Sahana Demo

Department of Disaster Management of Bhutan

Fran Boon &
Nuwan Waidyanatha
{fran,nuwan} @aidiq.com
October 11th 2021

Agenda

- Background
  - Speakers
  - Sahana
- Replacing DMIS
- SAFIRE: First Response
- SAMBRO: Alerting

Fran Boon

- Worked in Humanitarian Response in 30 countries for UN, Red Cross, Oxfam and other NGOs
- Headquarters, Regional & Field level experience
- Project Lead for Sahana Eden
- Mapping/GIS specialist

Nuwan Waidyanatha

Operations Research Analyst, Computer Engineer, and Emergency Communication Systems Expert

Over 17+ years experience in designing, building, implementing, and evaluating ICT-enable community-based and national emergency communication and telecom resiliency.

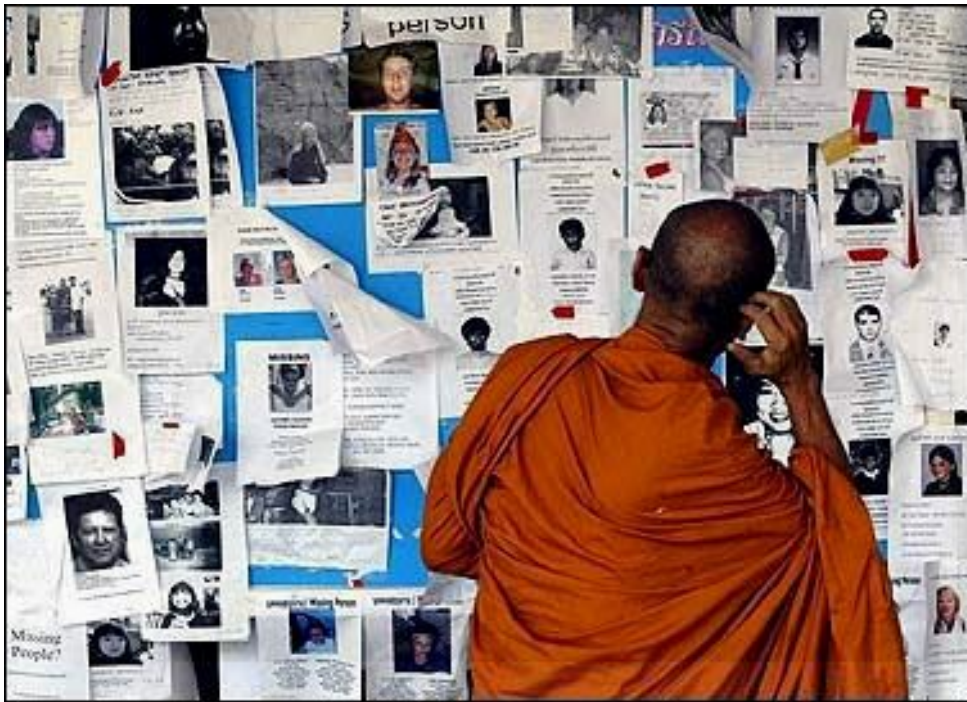
Developed and integrated enterprise-level mission-critical algorithms, databases, software, and hardware systems for managing operations and decision-support.

Published several book chapters, journal articles, conference proceedings and contributed to international technical committees and forums.

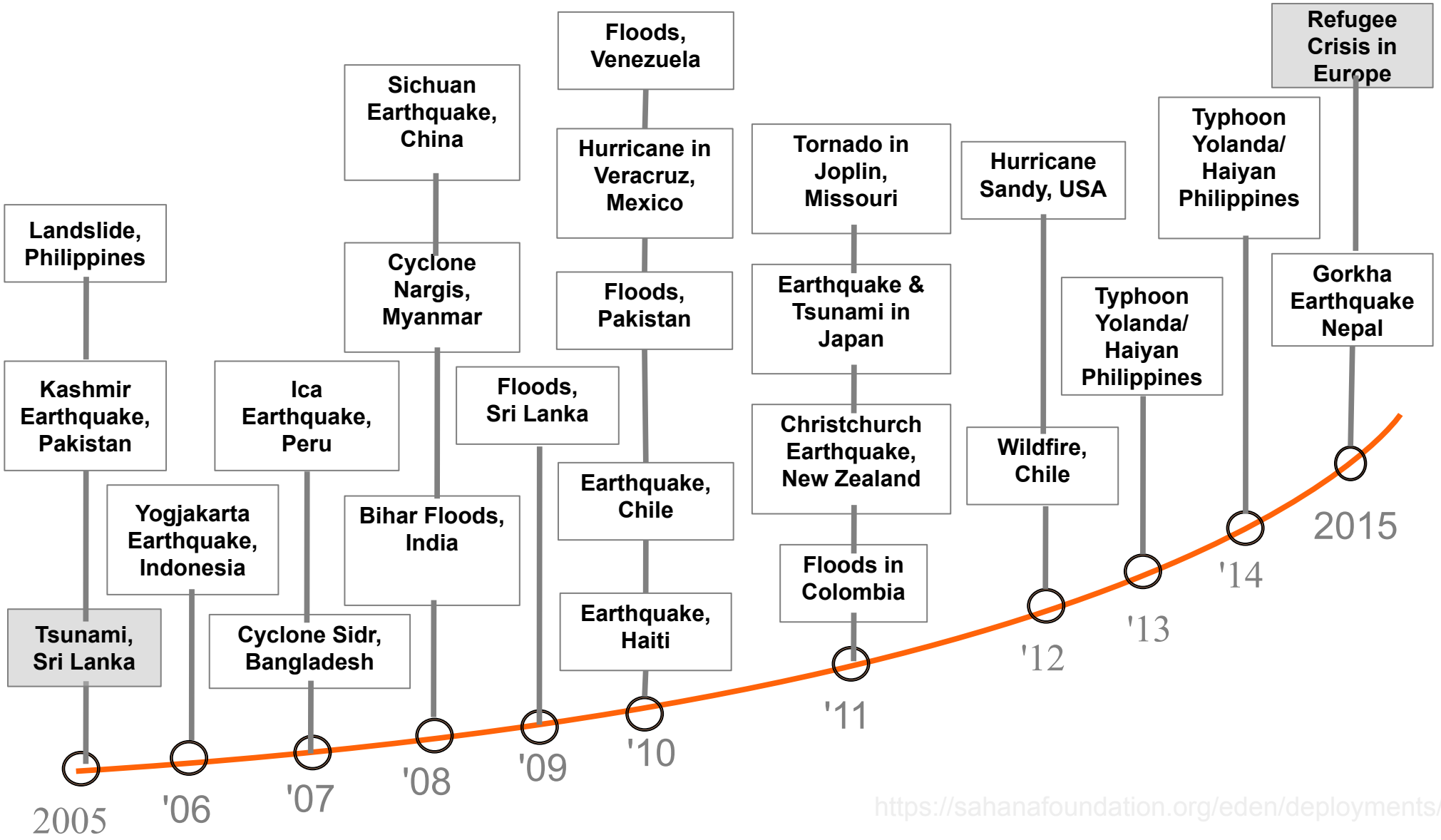
Led multitude of multi-sector, multi-stakeholder, and multi-disciplinary projects; completed over 35 research and implementation projects spanning across 12 countries

Sahana

- Indian Ocean Tsunami in Sri Lanka (2004)
  - Sahana is the Sinhalese word for Relief
- Since used in over 50 countries
- Stewarded by the Sahana Software Foundation
  - A 501(c)(3) non-profit organization



Emergency Deployments



https://sahanafoundation.org/eden/deployments/

What or Who is Sahana?

- A Free, Open Source Humanitarian software platform.
  - No licensing fees
  - No restrictions to use (MIT license)

- A Global Community of Disaster Management professionals

Mission:
To **save lives** by providing **information management solutions** that enable organizations and communities to better prepare for and respond to disasters.

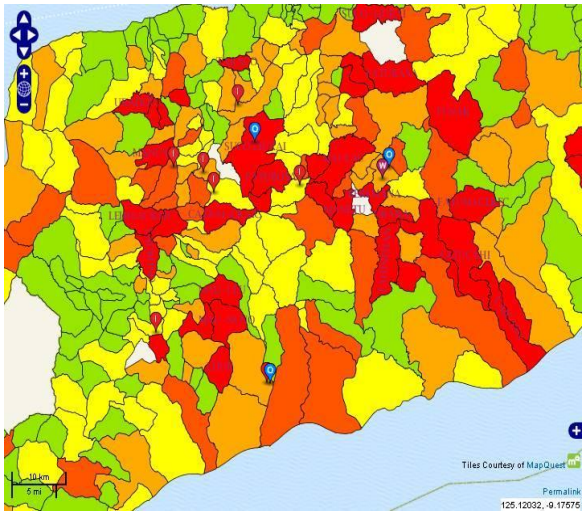
More than 75 deployments over more than 50 countries around the world.

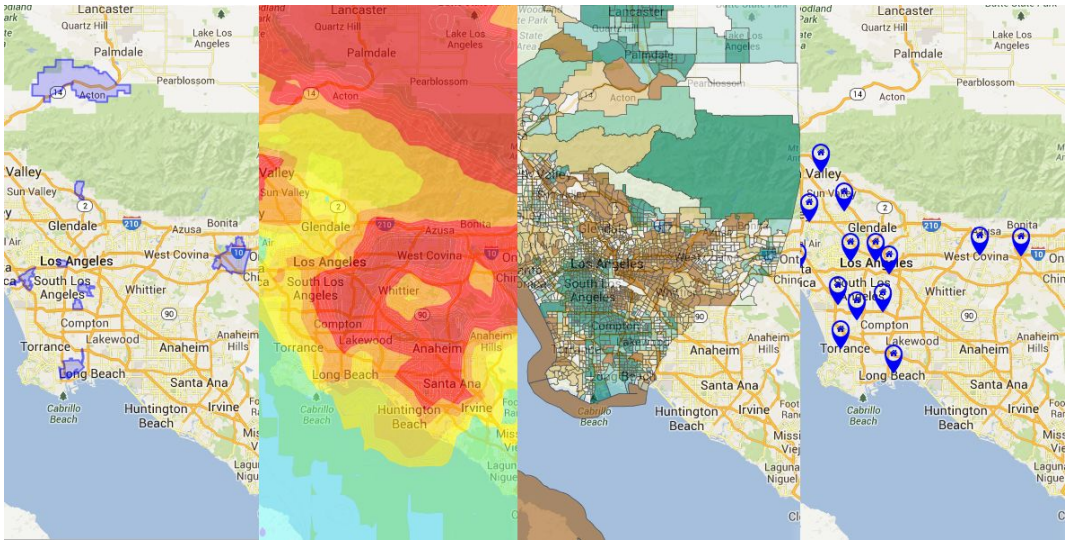
Sahana Features

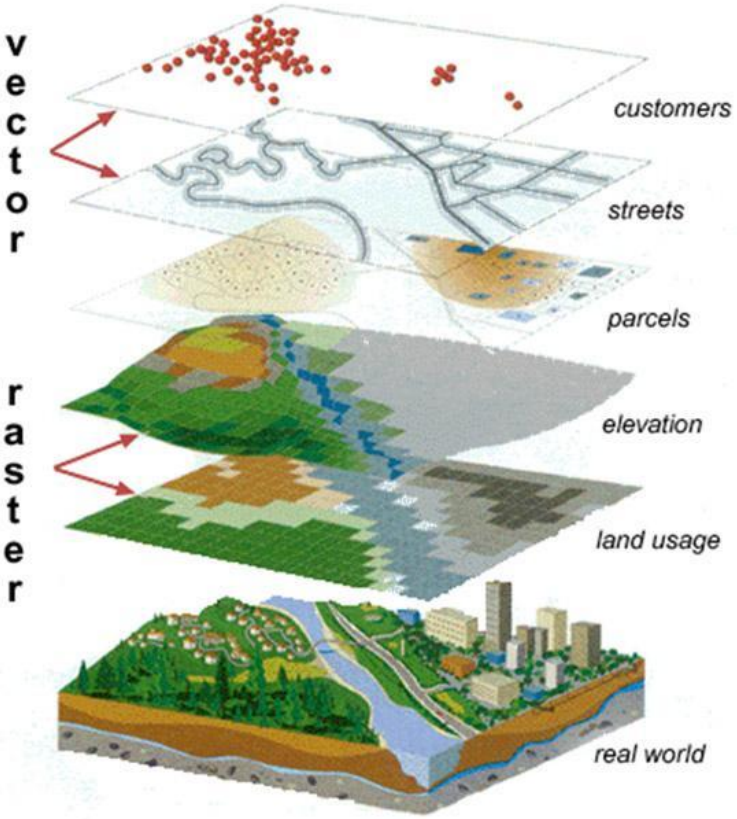
- Access Control
  - Hierarchical Realms
- Integration
  - Import/Export
  - Synchronisation
  - Open Standards
- Data Protection
  - Consent Tracking
  - Anonymisation
- Customisable
  - Rapid Application Development

Mapping

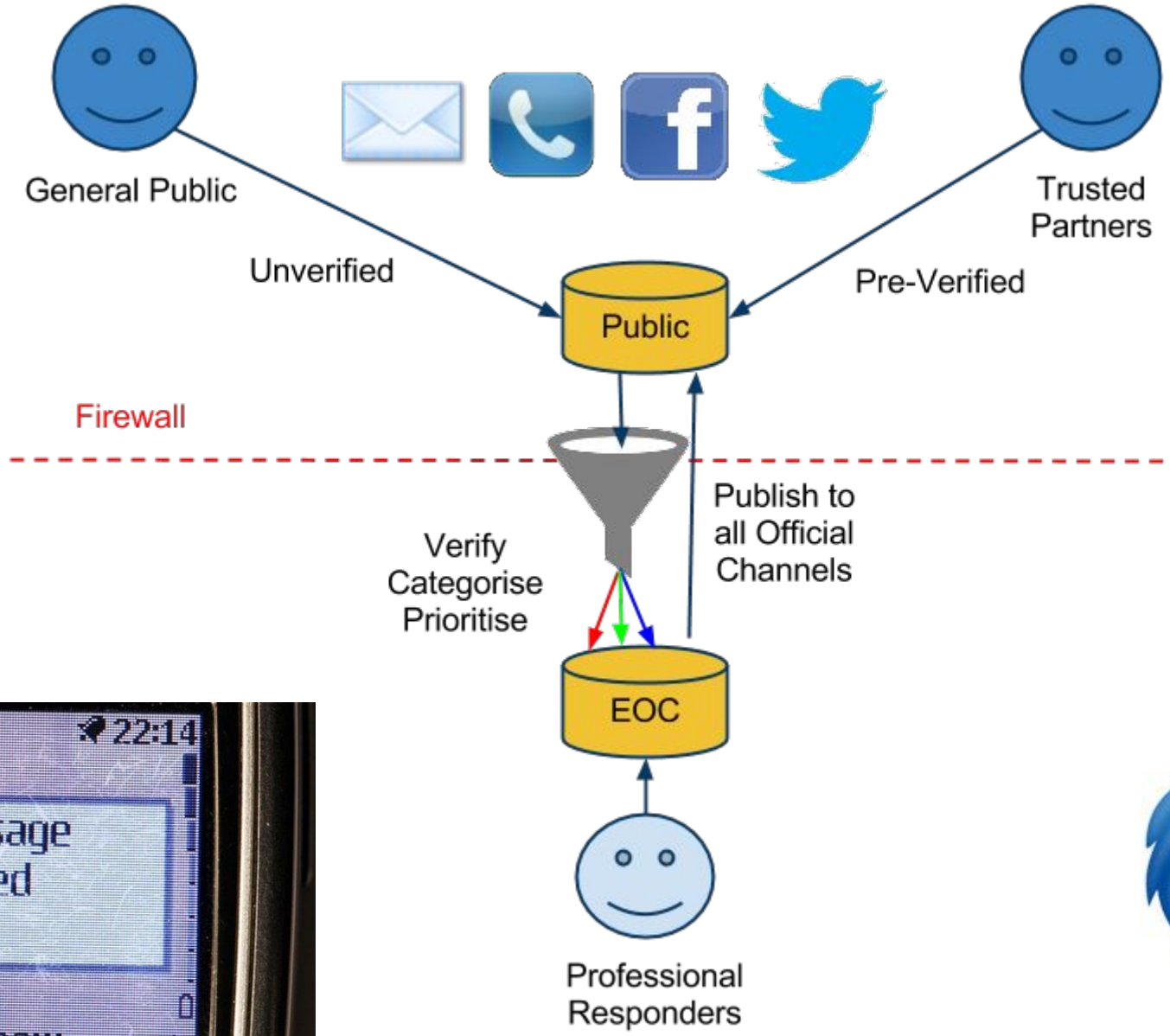
District	Population						Households			
	Total	Male	Female	Sex	Area in	Density	Private			Other
							Total	Male Headed	Female Headed	
TIMOR LESTE	1,066,409	544,198	522,211	104.21	14,954	71.31	184,652	155,118	29,534	1,342
AINARO	59,175	30,183	28,992	104.11	870	68.03	9,664	8,155	1,509	128
AINARO	15,558	8,083	7,475	108.13	236	65.94	2,292	1,949	343	108
Ainaro	6,937	3,640	3,297	110.40	31	225.61	871	702	169	105
Suro-Craic	1,088	580	508	114.17	28	39.03	182	166	16	1
Soro	1,861	931	930	100.11	28	65.34	299	247	52	2
Manutasi	1,704	902	802	112.47	18	95.50	265	227	38	0
Cassa	2,495	1,267	1,228	103.18	70	35.65	414	368	46	0
Mau-Ulu	470	246	224	109.82	27	17.20	89	80	9	0
Mau-Nuno	1,003	517	486	106.38	34	29.78	172	159	13	0
HATU-BUILICO	11,950	5,978	5,972	100.10	130	92.01	2,058	1,723	335	5
Mulo	6,274	3,123	3,151	99.11	45	138.34	1,112	910	202	5
Nuno-Mogue	3,394	1,701	1,693	100.47	33	101.38	542	470	72	0
Mau-Chiga	2,282	1,154	1,128	102.30	51	44.70	404	343	61	0
MAUBISSE	22,022	11,188	10,834	103.27	261	84.39	3,604	3,018	586	10
Maubisse	6,184	3,186	2,998	106.27	22	283.82	974	803	171	8
Manelobas	1,148	575	573	100.35	8	139.70	186	156	30	0
Manetu	2,413	1,213	1,200	101.08	20	120.17	362	323	39	1
Aitutu	4,539	2,301	2,238	102.82	47	96.76	767	635	132	0







Communications & Social Media



Sahana Case Studies

- Resource Mapping System
  - Red Cross
- DRR Project Portal
- Relief Goods Inventory & Monitoring System
  - Department of Social Welfare and Development, PH
- Disaster Risk Management System
  - Timor-Leste
- Early Warning: SAMBRO
  - Maldives, Myanmar & Philippines

RMS RESOURCE MAPPING SYSTEM Asia Pacific

Register | Sign In

Managing material and human resources together to better prepare for future hazards and vulnerabilities.

MAP | STAFF & VOLUNTEERS | WAREHOUSES | ASSETS | ASSESSMENTS | PROJECTS

NEWS

RMS workshop will be held in Hanoi, Vietnam 8-10 November.

Field assessments feature under implementation.

STAFF & VOLUNTEERS

Add new and manage existing human resources.

WAREHOUSES

Stocks and relief items.

ASSETS

Manage office inventories and assets.

ASSESSMENTS

Design, deploy & analyse surveys.

PROJECTS

Tracking and analysis of Projects and Activities.

Event Assessment Map

Display Question on Map:

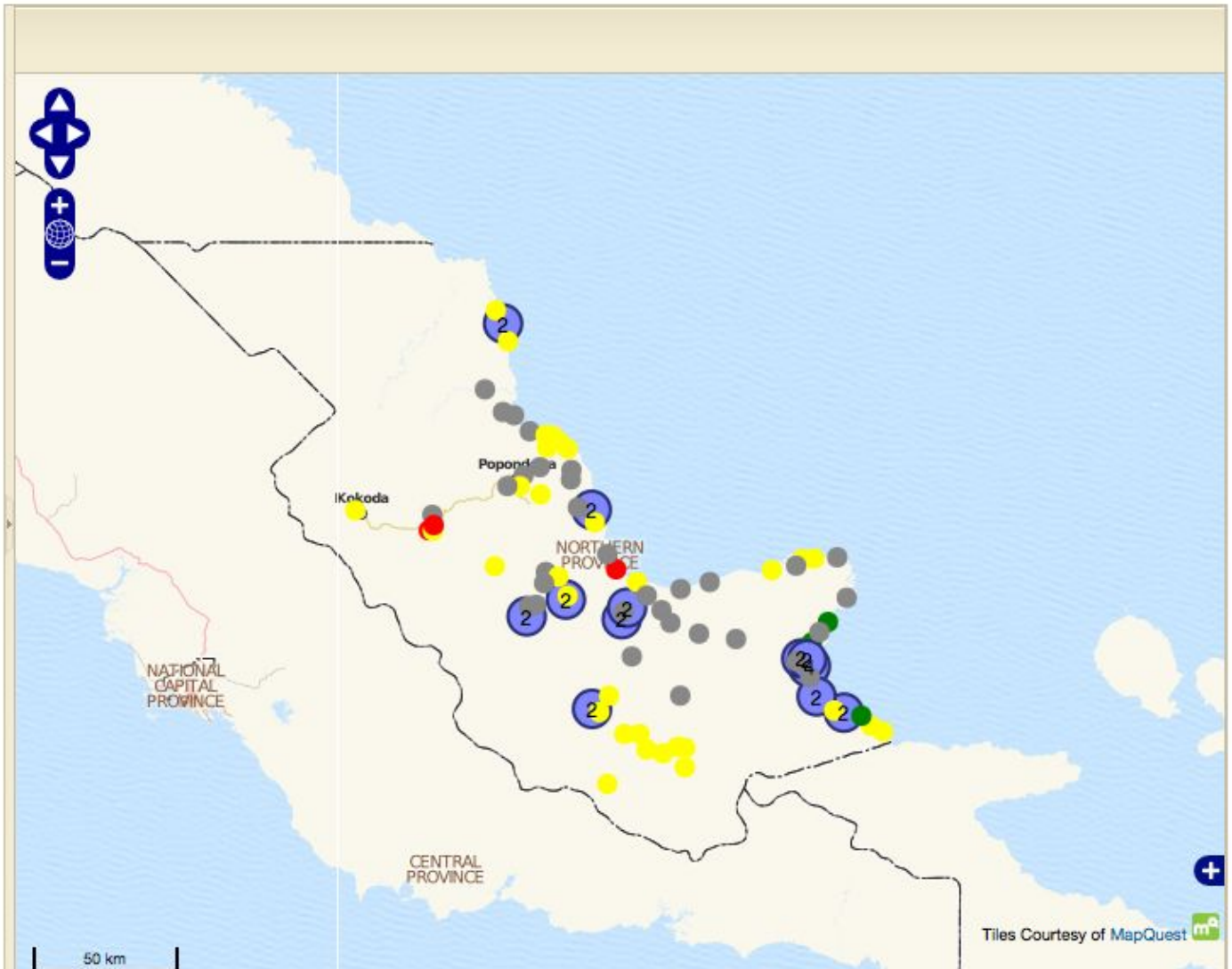
Displaced

Update Map

Marker Levels

Low	At or below 0
Average	0 - 1473
High	Above 1473
No Data	

Click on a marker to see the Event Assessment Response



List All

Event Assessments

New
List All

Administration

Import Templates
Import Completed Responses

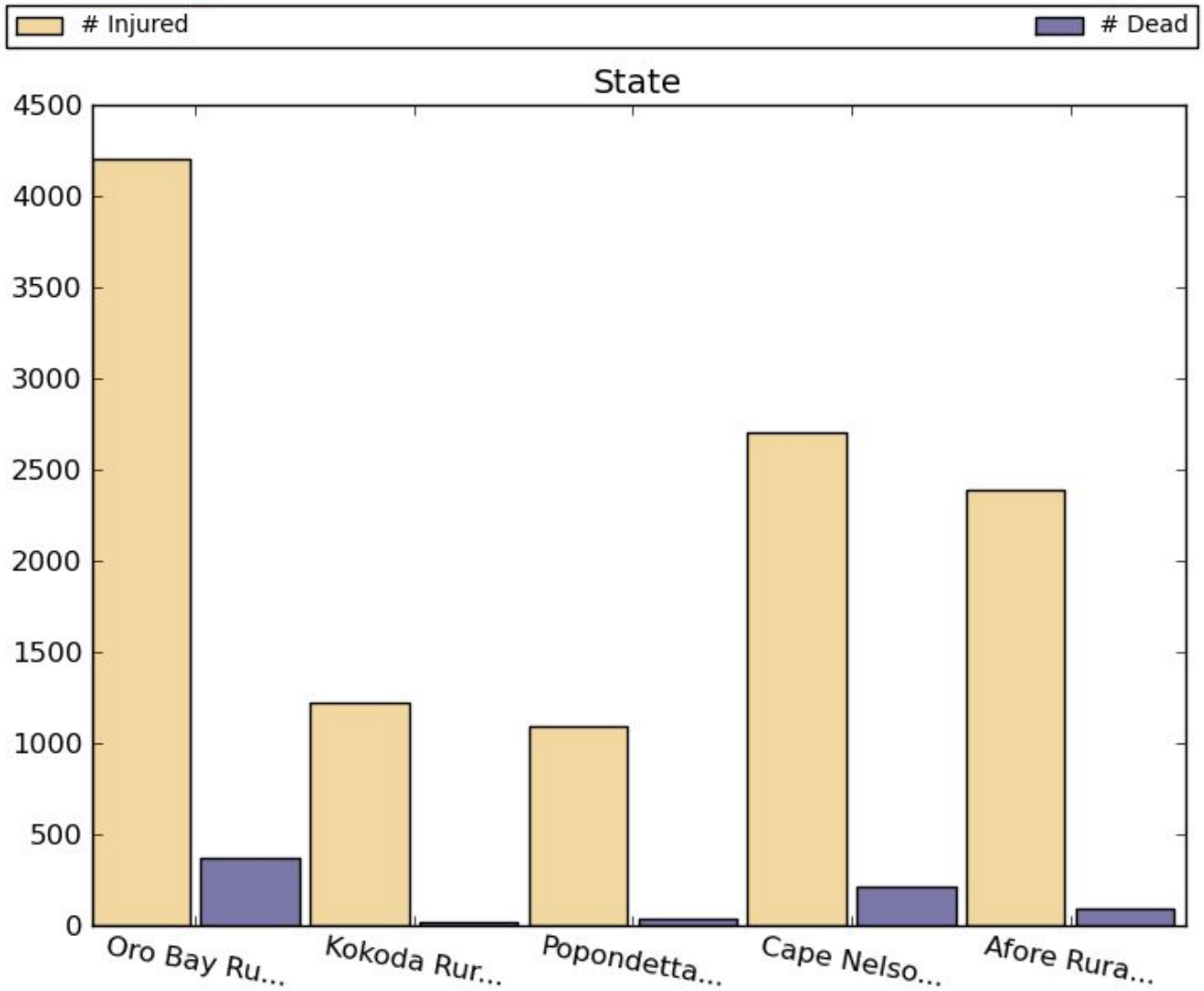
DISASTER ASSESSMENT CHART

Template: First 24 Hours **Name:** Tropical Storm Bulegila **Status:** Active

Number of Event Assessment Responses 142

Details | Add New Response | Responses | Summary | Chart | Map

Download Chart

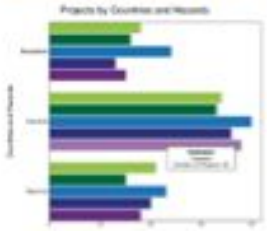


Select Label Question:

State

ASSETS
VAIO

INFORMATION PRODUCTS



WHY THIS PORTAL?

- Share information on implementation of DRR: Who? What? Where?
- Collectively identify gaps, improve planning and programming on DRR
- Identify areas of cooperation on implementation of DRR

WHAT CAN WE GET FROM THIS PORTAL?

- List of completed and ongoing DRR projects - by country, hazards, themes, partners and donors.
- List of planned/proposed projects - better planning of future projects.
- Quick analysis - on number and types of completed and ongoing DRR projects
- Generate customised graphs and maps.
- Know more on the DRR frameworks/action plans guiding the region - identify priority areas for providing support and implementation.
- List of organisations implementing DRR projects at regional level.
- Archive of periodic meetings of regional DRR mechanisms.

HOW WOULD THIS INFORMATION HELP?

National Government

ADD CURRENT PROJECT

ADD PROPOSED PROJECT

ADD COMPLETED PROJECT

ADD PROJECT OFFLINE

ADD DRR FRAMEWORK

LOGIN

E-MAIL:

PASSWORD:

LOGIN

Register | Lost Password

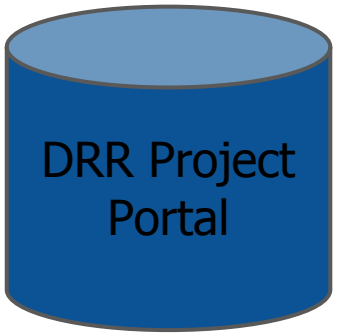
VIDEO TOUR

USER MANUAL

Currently the DRR Projects Portal has information on:

929 Projects

Integration



Project Data

International Federation
of Red Cross and Red Crescent Societies

SAHANA

Relief Goods Inventory & Monitoring System (RGIMS)

Department of Social Welfare and Development, Philippines

Home | Warehouse | Requests | Map | more | Administration | admin@example.com | Help

Relief Goods Inventory & Monitoring System

Request → Send → Receive

Manage Your Warehouse

Please Select a Warehouse Go

RGIMS aims to provide a reliable and accurate inventory control of the UNWFP and DSWD logistics management systems of tracking, monitoring and reporting of relief goods intake, warehousing and outflow of donations.

For more details on the RGIMS system please contact DSWD-NROC Office.

Map

© 1998-2012, Department of Social Welfare and Development
Constitution Hills, Batasan Pambansa Complex, Quezon City, Philippines
Tel. (632)931-81-01 to 07

DSWD Background

- In disaster response the World Food Programme (WFP) distributes food through the Department of Social Welfare and Development (DSWD)

- WFP wanted to build DSWD's capacity to manage warehouse inventory

- WFP selected Sahana to provide a Relief Goods and Inventory Management System (RGIMS)

AERO
NO. 9
Google

Typhoon Haiyan

- DSWD were the biggest provider of relief goods after Typhoon Haiyan - which was managed using Sahana
- RGIMS was used to manage relief goods at 19 Warehouses
- When changes were requested the volunteer Sahana community provided these in < 24 hours

MEDIA
HELP DESK
SMS Use Only
LOGISTICS

SAHANA

Disaster Risk Management System

National Disaster Operation Center

Timor-Leste

Timor-Leste Disaster Information System

Improving disaster prevention, preparedness and response in Timor-Leste.

Prevent

Share information to coordinate, cooperate, and collaborate with stakeholders in Timor-Leste to avoid potential adverse impacts of disasters through advanced actions

Prepare

Share information, knowledge and capacities to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events in Timor-Leste

Respond

Coordinate the provision of emergency services and assistance during or after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the needs of the people affected

Filter by Type :

Select

Filter by Location :

Select District

Select Subdistrict

Select Suco

Filter by Organization :

Select

Filter by Date :

From:

clear

To:

clear

Reset filter

SEARCH

Advanced Search

LATEST INFORMATION

Assessment | Fatuleto | Zumalai | Covalima | 20 Sep 13 15:13

Assesmentu konaba victemia iha covalima

Admin User - National Disaster Operation Center (NDOC)

Assessment | Fatuleto | Zumalai | Covalima | 20 Sep 13 15:08

Hala'o Assesmento iha fatin refere

Joao Carlos Sing - National Disaster Operation Center (NDOC)

Plan | Dili | 21 Sep 13 15:05

IOM Prontu atu ajuda tranpsorte (Kamioneta 3) ba responde emerjensia iha Covalima

Thomas Prozonato de Aroe Soares... - International Organization for Migration (IOM Timor-Leste)

! Alert | Covalima | 20 Sep 13 14:57

Covalima udan tau to'o semana 1 lae para tamba povo sira gosta tesi ai horis, etc.

Carmen dolores da cruz - MTC/DNMG

Activity | Debos | Suai | Covalima | 21 Sep 13 14:55

Mercycorps halo aktividades primeiro mak halo identikasaun ba comunidade nebe mak infrenta udan bot hodi fahe terpal no halo evakuasaun ba comunidade nebe mak hela besik mota ibun

Francelino cardoso - Mercy Corps (MC)

Report | Covalima | 20 Sep 13 14:45

Inundasaun Suai Iha loron 19 de Setembro de 2013 NOC simu informasaun husi DOC (Sentru Operasaun Distritu Suai) katak akontece udan boot iha sub distrito Maucatar no Suai Villa. Rezultado husi udan boot ne'e, akontece inundasaun boot iha sub-distrito rua nee. Iha Sub distrito Maucatar iha Suco rua mak afeita maka'as mak hanesan; Suco belacasac no Suco Maucatar, iha sub-distrito Suai villa nian mak hanesan suco Camenasa no Suco Suai loro. Atuasaun PNTL Pntl distrito Covalima husi subdistrito seluk iha dalan ona hodi ba fo apoio PNTL iha sub distrito Maucatar no Suai Villa, hodi

DISASTERS

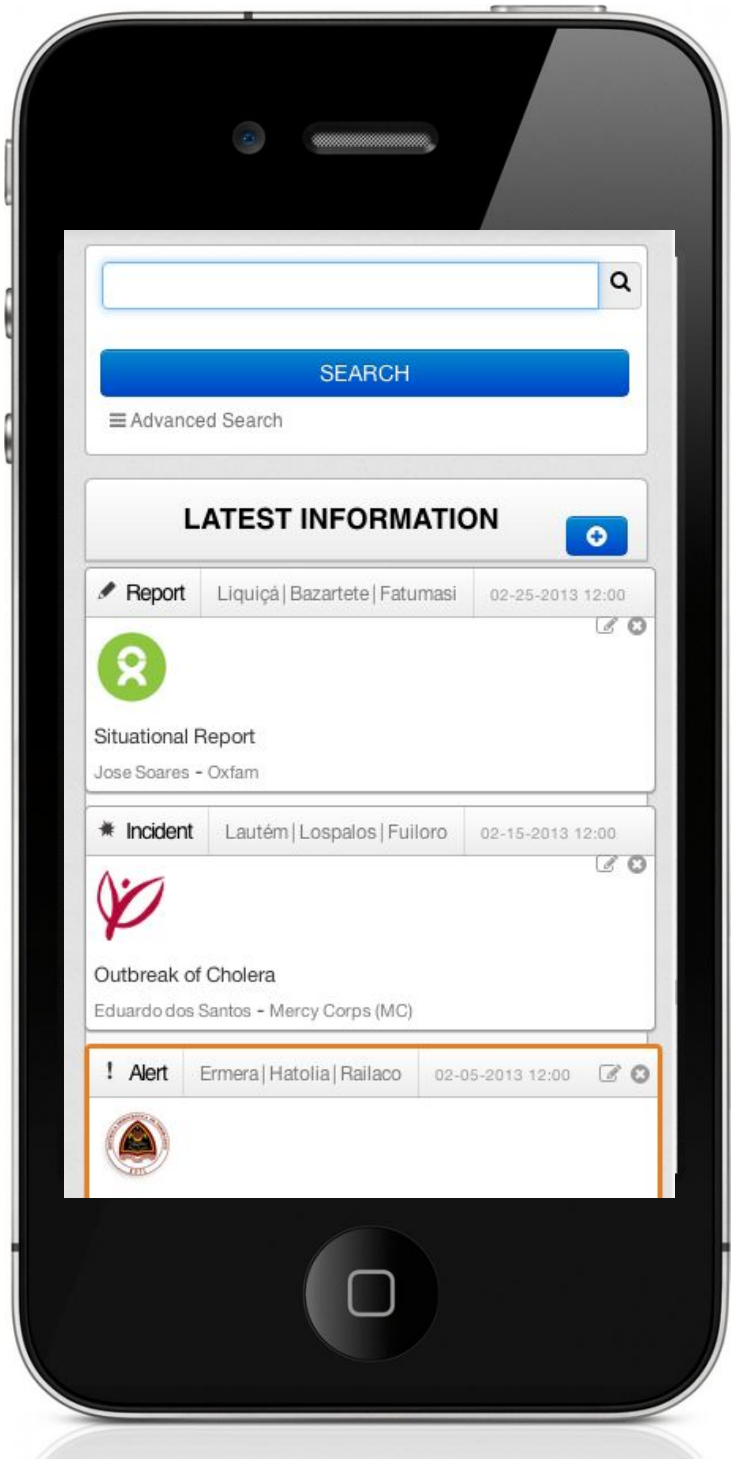
Udan Boot Covalima
20 Sep 13 14:30

Flood Manufahi
19 Sep 13 20:56

Cyclone Simone
19 Sep 12 09:00

Drought Zumalai
19 Aug 12 09:00

Aileu Floods
19 Jul 12 09:00


SEARCH
Advanced Search
LATEST INFORMATION
Report
Liquiçá | Bazartete | Fatumasi
02-25-2013 12:00
Situational Report
Jose Soares - Oxfam
Incident
Lautém | Lospalos | Fuiloro
02-15-2013 12:00
Outbreak of Cholera
Eduardo dos Santos - Mercy Corps (MC)
Alert
Ermera | Hatolia | Railaco
02-05-2013 12:00

TIMOR-LESTE RED CROSS SOCIETY

Contacts

19 Sep 13 18:11

Narcisio brites
no phone number narcsiobrites_cvtl@redcros.tl
no office assigned

19 Sep 13 18:11

Filomeno araujo
no phone number filomenoaraujo_cvtl@redcross.tl
no office assigned

19 Sep 13 18:11

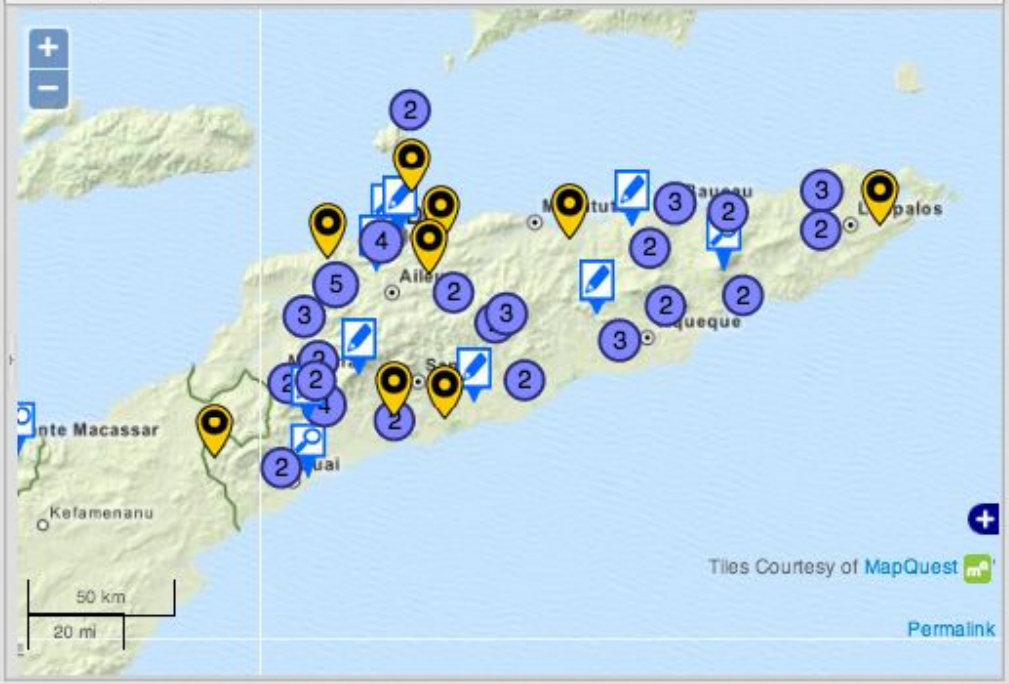
Claudia Gohan
+(670) 7358-3044 claudia.gohan@redcross.tl
no office assigned

19 Sep 13 18:11

Soraia Moises
+(670) 5295-1204 soraia.moises@redcross.tl
no office assigned

see more (2)

Map



Offices

Dili 19 Sep 13 21:18

CVTL Filial Dili
District
Av.Bairo formoza

Resources

Baucau 19 Sep 13 22:00

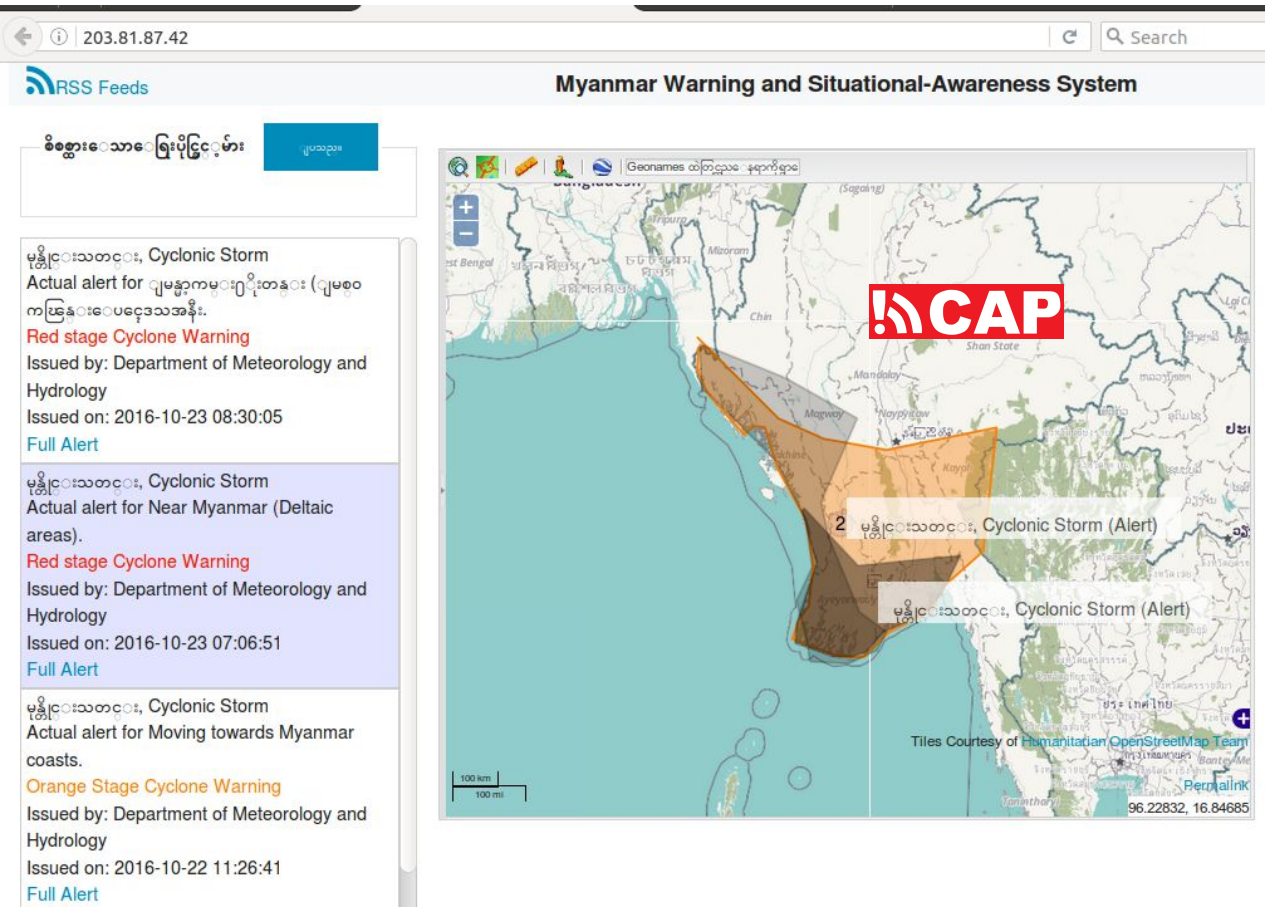
100 Volunteers
volantari iha distrito no mos iha suco iha 25 pessoas
Filomeno araujo - Timor-Leste Red Cross Society (CVTL)

Covalima 19 Sep 13 21:56

“Just like Facebook!”

Early Warning: SAMBRO

Improve institutional responsiveness to coastal hazards through Cross-Agency work in Myanmar, Maldives, and the Philippines



Myanmar Department of Meteorology and Hydrology (DMH)

Philippines Atmospheric, Geophysical, and Astronomical Service Administration (PAGASA)

Maldives National Disaster Management Center (NDMC)

http://www.unescap.org/disaster-preparedness-fund

Questions

1. What do you LIKE about the current DMIS?

   In your answer say “I LIKE …..”

2. What do you WANT from a future DMIS?

   In your answer say “I WANT …..”

JAMBOARD

DMIS Replacement

- Events
- Disaster Assessments
- Infrastructure
  - Population
- Human Resources
- Items
- DRR
  - Projects
  - Trainings

Additional Functionality

- Case Management
- Disease Management
- Shelters

DMIS Replacement

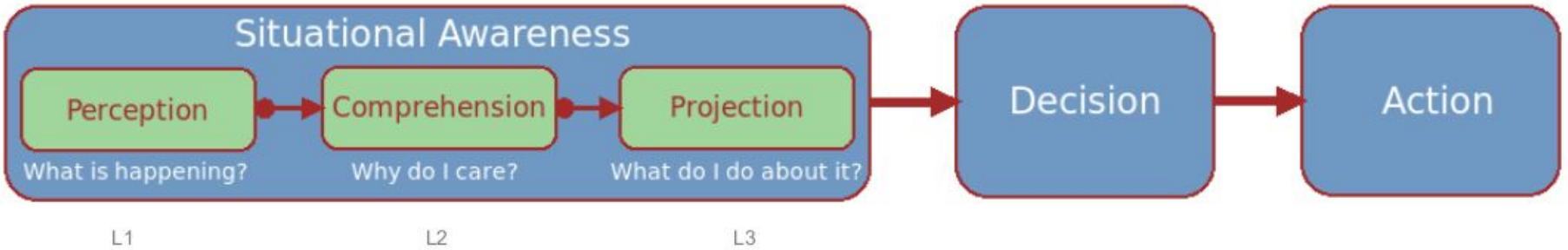
DEMO

Situational Awareness

SAMBRO & SAFIRE

Situational Awareness

Endsley's model



Got a "heavy rain" alert

Perception of the elements in an environment within a volume of time and space

I live by the river

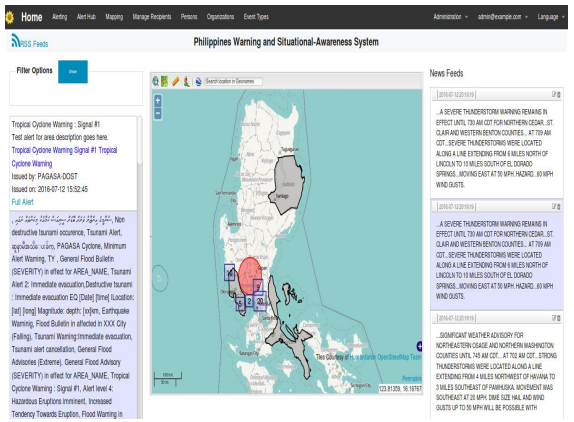
Sense-making of the immediate events and the ongoing situation that is actually occurring and deliberating

Observe the situation

critique–explore–compare–adapt (CECA) loop model, is a notion of the "vision" or "conceptual model" that contains not only a plan, but also indicators to monitor the plan as it unfolds.

1m below spill level

Let's evacuate



1. Improves information sharing among first-responders
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**

SAFIRE

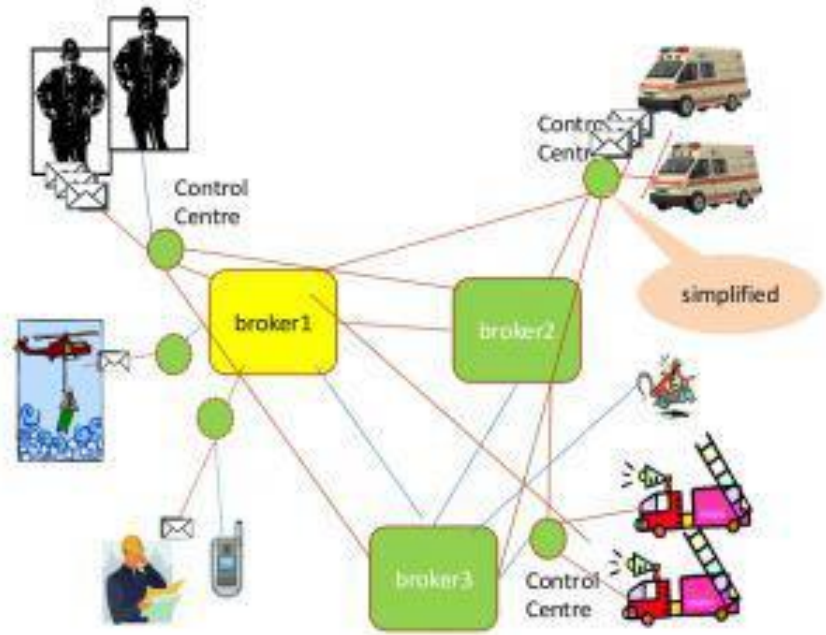
Sahana First Response

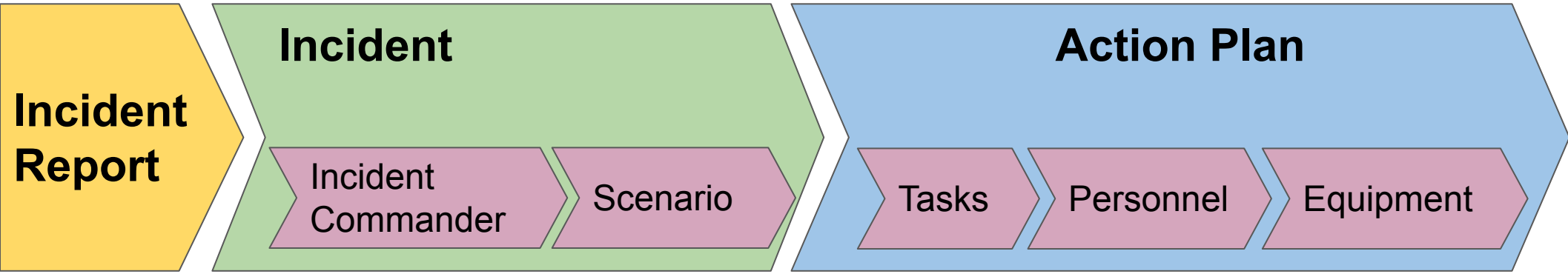
Typical Emergency Operation Center Functions

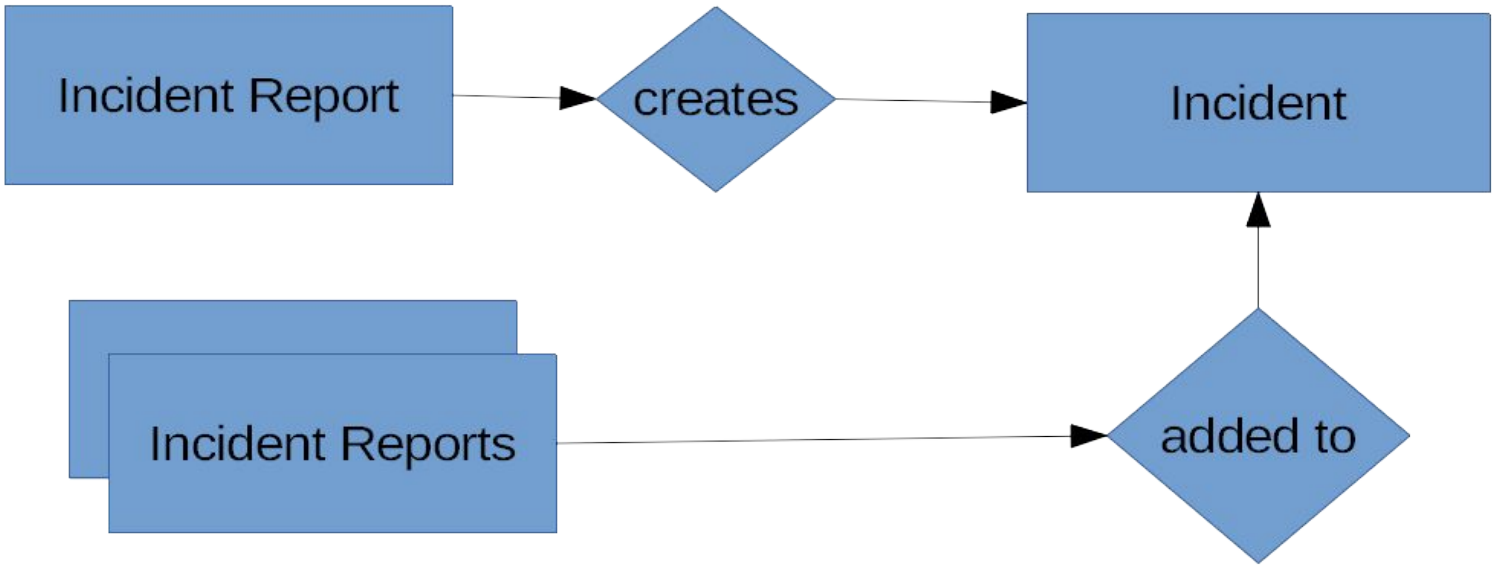
1) Call Center logs the Incident Reports received by the Public or the First-Responder through Voice and Data channels

2) EOC assess the situation, dispatch emergency services, and coordinate plans, operations, and logistics

3) SITREPs and real-time common operating picture – WHO is doing WHAT, WHERE, & WHEN, shared with stakeholders




Incident Report
Incident
Incident Commander
Scenario
Action Plan
Tasks
Personnel
Equipment


Incident Report
creates
Incident
Incident Reports
added to

SAFIRE Projects

- Urgences-Sante, Canada
  - Ambulance Dispatch
- Seychelles
  - Department of Risk Disaster Management NEOC
  - Prototype built
  - Positive Evaluations
- Albania
  - National Agency for Civil Protection
  - Interest from seeing Sahana used by Italian Civil Defence

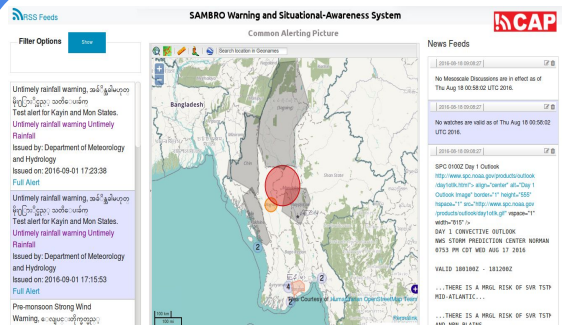
SaFiRe

DEMO

SAMBRO

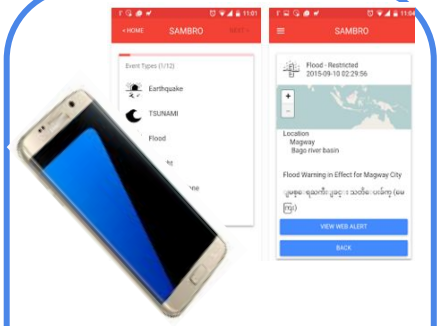
Sahana Alerting and Messaging Broker

SAMBRO Key Components



BROWSER APP

REST API

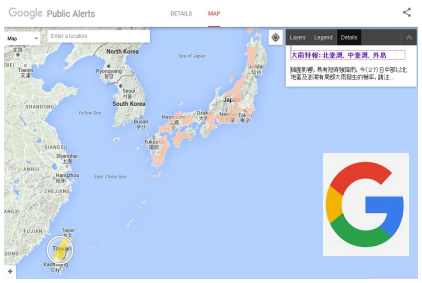


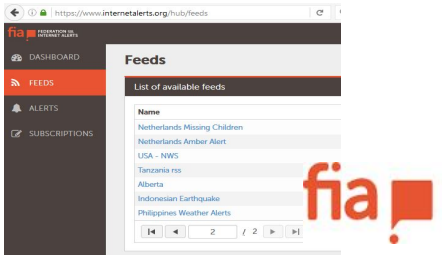
MOBILE APP

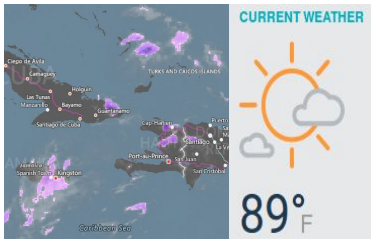
SAMBRO Server (Browser App) and Mobile APP talk to each other through RESTful **APIs**

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

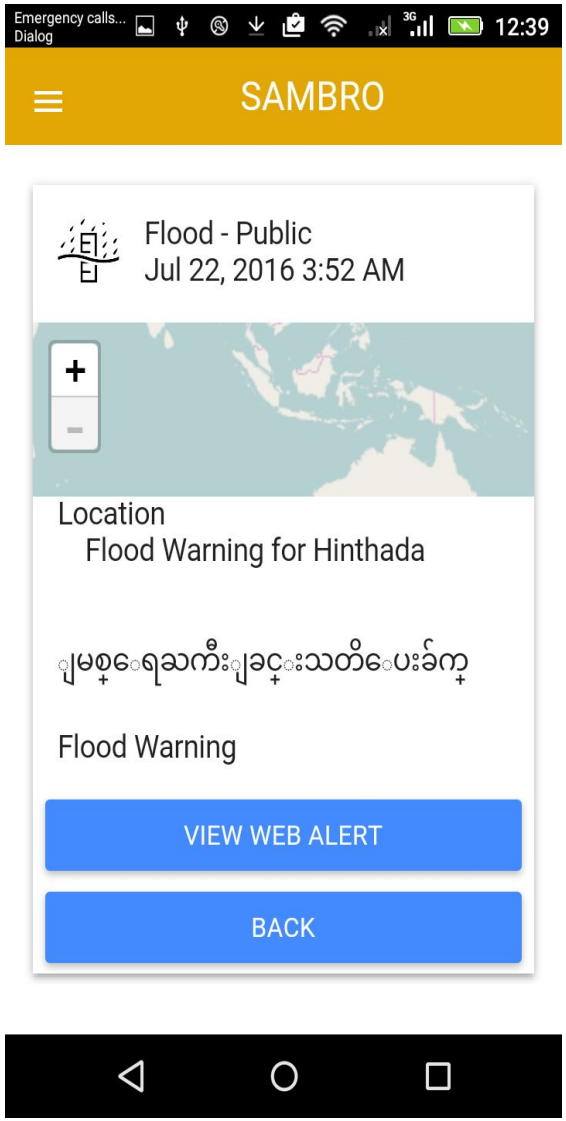
RSS Feeds







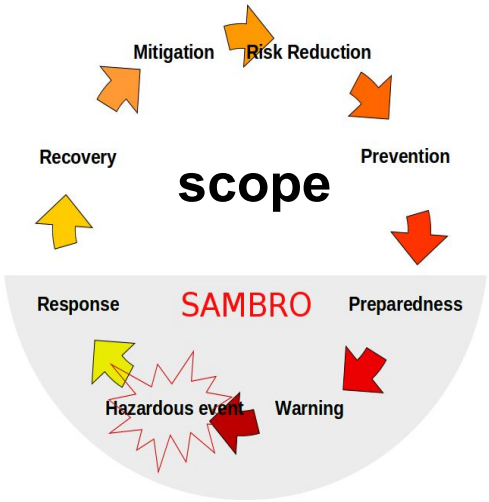
Mobile App



1. Designed for local alerting authorities to issue CAP-alerts for village, townships, Islands
2. GCM push serves as a wakeup function with a Siren (limited e.g. China)
3. Requires a data connection but future versions will make use of SMS as a data transport

SAMBRO

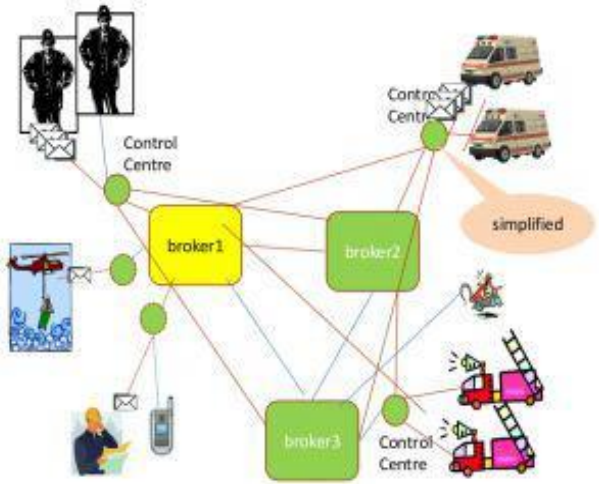
1



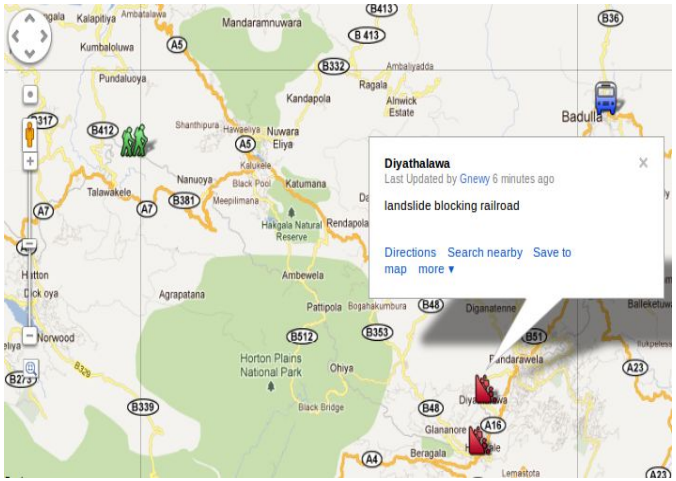
2 **function**

Alerting / Warning
(EDXL-CAP)
CAP

3 **architecture**



4 **keep it Simple**

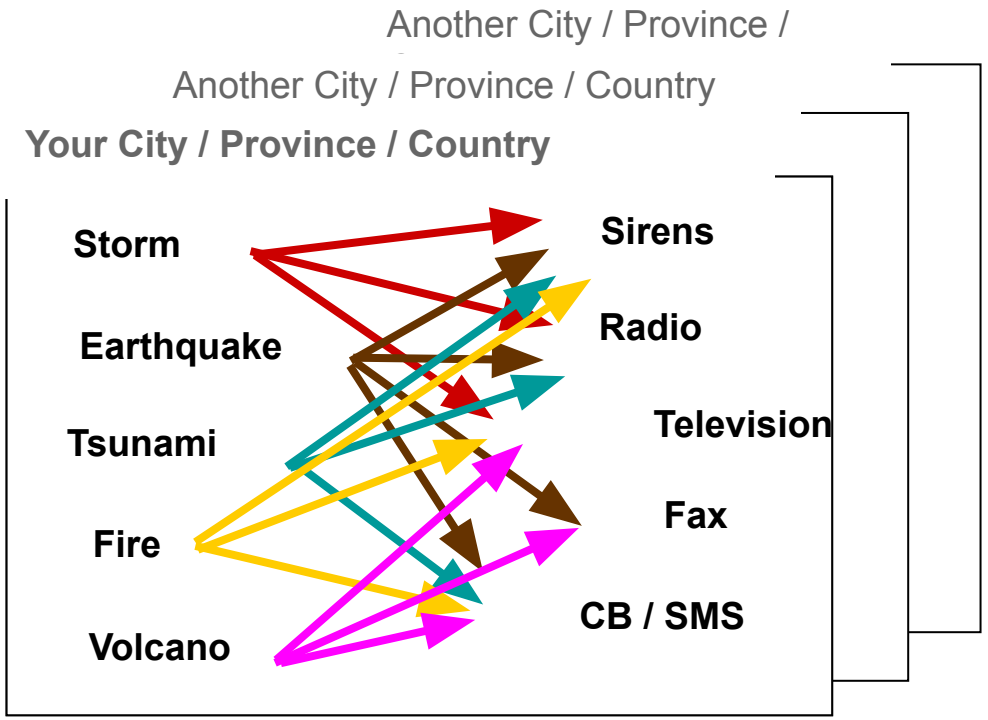


SAMBRO Principles

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**

Simplest all-hazard all-media warning

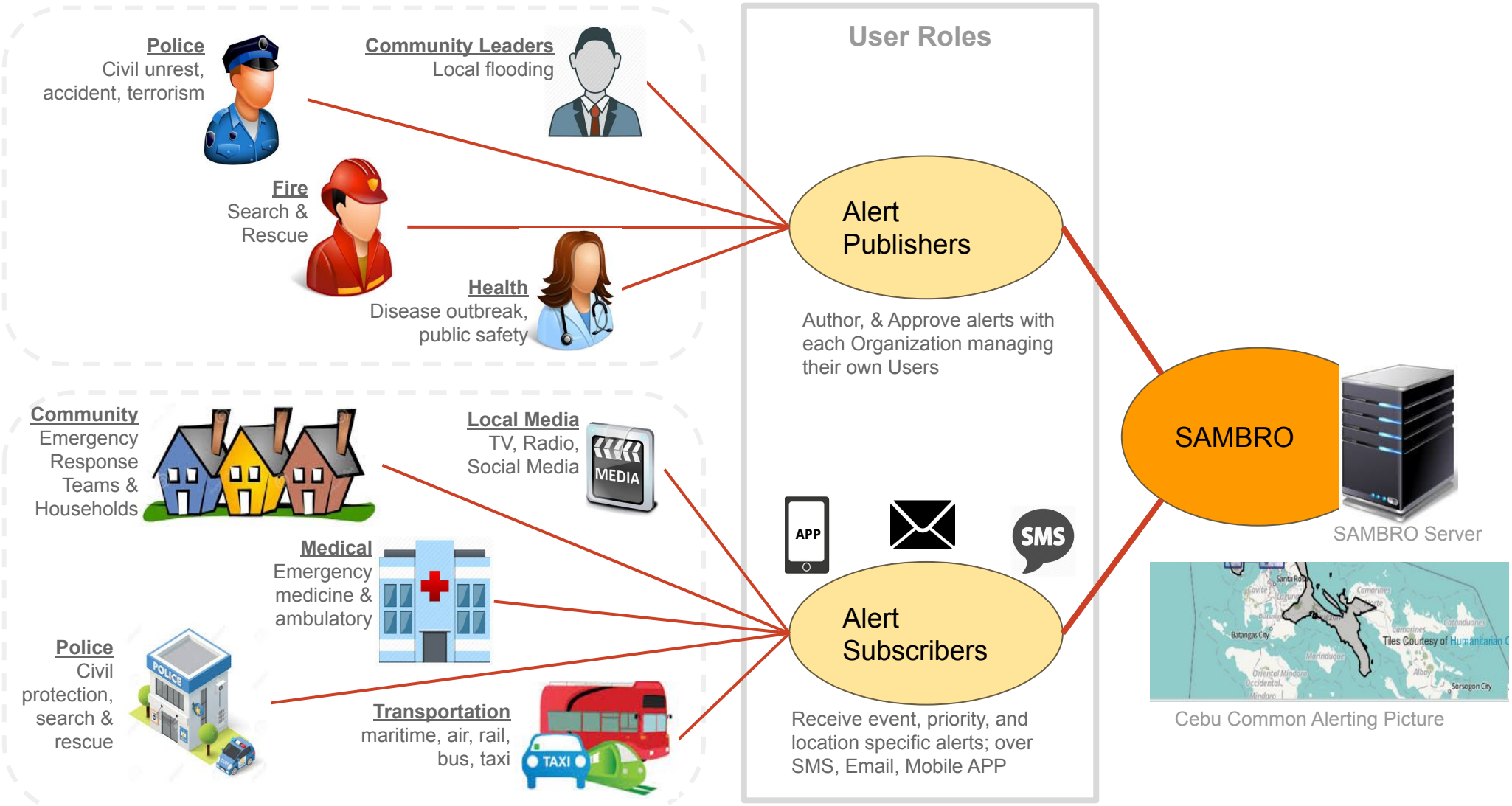
COMPLEX → **SIMPLIFIED**



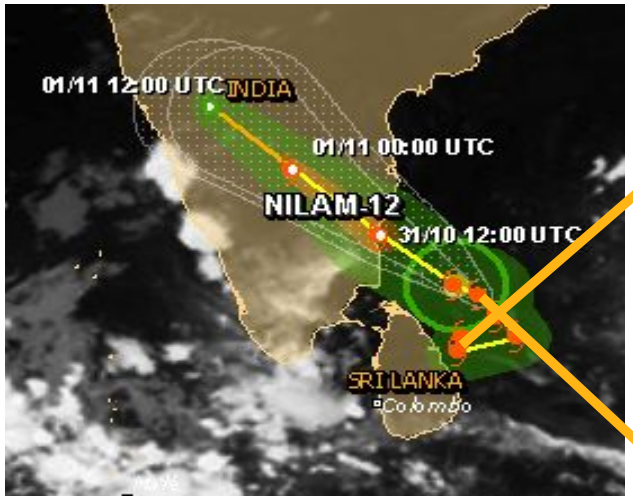
Single-entry of a message sent to through multiple channel

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.

Integrates Publishers and Subscribers



Multilingual Multi-sequence alerting



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

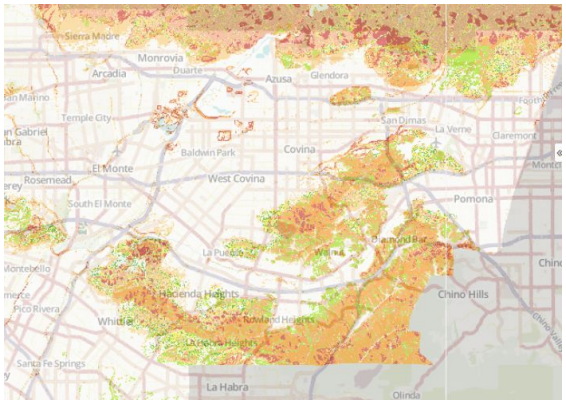
'si'
ඉහළ
කාලගුණ

'ta'
உயர்
வானிலை

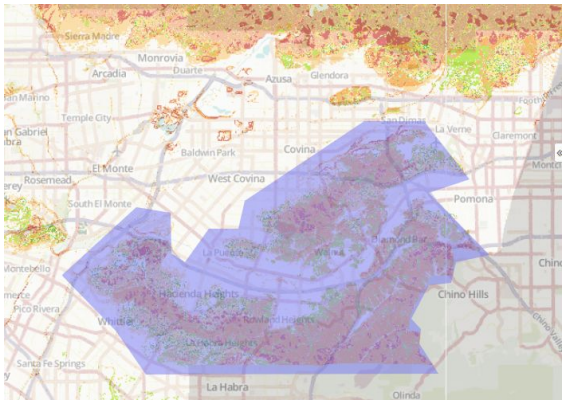
'en'
HIGH
MET

North
வடக்கு
උතුර

Risk mapping for impact-based alerting

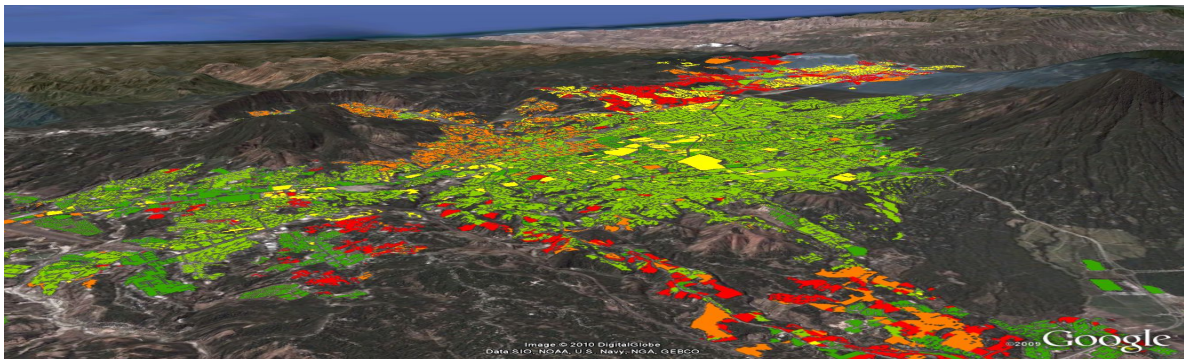


Using hazard, vulnerability, and exposure to identify risk (e.g., landslide prone area)



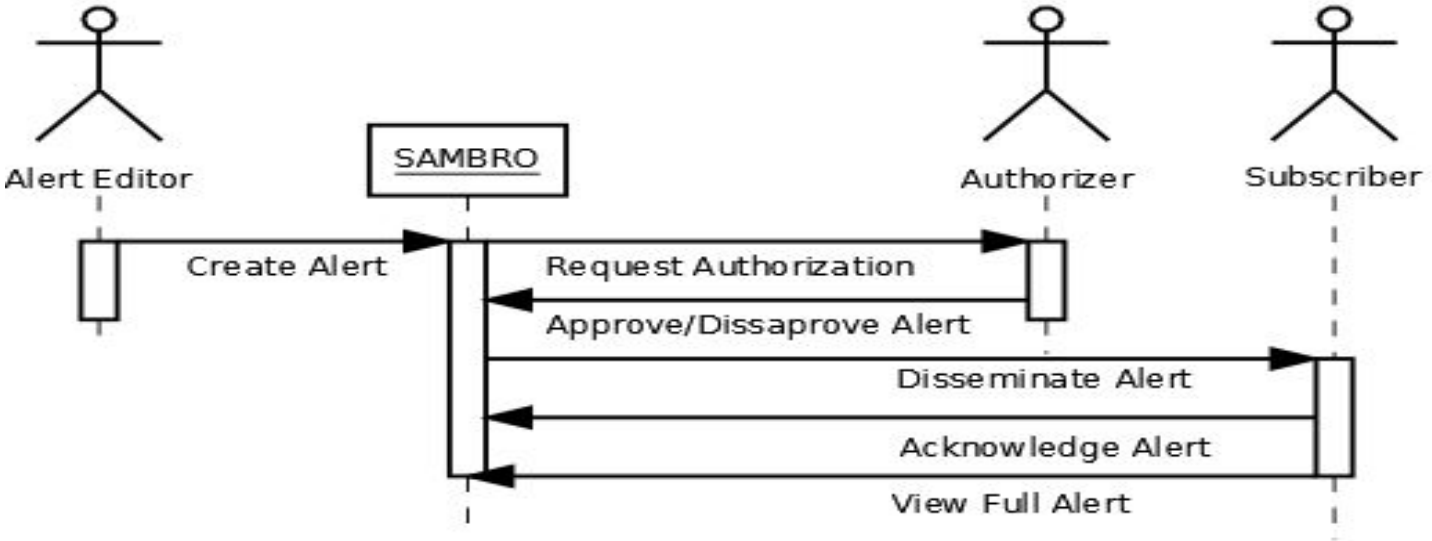
Define a risk-based predefined alert area to use when issuing heavy-rain and landslide warnings

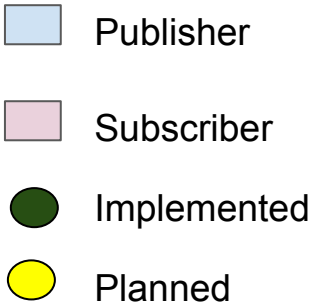
Overlay with telecommunications signal coverage data to ensure warnings go through to intended recipients



- High risk
- Low risk
- No risk

Alerting functions and modes





Functions	App	WWW	SMS	Email	RSS	Twitter	Facebook	FTP
1. Create Alert	●	●						
2. Request Authorization	●	●	●	●				
3. Approve/Disapprove Alert	●	●		●				
4. Disseminate Alert	●	●	●		●	●	●	●
5. Acknowledge Alert		●	●	●				
6. View Full Alert	●	●						

SAMBRO

DEMO

Forest Fire Emergency Management Workflow

Objective is to demonstrate the typical workflow of SAFIRE and SAMBRO

1. Call Log of a Forest Fire
2. Create an incident report and assign a forest protection officer to assess the situation
3. Upon confirmation a Closed User Group alert is issued to all first responders and agencies
4. EOC updates incident report and action plan
   a. task assignment, resources, and so on
   b. then creates the first SitRep
   c. continues to update and publish SitReps
5. After the fire is contained
   a. EOC closes all tasks
   b. Submits the final SitRep
6. DDM issues an All-Clear Public alert

THANK YOU

Redundant Slides

SAMBRO Research Projects

- HazInfo
  - Bridging the last-mile in community-based early warning system
- Biosurveillance
  - disease surveillance and notification, e-Health
- Voice-enabled Emergency Comms
  - Interactive Voice Response integration for alerting and incident reporting

SAMBRO Projects

- HazInfo project
  - Community-based early warning
- Syndromic Surveillance
  -
- Voice-enabled Emergency Communication
- CAP-on-a-Map
- Nepal

Evolution of Software Versions

2004: Indian Ocean Earthquake

- Initiated by IBM's Crisis Response
- Developed by Sri Lankan Center of Humanitarian Agencies (CHA).
- Funded by Swedish International Development Agency (SIDA).

SAHANA VESUVIUS

SAHANA AGASTI

2005-2008: Sahana PHP deployed throughout Asia, the Americas by NGOs and govts for disaster cycle.

SAHANA MAYON

2009-2017: Python-based EDEN platform launches as enterprise-grade solution. Functionality expands to incorporate over 20 modules driving adoption in over 25 countries.

SAHANA EDEN

Sahana community

python

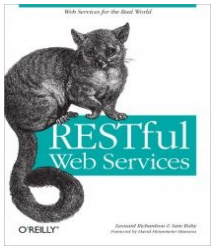
WEB2PY

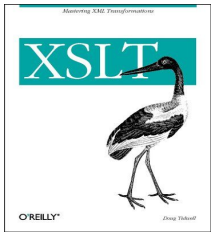
PostgreSQL

MySQL

NGINX

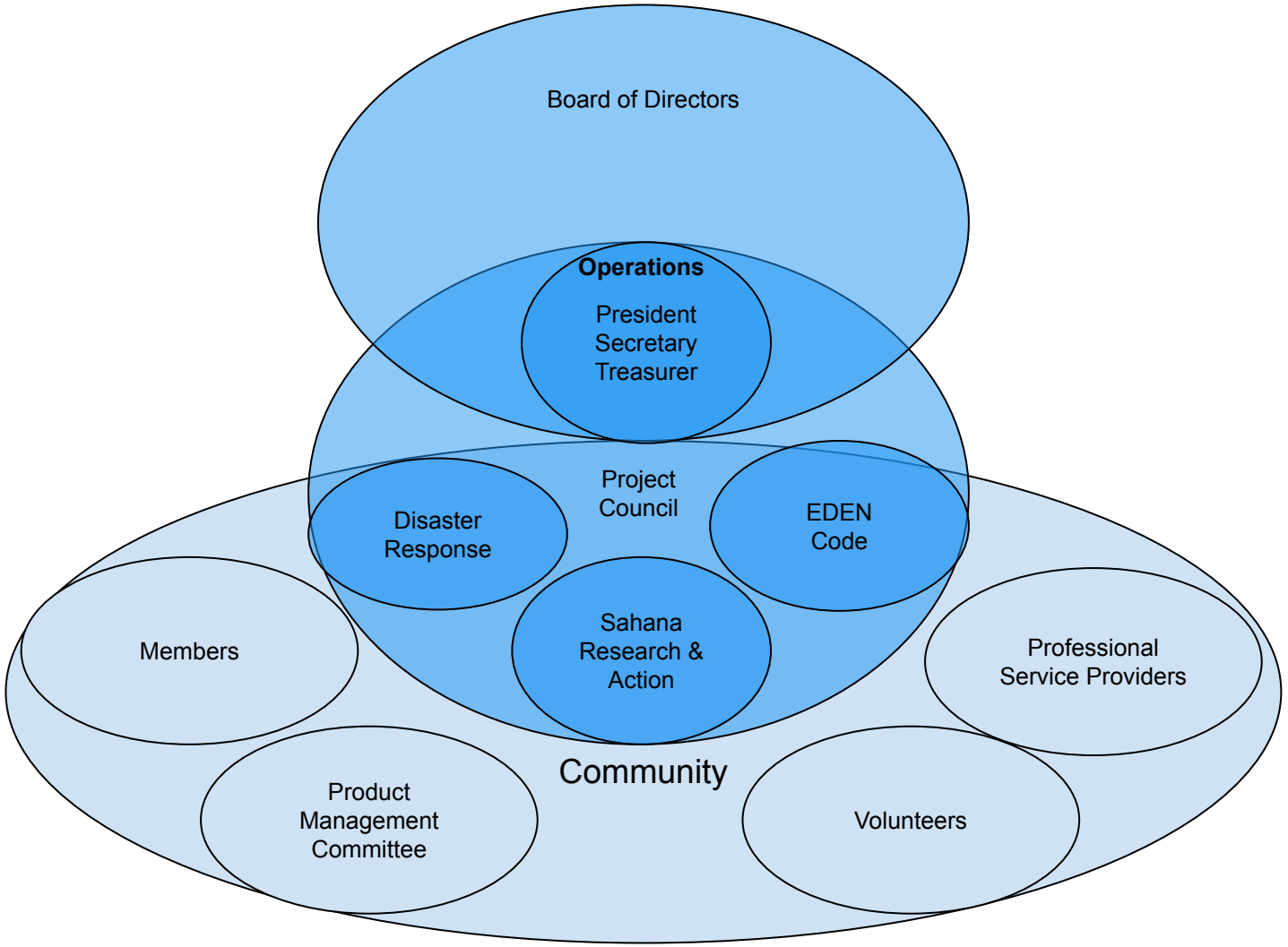
RED HAT ANSIBLE Automation





cherokee

Foundation's Operational Structure



Project Council aligns with the 3 types of deployments:

1. Response - In-situ emergency deployments to support major crises
2. Eden - Enterprise deployments institutional daily use
3. Research & Action - innovation and pilot projects

Complexity with disparate systems

Number of Channels M = N(N-1)/2; $O(N^2)$

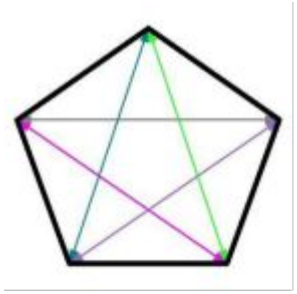
Information Lost in relay and propagation

Redundant Data Collection / Sharing

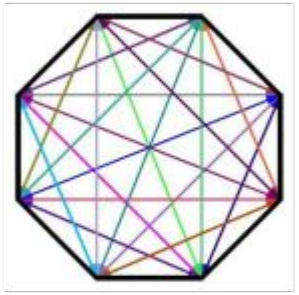
Inconsistent Terminology

Manual Collation / Calculation

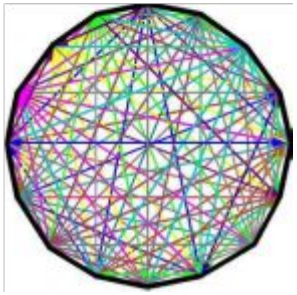
Delayed Situational-Awareness



N = 5; M = 10



N = 8; M = 28



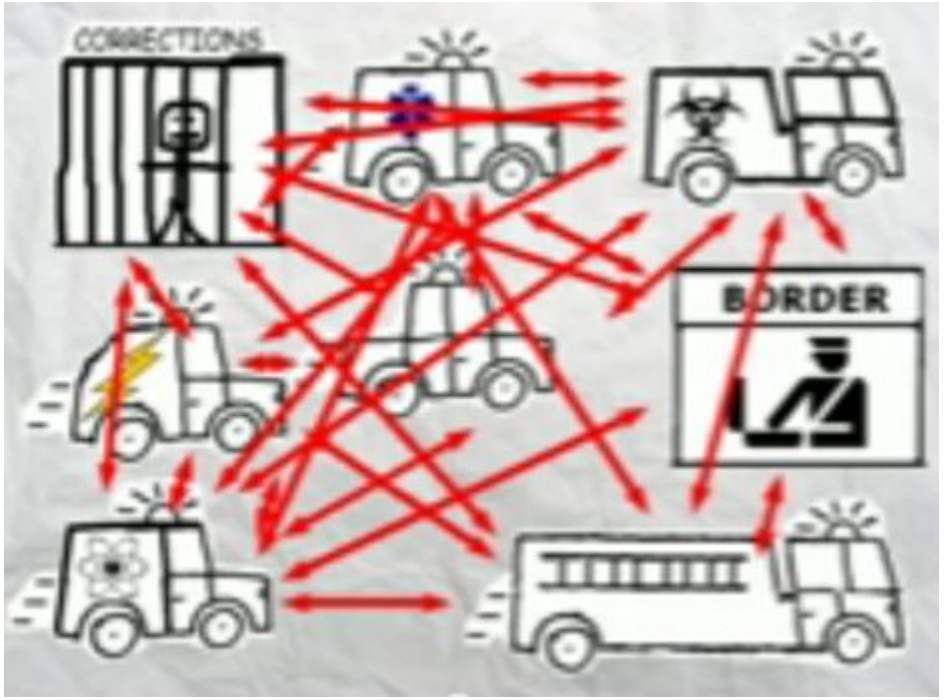
N = 20; M = 45

Data standards, Information Communication Technology, and Situational-Awareness has proven to overcome these challenges by bring all information together onto a single platform

MACS & EOC

MultiAgency Coordination System and Emergency Operation Center

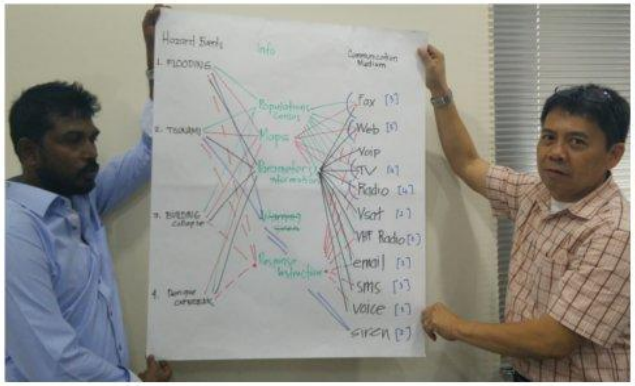
https://www.youtube.com/watch?v=BA1jY8LJ8tM&index=2&list=PL23CB283949653EDC

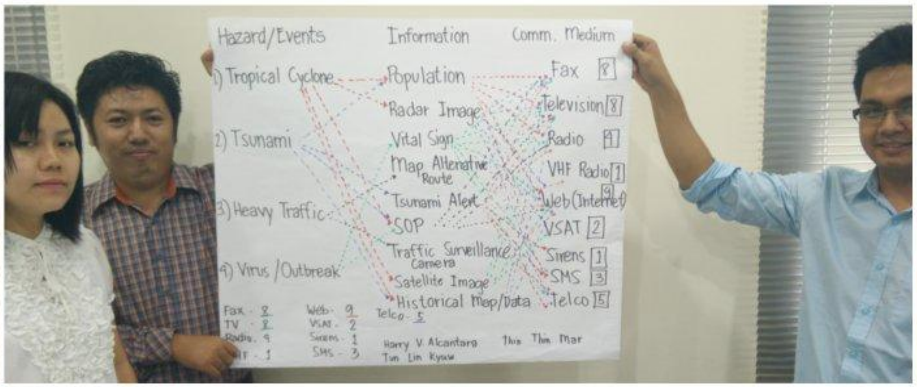


CAP

HDX

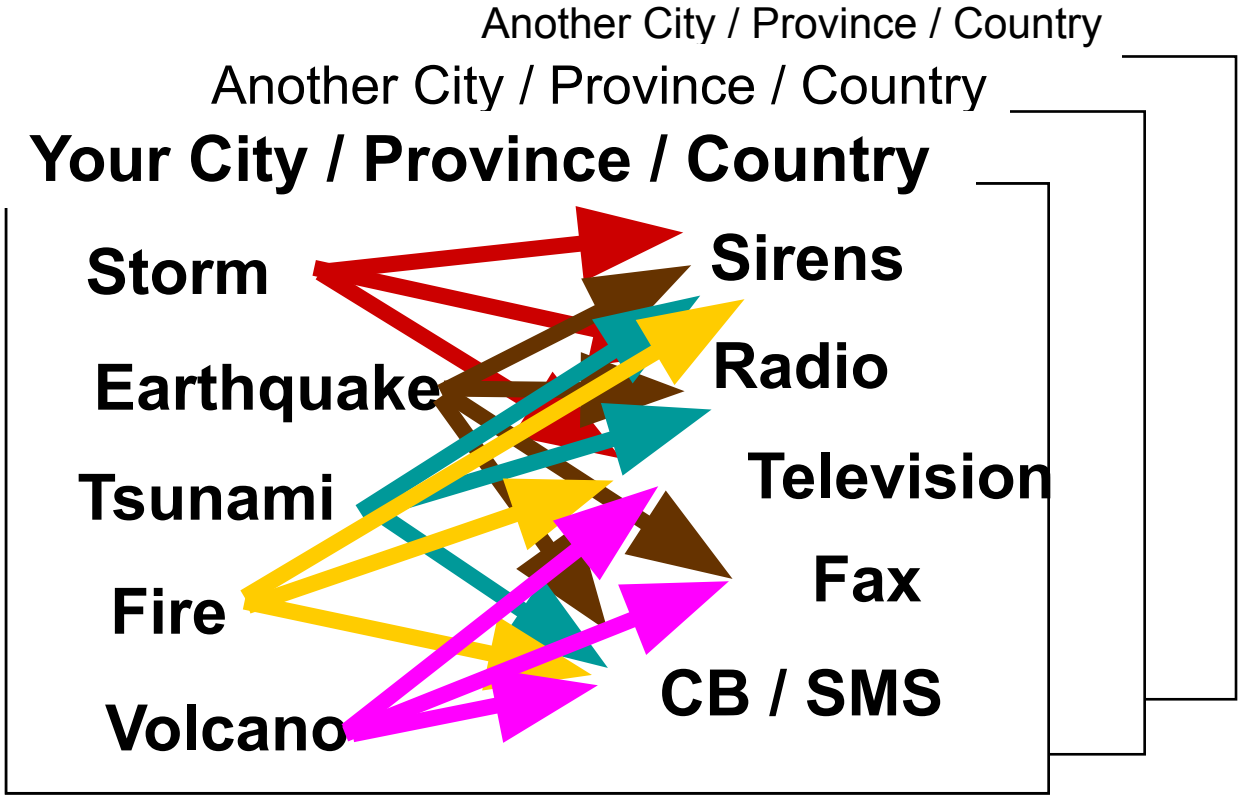
Complexity of All-hazard All-media Alerting





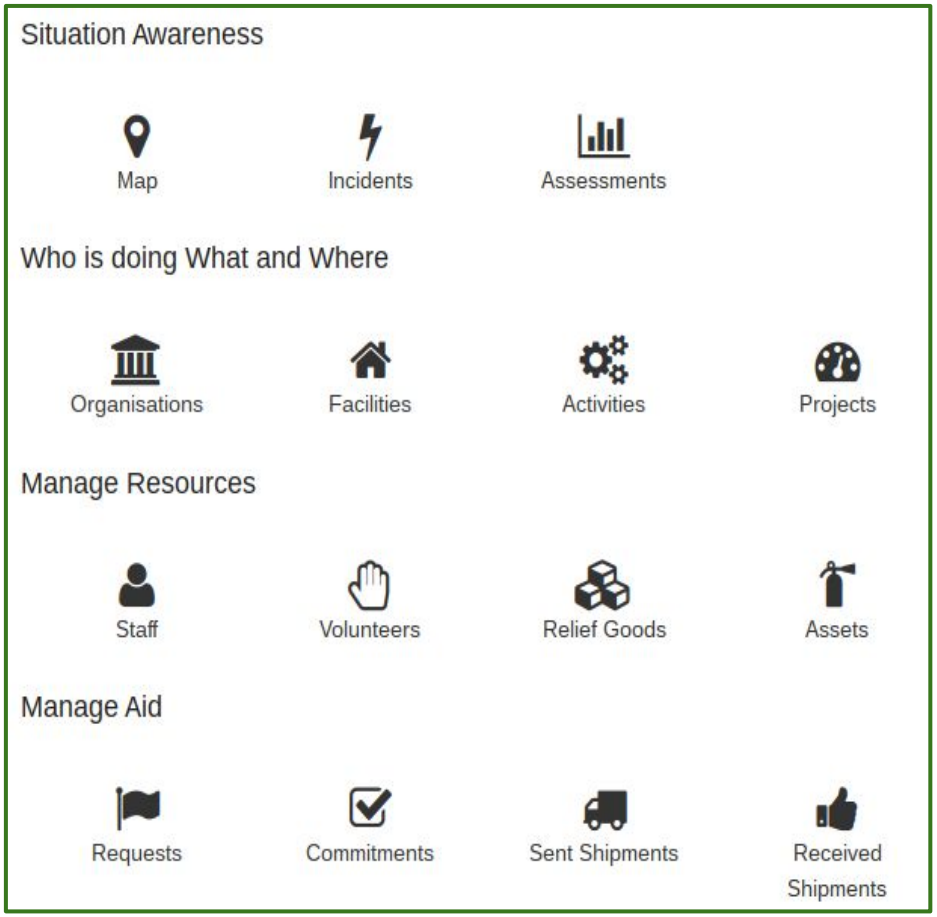
All governments have various public alerting systems:

- **Earthquakes/tsunami** by e-mail, news wire,
  Web sites, pagers, telephone calls ...
- **Weather** by newswire, fax, radio, television,
  e-mail, SMS text on cell phones ...
- **Fire, Security, Transportation** by television, radio, sirens, police with bullhorns...

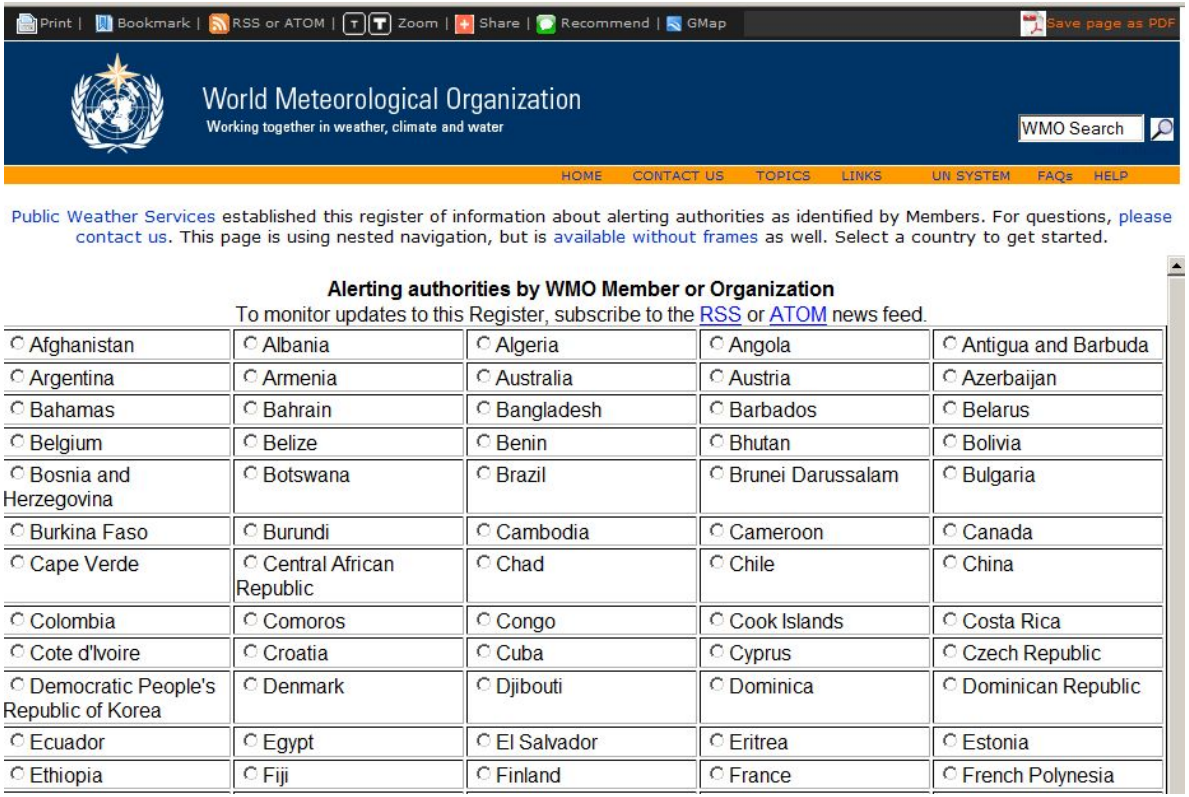


Eden Codebase

- **Mapping:** All geographic data can be displayed on a map.
- **Authorization:** All data is controlled by configurable permissions which allow for granular access by user, organization or office.
- **Reporting:** All data can be filtered and represented on matrix reports, pivot tables and charts.
- **Data Integration:** Web Services via RESTful API. Data import/export to CSV, XLS, XML, JSON.



WMO Register of Alerting Authorities



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World Meteorological Organization
Working together in weather, climate and water

WMO Search

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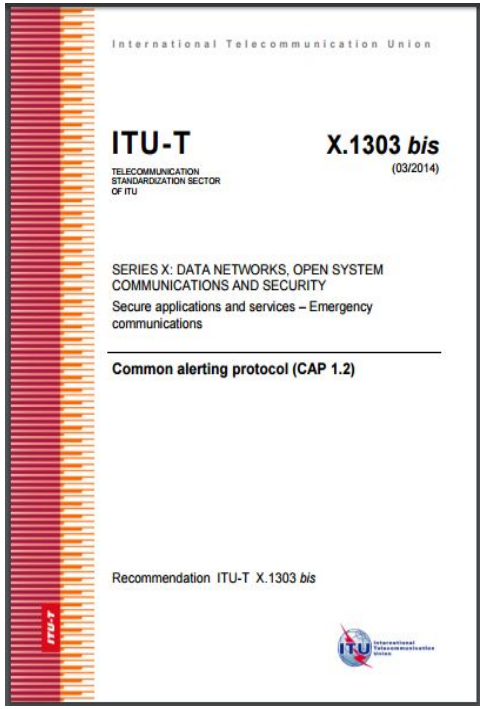
Public Weather Services established this register of information about alerting authorities as identified by Members. For questions, please contact us. This page is using nested navigation, but is available without frames as well. Select a country to get started.

Alerting authorities by WMO Member or Organization

To monitor updates to this Register, subscribe to the RSS or ATOM news feed.

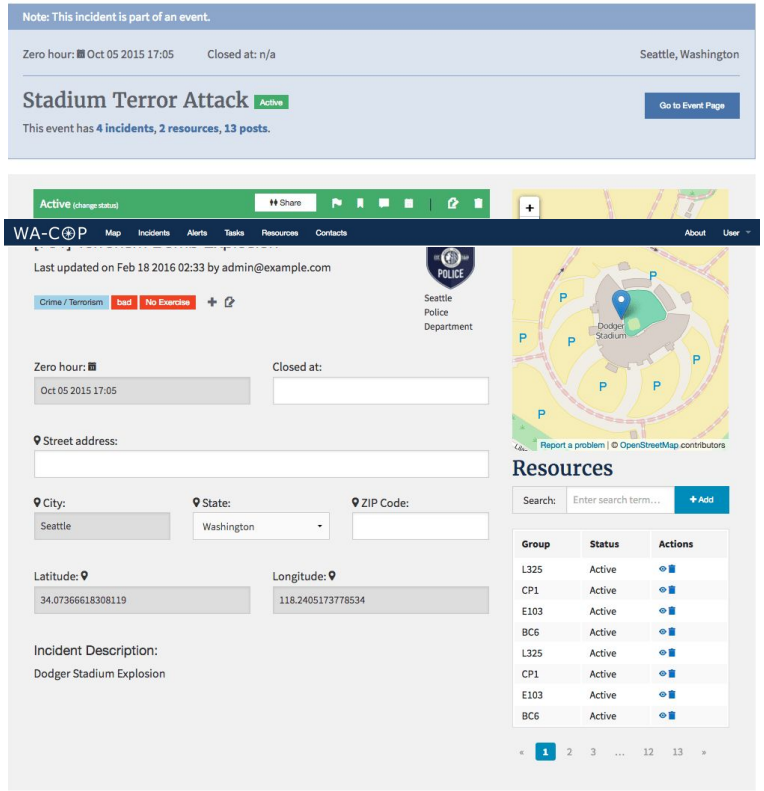
Afghanistan	Albania	Algeria	Angola	Antigua and Barbuda
Argentina	Armenia	Australia	Austria	Azerbaijan
Bahamas	Bahrain	Bangladesh	Barbados	Belarus
Belgium	Belize	Benin	Bhutan	Bolivia
Bosnia and Herzegovina	Botswana	Brazil	Brunei Darussalam	Bulgaria
Burkina Faso	Burundi	Cambodia	Cameroon	Canada
Cape Verde	Central African Republic	Chad	Chile	China
Colombia	Comoros	Congo	Cook Islands	Costa Rica
Cote d'Ivoire	Croatia	Cuba	Cyprus	Czech Republic
Democratic People's Republic of Korea	Denmark	Djibouti	Dominica	Dominican Republic
Ecuador	Egypt	El Salvador	Eritrea	Estonia
Ethiopia	Fiji	Finland	France	French Polynesia

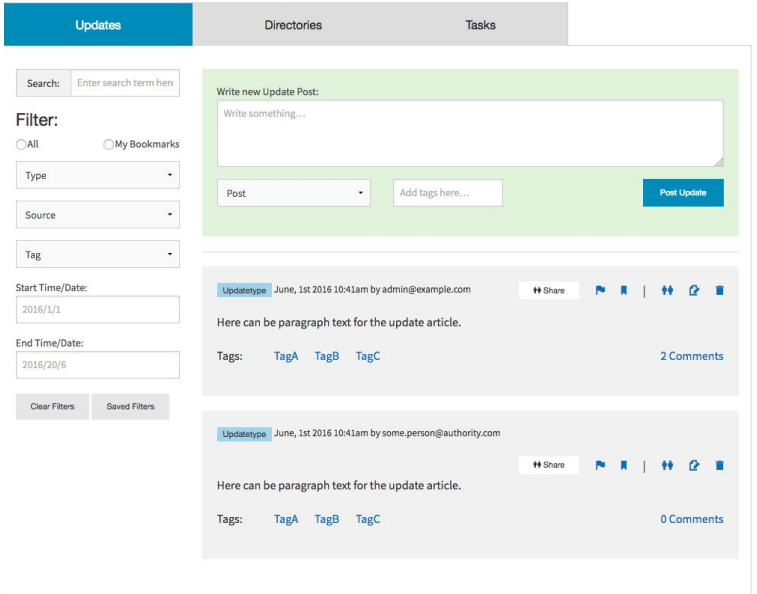
Complements SDGs



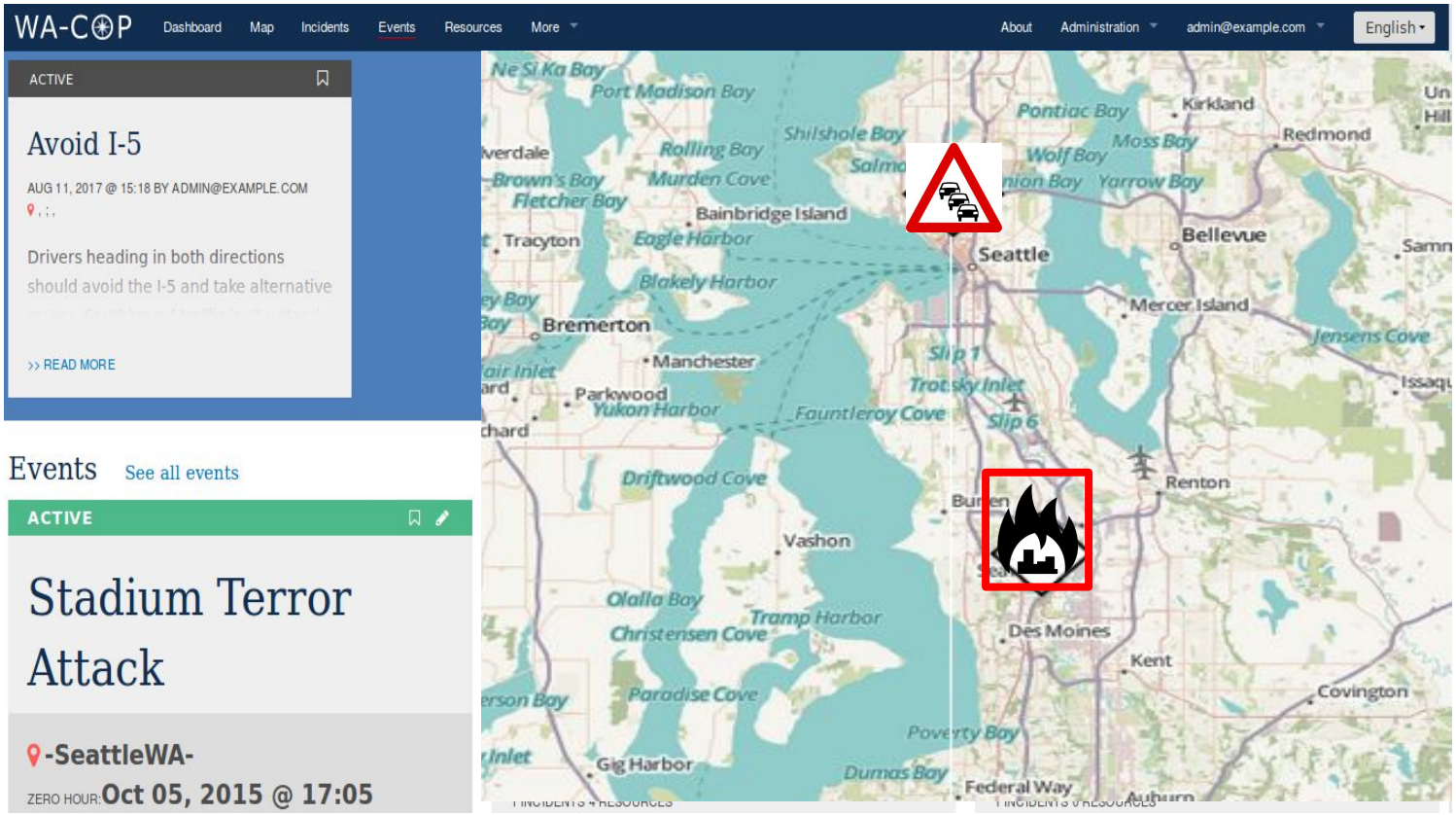
COMPLEMENTS

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


Note: This incident is part of an event.
Zero hour: Oct 05 2015 17:05
Closed at: n/a
Seattle, Washington
Stadium Terror Attack
Active
Go to Event Page
This event has 4 incidents, 2 resources, 13 posts.
Active (change status)
Share
WA-COP
Map
Incidents
Alerts
Tasks
Resources
Contacts
About
User
Last updated on Feb 18 2016 02:33 by admin@example.com
Crime / Terrorism
bad
No Exercise
Seattle Police Department
Zero hour:
Oct 05 2015 17:05
Closed at:
Street address:
City:
Seattle
State:
Washington
ZIP Code:
Latitude:
34.07366618308119
Longitude:
118.2405173778534
Incident Description:
Dodger Stadium Explosion
Dodger Stadium
Report a problem | © OpenStreetMap contributors
Resources
Search:
Enter search term...
+ Add
Group
Status
Actions
L325 Active
CP1 Active
E103 Active
BC6 Active
L325 Active
CP1 Active
E103 Active
BC6 Active
« 1 2 3 ... 12 13 »


Updates
Directories
Tasks
Search:
Enter search term here
Filter:
All
My Bookmarks
Type
Source
Tag
Start Time/Date:
2016/1/1
End Time/Date:
2016/20/6
Clear Filters
Saved Filters
Write new Update Post:
Write something...
Post
Add tags here...
Post Update
Updatetype June, 1st 2016 10:41am by admin@example.com
Share
Here can be paragraph text for the update article.
Tags: TagA TagB TagC
2 Comments
Updatetype June, 1st 2016 10:41am by some.person@authority.com
Share
Here can be paragraph text for the update article.
Tags: TagA TagB TagC
0 Comments

Washington State Common Operating Picture for MACS



Adashi

Sahana integrated Adashi Computer Aided Dispatch (ICCS) data streams, from State of WA Emergency Services to provide a Common Operating Picture for the public and stakeholders.

WA-COP proved the EDXL-SITREP could be implemented