SYSTEM COMMUNICATIONS AND SECURITY

Secure applications and services – Emergency communications

Common alerting protocol (CAP 1.2)

Recommendation ITU-T X.1303 *bis*

COMPLEMENTS

http://www.itu.int/ITU-T/recommendations/rec.aspx?rec=12150&lang=en

Conclusions

1. Cross-Agency Situational-Awareness improves institutional responsiveness as a result of information sharing among first-responders, immediate collaboration in response & mitigation, connected agencies for public safety, and efficient management of resources for saving lives
2. ITU-T X.1303 Common Alerting Protocol (CAP) international interoperable content standard simplifies Cross-Agency Situational-Awareness, enables All-hazard All-media warning, and fosters the implementation of a National Alert-Hub to support WMO's Global Alert-Hub initiative
3. Sahana Alerting and Messaging Broker (SAMBRO) CAP-enabled Cross-Agency Situational-Awareness free and open libre platform is designed to serve as a Broker, an important subsystem of an EWS

Thank You