

## Early Warning Systems

presented by Eliot Christian  
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at the First International Congress, "Ciudades más  
seguras y más humanas ante el riesgo de desastres"  
of the *Colegio Mexicano de Profesionales  
en gestión de Riesgos y Protección Civil, A.C.*

The title of my presentation is: "Early Warning Systems".

## Better Early Warning for Safer, Healthier Cities

- Warnings (private and public) are essential to emergency management at all scales
- Challenges: better forecasting, better dissemination, better "interoperability"
- Interoperability among city agencies, plus: NGOs (e.g., Red Cross); commercial (e.g., news, telecom); adjacent cities; and other government levels, up to national and sometimes international



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We know that warnings, whether sent privately among emergency personnel or broadcast to the general public, are essential to emergency management, at all scales--from city neighborhoods to international.

Effective warning presents huge challenges. There is the challenge of better forecasting--"earlier warning". And, there is the separate challenge of better dissemination--making warnings faster, more precise, more reliable, and completely trusted.

We know that most emergencies occur at city scale, or smaller. At this scale, warning systems are operated within and among agencies such as police, fire, and civic authorities. Cities are challenged to make their warning systems work better together--to "interoperate" effectively.

Yet, even if a city perfectly integrates its own warning systems, the city needs to interoperate with Non-Government organizations such as the Red Cross, and with commercial organizations such as telecom operators and news media. City warning systems also need to interoperate with adjacent cities, and with other levels of government in the country. For major disasters, international interoperability may be necessary too.

In this presentation, I will show how one simple step can go a long way to address these interoperability challenges: to adopt the international standard for early warning, the Common Alerting Protocol (CAP).

Adopting the CAP standard is the necessary and least-cost step a city can take to have much better early warning systems.

## Presentation Outline

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1. Early Warning Systems in the Sendai Framework
2. The Common Alerting Protocol (CAP) Standard
3. CAP Alert Hubs--Free, Fast, Reliable, Secure
4. Use of Cell Broadcast for Warnings
5. Survey of CAP-enabled Warning Systems

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Here is the outline of my presentation.

We will start with the global context: how Early Warning Systems are woven into the Sendai Framework for Disaster Risk Reduction.

This will lead into a brief introduction of the CAP Standard.

I will then describe an exciting, new development: CAP Alert Hubs.

At this point, I will also mention Cell Broadcast, another key technology for public warning that cities should embrace.

With all of that as background, I will describe some examples of CAP-enabled Warning Systems around the world .

## The Sendai Framework

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- The Sendai Framework is a 15-year, voluntary, non-binding agreement among United Nations Member States
- Adopted March 2015 at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Japan
- Successor to the Hyogo Framework for Action 2005-2015: *Building the Resilience of Nations and Communities to Disasters*

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The Sendai Framework is a 15-year, voluntary, non-binding agreement. It was adopted by UN Member States in March 2015 at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Japan. It is the successor instrument to the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters.

## Intended Outcome

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The Sendai Framework aims for:

The substantial reduction of disaster risk and losses in lives, livelihoods and health, and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.

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The Sendai Framework aims for the following outcome:

*The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.*

## Seven Global Targets

1. Reduce global disaster mortality, by 2030
2. Reduce affected people globally, by 2030
3. Reduce economic loss, by 2030
4. Reduce infrastructure damage and disruption of basic services, by 2030
5. Increase disaster risk reduction strategies, by 2020
6. Enhance cooperation to developing countries, by 2030
7. Increase multi-hazard **early warning systems** and disaster risk information, by 2030

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To assess progress in achieving the Sendai Framework outcome, seven global targets were agreed:

1. Substantially **reduce** global disaster mortality over the ten years 2020-2030 compared to 2005-2015;
2. Substantially **reduce** the number of affected people over the years 2020-2030 compared to 2005-2015;
3. **Reduce** direct disaster economic loss in relation to global gross domestic product, by 2030;
4. Substantially **reduce** disaster damage to critical infrastructure and disruption of basic services, by 2030;
5. Substantially **increase** the number of countries with national and local disaster risk reduction strategies by 2020;
6. Substantially **enhance** international cooperation to developing countries by 2030 to help national actions to implement the framework;
7. Substantially increase all people's access to **multi-hazard early warning systems** and disaster risk information by 2030.

## International Network for Multi-Hazard Early Warning Systems (IN-MHEWS)

- In response to Sendai Framework call for strengthening early warning, IN-MHEWS established in February 2016
- IN-MHEWS includes UNISDR, WMO, IFRC, UNESCO, UNDP, and ITU, among others.
- International Conference on Multi-Hazard Early Warning Systems (Cancun, Mexico, May 2017)
- Objectives include: "promote best practices for warnings... including especially the CAP standard"

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In response to the Sendai Framework call for strengthening early warning systems, the International Network for Multi-Hazard Early Warning Systems (IN-MHEWS) was established in February 2016.

IN-MHEWS is a multi-stakeholder partnership. It focuses on facilitating the sharing of expertise and good practice for multi-hazard early warning systems. Its Members include, among others, the United Nations International Strategy for Disaster Reduction (UNISDR), the World Meteorological Organization (WMO), the International Federation of Red Cross and Red Crescent Societies (IFRC), the United Nations Development Program (UNDP), and the International Telecommunication Union (ITU).


In May 2017, IN-MHEWS will hold an International Conference on Multi-Hazard Early Warning Systems. This will be in Cancun, Mexico, and adjacent to the next UNISDR "Global Platform" meeting.

The Concept Note for this conference highlights CAP in its conference Objectives:

*"Promote best practices for warnings to reach to people in need for timely action, including especially the Common Alerting Protocol standard for all hazards alerting across all kinds of media".*

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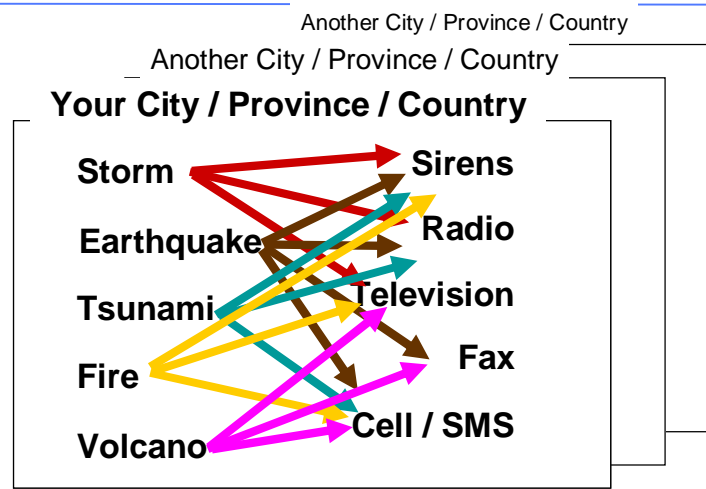
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Now some of you might be wondering, What is this *CAP standard*?

## A Patchwork of Warning Formats



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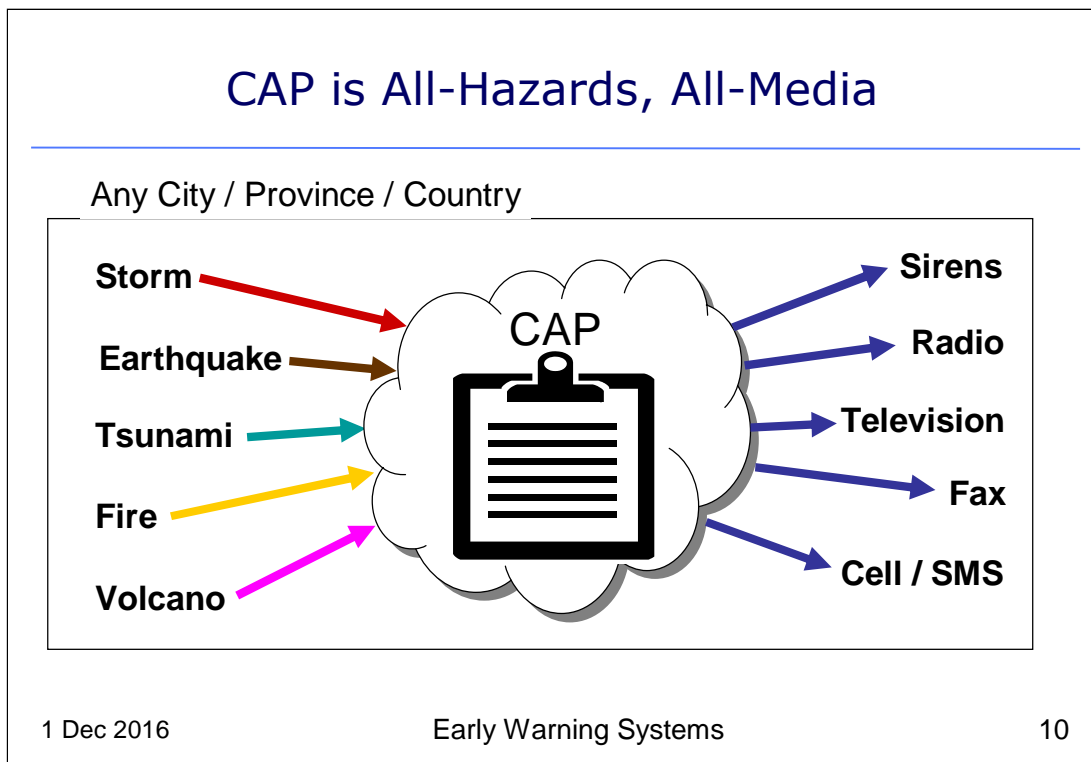
Here's the problem that CAP was designed to fix.

Historically, emergency warnings have been mostly plain text, composed much like a press release.

But, automated systems cannot do much with unstructured text like that.

Even where certain hazards did have structured warnings, different hazard types had different formats, and there could be different formats across different cities and countries as well.

Without an international, multi-hazard warnings standard, automated processing of warnings was just not possible.



CAP is exactly the international standard format needed for emergency warnings. CAP is pretty simple, yet it is flexible enough to convey the key warning information for any kind of emergency.

CAP is essentially a "standard business form". The CAP format has various fill-in boxes and check boxes giving key details of the warning. The power of CAP is just that it standardizes those form boxes.

So, we see that with warnings in CAP format, it is much easier to activate multiple warning technologies--sirens, radio and TV, FAX, cell phones, smart-phone apps, e-mail, web sites, highway signs, and many others.

## Common Operational Picture

The screenshot shows a Google Maps interface with a 'Common Operational Picture' overlay. The map displays various warning icons (e.g., accidents, closures, fires) overlaid on a geographical map of the region. A detailed information box for 'Confederation Bridge Wind Watch' is visible, providing specific details about the warning, including its status, scope, and instructions.

**Confederation Bridge Wind Watch**  
 Sent: 3/23/2010 5:34:09 AM (GMT)  
 Sender: Trans@GNB  
 Status: Actual  
 Scope: Public  
 Description: Commencing approximately 22:00hrs, March 23, 2010 winds are projected in the 60-80KM range gusting to 90KM. Forecast indicates conditions will remain the same until approximately 10:00hrs, March 24, 2010.  
 Instruction: wind conditions on March 23, 2010 may result in restrictions of traffic on the Bridge.  
 Download: [GAP.XML](#), [HTML](#)  
[Directions](#) [Search nearby](#) [Save to...](#) [more](#)

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Alerting authorities typically implement CAP as an add-on feature to their current warning processes. They publish their warnings in CAP format by including them on their own Internet news feed.

Other warning disseminators (such as news media, the Red Cross, and Google) simply monitor such CAP feeds and automatically disseminate critical warnings to people in the warning area.

As a result of this simple approach to CAP-enabled warning, it is easy to compile warnings from many sources. Emergency managers can monitor the whole situation--all types of local, regional, and national warnings, easily shown on one map thanks to the CAP standard.

## Sample CAP Message

```

<?xml version="1.0" encoding="UTF-8"?>
<alert xmlns="urn:oasis:names:tc:emergency:cap:1.1">
  <identifier>KSTO1055887203</identifier>
  <sender>KSTO@NWS.NOAA.GOV</sender>
  <sent>2003-06-17T14:57:00-07:00</sent>
  <status>Actual</status>
  <msgType>Alert</msgType>
  <scope>Public</scope>
  - <info>
    <category>Met</category>
    <event>SEVERE THUNDERSTORM</event>
    <responseType>Shelter</responseType>
    <urgency>Immediate</urgency>
    <severity>Severe</severity>
    <certainty>Observed</certainty>
    <expires>2003-06-17T16:00:00-07:00</expires>
    <senderName>NATIONAL WEATHER SERVICE SACRAMENTO CA</senderName>
    <headline>SEVERE THUNDERSTORM WARNING</headline>
    <description> AT 254 PM PDT...NATIONAL WEATHER SERVICE DOPPLER RADAR
      INDICATED A SEVERE THUNDERSTORM OVER SOUTH CENTRAL ALPINE
      COUNTY...MOVING SOUTHWEST AT 5 MPH. HAIL...INTENSE RAIN AND STRONG
      DAMAGING WINDS ARE LIKELY WITH THIS STORM. </description>
    <instruction>TAKE COVER IN A SUBSTANTIAL SHELTER UNTIL THE STORM
      PASSES.</instruction>
    <contact>BARUFFALDI/JUSKIE</contact>
    - <area>
      <areaDesc> EXTREME NORTH CENTRAL TUOLUMNE COUNTY IN CALIFORNIA,
        EXTREME NORTHEASTERN CALAVERAS COUNTY IN CALIFORNIA,
        SOUTHWESTERN ALPINE COUNTY IN CALIFORNIA </areaDesc>
      <polygon>38.47,-120.14 38.34,-119.95 38.52,-119.74 38.62,-119.89 38.47,-
        120.14</polygon>
    </area>
  </info>
</alert>

```

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Here, let's pause to see what an actual CAP warning looks like.

This is an example message in the CAP format, shown in "XML" format.

Sample CAP Message

```
<senderName>NATIONAL WEATHER SERVICE SACRAMENTO CA</senderName>
```

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This particular CAP message has the senderName: “**National Weather Service, Sacramento, California**”.

Sample CAP Message

```
<headline>SEVERE THUNDERSTORM WARNING</headline>
```

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Here the headline is: “**Severe Thunderstorm Warning**”.

## Sample CAP Message

```
<description> AT 254 PM PDT...NATIONAL WEATHER SERVICE DOPPLER RADAR  
INDICATED A SEVERE THUNDERSTORM OVER SOUTH CENTRAL ALPINE  
COUNTY...MOVING SOUTHWEST AT 5 MPH. HAIL...INTENSE RAIN AND STRONG  
DAMAGING WINDS ARE LIKELY WITH THIS STORM. </description>  
<instruction> TAKE COVER IN A SUBSTANTIAL SHELTER UNTIL THE STORM  
PASSES. </instruction>
```

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In the description we see that the storm is likely to have “**hail...intense rain and strong damaging winds**”.

And, the instruction says: “**take cover in a substantial shelter until the storm passes**”.

## Sample CAP Message

```
- <area>  
  <areaDesc> EXTREME NORTH CENTRAL TUOLUMNE COUNTY IN CALIFORNIA,  
    EXTREME NORTHEASTERN CALAVERAS COUNTY IN CALIFORNIA,  
    SOUTHWESTERN ALPINE COUNTY IN CALIFORNIA </areaDesc>  
  <polygon>38.47,-120.14 38.34,-119.95 38.52,-119.74 38.62,-119.89 38.47,-  
    120.14</polygon>  
</area>
```

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Notice the warning area.

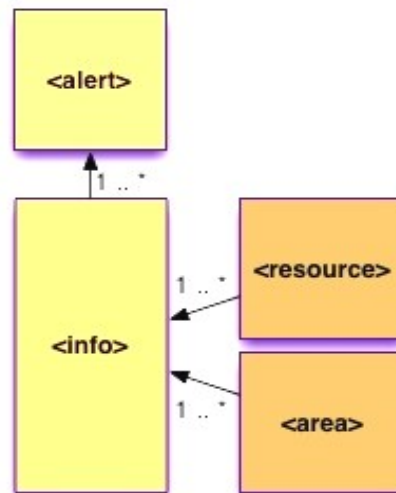
For human readers, the area is described in text

But, for processing by automated tools, the area is delineated by a polygon with latitude/longitude vertices.

## CAP Messages Use XML

CAP Messages contain:

- Text values for human readers, such as "headline", "description", "instruction", "area description", etc.
- Coded values useful for filtering, routing, and automated translation to human languages



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This is a critically important feature of CAP messages--it was designed to leverage the XML standard for structured information.

CAP Messages in XML contain some text values for human readers, such as "area description", "headline", and "instruction".

But, CAP messages in XML also contain **coded values** that are useful for filtering, routing, and automated translation to human languages.

## Presentation Outline

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1. Early Warning Systems in the Sendai Framework
2. The Common Alerting Protocol (CAP) Standard
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Now that we have the CAP standard format for emergency warnings, alerting authorities can use simple tools to get critical messages to affected people, wherever they are and whatever they are doing.

As we will see, many countries are already implementing CAP. Soon there will be thousands of CAP alert sources worldwide, together delivering hundreds of alerts per second.

In this next section, we look at exciting new technology that select from this rich trove of emergency warning just those alerts needed for some particular uses. We call this technology a "CAP-enabled Alert Hub".

## Filtered Alert Hub

- Free service offers CAP alerts filtered by location, language, and other criteria (e.g., "official-only")
- Cloud-based: Highly Available, Reliable, Secure
- To minimize delay, sources can push alerts to the Hub, and the Hub can push to subscribers

The diagram illustrates the architecture of the Filtered Alert Hub. It is divided into two main sections: 'Alert Hub' and external components. The 'Alert Hub' contains four boxes: 'input feed subscriber', 'output feed publisher', 'input push receiver', and 'output push sender'. On the left, 'alerts' are received from 'CAP alerts by news feed (RSS, ATOM)' via a 'pull' action to the 'input feed subscriber', and from 'CAP alerts by direct push (HTTPS POST)' via a 'push' action to the 'input push receiver'. On the right, the 'output feed publisher' sends 'CAP alerts by news feed (RSS, ATOM)' to 'Alert Hub news feed subscribers' via a 'pull' action, and the 'output push sender' sends 'CAP alerts by direct push (HTTPS POST)' to 'Alert Hub direct push receivers' via a 'push' action.

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One example is the "Filtered Alert Hub" technology. This is a free facility that aggregates sources of CAP alerts worldwide and offers them as CAP news feeds filtered by location, language, or other alert content.

For example, one can filter on "official-only". This selects CAP alerts from sources in the international Register of Alerting Authorities. That is a distinguishing feature of the WMO Alert Hub, for example.

The Filtered Alert Hub is cloud-based, with high levels of availability, reliability, authenticity, and security.

For updating, CAP alert feeds are normally polled periodically, typically once per minute. But, for sudden-onset events such as earthquakes, tsunami, and tornadoes, even seconds of delay could be deadly.

So, the Filtered Alert Hub allows for alerts to be pushed immediately to the hub, and pushed immediately from the hub to specific subscribers. Used this way, critical warnings can be delivered within a second or two.

## Part of the NOAA Big Data Project



- Collaborative project with working prototype now
- Open Commons Consortium and Amazon Web Services already joined; others are welcome
- Core components are *Free Open Source Software*
- [Contact Project Lead \(Eliot Christian\)](#)

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Collaborators are developing the Filtered Alert Hub technology (which is also seen as the WMO Alert Hub prototype) as part of the NOAA "Big Data Project".


Current collaborators include Amazon Web Services (AWS) and the Open Commons Consortium (OCC). Other organizations are also welcome.

Core functions of the Alert Hub will be maintained as Free Open Source Software in the public domain.

I am leading the initiative. Please contact me if you know developers of cloud-based systems for emergency alerting who wish to get involved, .

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We have seen that CAP-enabled technology is now a key part of early warning, and I want to show some really impressive examples of such systems.

But first, let me also mention a separate technology that gets warnings to everyone in the warning area with a mobile phone: Cell Broadcast.

## Cell Broadcast

- Standard cellular phone service
- Broadcast from cell tower to all cell phones in warning area; no service subscription is needed
- Message is immediately broadcast to all; not one-at-a-time like SMS messages
- Cell Broadcast adopted for public warning in: Canada, Chile, China, Israel, Japan, Lithuania, Netherlands, South Korea, Taiwan, Turkey, USA



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Smart phones interface well with CAP, especially if apps are in use. But, there are an awful lot of cell phones that are not smart phones. These can be bought for as little as \$25 in India, for example.

To get warning to all cell phones, many countries are now engaged in implementing the "Cell Broadcast" technology, and this is a good fit with CAP implementations.

Cell Broadcast is a standard message delivery service over cellular phone systems. When used in public warning, a message goes to each cellular base station (cell tower) in the warning area. That base station then sends the warning to the cell phones.


A cell broadcast warning goes to all cell phones in range, whether or not the phone owner subscribes to the particular cellular service. The station sends the warning immediately as a broadcast, which is much faster and more reliable than calling perhaps thousands of phones, one by one.

For these reasons, cell broadcast is ideal for severe emergencies, when cellular message traffic is often heavy and the cellular network itself may have been degraded by the emergency.

I have been told that Cell Broadcast is already adopted for public warning in: Canada, Chile, China, Israel, Japan, Lithuania, Netherlands, South Korea, Taiwan, and Turkey, in addition to the United States.

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Now let's look at examples of CAP-enabled Warning Systems.

## *CAP Implementations*

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- NGO and Commercial
- National Systems
  - Americas
  - Europe, Middle East, Africa
  - Asia/Pacific

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I will start with CAP systems offered by Non-Governmental Organizations and by Commercial organizations. Then I will give examples of CAP systems implemented at the national level.

## CAP over TV, Radio, Digital Signs

Commercial TV  
and radio send  
warnings as  
"crawl text"  
and/or audio

Compatible  
with CAP



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Alerting authorities have long relied on commercial media, such as broadcast radio and television, to help disseminate public warnings. Typically, television stations insert "crawl text" with the warning message, and radio stations insert a recorded message.

Systems supporting this warning capability, both analog and digital, are compatible with CAP.

It is also possible for digital signage companies to show CAP warnings. In the United States, for example, official warnings are displayed on highway signs by the country's largest billboard company, Lamar.

## Unattended Radio Broadcasting

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an open source suite of tools for unattended  
CAP messaging over broadcast radio, TV,  
streaming, and digital signage

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"OpenBroadcaster" is an open source suite of tools for unattended messaging of CAP warnings over broadcast radio and TV, streaming, and digital signage. This free system is used extensively throughout Canada, and is especially important for the most isolated regions.

## IFRC Hazard App

Hazard app from Indonesia showing hazard alert features.

The Hazard app is available in 4 languages.

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IFRC (the International Federation of Red Cross and Red Crescent Societies) is the leading NGO for emergencies.

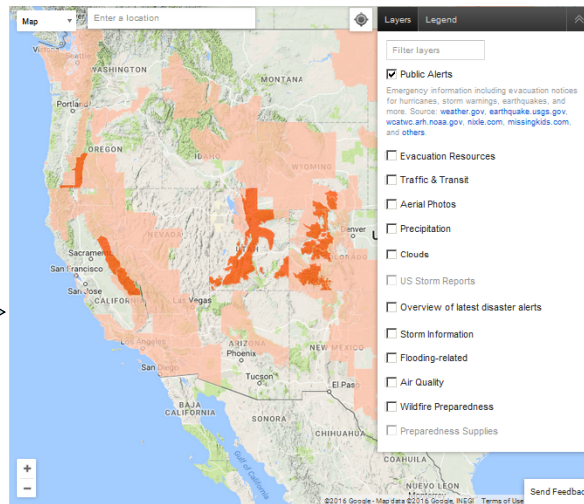
IFRC provides templates for each Red Cross/ Red Crescent National Society to customize and distribute free mobile apps for needs such as giving first aid, finding shelters, and making emergency preparedness kits. One is the "Hazard App" for emergency warnings.

Eighteen RC/RC National Societies have already implemented Hazards App: Indonesia, Myanmar, Philippines, the United States, Vietnam, and 12 countries in the Caribbean area. Four others have Hazard App in development: Argentina, Canada, Suriname, and New Zealand.

Hazard App is also capable of creating and publishing CAP warnings. This feature can be used by any Red Cross/ Red Crescent National Society, and all of those are registered included in the international Register of Alerting Authorities. This CAP publishing capability can be used by other alerting authorities in the country as well.

## Google.Org Public Alerts

- Emergency alerts whenever Google tools are used
- All active CAP alerts shown at [www.google.org/publicalerts](http://www.google.org/publicalerts)
- Google will show alerts from any CAP news feed



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"Public Alerts" is a service supported by Google.Org (the not-for-profit part of Google).

This service delivers high-priority emergency warnings whenever and wherever Google tools are used (Google Search, Google Maps, etc).

Also, you can see all of the active CAP alerts at the public alerts homepage **[www.google.org/publicalerts](http://www.google.org/publicalerts)**

Any alerting authority can get Google to disseminate its CAP alerts this way, for free.

## CAP over Online Advertising

Online advertising companies overlay commercial advertising with official, critical warnings  
(see the [Federation for Internet Alerts](#))



Here we see online commercial advertising showing a tornado warning to Internet users in the alerting area.

The advertising technology already has the location of the user's device. CAP warnings are published continuously at CAP news feeds, and each of these has the alerting area. So, wherever a user device is in the area of a CAP warning, the advertisement can be replaced with a warning.

Only critical warnings are displayed to users—CAP alerts that require immediate action, such as a tornado warning **right here and right now**.

## Typical CAP-enabled Warning System

Based on CAP, [Alerting Solutions Inc](#) (ASI) supports many delivery methods:

U.S. Emergency Alert System (EAS), local radio station, local cable TV, sirens, strobe lights, e-mail, SMS, voice telephone, intercom / digital telephony, computer pop-up's, Web sites, social media (Twitter, Facebook, Myspace...), Emergency Call Boxes, reverse Weather Radio, building loudspeakers, voice fire speakers, police car loudspeakers, 800 Number/Hotline, LED signs and LCD screens



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This diagram gives a sense of the range of methods that a typical CAP-enabled warning system supports when it is deployed.

Notice that even devices like modern sirens can be controlled with CAP messages.

## Other CAP-enabled Systems

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- [IBM Intelligent Operations Center for Smarter Cities](#)
- [Microsoft CityNext](#)
- Neighborhood Watch
- Sighting of Bombers in Syria
- Hate Group Monitoring

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The IBM Intelligent Operations Center for Smarter Cities supports CAP. So does Microsoft CityNext.

I am aware of an extensive CAP implementation supporting "Neighborhood Watch"--a very local facility for neighbors to inform each other about events they observe personally.

One of the newer implementations is operated by volunteers that report sightings of bombers heading for targets in Syria.

One of the *earliest* implementations of CAP was for the monitoring of hate groups in Germany.

## Commercial Weather Alerting

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- AccuWeather
- MeteoFrance Vigilance
- MeteoFrance International, MeteoFactory
- The Weather Company

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Let me mention CAP-enabled Commercial Weather Alerting.

AccuWeather has integrated official warnings in over 50 countries, many using CAP. AccuWeather apps and partner apps reach 1.5 billion people globally, in over 100 languages.

The MeteoFrance Vigilance system is moving to CAP as well. Vigilance has been in use since 2001 and adopted by a number of countries. MeteoFrance has a strong relationship with the national civil security organization, and 90 % of French people know the Vigilance map.

MeteoFrance International supports CAP warning creation and dissemination through their MeteoFactory products. MeteoFactory is used in 13 countries: Cambodia, Egypt, France, India, Indonesia, Kenya, Lebanon, Libya, Madagascar, Qatar, South Africa, Swaziland, and Viet Nam.

The Weather Company, an IBM business, distributes meteorological alerts and powers over two billion mobile devices globally. They are developing a free cloud-hosted tool for meteorological authorities to create and communicate all-hazards alerts using CAP.

## Sensors that Emit CAP Messages

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- In-home monitors becoming all-hazard alarms
  - [Halo+](#) smoke alarm
  - [Speck](#) sensor
- [Earth Networks](#) (lightning detection)
- [Earthquake Building Damage Assessment](#)

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Here are two examples where in-home monitors pick up CAP alerts.

The Halo in-home smoke sensor is designed for emerging economies. Because it also picks up CAP alerts from the Internet, it becomes an all-hazards alarm.

Another device, called Speck, detects fine airborne particles indoors. The device has network connectivity so the company is adding an all-hazards warning capability.

Earth Networks produces CAP warnings for thunderstorms, using sensors that monitor radio emissions from lightning.

I am also aware of building sensors for earthquake damage assessment. These send floor-by-floor CAP alerts to a central control system.

# Pinkerton's Corporate Risk Management

**Moderating twitter filtered queue:**

Category: Security  
Order by: Highest score, Newest articles


**csepepsy** 2

0 Edit Text · 1 Show Original

US: Phoenix, AZ - Police search activity|

Sep. 22, 2015 02:15 AM PDT

<p><strong>Source: </strong><a target='\_blank'  
href='https://twitter.com/csepepsy/statuses/646250548384043008'>https://twitter.com/csepepsy/s  
tatuses/646250548384043008</a></p><p><strong> Note: </strong>Pinkerton is not responsible  
for the content contained in external sites.</p>



**PINKERTON®**

3 Category: Safety

4 Urgency: Immediate

5 Severity: Moderate

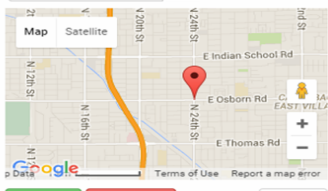
6 Certainty: Possible

33.4875641 -112.030219100000

9 Lookup address: Osborne & 24th Pho

Latitude Longitude

9 Lookup address



Ignore Escalate Done

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Pinkerton's corporate risk management services 80 of the world's 100 largest companies and is active in over 100 countries . All of Pinkerton warning is CAP-enabled. Here we see Pinkerton's extracting risk information from Twitter and converting it into a CAP alert.

Pinkerton's parent company, Securitas, provides 300,000 guards for hire worldwide. Use of CAP is a strategic asset because it allows these agents to rapidly hook up with local law enforcement and civil protection agents if CAP is already in use there.

For example, Rio de Janeiro needed to hire tens of thousands of additional guards for the Olympics and Brazil has already adopted CAP.

## CAP Implementations

---

- NGO and Commercial
- ➔ National Systems
  - Asia/Pacific
  - Europe, Middle East, Africa
  - Americas

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Now let me turn to CAP systems at the level of National governments: first, Asia and the Pacific; followed by Europe, the Middle East, and Africa; and ending with the Americas.

## CAP Operational or In-Progress

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### Asia/Pacific

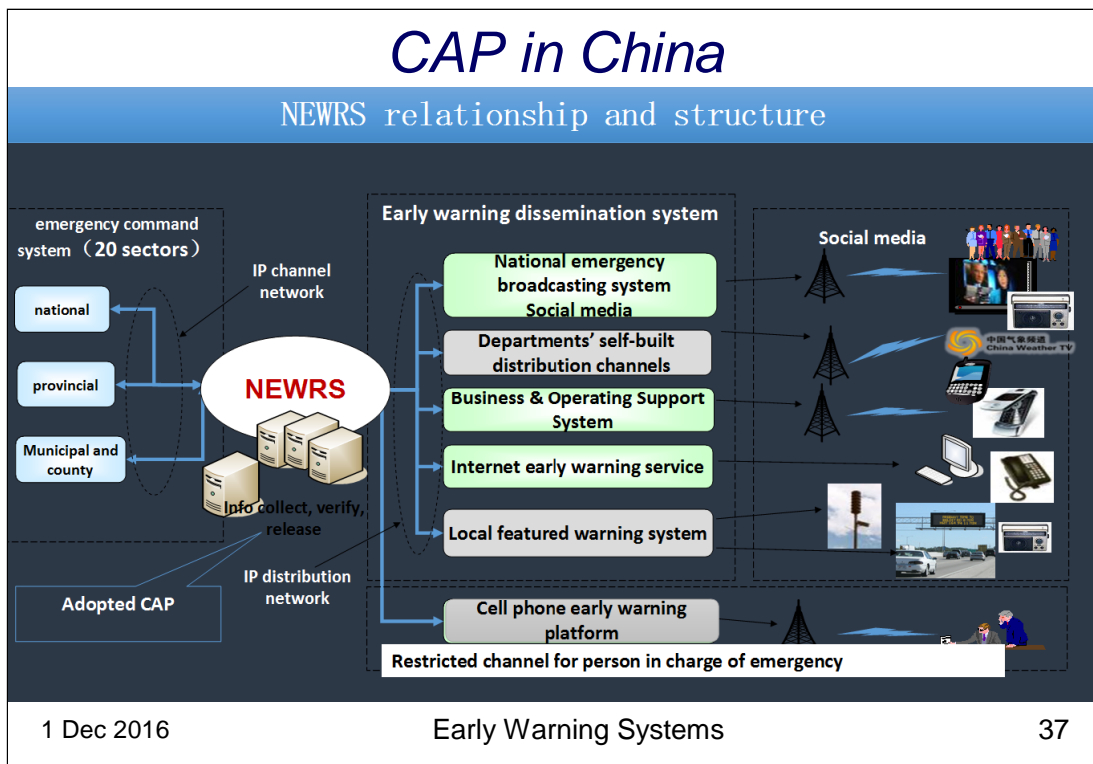
Australia, China, Fiji, Hong Kong,  
India, Indonesia, Maldives, Madagascar,  
Myanmar, Nepal, New Zealand, Papua  
New Guinea, Philippines, Samoa,  
Solomon Islands, Sri Lanka, Taiwan,  
Thailand, Tonga, Vanuatu

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Here are twenty operational or in-progress CAP implementations in the Asia-Pacific region: Australia, China, Fiji, Hong Kong, India, Indonesia, Maldives, Madagascar, Myanmar, Nepal, New Zealand, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Taiwan, Thailand, Tonga, and Vanuatu



The National Early Warning Release System (NEWRS) is China's CAP-enabled all-hazards system. This is the world's most extensive CAP system, with 2015 county, 343 city, and 31 provincial.

## CAP Operational or In-Progress

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### Europe, Middle East, Africa

Botswana, Burundi, France,  
Germany, Ireland, Israel, Italy,  
Kenya, Kuwait, Malawi, Mauritius,  
Nigeria, Norway, Rwanda, Serbia,  
South Africa, Sweden, Tanzania,  
Togo, United Kingdom, Zimbabwe

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Now let's turn to Europe, the Middle East, and Africa.

I am aware of operational or in-progress CAP Implementations in these 21 countries: Botswana, Burundi, France, Germany, Ireland, Israel, Italy, Kenya, Kuwait, Malawi, Mauritius, Nigeria, Norway, Rwanda, Serbia, South Africa, Sweden, Tanzania, Togo, the United Kingdom, and Zimbabwe

# MeteoAlarm

The screenshot shows the MeteoAlarm website interface. At the top, the logo 'meteoalarm' is displayed with the tagline 'alerting europe for extreme weather'. To the right, the EUMETNET logo is visible, along with the text 'The Network of European Meteorological Services'. Below the header, there is a navigation menu with links for 'Start', 'News', 'About Meteoalarm', 'Help', 'Terms and Conditions', 'Links', and 'Display Options'. A language dropdown menu is set to 'english'. The main content area features a map of Europe with color-coded weather warnings (green, yellow, orange, red) overlaid on various regions. To the right of the map is a section titled 'Weather warnings: Europe' with a sub-heading 'Awareness Reports'. Below this, there is a table listing 33 European countries with their respective flags and icons representing the types of weather warnings issued. At the bottom of the page, there are options to change the language and display settings (today or tomorrow).

Created: 28.10.2012 02:19 CET | Valid for: 28.10.2012

### Weather warnings: Europe

Awareness Reports - You can find detailed information about the warnings in the awareness reports issued for each country. Select the relevant country.

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| AT | BE | BG | CH | CY | CZ | DE | DK | EE | ES | FI | FR | GR | HR | HU | IE | IS | IT | LU | LV | ME | MK | MT | NL | NO | PL | PT | RO | RS | SE | SI | SK | UK |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

awareness types:  Display:

Change Language: | BG | CZ | DA | DE | EE | EN | ES | ES | FI | FR | GR | HR | HU | IS | IT | LT | LV | ME | MK | MT | NL | NO | PL | PT | RO | RS | SI | SK | SV

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Here I want to highlight the MeteoAlarm system operated on behalf of 33 European national weather services. MeteoAlarm is currently expanding to include Russia and some Near East countries.

MeteoAlarm started out with its own "standard business form" for severe weather. This format, also using XML, was quite similar to CAP. In fact, software for automatically creating CAP alerts has been available in MeteoAlarm for several years.

I understand that all members of MeteoAlarm will have public CAP alert feeds by the end of this year. We also anticipate another ten nations in South Eastern Europe will implement CAP over the next year or so.

## Satellite Alert Channel

Sample web page  
with volcanic ash  
CAP message



EUMETSAT Volcanic Ash CAP Alert

### Volcanic ash detection report

**Summary**

Identifier: EUM MET09-VASH.1  
 Sender: [oa@eumetsat.int](mailto:oa@eumetsat.int)  
 Sent: 2008-09-26T11:35:00-00:00  
 Status: Actual  
 Message Type: Alert  
 Scope: Public

**Additional Details:**

Category: Geo  
 Event: Volcanic ash  
 Urgency: Immediate  
 Severity: Moderate  
 Certainty: Likely  
 Effective: 2008-09-26T11:35:00-00:00  
 Expires: 2008-09-26T11:30:00-00:00  
 Sender Name: EUMETSAT  
 Headline: Volcanic ash detection report  
 Description: Volcanic ash has been detected in the region of 50.0 deg North, 9.8 deg East at 8:56 PM Universal Time Coordinated on Friday, September 26, 2008. (This is a computer generated report and has not been reviewed by a human.)  
 Web: [http://www.eumetsat.int/Home/Main/Access\\_to\\_Data/Meteosat\\_Meteorological\\_Products/Product\\_List?P\\_1195473535618?lang](http://www.eumetsat.int/Home/Main/Access_to_Data/Meteosat_Meteorological_Products/Product_List?P_1195473535618?lang)  
 Parameter: Volcano type Stromboli  
 Parameter: Plume coverage 1800 ha  
 Parameter: Plume orientation 321 deg  
 Description: 1800 ha (2 pixels) with centre of mass located at 50.0 deg North, 9.8 deg East  
 Polygon: 49.9750,9.7875 49.9750,9.8125 50.0000,9.8125 50.0000,9.7875 49.9750,9.7875  
 Polygon: 50.0000,9.7875 50.0000,9.8125 50.0250,9.8125 50.0250,9.7875 50.0000,9.7875



Page Last Modified: October 2008

We should also note that CAP messages can be disseminated worldwide **for free** via satellites.

The European Organisation for the Exploitation of Meteorological Satellites, EUMETSAT, delivers CAP warnings over a dedicated channel on cooperating satellites that cover the whole world.

Here is a sample showing a volcanic ash CAP warning.

## CAP Operational or In-Progress

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### Americas

Anguilla (UK), Antigua and Barbuda,  
Argentina, Aruba (Netherlands), Brazil,  
Canada, Chile, Colombia, Cuba, Dominica,  
Guyana, Jamaica, Mexico, Montserrat (UK),  
Puerto Rico (US), Sint Maarten  
(Netherlands), Trinidad and Tobago,  
United States, US Virgin Islands

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Finally, let's look at the Americas.

Here are 18 countries or territories with operational or in-progress CAP implementations: Anguilla, Antigua and Barbuda, Argentina, Aruba, Brazil, Canada, Chile, Colombia, Cuba, Dominica, Guyana, Jamaica, Mexico, Montserrat, Puerto Rico, Sint Maarten, Trinidad and Tobago, and the United States.

## United States of America

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- [National Oceanic and Atmospheric Administration \(NOAA\), National Weather Service](#)
- [NOAA National Tsunami Warning Center](#)
- [United States Geological Survey \(USGS\), Earthquakes](#)
- [USGS Volcano Hazard Program](#)
- [Environmental Protection Agency, Air Quality Alerts](#)
- Federal Emergency Management Agency, Integrated Public Alert and Warning System (IPAWS)

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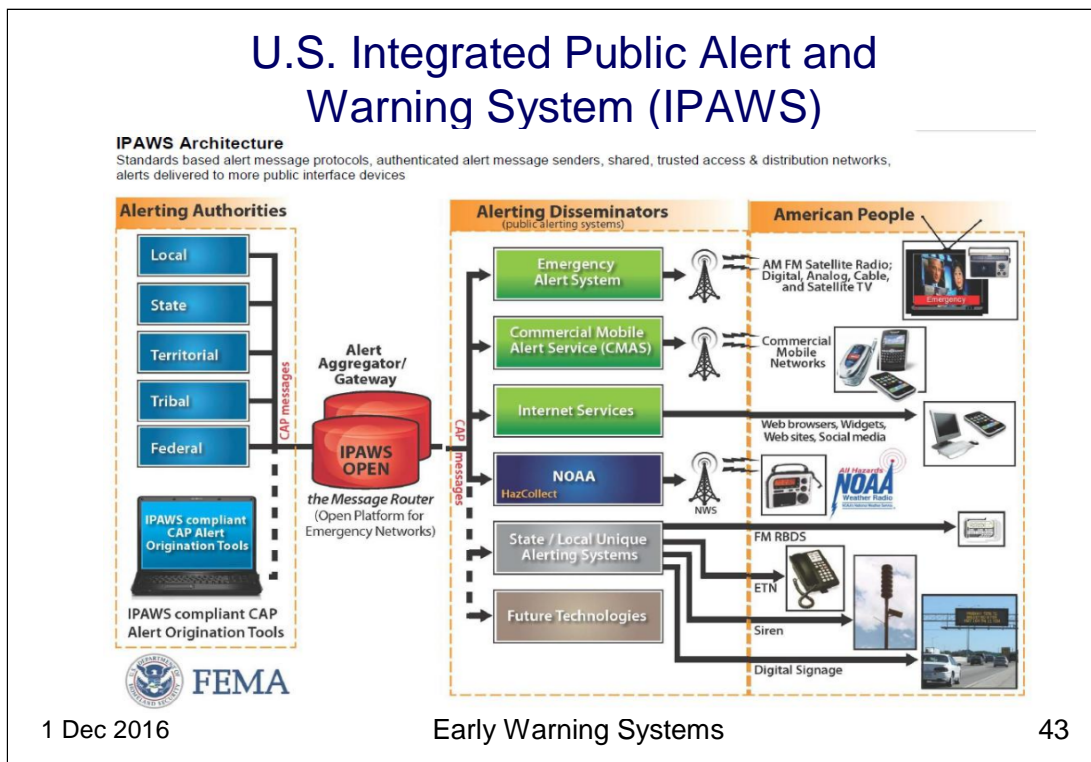
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In this group, I would like to highlight the United States, noting that CAP in Mexico is the topic for the presentation following mine.

Here you see the CAP Feed URL for several United States CAP feeds maintained by alerting authorities listed in the Register of Alerting Authorities. Two are operated by the National Oceanic and Atmospheric Administration (NOAA): the National Weather Service CAP and the National Tsunami Warning Center CAP news feed.

The Earthquakes news feed from the United States Geological Survey (USGS) was one of the first CAP alert sources. A very recent addition from USGS is the CAP news feed for the Volcano Hazard Program.

The Environmental Protection Agency has a CAP feed source for Air Quality Alerts. EPA is extending this approach to many cities worldwide through its AirNow initiative.



The Integrated Public Alert and Warning System (IPAWS) aggregates CAP alerts from over 700 sources.

I understand about 150 vendors of CAP software offer IPAWS-compliant products.

IPAWS has its own interface for retrieving and publishing CAP alerts. It needs an upgrade to support Internet-standard news feeds.

This is important to note if you are evaluating products for a CAP implementation. For example, the popular WebEOC product processes CAP alert messages, but its only CAP interface now is with IPAWS.

## USA Wireless Emergency Alerts

Hurricane Sandy Wireless Emergency Alerts



During Hurricane Sandy, Wireless Emergency Alerts appear on the Verizon Galaxy Nexus and iPhone 5. (Google | Apple)

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While on the United States, I want to take note of the Wireless Emergency Alerts (WEA) system. Here we see CAP messages on smart-phones as delivered extensively in 2012 to people affected by Hurricane Sandy.

WEA is operated by all major wireless service providers in the United States. It uses Cell Broadcast to send CAP alerts aggregated by IPAWS.

Canada is now adding Cell Broadcast to its nationwide CAP system, and I hope Mexico plans to do the same.

## Better Early Warning for Safer, Healthier Cities

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Here is my last slide.

Better Early Warning is essential for Safer, Healthier Cities but there are challenges to achieving that goal. I focused on the challenge for cities to make warning systems more interoperable, at all scales: city, state, national, and international.

I showed many examples where implementing the CAP standard enabled alerting authorities to greatly enhance their warning systems, often at very little cost.

Please do feel free to call on me if I can be of any help.

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