Introduction to Operationalizing the Common Alerting Protocol (ITU-T X.1303)

NBTC-ITU Training Workshop on the Use of Telecommunication/ICTs for Disaster Management

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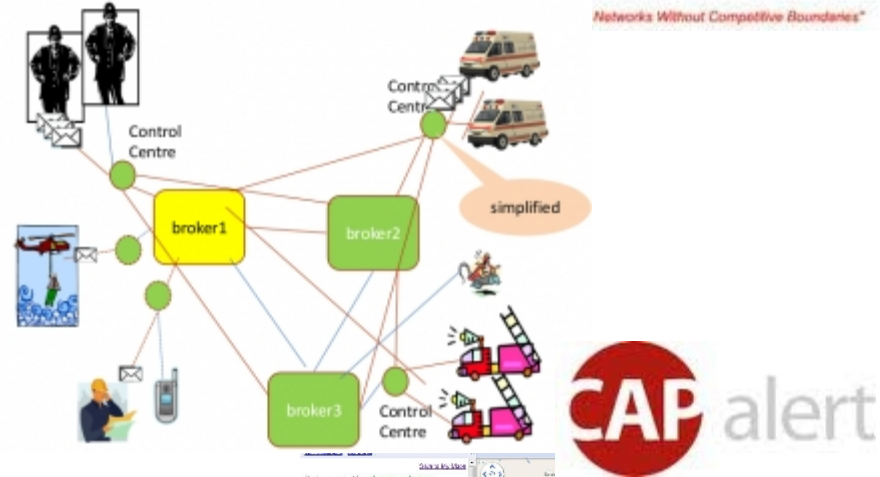http://www.lirneasia.net/profiles/nuwan-waidyanatha
Mobile: +8613888446352 (cn) +94773710394 (lk)

Outline

☐ Why do we need CAP

☐ What is CAP?

☐ How do we use it?

  ▪ CAP-Profile

  ▪ Register of Alerting Authorities

  ▪ Multi agency situational awareness

☐ Exercises

  ▪ Sahana

  ▪ SWOT

  ▪ Action Plan
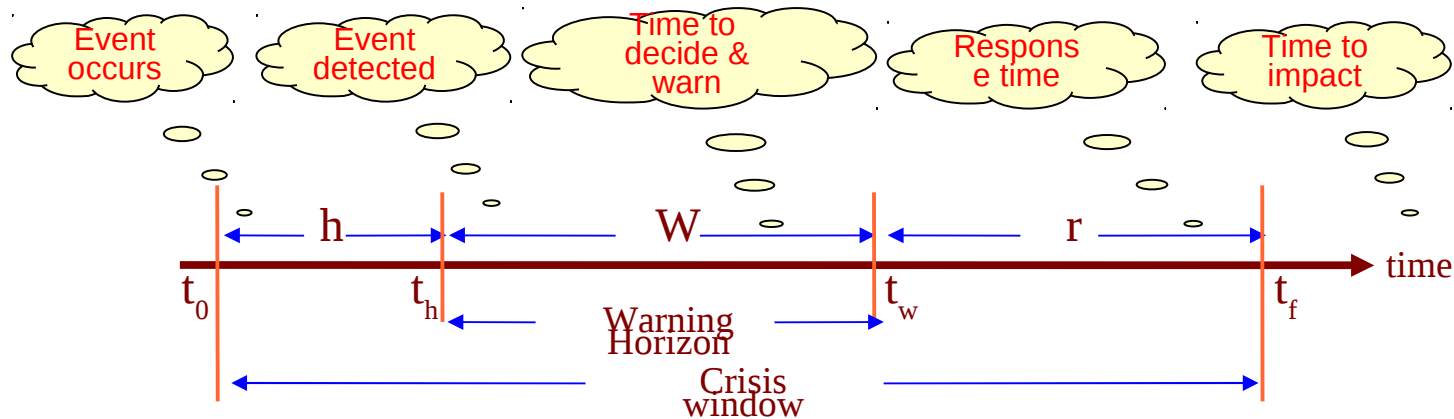
  ▪ Incident reports

☐ Conclusion

☐ Resources

How can we better mitigate ALL hazards?

By Sharing Trusted and Timely HazInfo with relevant agencies

What does trusted and timely mean?

Establish a hazard *event type (λ)*, *area*, and ***community*** specific balance between the warning horizon (**w**) and the response time (**r**)

Hand down some of the alerting to the ***local authorities*** – let them decide (θ) their own warning and response but regulated by the National Disaster Management Authority.

In our quest to minimize the human and economic losses
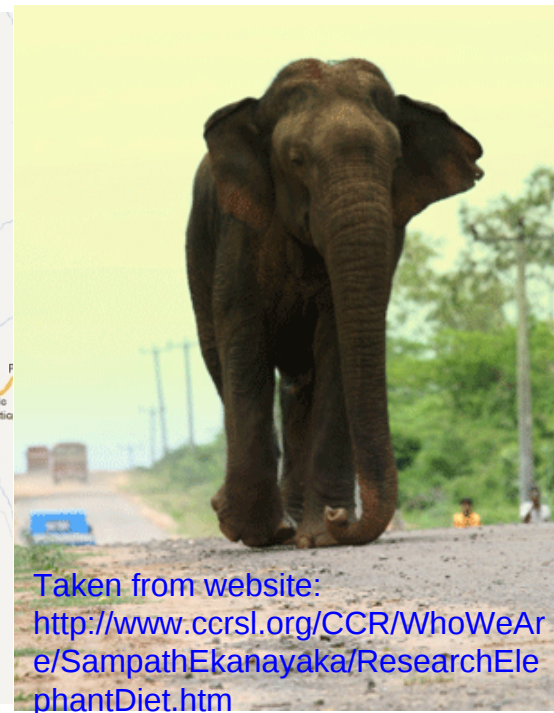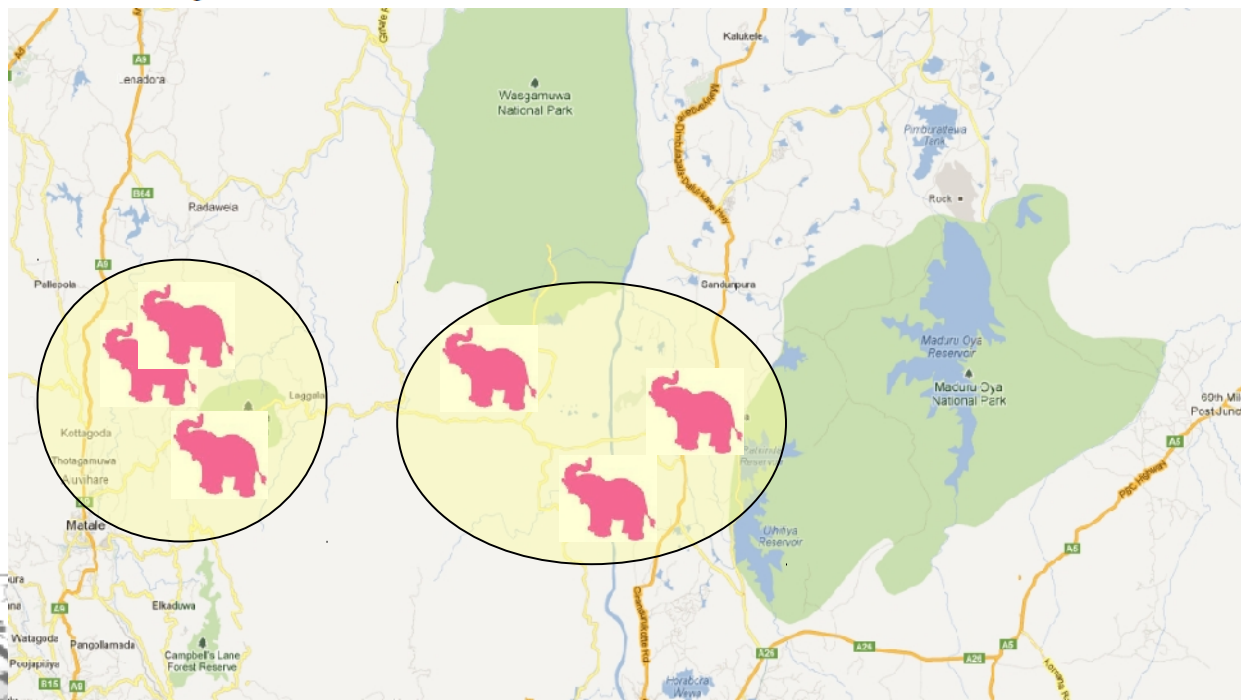
www.lirneasia.net

Why do we want to Share Trusted Timely HazInfo?

Table 1. Crop damage by elephants.   Source: http://www.asesg.org/PDFfiles/Gajah/31-5-14-Campos-Arceiz.pdf

Crop	No. of attacks	Consumption*	Consumed parts	Growth stage** E	I	M
Banana	318	100	Pith, tender leaves, and rarely fruit	7	38	55
Paddy	176	97	All plant	10	16	74
Coconut	128	100	Leaves and secondarily rachis	22	38	40
Sugarcane	106	82	Culm	16	45	39
Maize	87	91	Cobs and secondarily leaves	6	14	80
Manioc	85	100	Rhizome	9	28	73
Seasonal vegetables	62	93	All plant	7	10	83
Papaya	52	85	Fruit	4	17	79
Tree	41	97	Fruit, bark and leaves	3	14	83
Sesame	27	0	-	11	33	56

* percentage of cases in which damage was caused for consumption as opposed to trampling.

**E = early, I = intermediate; M = mature.

Taken from website:
http://www.ccrsl.org/CCR/WhoWeAre/SampathEkanayaka/ResearchElephantDiet.htm

Problem to solve in alerting/warning systems

☐ How do we manage the subscribers and publishers?

☐ How do we deliver early warnings in local language?

☐ How do we use available technologies?

☐ How do we disseminate alerts over multiple channels?

☐ How do we interoperate with incompatible systems?

☐ How do we effectively communicate the optimal content?

☐ How do we address the communication strategy?

☐ How do we accommodate upstream-downstream alerting?

ANSWER: Common Alerting Protocol - CAP

☐ XML Schema and Document Object Model

☐ Interoperable Emergency Communication Standard

☐ Specifically geared for Communicating Complete Alerts

☐ Capability for Digital encryption and signature X.509

☐ It's for "all-hazards all-media" communication

☐ Recommended by ITU-T X.1303

☐ Incubated by W3C Emergency Information Interoperability Framework

☐ Can be used as a guide for structuring alerts

☐ Used by USGS, WMO, PTWC, Gov of AUS, CAN, USA, ...

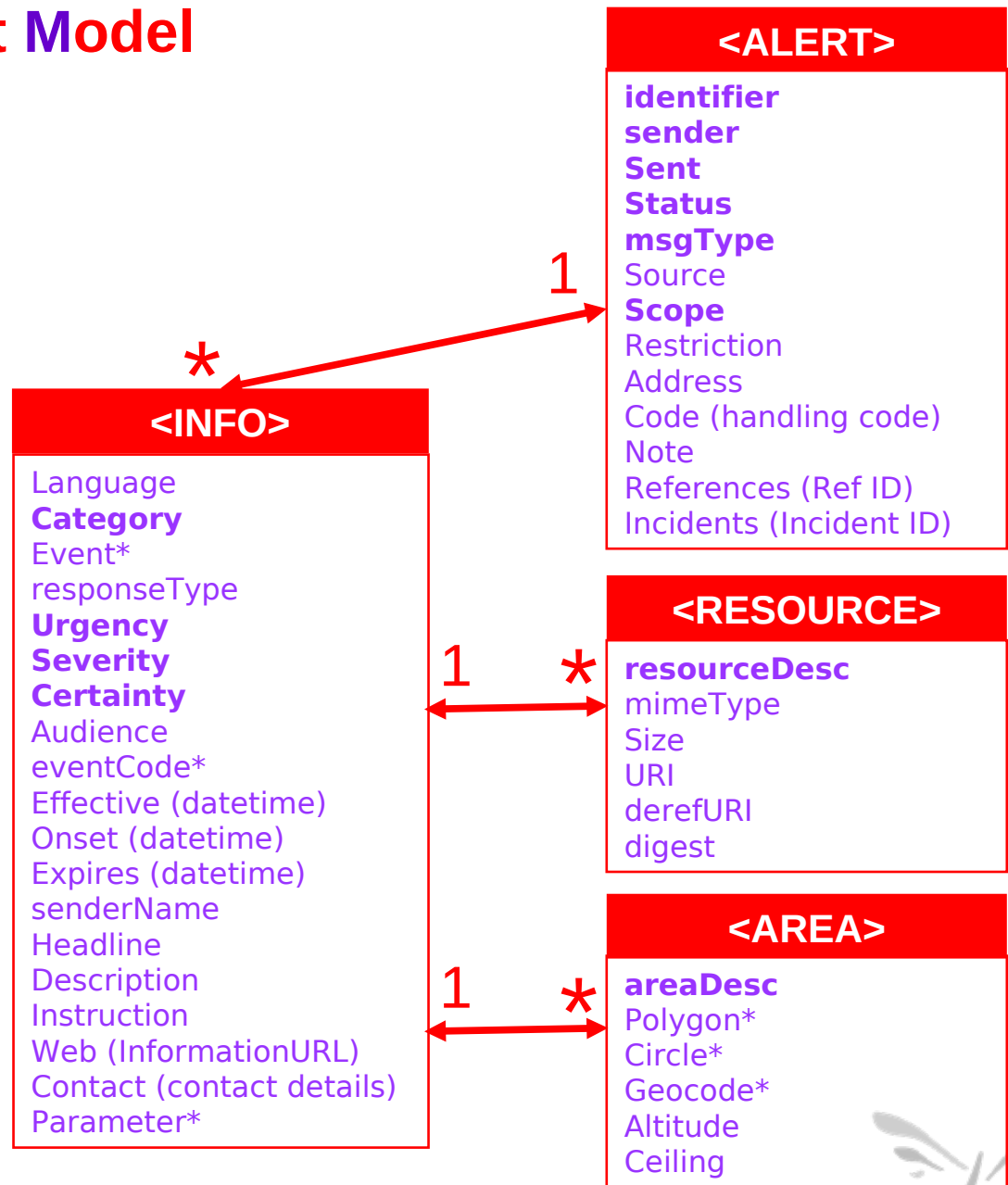# CAP Document Object Model

- <Alert> block is the "envelop"
    - Identifies the message no., sender, message type, scope of audience, time sent
    - Contains one or more <info> blocks
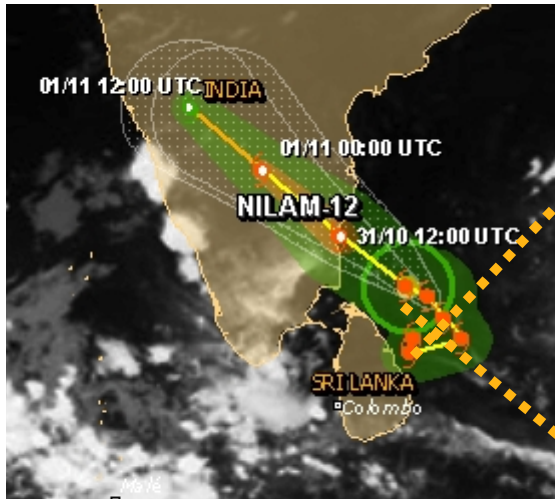- <Info> carries details of the audience, area, or time frame:
    - who, what, where, so what?
    - Multiple <info> blocks for each language
    - The <category> is for recipients to filter messages
    - <Urgency>, <Severity>, & <certainty> define the message priority
    - <Effective. and <expiration> date
    - Hazard <event> details and public <instructions>
    - <Contact> info
    - Additional technical <parameters>
- <Area> specific geographic target area for particular <info> block
- <Resource> additional information
    - include text, audio, or photos, maps, video files

<ALERT>

identifier
sender
Sent
Status
msgType
Source
Scope
Restriction
Address
Code (handling code)
Note
References (Ref ID)
Incidents (Incident ID)

<INFO>

Language
Category
Event*
responseType
Urgency
Severity
Certainty
Audience
eventCode*
Effective (datetime)
Onset (datetime)
Expires (datetime)
senderName
Headline
Description
Instruction
Web (InformationURL)
Contact (contact details)
Parameter*

<RESOURCE>

resourceDesc
mimeType
Size
URI
derefURI
digest

<AREA>

areaDesc
Polygon*
Circle*
Geocode*
Altitude
Ceiling

1   *

1   *

1   *

*   1

Purpose of the multiple <INFO> and <AREA>

Cyclone NILAM-12
2012 October 31

<Alert> qualifiers →

<AREA> ↓

NILAM-12
LK Met Dept
02:00 UTC
Update
Alert

<INFO>
02:00 UTC →

'si' ඉහළ කාලගුණ	'ta' உயர வானிலை	'en' HIGH MET

→ North
→ Northeast
→ வடக கᵎ
→ வடகிழக கᵎ
→ උතුර
→ ඊශාත

<INFO>
12:00 UTC →

'si' ඉහළ කාලගුණ	'ta' உயர வானிலை	'en' HIGH MET

→ North
→ வடக கᵎ
→ උතුර
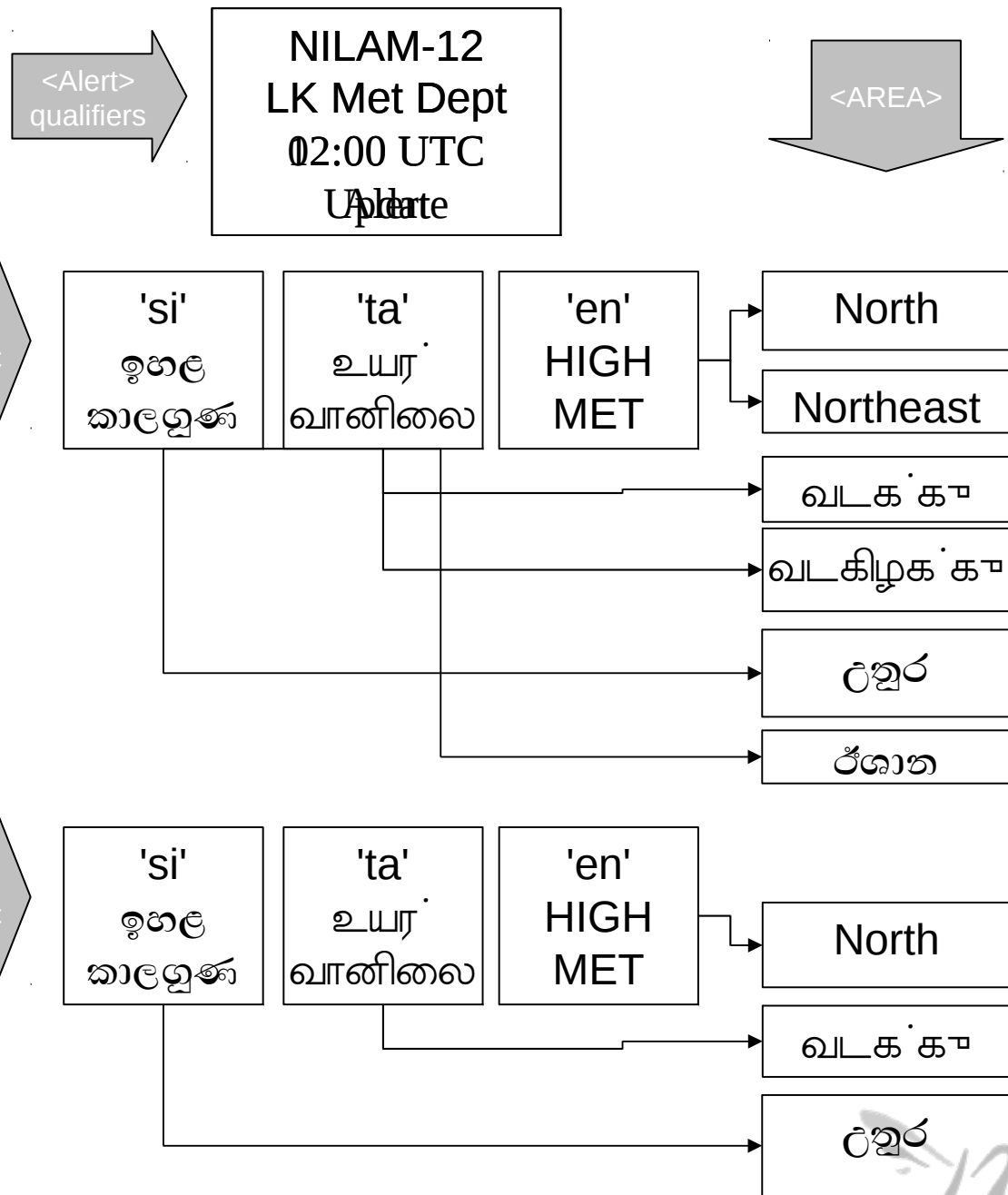
CAP Country Profile, the steps

(1) Events
What type of incidents will you address? (e.g. geological, meteorological, …)

(2) Audience <Scope>
Alert First Responders only (i.e. closed user group)
Example: police, health workers, civil society, public servants
Alert Public (entire population)
Combination of First Responders and Public
step 1: alert First-Responders to give them time to prepare
Step 2: warn public

(3) Geographical Descriptions <Area>
Country wide
Province or State
District
Other – Geocodes or GPS polygons

(4) National <Languages>
English only or Chinese only or Malay only
English, Hindi, Chinese, and Malay which jurisdictions?

(5) Communications Technology?
Mobile phones – SMS, CB, Email, Applet
TV – Text, Audio, Visual
AM/FM Radio - Text, Audio
VHF/UHF Radio - Audio
Internet – HTTP, Email, Webserviceshich jurisdictions?

(6) Publisher Subscriber Rules (OIDs and EDXL-DE)
Who can publish what alerts in which jurisdictions?
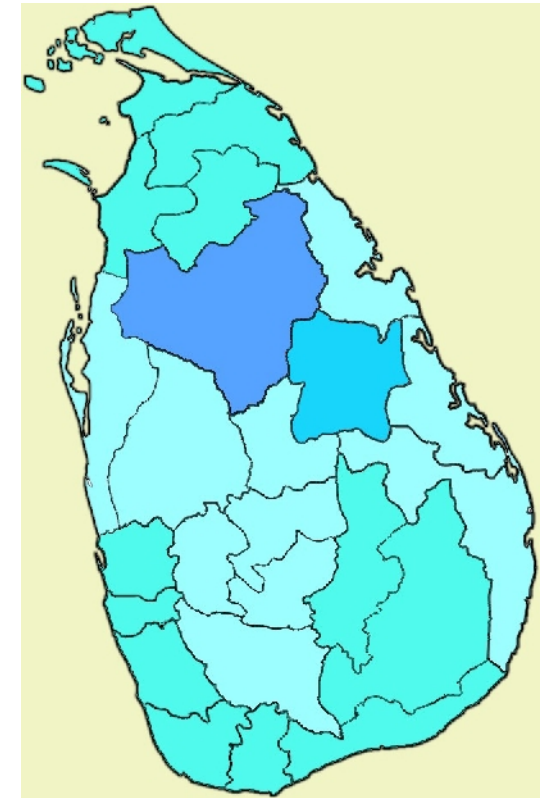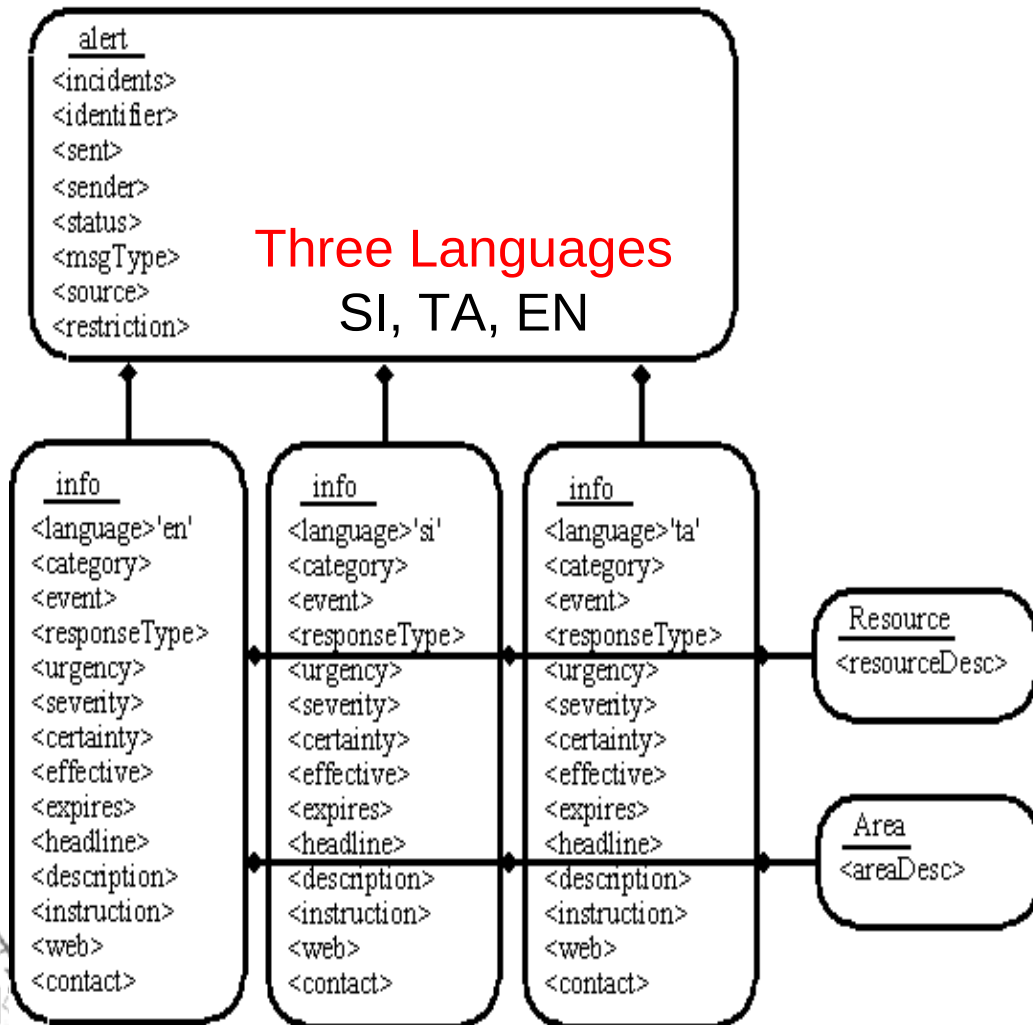Who can subscribe to what alerts in which jurisdictions?

Who?
What?
Where?
When?

Events

Audience

Geography

Language

Technology

Pub-Sub
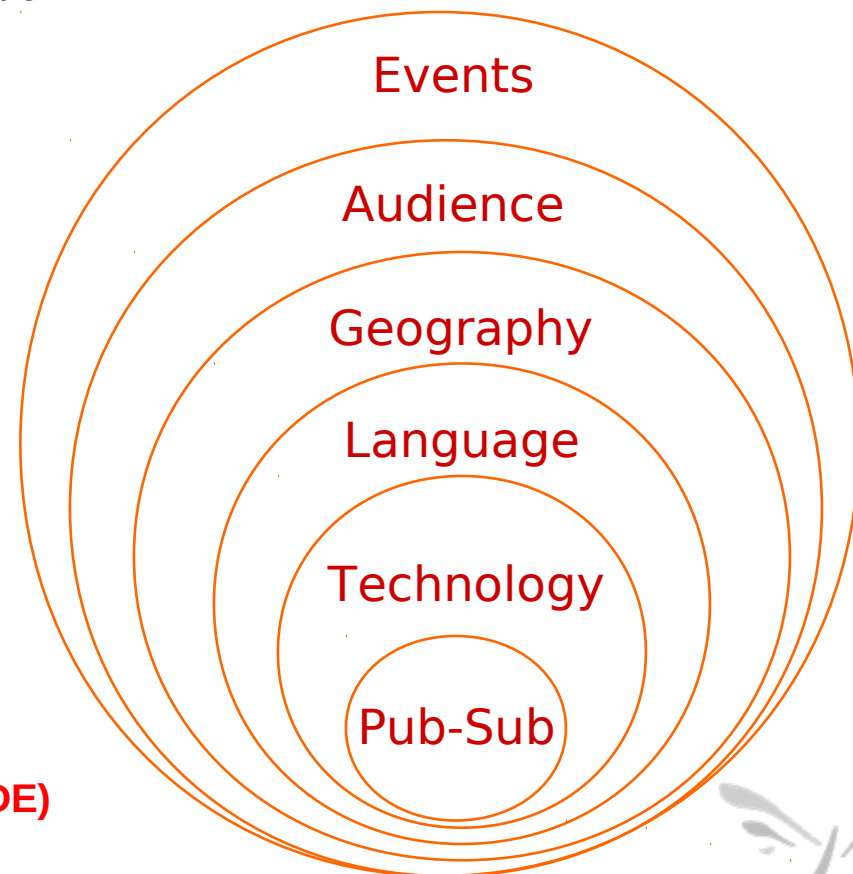
For example the Profile, the Sri Lanka example

Event and incident categorization by authorities
e.g. Met, Hydro, Health, Agri, Maritime, Transport, ...

alert
<incidents>
<identifier>
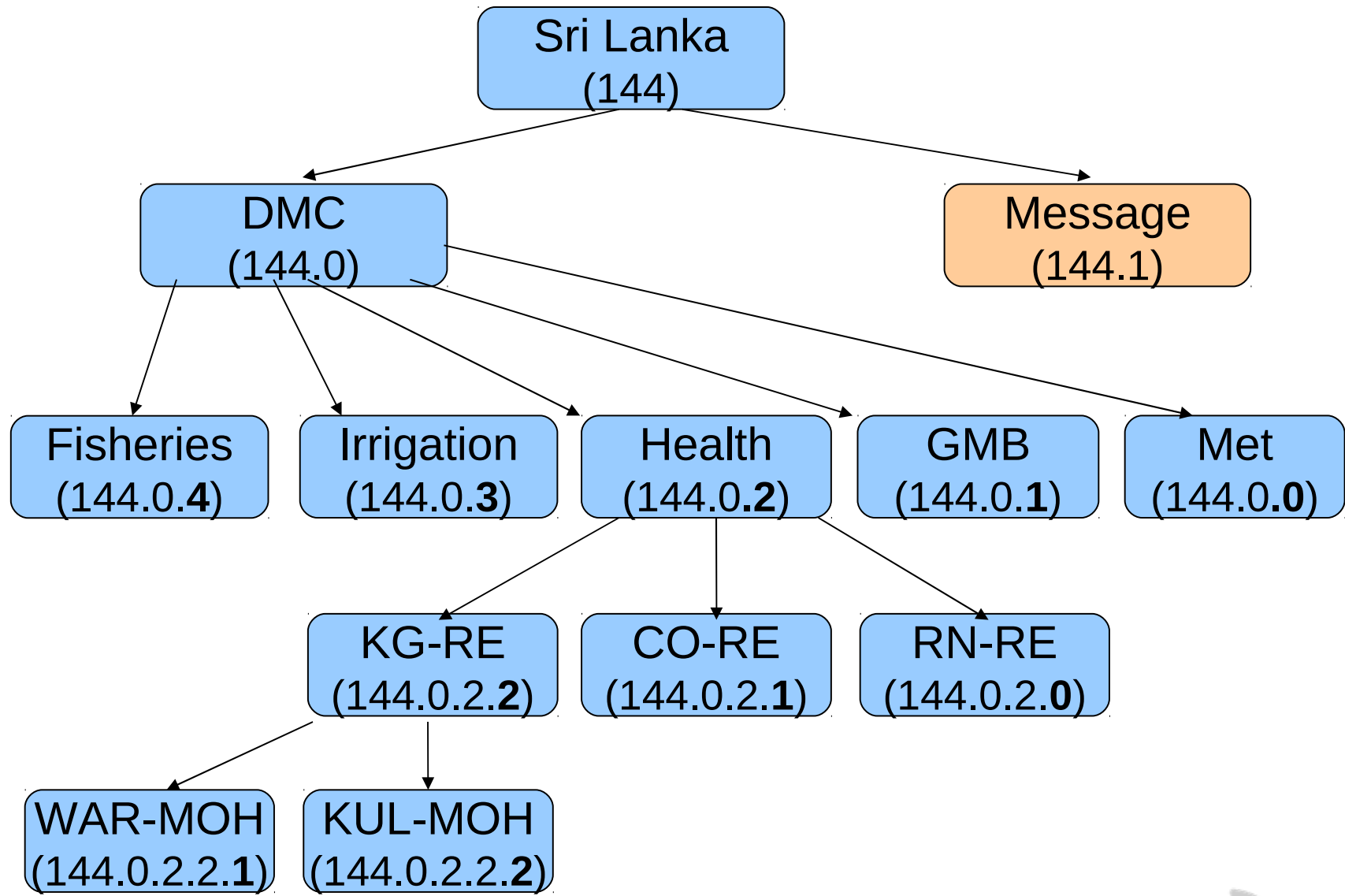<sent>
<sender>
<status>
<msgType>
<source>
<restriction>

Three Languages
SI, TA, EN

info
<language>'en'
<category>
<event>
<responseType>
<urgency>
<severity>
<certainty>
<effective>
<expires>
<headline>
<description>
<instruction>
<web>
<contact>

info
<language>'si'
<category>
<event>
<responseType>
<urgency>
<severity>
<certainty>
<effective>
<expires>
<headline>
<description>
<instruction>
<web>
<contact>

info
<language>'ta'
<category>
<event>
<responseType>
<urgency>
<severity>
<certainty>
<effective>
<expires>
<headline>
<description>
<instruction>
<web>
<contact>

Resource
<resourceDesc>

Area
<areaDesc>

Administrative Areas
09 Provinces
25 Districts
324 Divisions
14,008
Gramaniladari

Managing your publishers (alerting authorities)

Sri Lanka (144)

DMC (144.0)

Message (144.1)

Fisheries (144.0.**4**)

Irrigation (144.0.**3**)

Health (144.0.**2**)

GMB (144.0.**1**)

Met (144.0.**0**)

KG-RE (144.0.2.**2**)

CO-RE (144.0.2.**1**)

RN-RE (144.0.2.**0**)

WAR-MOH (144.0.2.2.**1**)

KUL-MOH (144.0.2.2.**2**)

WMO Register of Alerting Authorities

▸ joint-iso-itu-t(2) ▸ alerting(49)

wmo(0)
child OIDs: ▸ authority(0) ▸ country-msg(1) ▸ org(2) ▸ org-msg(3) ▸

OID description

▸ Format of this page
▸ Modify this OID
▸ Create a child OID
▸ Create a brother OID

	{joint-iso-itu-t(2) alerting(49) wmo(0)}	(ASN.1 notation)
OID:	2.49.0	(dot notation)
	/Alerting/WMO	(OID-IRI notation)

Description:	World Meteorological Organization (WMO)
Information:	In applications and services which support alerting, it is necessary to identify various information objects. Subsequent OIDs identify content included in alert messages or otherwise associated with the activity of alerting.
	The procedures (and criteria for acceptance) for allocating subsequent arcs are described in WMO/TD No. 1556 "Administrative procedure for registering WMO alerting identifiers."
	WMO maintains a publicly accessible Register of Alerting Authorities. In collaboration with the WMO Public Weather Services Programme, entries in the WMO Register of Alerting Authorities shall be maintained by the editors designated by the Permanent Representatives (PRs) to the WMO of national WMO Members.

Tree display

⊞ itu-t(0) | ccitt(0) | itu-r(0) -- ITU-T (International Telecomm... [more]
⊞ iso(1) -- International Organization for Standardization (ISO)
⊟ joint-iso-itu-t(2) | joint-iso-ccitt(2) -- Common standardizati... [more]
  presentation(0) -- Presentation layer service and protocol
  ⊞ asn1(1) -- ASN.1 standards: - Rec. ITU-T X.680 | ISO/IEC 8824... [more]
  ⊞ association-control(2) -- Association Control Service Element... [more]
    ⊟ alerting(49) -- Alerts and alerting agencies according to Rec... [more]
      ⊟ wmo(0) -- World Meteorological Organization (WMO)
        ⊟ authority(0) -- Alerting authorities of countries
          ⊞ (183 OIDs)
        country-msg(1) -- Alerting messages of countries
        org(2) -- Alerting authorities of other organizations
        org-msg(3) -- Alerting messages of other organizations

☐ It is a way to uniquely identify national and international alerting authorities

☐ Messages originating from those authorities can be uniquely identified

☐ Typically used in the CAP <identifier>

☐ OID Repository Tree: http://www.oid-info.com/cgi-bin/display?oid=2.49.0

☐ List of organizations already registered with WMO: http://www-db.wmo.int/alerting/authorities.html

☐ For example:

WMO Register of Alerting Authorities [home]

○ 2.49.0.0.144.0 Department of Meteorology
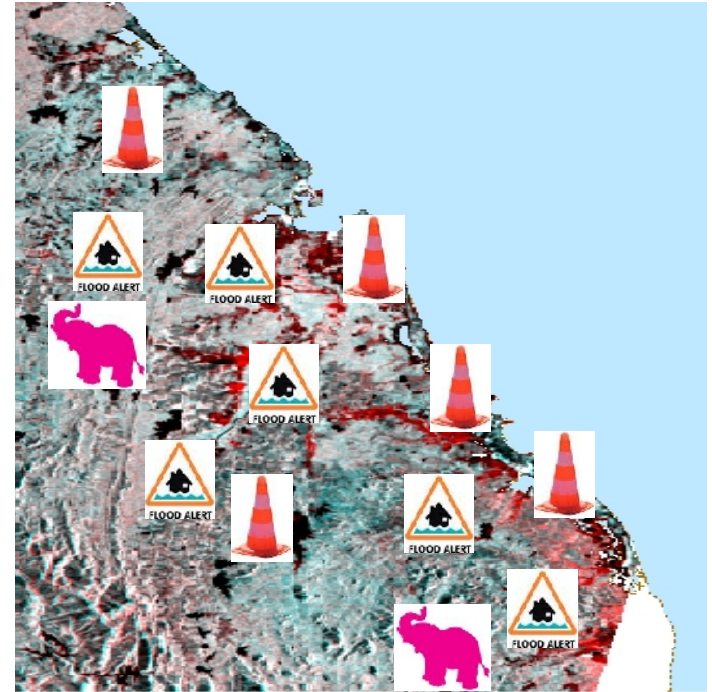○ 2.49.0.0.144.1 Hydrology Division, Department of Irrigation

Select one of the above 2 alerting authority records for Sri Lanka

☐ Administrative procedure for registering an alerting authority: http://www.wmo.int/pages/prog/amp/pwsp/documents/AIR_PWS-20.pdf

Inter and Intra jurisdictional Alerting

1) Transportation authority subscribe to hydrological, meteorological, and geological event category alerts.

2) Irrigation department issues a flash flood warning for Kirinda area, with regular updates of the flood inundation trajectories

3) Transportation authority monitors the alert updates and forewarns the depots in the inundation area.

4) Each bus depot and train station activates their emergency response plans to secure their assets

5) Wildlife authority may advise rangers to be observant of wildlife movements on to railways, roads, and farmlands, and residential areas

CAP (XML) → uses XSL to transform → delivery method

Common Alerting Protocol XML File

- short-text-sms + sms subroutine → SMS
- short-text-email / long-text-email + email subroutine → MAIL
- long-text-web + html/css subroutine → World Wide Web, RSS, XML, ATOM
- long-text-voice + audio subroutine → (audio)

Example output of style sheet generated SMS

Escalating mumps in Kurunegala district : *Exercise Update* for *Wariyapola-PHI* area with

low priority *notifiable disease outbreak* issued by *Dr Hemachandra*.

Msg : *nwpdhs-1281246871* sent on *2010-08-08 11:08:57*.

Desc : *2 cases of Mumps for 15-20 age group and all genders were reported in Munamaldeniya.*

More Details

Web *www.scdmc.lk*

Call *2395521*
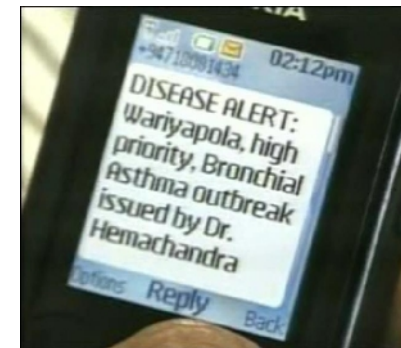
Example of style sheet template for SMS

<headline> : *<status>*

<msgType> for *<areaDesc>* area with *<priority>* priority *<event>* issued by *<senderName>*.

Msg: *<identifier>* sent on *<sent>*

Desc: *<description>*

More details

Web: *<web>*

Call: *<contact>*

CAP Interoperability

June 2007 between WorldSpace-Sankya and Dialog-Microimage
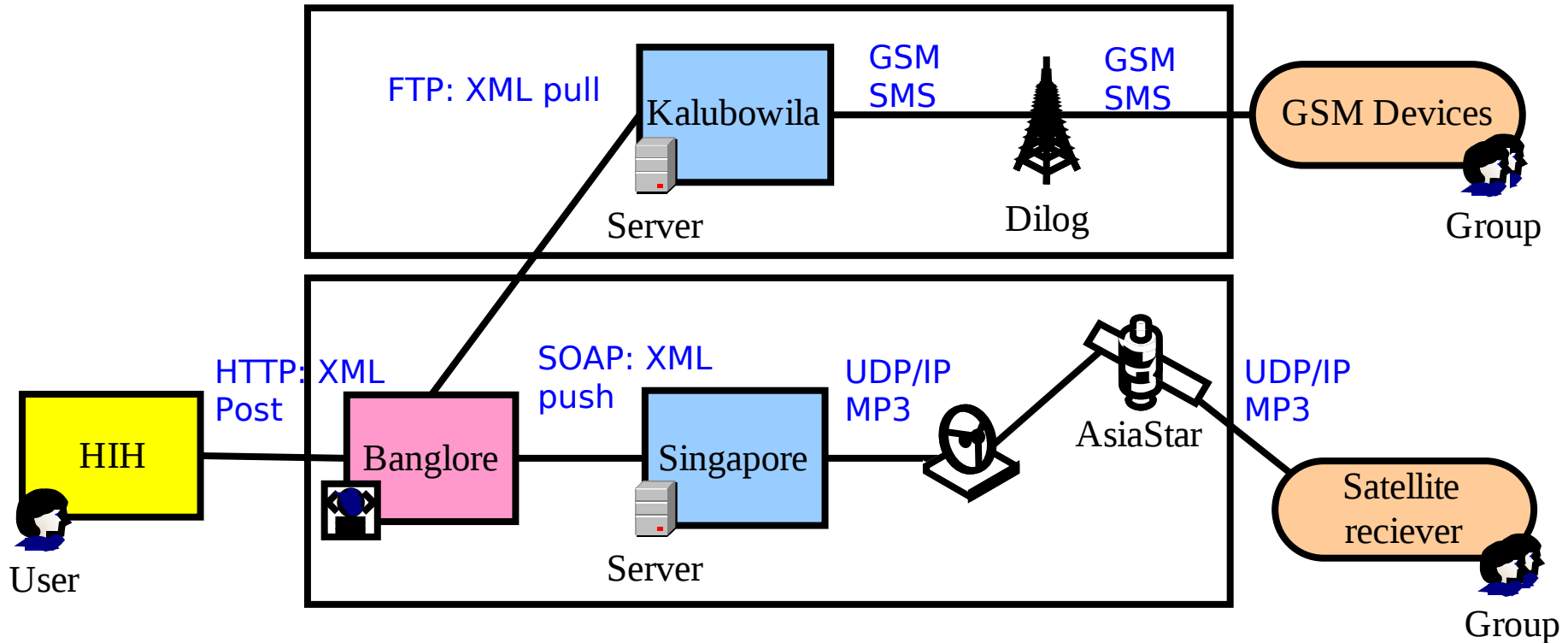
Dialog DEWN Terminal Devices

Interface	HIH Monitor issued CAP Message	Receiver Device and {Medium}	ICT Guardian received Message elements
DEWN Internet Browse	<info> sub element with <Language>en <Description> ... {no size restriction} <Language>si <Description> ... {no size restriction} <Language>tm <Description> ... {no size restriction}	MP {**Text**} RAD {**Text**}	"Warning" <info> <Language>en <Description> A SEVERE CATEGORY 4 CYCLONE... <Language>si <Description> ...{sinhala} <Language>tm <Description> ...{tamil} {restricted by 140 characters}

WorldSpace Satellite Radio

Interface	HIH Monitor issued CAP Message	Receiver Device and {Medium}	ICT Guardian received Message elements
ANNY Internet Browser application (AREA)	All sub elements in <Alert> element and message in <Language>en only.	AREA – B {**Text**}	<msgType>Alert <Scope>restricted <Sender>hih <Status>exercise <Category>met <Urgency>expected <Severity> sever <Certainty>observed <Event>A SEVERE CATEGORY 4 CYCLONE … {restricted 250 characters}

AREA – B
{**Audio**}

Public Internet Alert System

Interface	HIH Monitor issued CAP Message	Receiver Device and {Medium}	ICT Guardian received Message elements
IPAS Internet Browser	<Description> with <Language>en only ... {no size restriction}	Personal Computer {**Text**}	<Description> A SEVERE CATEGORY 4 CYCLONE ... {no size restriction}

Freedom Fone and Sahana for voice-enabled alerting (WIP)
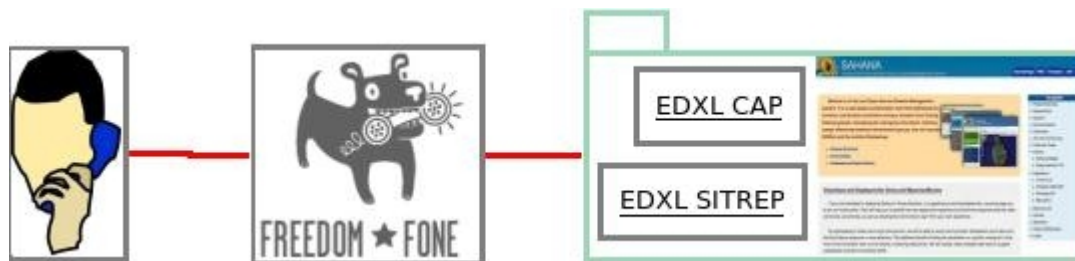
☐ Freedom Fone is an interactive voice-enabled software system: http://www.freedomfone.org/

☐ The project investigated the use of voiced CAP compliant messages

☐ The automated voice-text process outputs a text file that a person can use to record a message.

☐ One recommendation is embedding the voice-based message as a <Resource> file in a CAP message

The Feedback Control using Social Media

THANK YOU