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# Introduction

This contribution proposes the disaster alert system case study for USA as the first input.

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# 5. Case studies of existing disaster alert and warning systems

## 5.1 Introduction

This clause contains several case studies for exising disaster alert and warning systems, so that the relavant use cases and requirements, possibly, can be derived to specify the disaster alert service enabler over the oneM2M system. The interests to the case study is how diaster alert and warning solutions can be extended for IoT systems, then alert and warning information can also be consumed by things as well as human beings.

## 5.2 Integrated Public Alert and Warning System in USA

### 5.2.1 IPAWS

In June 2006, after the Hurricane Katrina, it was initiated to integrate and modernize existing warning systems in the USA by the president’s Executive Order 13407 including:

* Emergency Alert System (EAS)
* National Warning System (NAWAS)
* Commercial Mobile Alert System (CMAS)
* NOAA Weather Radio All Hazards

The new warning system is a integrated system termed the Integrated Public Alert and Warning System (IPAWS). The IPAWS is the system deployed in the USA which is can be used by authorized officials to send out alerts to the public over multiple communication methods. Warning authorities are Federal, State, territorial, tribal and local which can send alert and warnings to their communities over multiple communication pathways including commercial mobile services, Internet services, National Weather Service, Emergency Alert System, state and local alerting systems.

The Figure 5.2-1 shows the architecture combining standard alert message protocols, authenticated alert message senders, and shared access and distribution networks work together to deliver alerts and warnings through different communication pathways.



Figure 5.2.1-1. IPAWS Architecture

The IPAWS includes four components as below.

* Alerting systems
	+ Emergency Alert System (EAS): the message dissemination pathway that sends warnings via broadcast, cable, satellite, and wireline services.
	+ Wireless Emergency Alert (WEA): the message dissemination pathway that broadcasts alerts and warnings to cell phones and other mobile devices.
	+ NOAA Weather Radio (NWR): a nationwide network of radio stations including 1000 transmitters covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories.
	+ Internet Systems: The All-Hazards Emergency Message Collection System, also known as “HazCollect,” automatically relays Non-weather Emergency Messages (NWEMs) over the internet to subscribing software providers.
* Protocol standards
	+ Common Alerting Protocol (CAP): the digital format for exchanging emergency alerts that allows a consistent alert message to be disseminated simultaneously over many different communications systems.
	+ IPAWS Profile: the standard for receipt and translation among devices intended to receive alerts from IPAWS.
* Infrastructure
	+ Primary Entry Point Stations (PEP): private or commercial radio broadcast stations that cooperatively participate with FEMA to provide emergency alert and warning information to the public before, during, and after incidents and disasters.
	+ IPAWS Open Platform for Emergency Networks (IPAWS-OPEN): the Federal alert aggregator that receives and authenticates messages transmitted by alerting authorities and routes them to existing and emerging public alerting systems.
* Testing
	+ IPAWS Supported State and Regional Tests: the IPAWS Program Management Office (PMO) supports efforts to improve IPAWS message delivery pathways and mitigate identified limitations by coordinating statewide and regional testing activities.
	+ Testing with the IPAWS Lab at JITC: the IPAWS PMO provides public safety officials with a controlled IPAWS testing environment where alert and warning technologies can be exercised to assess capabilities and effectiveness with IPAWS.

### 5.2.2 IPAWS CAP Profile

The Common Alerting Protocol (CAP) allows emergency messages to be simultaneously sent over multiple alerting systems. CAP is the data specification developed by the Organization for the Advancement of Structured Information Standards (OASIS). In addition to the basic CAP standard, a supplemental IPAWS Profile technical specification was developed to ensure compatibility with existing warning systems in the USA. FEMA has formally adopted CAP and the IPAWS Profile to implement the IPAWS.

CAP provides the capability to include rich content, such as photographs, maps, streaming video and more. And it also provides the ability to geo-target alerts to a defined warning area, limited only by the capacity of the delivery system used. Although IPAWS does not provide language translation, CAP does provide the capability to transmit alerts in multiple languages. Because CAP provides the capability to incorporate both text and equivalent audio, CAP alerts are still meaningful for visually impared people.

The CAP 1.2 standard specifies the following document object model to represent alert messages.



Figure 5.2.2-2. CAP document object modeling [i.1]

The IPAWS CAP Profile, as the extension to CAP, provides more specific definitions of warnings and alerts.

The table below specifies the constraints placed by the CAP v1.2 IPAWS Profile on a CAP v1.2 message. This table contains only those elements of CAP v1.2 which there are constaints as defined in the IPAWS Profile. CAP v1.2 elements not included here simply means there is no specific constraint or condition in the use of those elements for the IPAWS Profile.

Table 5.2.2-1. CAP v1.2 IPAWS Profile Specification and Profile Note

|  |  |  |
| --- | --- | --- |
| CAP Element  | Profile Specification (Normative)  | Profile Note (Non-Normative)  |
| status | A value of "Actual" SHALL be used for messages intended for dissemination to the public, including test messages intended for delivery to the public.  | Some exchange partners may elect not to transmit certain messages of “Actual” based on the values of the messages. For example, CMAS may not carry EAS required weekly test messages.  |
| source |  | Exchange partners should be aware that the value may be publicly presented as a "signature line” in some delivery systems.  |
| code \*  | (1) REQUIRED. (2) Value SHALL include the string "IPAWSv1.0" to indicate the Profile version in use.  |  |
| references | All related messages that have not yet expired MUST be referenced for “Update” and “Cancel” messages.  |  |
| info \*  | (1) All blocks in a single alert MUST relate to a single incident or update, with the same and values. (2) An block SHOULD contain only one with a of “SAME” (3) All blocks SHALL be appropriate for immediate public release.  | (1) Multiple blocks may be used to deliver content in different languages. (2) Exchange partners may elect to process only the first block encountered in a language they support. (3) Other elements may also be present. |
| eventCode \* | (1) REQUIRED.(2) Messages intended for EAS, CMAS and HazCollect dissemination MUST include one and only one instance of this with a of "SAME" and using a SAME-standard three-letter value. (3) Other elements, other than SAME, may also be present. (4) All values for EAS Event Code SHALL be passed through by EAS CAP Profile devices, even if the Event Code is not shown in FCC Part 11.31, as long as the value is a three-letter code.  |  |
| effective | Ignored if present. Alerts SHALL be effective upon issuance.  | The and elements may refer to future events or actions.  |
| onset | Ignored if present. Alerts SHALL be effective upon issuance.  | The and elements may refer to future events or actions. |
| expires | REQUIRED.  |  |
| description | Messages SHOULD have meaningful values for the .  | The content in may be truncated and therefore it is recommended that essential information be addressed first.  |
| instruction | Messages SHOULD have meaningful values for the . | The content in may be truncated and therefore it is recommended that essential information be addressed first.  |
| parameter \*  | (1) Messages intended for EAS and/or HazCollect dissemination MUST include an instance of with a of "EASORG" with a of the originator’s SAME organization code. (2) Messages invoking the "Gubernatorial Must-Carry" rule MUST include a with of "EAS-Must-Carry" and value of "TRUE" for gubernatorial alerts. (3) Messages intended for CMAS dissemination MAY include an instance of with a of "CMAMtext" and a containing free form text limited in length to 90 English characters. |  |
| resourceDesc | (1) A value of “EAS Broadcast Content” SHALL be used to indicate that the elements of a block are intended for EAS broadcast. (2) EAS broadcast audio and video content SHOULD match the message's textual content.  | (1) The value of is case sensitive. (2) The content is identified by the .  |
| mimeType | A of “audio/x-ipawsaudio", "audio/x-ipaws-streamingaudio", "video/x-ipaws-video" and "video/x-ipaws-streaming-video" SHALL be used to identify broadcast content for delivery to the public.  | (1) Selection of the most appropriate encoding is outside of the OASIS Emergency Management Technical Committee’s expertise. However, OASIS recommends :  A) that a single format be specified for each of these types; and,  B) that preference be given to open, non-proprietary standards when selecting these encodings. (2) If broadcast content exceeds two minutes playing time it may be truncated by exchange partners except for Presidential Messages.  |
| area \*  | (1) REQUIRED. (2) At least one block MUST be present.  |  |
| geocode \*  | (1) At least one instance of with a of “SAME” and a value of a SAME 6-digit location (extended FIPS) SHOULD be used. (2) The more precise geospatial representations of the area, and , SHOULD also be used whenever possible. (3) A SAME value of “000000” refers to ALL United States territory or territories.  | (1) The 5-digit form, if needed, can be derived by removing the first digit from the 6 digit form. (2) If a SAME-based is not present, IPAWS exchange partners unable to use a geospatial representation may ignore the message.  |

## 5.3 European Alert System

Editor’s Note: this is TBD

## 5.4 Korea National Disaster Warning System

Editor’s Note: this is TBD

## 5.5 J-Alert in Japan

Editor’s Note: this is TBD

## 5.6 Summary of case studies

Editor’s Note: this is TBD

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## 2.2 Informative references

Clause 2.2 shall only contain informative references which are cited in the document itself.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] CAP (<https://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html>)

[i.2] Common Alerting Protocol, v. 1.2 USA Integrated Public Alert and Warning System Profile Version 1.0 (<https://docs.oasis-open.org/emergency/cap/v1.2/ipaws-profile/v1.0/cap-v1.2-ipaws-profile-v1.0.pdf>)

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