CAP Implementors Workshop
World Meteorological Organization, Geneva

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2011 April 20

Abstract

The Common Alerting Protocol (CAP) was developed by Art Botterell et al[1] (2006) with the WWW and the underlying Internet as the basis but with an all-hazards all-media approach. The LIRNEasia research is studying the CAP implementation challenges in the last-mile and with frontline personnel. The knowledge was transferred into developing the Sahana Alerting Broker (termed as SABRO). This report summaries the learnings from the CAP Implementers Workshop hosted by the World Meteorological Organization Information Systems (WIS) group, International Telecommunications Union Standards (ITU-T SG17), and the Organization for the Advancement of Systems and Information Standardization (OASIS) technical committee. The fourth CAP meeting (06-07 April 2011) was held at the WMO office in Geneva, Switzerland.

Since 2006, when CAP version 1.1 was released, the CAP standard adopters have grown with Multi-Agency Situational Awareness System (MASAS of Canada) and Integrated Public Alerting and Warning System (IPAWS of USA) as the role models for implementing a CAP profile as well as established CAP compliant interoperability between the two agencies. CAP version 1.2 is the latest version. OASIS and ITU-T SG17 Security Working Group are making headway with CAP version 2.0.

Google showed results of their search engine utilization, dramatically, spiking during a hazardous event as with the case during the Japan earthquake. There policy is based on the face that people heavily search for terms like "tsunami" or any other disaster term(s) to get information as to what they should do. Hence, there idea is to provide the right information to those people through their infrastructure. One of them is publishing important warning information received through CAP feeds.

Our hands in CAP

At LIRNEasia, we've been investigating the CAP emergency data exchange standard since the 2005 HazInfo project[2]. Eliot Christian (Senior Scientific Officer, World Meteorological organization) speaks of us (LIRNEasia) as an early adopter of the CAP standard. We first tested CAP with the WorldSpace

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1 Botterell, A. and Addams-Moring, R. (2007). Public warning in the networked age: open standards to the rescue. Communications of the ACM, 30 (7), 59-60.

2 Gow, G. (2007) Implementing Common Alerting Protocol for Hazard Warning in Sri Lanka, Journal of Emergency Management, Volume 5, Number 1, pages 50-56

satellite radios[3], Specialized GSM devices[4], mobile phones, fixed phones, and Internet Public Alerting over Very Small Aperture Terminals[5]. Findings were such that if communities were provided with ambiguous information, then those lead to false information propagation as well as execution of inappropriate response actions.

CAP was, originally, designed for the WWW to assist with the authoring and exchange of unambiguous interoperable all-media all-hazards risk information. However, when applied to other technologies like GSM text-based terminal devices, fixed-wireless voice-based phones, and satellite radios (equipped with both voice and text) we run into CAP implementation difficulties.

We took the lessons learned from the HazInfo and improved the CAP-based SABRO to be used for health alerting in the, 2008-2010 research: Real-Time Biosurveillance Program (RTBP). Inclusion of a message delivery type of short-text-sms, short-text-email, long-text-www, so on and so forth, were created for the delivery of customized (styled) CAP messages in human readable form on to the various terminal devices.

The key findings were discussed in peer reviewed proceedings authored by Careem et al[6] (2010). Since we started experimenting with CAP in 2005, between Gordon Gow (in 2006, 2007, 2011) and I (in 2009, 2011) we have been contributing our lessons learned to the CAP working groups lead by WMO, OASIS, and ITU. This was the first time I physically attended the CAP implementers workshop , in the past it was all conference calls.

Technical notes

Object Identifiers

WMO is in the process of establishing a database of alerting authorities (ITU-T Rec. X.660 series | ISO/IEC 9834); namely the WMO registry of Alerting Authorities (Agenda Item 2.3 in the Workshop Report). The importance of this comes along with CAP and it's interoperability aspects of cross boarder alerting. The format follows from the *Object Identifier* (OID), which have already been established and are extended (ITU-T ASN.1 and OID projects).

Every alerting editor (author) will get their own identifier. In the current OID tree hierarchy, as in the OID repository, 2.49.0 is the OID for WMO. There is also a component for the WMO member states (procedure for registering alerting authorities).

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3   Ranagarajan, S., Gow, G., Anderson, P., and Waidyanatha, N. (2007). Last-Mile Hazard Warning System in Sri Lanka: Performance of the WorldSpace Addressable Radios for Emergency Alerts, Proceedings 10th International Wireless Personal Multimedia Communications, Jaipur, India, Pages 233-237

 – *idl-bnc.idrc.ca/dspace/bitstream/10625/42341/1/129766.pdf*

4   Dias, D., Purasighe, H. and Waidyanatha, N. (2007). Challenges of Optimizing Common Alerting Protocol for SMS based GSM devices in a Last-Mile Hazard Warning System in Sri Lanka, Proceedings 19th Meeting Wireless World Research Forum, Chennai, India, http://www.lirneasia.net/wp-content/uploads/2007/11/challenges-of-optimizing-cap-on-sms-over-gsm-in-sri-lanka.pdf

5   Anderson, P., Gow, G., and Waidyanatha, N. (2007). "Common Alerting Protocol Message Broker for Last-Mile Hazard Warnings in Sri Lanka: An Essential Component". Proceedings of the 2nd International ISCRAM Workshop, Harbin, China (B. Van de Walle, X. Li, and S. Zhang, eds.), Pages 59 - 65

6   Mifan Careem, Damendra Pradeeper, Mahesh Kaluarachchi, Gordon Gow, Ganesan M., Janakiraman, N., Nuwan Waidyanatha, and Chamindu Sampath, (2010). Sahana Alerting Software for Real-Time Biosurveillance in India and Sri Lanka, proceedings of the 1st International p 370-373

Let us assume Sri Lanka registers the National Disaster Management Center (NDMC) as the alerting authority and is assigned the integer 0. Then the OID will be 2.49.0.0.0.144 implying that NDMC is a "Sri Lankan" alerting authority registered with WMO (144 LKA is the UN assigned country statistic code for Sri Lanka).

The NDMC could then register authorities and manage the local registry such as assigning the number 4 authorizing the National Meteorological Department to issue severe weather alerts. The National Met Dept would maintain their tree of Ids such as assigning the number 1, 2, and 3 to the three senders (authors). The OID for sender 3 will be 2.49.0.0.0.144.0.4.3. Eventually, this string of digits would be the value for the CAP *<alert.identifier>* element (also termed as the *<alert.msgIdenfier>*).

Unlike XML that can be read with standard text editors, Binary XML requires specialized software tools. This is handy when designing low-end mobile hand held device specific emergency communication authoring and authenticating applications. A CAP function would be sending the message on to a authorizing person's smart phone for him or her to digitally sign it before issuing. Another would be the Emergency Data Exchange Language (EDXL) Situational Reporting (SITREP) standard for first-responders to send field reports to an incidence management center.

Symbols and Color Codes

Damage concept color coding based on subjective prospective. Apparently 10% of the male population cannon clearly distinguish between green and red. This is one problem we had with RTBP where Public Health Inspectors who are not emergency managers and not attuned to the concept of a priority that is designated by the urgency, severity, and certainty elements of the CAP *<info>* Segment.

Another important aspect is using symbols as they speak a universal language. There are already symbols for warning types and categories. It was recommended by LIRNEasia that *<responseType>* be associated with a standard set of graphics gesturing the response action; e.g. "run up hill" or "seek shelter". Those in a foreign country, unfamiliar with the local language, could interpret a symbol, opposed to deciphering the words, to at least, realize the immediate action, if required.

Element specific discussions

In a multilingual CAP profile, it is not necessary that all the elements inside the *<info>* segment be translated. For example the *<category>* element is indexed by the fixed terms Met, Env, Geo, Health, etc, would be the same values Met, Env, Geo, Health so on and so forth. An element such as the *<description>* would carry text in the language specified by the element *<language>* which may be set to "si" (two character ISO code for Sinhala language).

The CAP *<category>* element can appear multiple times. It is merely for presentation (i.e. recipient's receiving and filtering) and not for issuing. The example given in slides sixteen of the *CAP implementation in Canada* (presented by Norm Polson, 2011), explains how an air quality alert, which is typically of category "Env" is also categorized as "Met" and "Health"; whereby recipients of the Health sector would also receive the alert and could be better prepared to respond to respiratory tract patient complaints.

Some Reusable code

Google.org PubSubHubbub originates from the concepts of Atom and RSS feeds; more so on real-time updates. The PubSubHubbub model is not to be mistaken with pulling and pushing content with automated server requests and posts but more so a persistent link. It was recommended by the Google.og representatives that the Atom header was prefered over the EDXL-DE (Distribution) element.

Sahana had developed a Fire Fox Atom Feed Reader (also know as the Fire Fox CAP plugin) that specifically read CAP feeds. This was a Google Summer of Code 2009 student project.

Sahana Software Foundation and Google Crisis Response have been working hand in hand, especially starting with the 2010 Haiti Earthquake with the People Finder Interchange Format (PFIF), which now is driven by both organization towards a standard.

The Sahana Broker could be another application that publishes to with Google crisis response products. Unlike the Google Aggregator approach the SABRO provides authoring and publishing of CAP messages; where Sahana published CAP messages can be delivered through the Google.org Hub.

ESRI Geo Portal Server is a free to use open source product for exchanging geospatial information. has a free product on sourceforge for integrating.

Google Dot Org wish list

Google.org recommended that the Global Unique Identifier (GLIDE) number be added to the CAP message. The GLIDE number can be a CAP community recognized *<parameter>*. Another option is to include as a *<resource>* especially if it links back to a GLIDE author (or originator). The new format for the GLIDE number comprises two letters designating the type of hazard (e.g. EP – epidemic or IN – Insect Infestation) that has caused enough damage to be a disaster or is an imminent threat, four digits for the year (e.g. 2010), six digits for the sequential number (e.g. 000034) , three letters to designate the country using the UN standard code (e.g. LKA – Sri Lanka).

> Here's a most recent GLIDE for Sri Lanka: *"FL-2011-000003-LK, Flood, Sri Lanka (Sri Lanka President Mahinda Rajapakse has issued directives to Essential Services Commission to muster all its resources to assist the recent flood vicitims in all possible manners."*

The national governments can decide whether it is necessary to append 3 digits or 3 letters to designate sub national first and second administrative levels. WMO would propose a revision of hazard type codes for meteorological disasters. It was suggested that tsunami be distinguished from wave surge and snow avalanche from slide.

The Google.org wire frames (or user operating picture) emphasizes on *<instructions>*, *<incident>*, *<resource>*, and *<web>* elements. These elements are optional in the CAP definitions. However, a country CAP profile could make them mandatory.

Norm Polson from Canada empathized the difference between the CAP technical data standard and the CAP Community. Very likely CAP Community will work with Google to redistribute CAP messages and as a result would take those elements into being part of their profile.

In LIRNEasia's Real-Time Biosurveillance pilot, health officials requested that *<instructions>* be clearly given in each alert; where some response related operating procedures would be uploaded or linked to through the *<resource>* element.

The *<incident>* element is used to describe incidences caused by an event; for example, mini cyclone causing a bridge to be blocked by fallen trees or twisted electric poles leading to vulnerable situations.

Cell Broadcast

Cell Cast successfully carried two Cell Broadcast (CB) pilot one of which was with Mobile Tel Lanka. [LIRNEasia has been strongly advocating Cell Broadcasting](#) as one way to efficiently deliver location based public warnings.

China had conducted a CB pilot in Schenzhen. However, the cellular operators are reluctant to open up CB for public warnings or any kind of location based service. Telcos ausually do not want to be held responsible against hackers taking advantage of the CB service that may cause public havoc.

CAP would play a key role in CB. USA is gearing up to offer CB. They have chosen to embed the 90 character short message in to a CAP *<parameter>* termed as "CMAMtext" with the actual 90 character short-text message at the *<paramValue>*. CMAM is the Commercial Mobile Alert Message, which is part of the Commercial Mobile Alert System (CMAS).

Acknowledgement