



Common Alerting Protocol (CAP)



Presentation Outline

- 101.1 Opportunity and Challenge
- 101.2 Alerting Authorities
- 101.3 Benefits of CAP
- 101.4 Features of a CAP Message
- 101.5 CAP-enabled Alerting Systems
- 101.6 CAP Alert Hubs--
Free, Fast, Reliable, Secure



Warnings Via Commercial Media

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

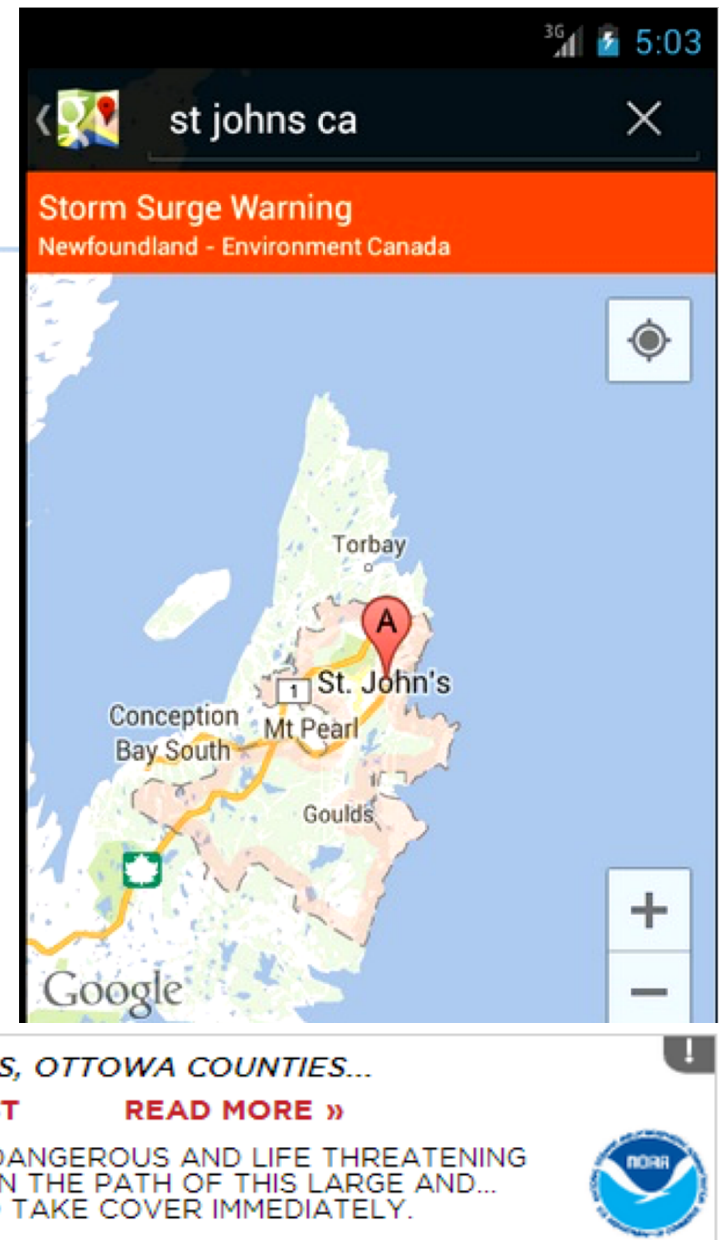
What about
online media
users?





An Opportunity

Online media (e.g, Google, the Federation for Internet Alerts...) are using their own capabilities to help alerting authorities send warnings to people using the Internet, at no charge





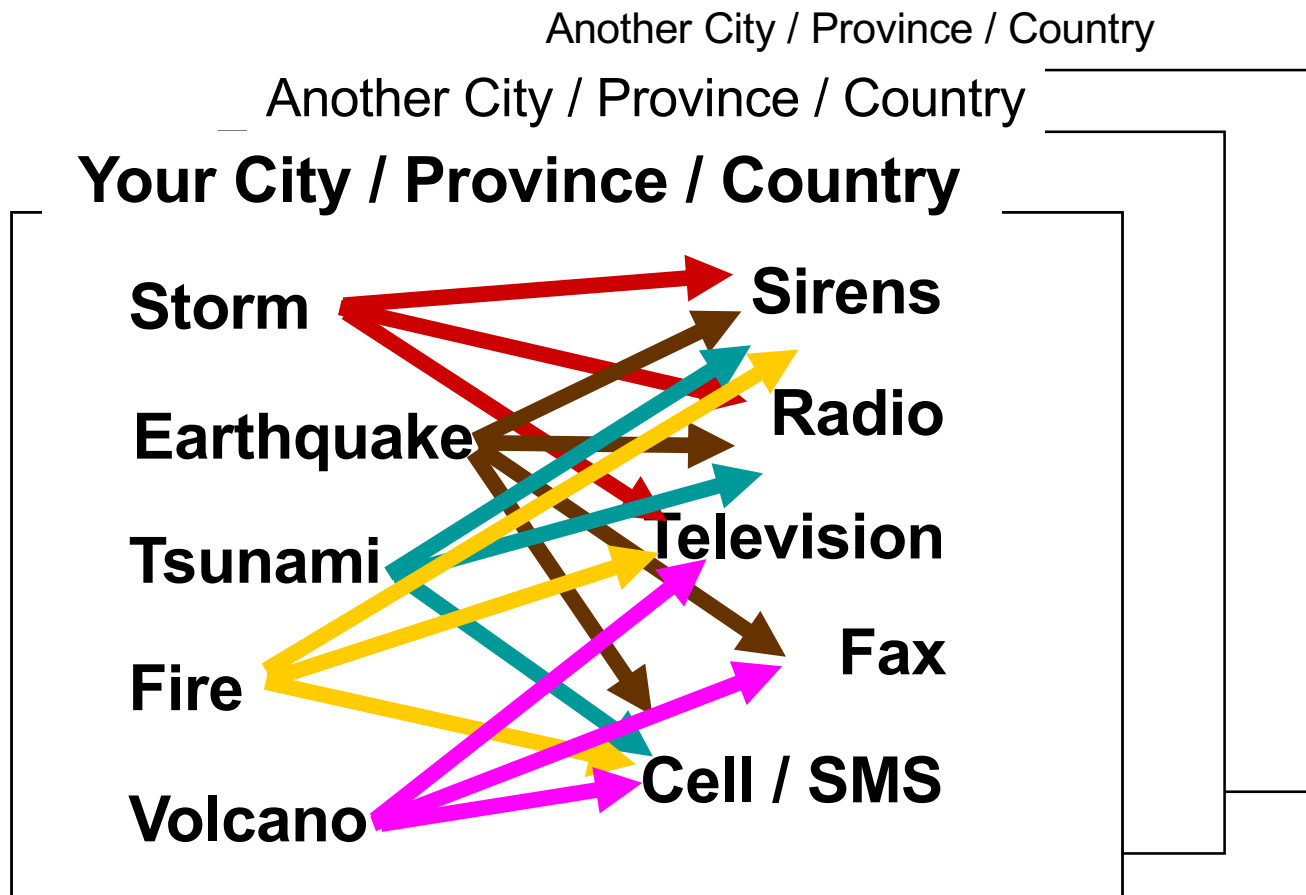
The Challenge of Alerting

All governments have various public alerting systems:

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



Across communities, nations, regions— a “public alerting patchwork”





What is CAP?

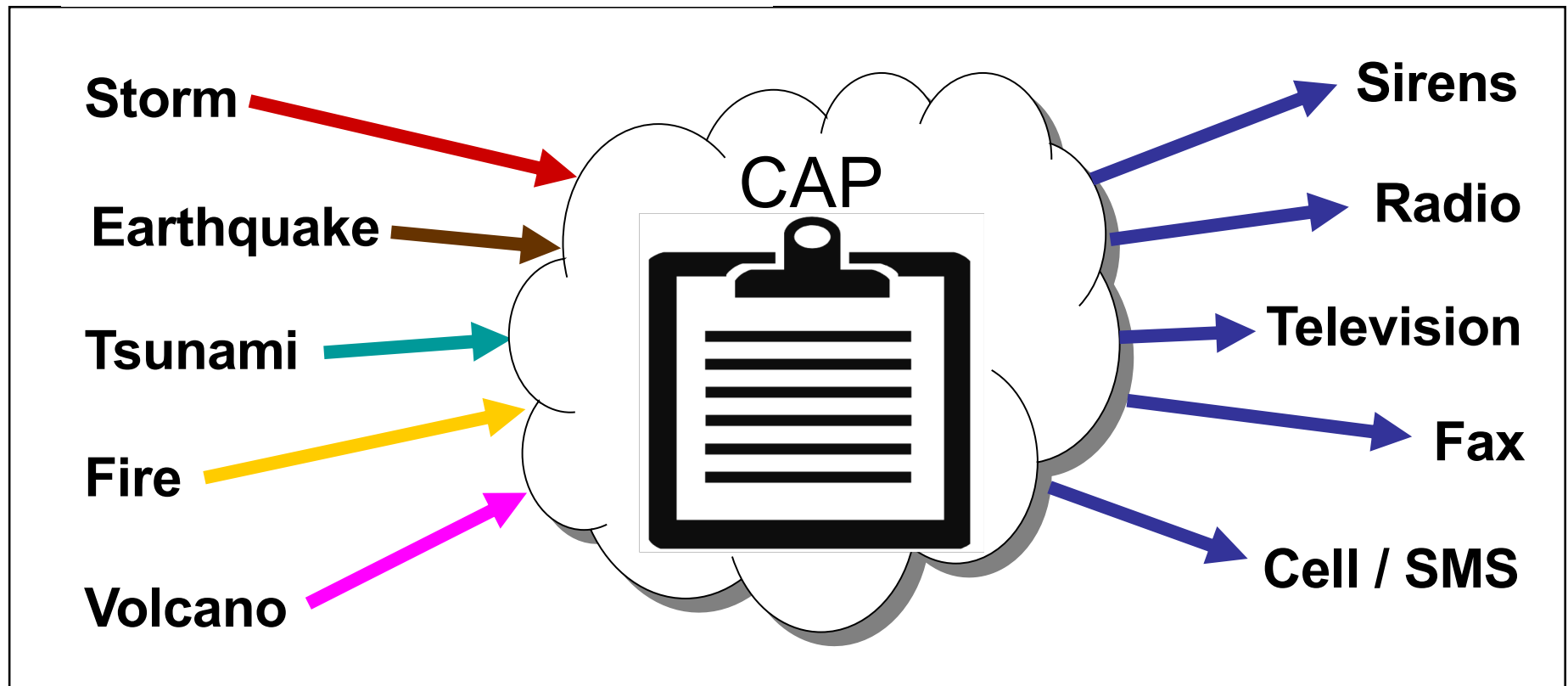
The Common Alerting Protocol (CAP) is a standard message format designed for All-Media, All-Hazard, communications:

- **over any and all media** (*television, radio, telephone, fax, highway signs, e-mail, Web sites, RSS "Blogs", ...*)
- **about any and all kinds of hazard** (*Weather, Fires, Earthquakes, Volcanoes, Landslides, Child Abductions, Disease Outbreaks, Air Quality Warnings, Transportation Problems, Power Outages ...*)
- **to anyone:** the public at large; designated groups (civic authority, responders, etc.); specific people



All-Hazards, All-Media Message Format

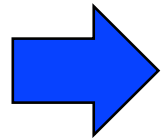
Any City / Province / Country





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What is an Alerting Authority?

Official alerting authority could be:

- National Meteorological or Hydrological Service
- Emergency Management Agency
- any other organization authorized to perform the function of alerting



The Need for a Register


- Aggregators and other intermediaries may lack direct knowledge needed to distinguish an authoritative source of alert messages
- This lack becomes critical as alerting makes use of large public networks
- The international Register of Alerting Authorities fills that knowledge gap
- Each entry asserts a particular alerting source as authoritative, with its typical hazard types and its typical alerting area



Register of Alerting Authorities

<http://www.wmo.int/alertingorg>

Print | Bookmark | RSS or ATOM | Zoom | Share | Recommend | GMap | Save page as PDF

 **World Meteorological Organization**
Working together in weather, climate and water

WMO Search

HOME CONTACT US TOPICS LINKS UN SYSTEM FAQs HELP

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.

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

WMO Register of Alerting Authorities [[home](#)]

OID: 2.49.0.0.840.0 WMO Member: United States of America ISO 3166: US USA 840

Issuing Organization: National Oceanic and Atmospheric Administration (NOAA), National Weather Service

Hazard Categories: Geo Met Fire Health Env CBRNE

hazards

Authorization Basis: The National Weather Service Organic Act of 1890, currently codified as amended in section 313 of title 15 of the federal statutory code (called the United States Code) authorizes the National Weather Service to issue and distribute warnings of environmental hazards. The authority is summarized as: The National Weather Service (NWS) provides weather Act, codified as amended sections 5121 to 5206 of title 42 of the United States Code.

CAP Feed URL(s):

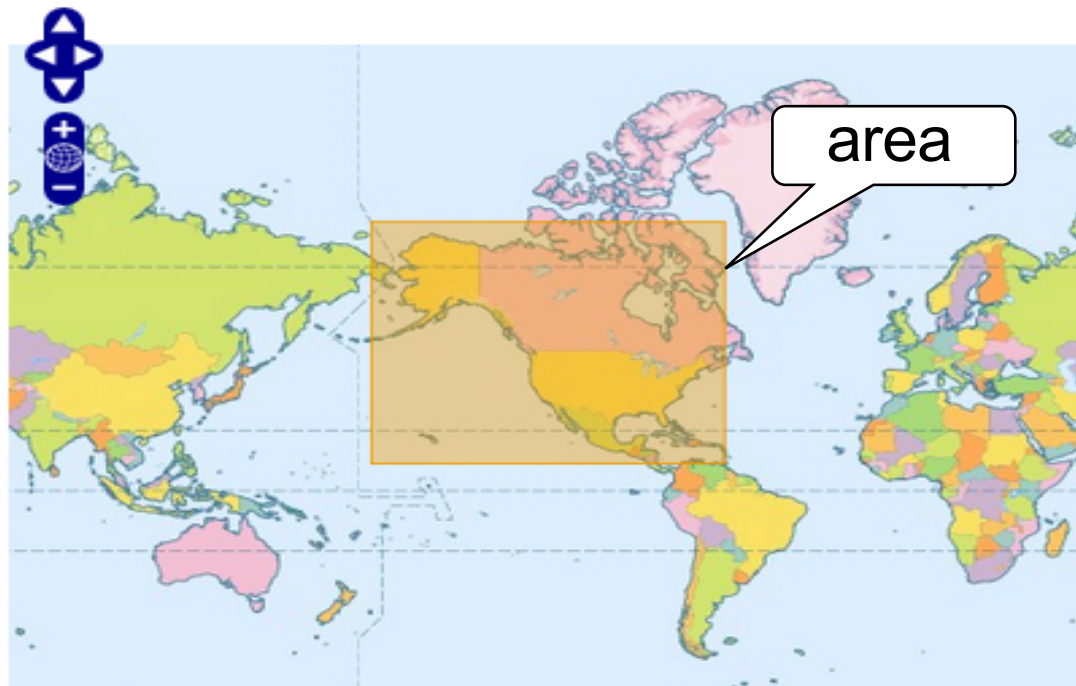
Language: English URL: <https://alerts.weather.gov/cap/us.php?x=0>

CAP feed URL

Forecasts URL: <http://www.worldweather.org/093/m093.htm>

Alerting Area (NWSE): 73 -176 11 -61

Map view of the typical area for this alerting authority.



area

Hazard Categories

Geo: Geophysical (earthquakes, volcanoes, tsunami, etc., includes landslide)

Met: Meteorological (weather, storms, etc. includes flood)

Safety: General emergency and public safety

Security: Law enforcement, military, homeland and local/private security

Rescue: Rescue and recovery

Fire: Fire suppression and rescue

Health: Medical and public health

Env: Pollution and other environmental


Transport: Public and private transportation

Infra: Utility, telecommunication, other non-transport infrastructure

CBRNE: Chemical, Biological, Radiological, Nuclear or High-Yield Explosive threat or attack

Other: Other events


CAP Internet News Feed



National Oceanic and Atmospheric Administration's

National Weather Service

weather.gov



Site Map NewsOrganization Search ☐ NWS ☐ All NOAA

Local forecast by "City, St"

Sign-up for Email Alerts

XML RSS Feeds

Warnings

Current

By State/County...

UV Alerts

Observations

Radar

Satellite

Snow Cover

Surface Weather...

Observed Precip

Forecasts

Local

Graphical

Aviation

Marine

Hurricanes

Severe Weather

Space Weather

Fire Weather

Text Bulletins

By State

By Message Type

National

Forecast Models

Numerical Models

Statistical

Models...

MOS Prod

GFS-LAMP Prod

[Home](#) >

NWS Public Alerts in XML/CAP v1.1 and ATOM Formats

Overview

This page provides access to NWS watches, warnings, advisories, and other similar products in the Common Alerting Protocol ([CAP](#)) and Atom Syndication Format ([ATOM](#)).









Use of ATOM and CAP with Traditional and Emerging Technologies

NWS CAP and ATOM feeds can be used to launch Internet messages, trigger alerting systems, feed mobile device (e.g., cell phone/smart phone and tablet) applications, news feeds, television text captions, highway sign messages, and synthesized voice over automated telephone calls or radio broadcasts.

The ATOM and CAP feeds are updated about every two minutes.

More information on NWS CAP and ATOM feeds is available in the [Service Description Document for NWS Watches, Warnings, and Advisories using CAP and ATOM based Formats](#).

A | C | D | F | G | H | I | K | L | M | N | O | P | R | S | T | U | V | W | -U.S.-

State (Zone List County List)	ATOM
National (all)	 ATOM
Alabama -- (Zone List County List)	 ATOM
Alaska -- (Zone List County List)	 ATOM
America Samoa -- (Zone List County List)	 ATOM
Arizona -- (Zone List County List)	 ATOM
Arkansas -- (Zone List County List)	 ATOM
California -- (Zone List County List)	 ATOM
Colorado -- (Zone List County List)	 ATOM

<http://alerts.weather.gov/>



How is the Register Maintained?

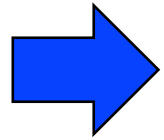
- Register of Alerting Authorities established by WMO and ITU
- WMO Member countries register alerting authorities they recognize
- WMO Permanent Representative designates editor to maintain entries



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101.1 Opportunity and Challenge

101.2 Alerting Authorities



101.3 Benefits of CAP

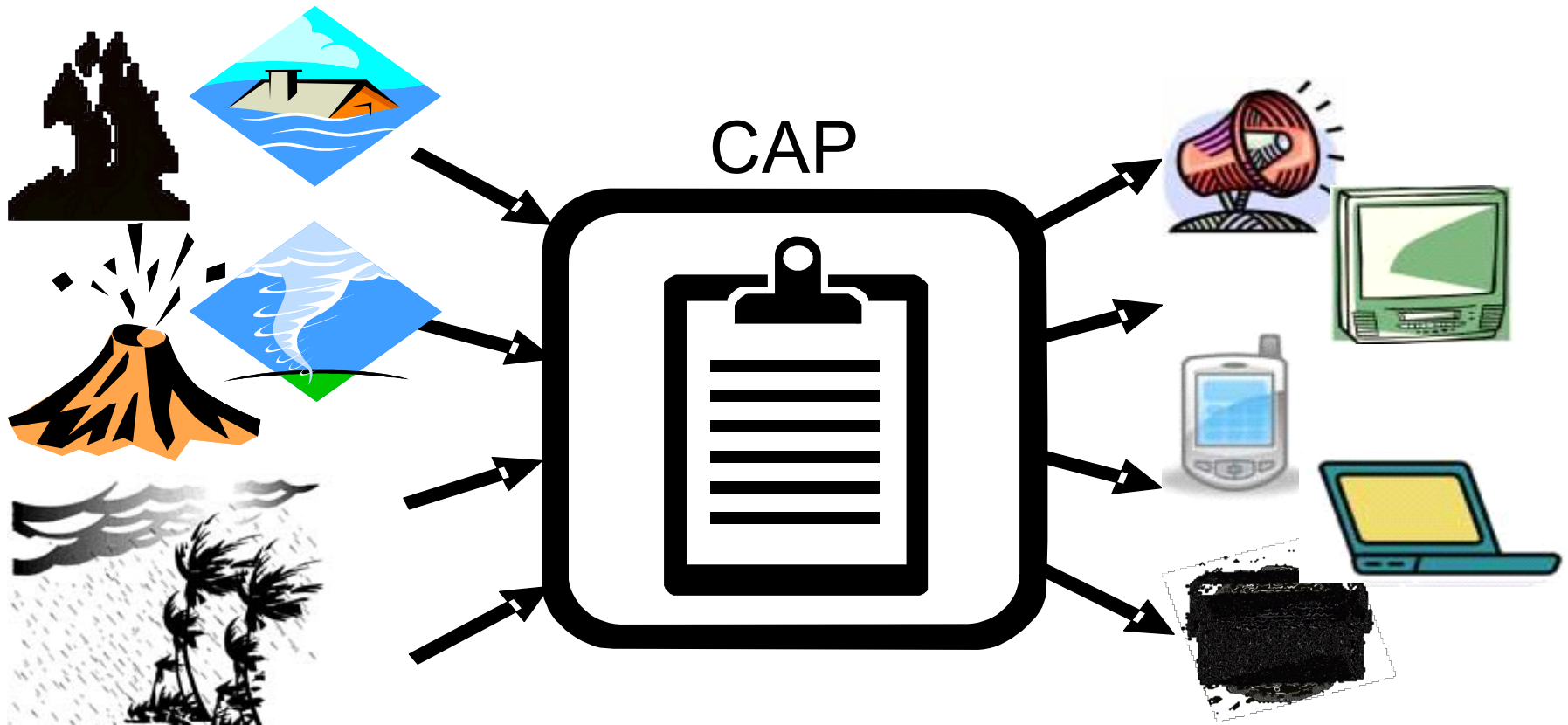
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101.5 CAP-enabled Alerting Systems

101.6 CAP Alert Hubs--
Free, Fast, Reliable, Secure



All-Hazards, All-Media





Alerting the Target Audience

- People can reduce damage and loss of life if alerts are timely and appropriate
- Alerts should reach everyone who needs them, and only those who need them
- Alerting authorities rely on public media and CAP leverages online public media



Consistency and Compatibility

- CAP provides consistency over multiple channels, allowing exact corroboration of alert information
- CAP defines a digital message format compatible with all kinds of existing and emerging systems--data networks as well as broadcast radio and TV
- CAP useful for multilingual and special-needs populations.

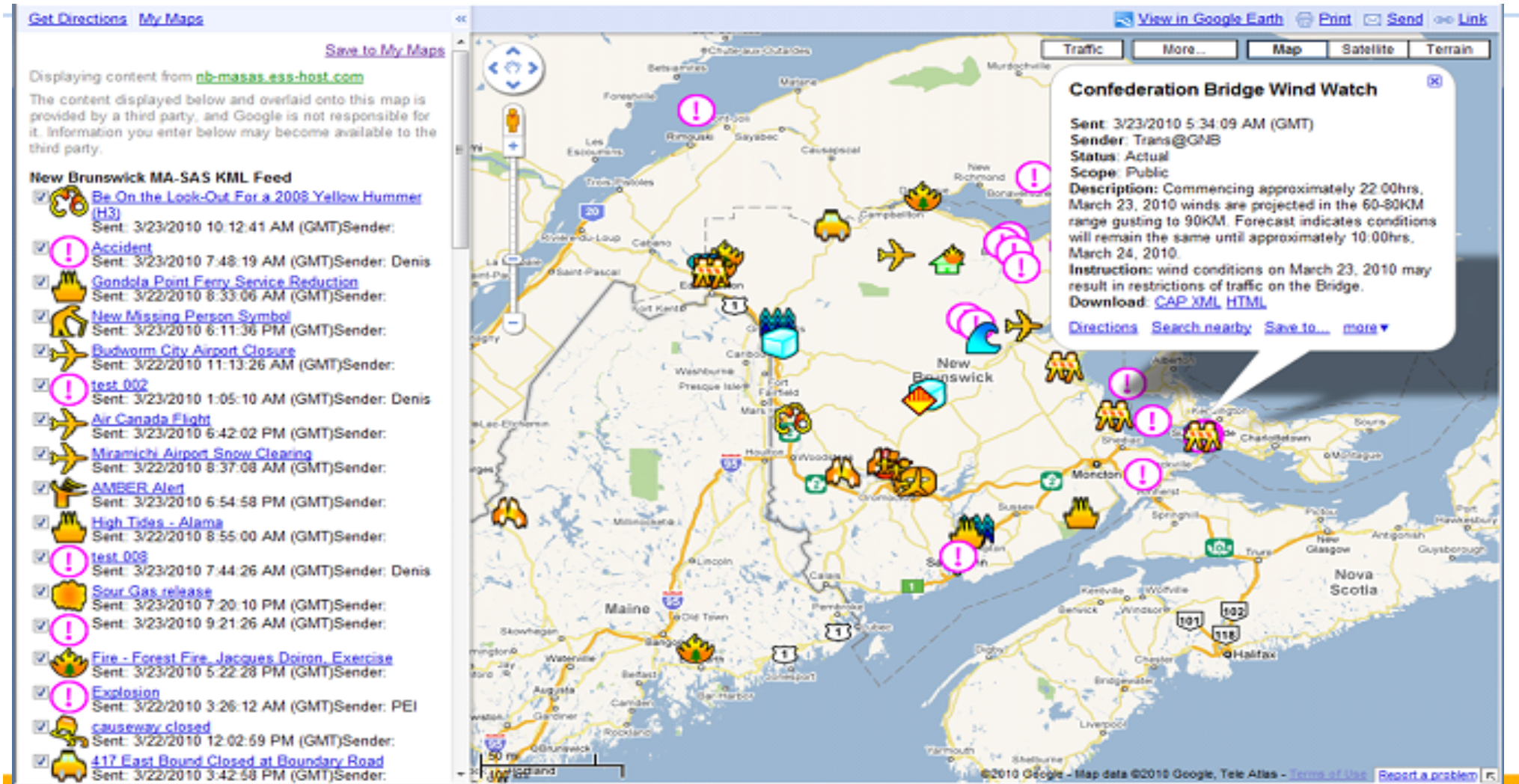


Reducing Cost and Complexity

- A CAP message sender can activate multiple alerting systems with a single input
- Standardized alerts from many sources can be compiled for "situational awareness"
- Managers can monitor the whole picture across all types of local, regional, and national alerts (public alerts as well as messages among emergency personnel)



Common Operating Picture





Breakthrough Standard

- Technical innovation ([~300 U.S. Patents](#))
- CAP alerts are being used to reach
 - landline and cellular telephones
 - radio and television sets
 - alerting sirens and lights
 - digital signage (highways, etc)
 - pagers of emergency responders
 - networks of law enforcement
 - "home all-hazards alarm" (next generation of today's home fire alarm)

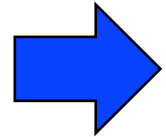


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Sample CAP Message

```
<?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,-
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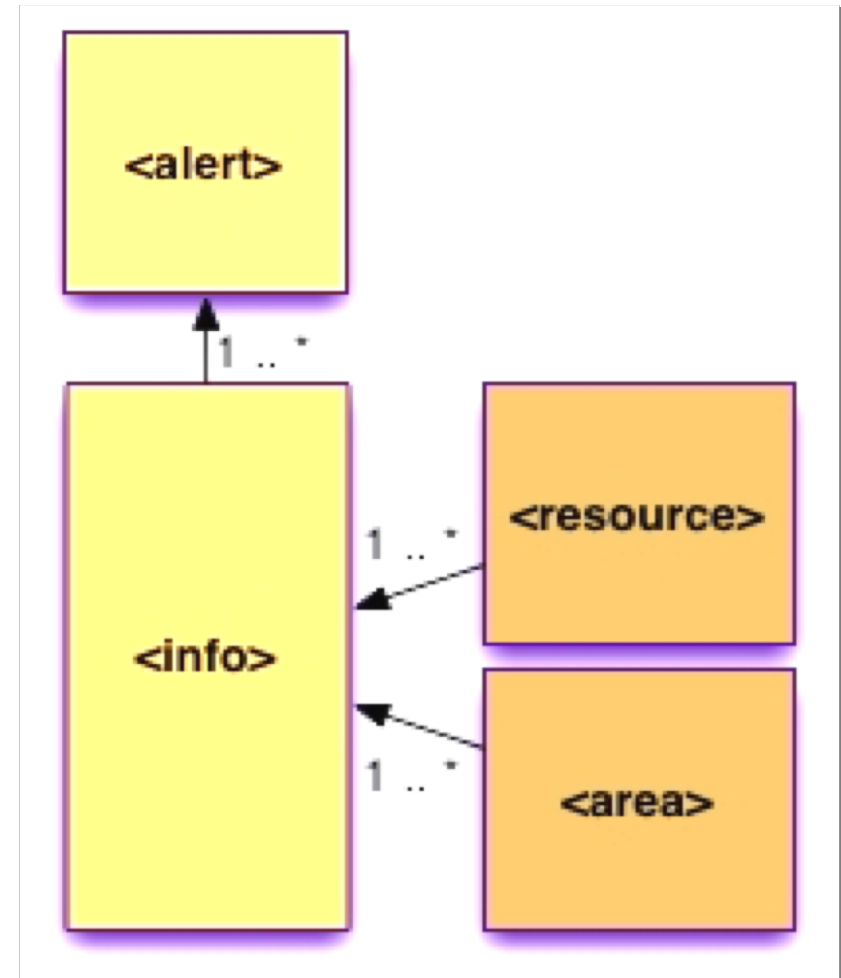
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Structure of a CAP Message

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





Filtering and Routing Criteria

- **Event Categories**
(*Geo, Met, Safety, Security, Rescue, Fire, Health, Env, Transport, Infra, Other*)
- **Urgency:** Timeframe for responsive action
(*Immediate, Expected, Future, Past*)
- **Severity:** Level of threat to life or property
(*Extreme, Severe, Moderate, Minor*)
- **Certainty:** Probability of occurrence
(*Very Likely, Likely, Possible, Unlikely*)



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Typical CAP-based Alerting 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





CAP Implementations

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



CAP Operational or In-Progress

Americas

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



United States of America

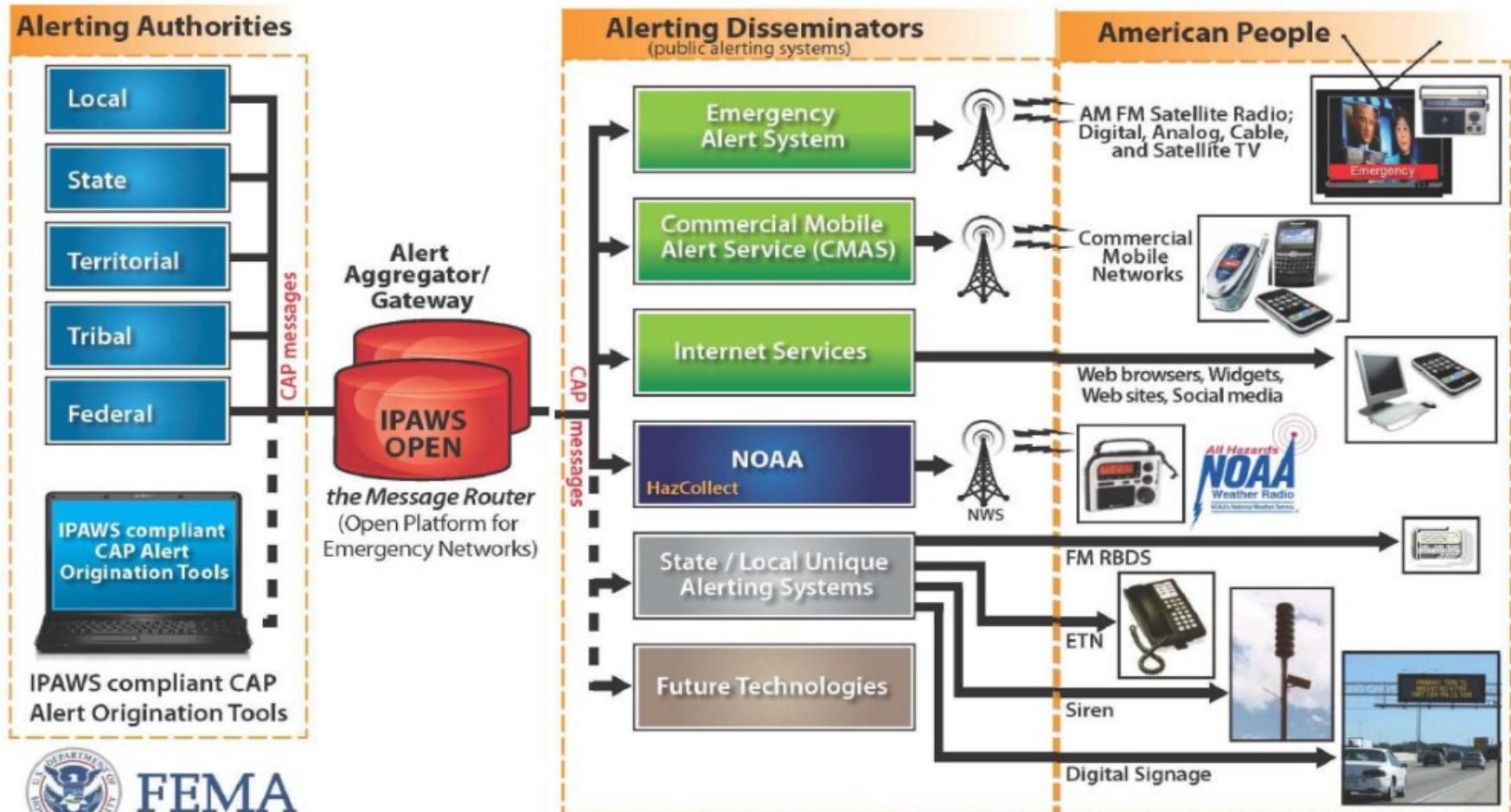
- National Oceanic and Atmospheric Administration (NOAA), National Weather Service
- NOAA National Tsunami Warning Center
- United States Geological Survey (USGS), Earthquakes
- USGS Volcano Hazard Program
- Environmental Protection Agency, Air Quality Alerts
- Federal Emergency Management Agency, Integrated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



U.S. Integrated Public Alert and Warning System (IPAWS)

IPAWS Architecture

Standards based alert message protocols, authenticated alert message senders, shared, trusted access & distribution networks, alerts delivered to more public interface devices





Americas - South America

- Argentina: [Servicio Meteorologico Nacional](#)
- Brazil: [Alert-AS](#)
- Chile
- Colombia: [UNGRD \(National Unit for Disaster Risk Management\)](#)
- Guyana: [Hydrometeorological Service](#)

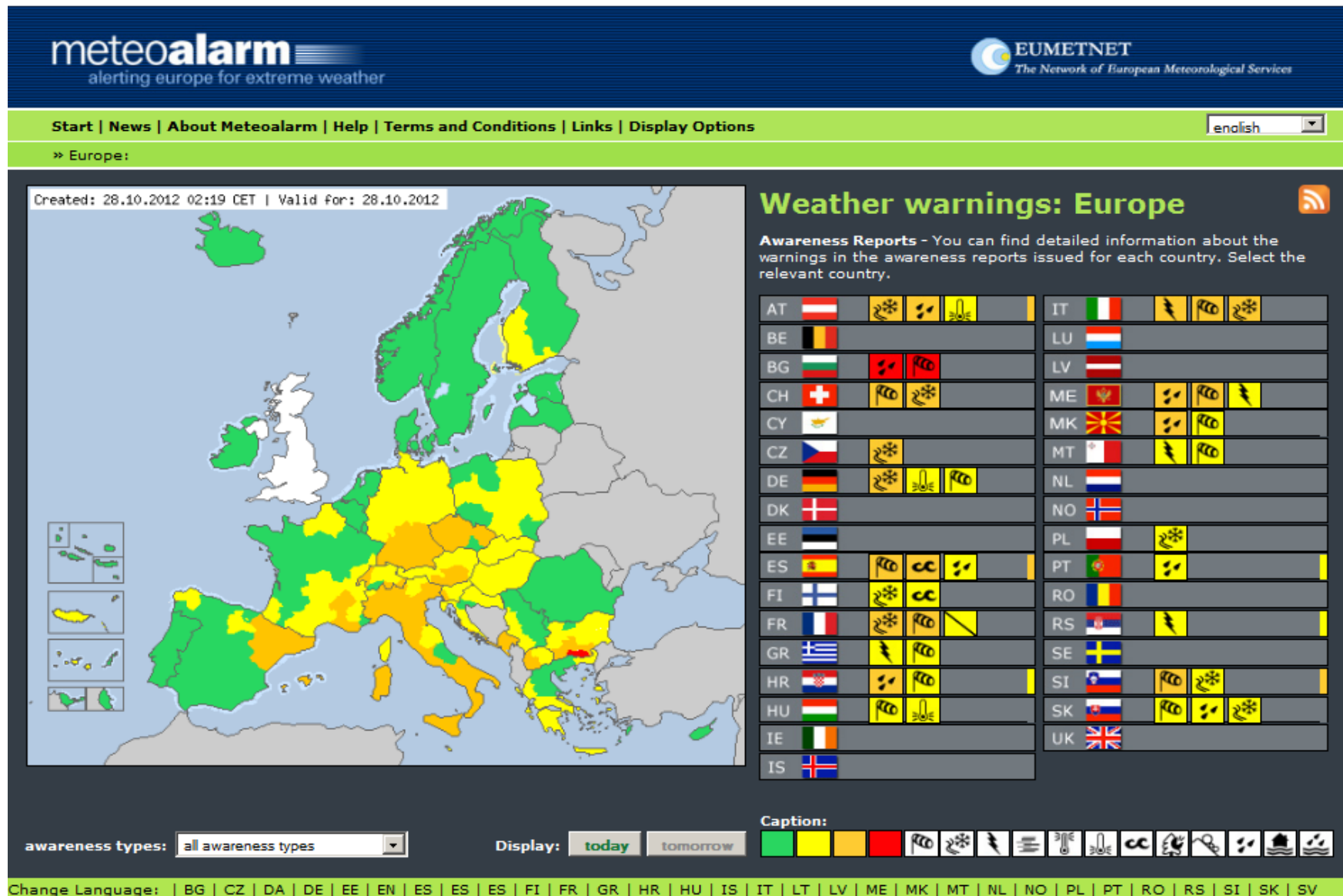


CAP Operational or In-Progress

Europe, Middle East, Africa

Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Burundi, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kenya, Kuwait, Latvia, Lithuania, Luxembourg, Macedonia, Malawi, Malta, Mauritius, Moldova, Montenegro, Netherlands, Nigeria, Norway, Poland, Portugal, Romania, Rwanda, Serbia, Slovakia, South Africa, Spain, Sweden, Switzerland, Tanzania, Togo, United Kingdom, Zimbabwe

MeteoAlarm



CAP-101 Introducing CAP



CAP Operational or In-Progress

Africa

Botswana, Burundi, Kenya,
Malawi, Mauritius, Nigeria,
Rwanda, South Africa,
Tanzania, Togo, Zimbabwe



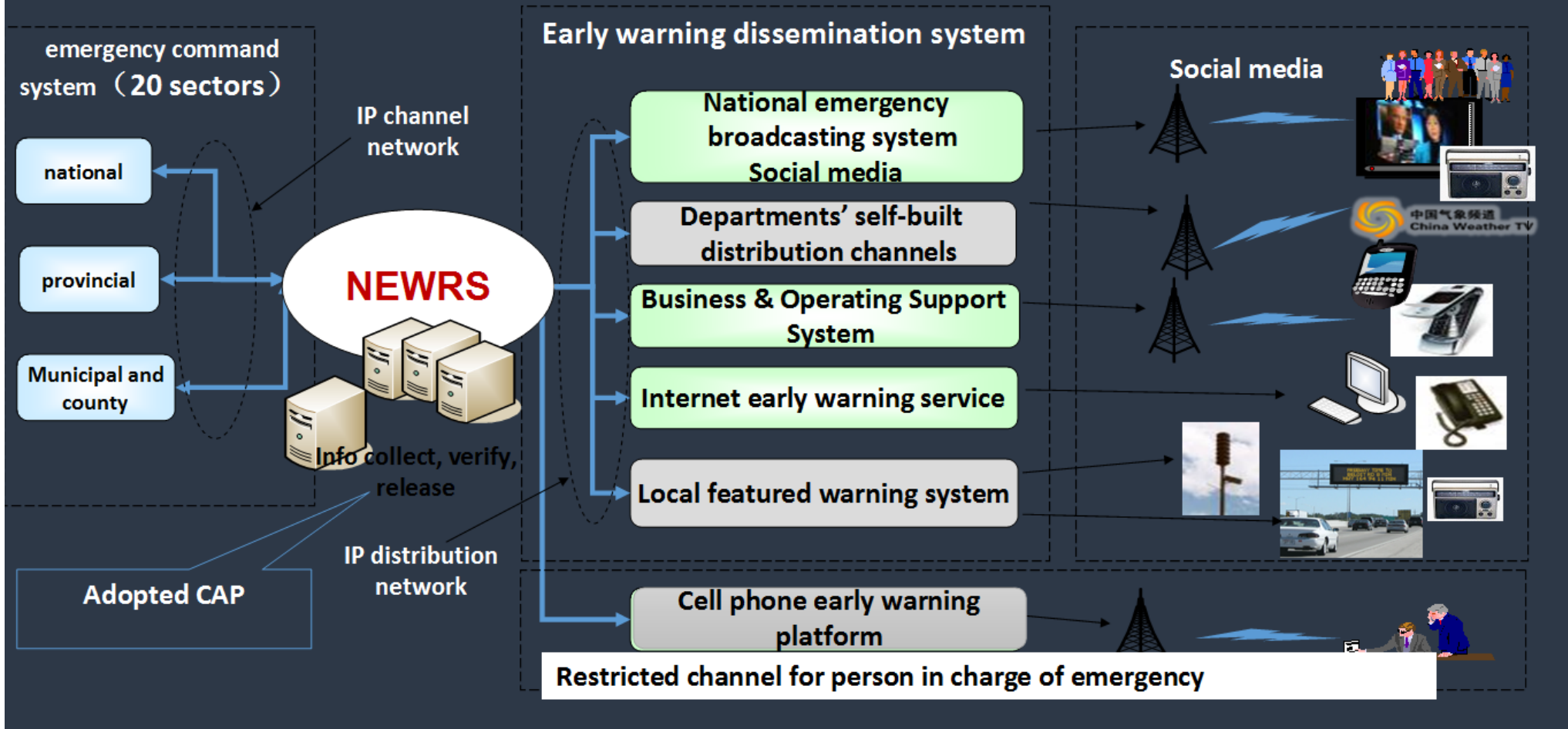
CAP Operational or In-Progress

Asia/Pacific

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

CAP in China

NEWRS relationship and structure

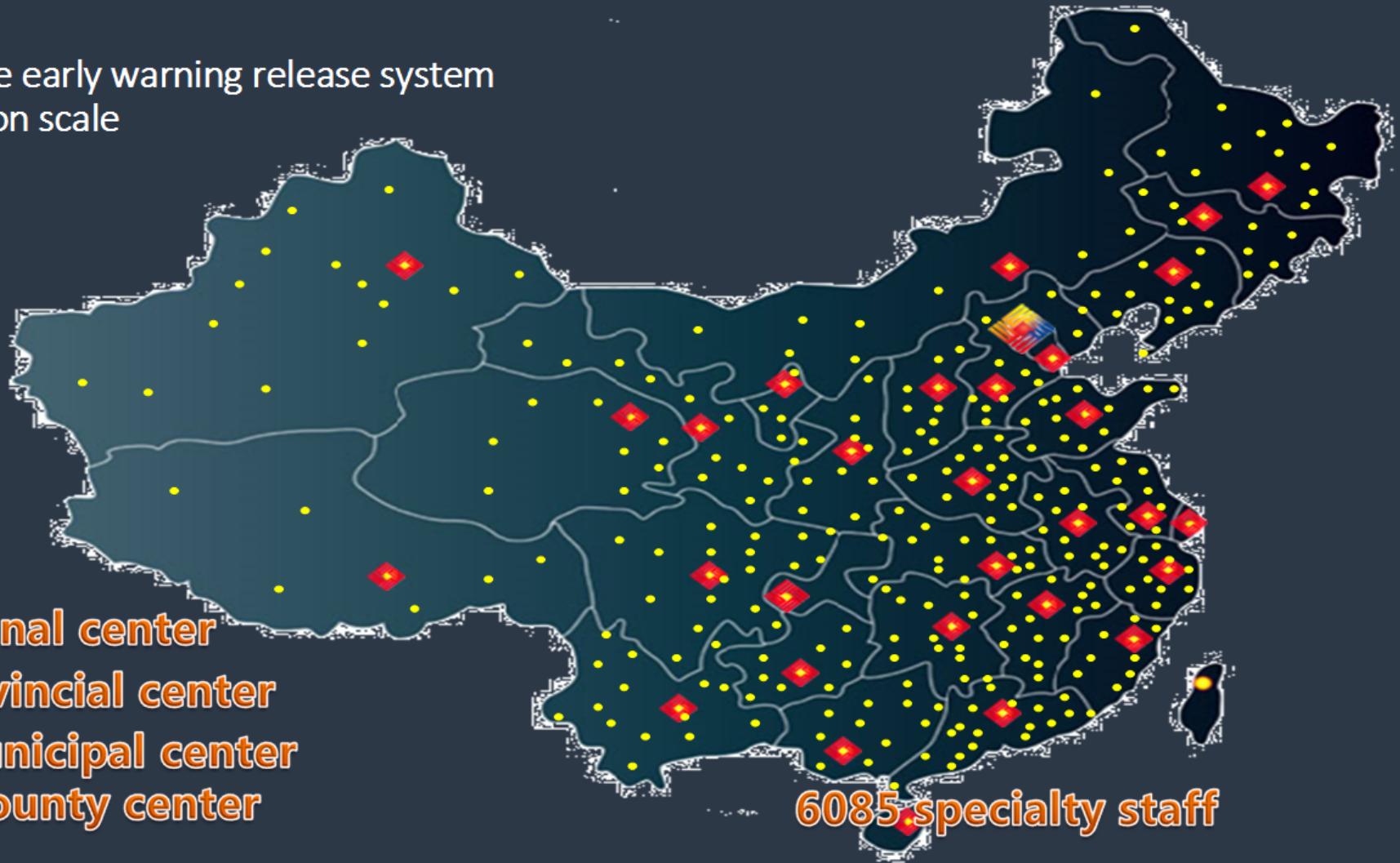


CAP in China

Nationwide early warning release system
construction scale

1 national center
31 provincial center
343 municipal center
2015 county center

6085 specialty staff





CAP Implementations

- National Systems

- Americas

- Europe, Middle East, Africa

- Asia/Pacific

- ➡ NGO and Commercial



IFRC Universal App Program



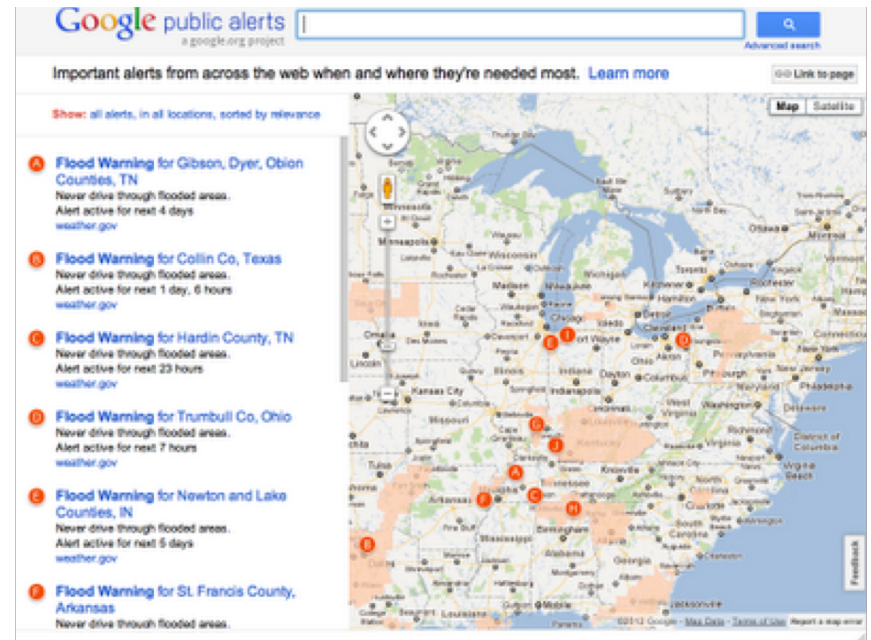
American Red Cross Mobile Apps (example)



Google Public Alerts

- Platform designed to bring users relevant emergency alerts when and where they are using Google tools
- Whether user sees an alert depends on search query, which alerts are active, and the event importance
- To see all active alerts, go to homepage →

<http://www.google.org/publicalerts>





What Now Service (IFRC + Google)

- Data feed of actionable and contextualized messages on how to prepare and respond to local hazards
20 hazards; 78 languages; 192+ countries
- Designed specifically to complement CAP messages
- Uses IFRC Public Awareness and Public Education Messages, for example:

1. Prepare to evacuate, and know when and where to evacuate
2. Turn off utilities and gas tanks. Unplug small appliances
3. Never try to drive through flood waters. Turn around and go the other way



Commercial Weather Alerting

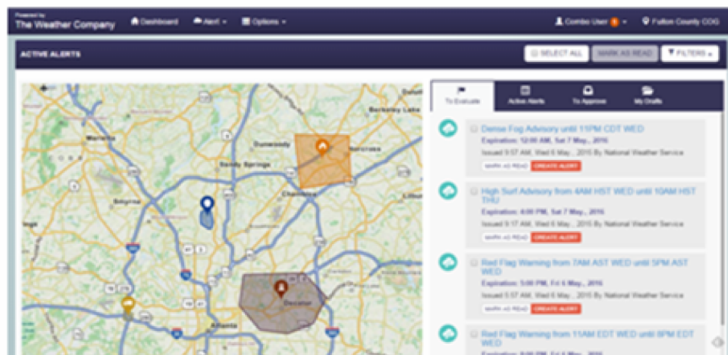
- AccuWeather
- MeteoFrance Vigilance
- MeteoFrance International, MeteoFactory
- The Weather Company



The Weather Company Local Alerts Platform

1) WMO Registry of Alerting Authorities (HKO)

Authenticates authorized alert creators



2) Local Alerts Platform

Authorized users create/approve alerts on the Local Alerts Platform which attributes Alerting Authority as source and distributes alerts to Alert Hub



3) WMO Alert Hub

Enables Publishers to post alerts and Subscribers to receive Authority's alerts

Alert Subscribers & Citizens receive alerts from their country's Alerting Authority(s)



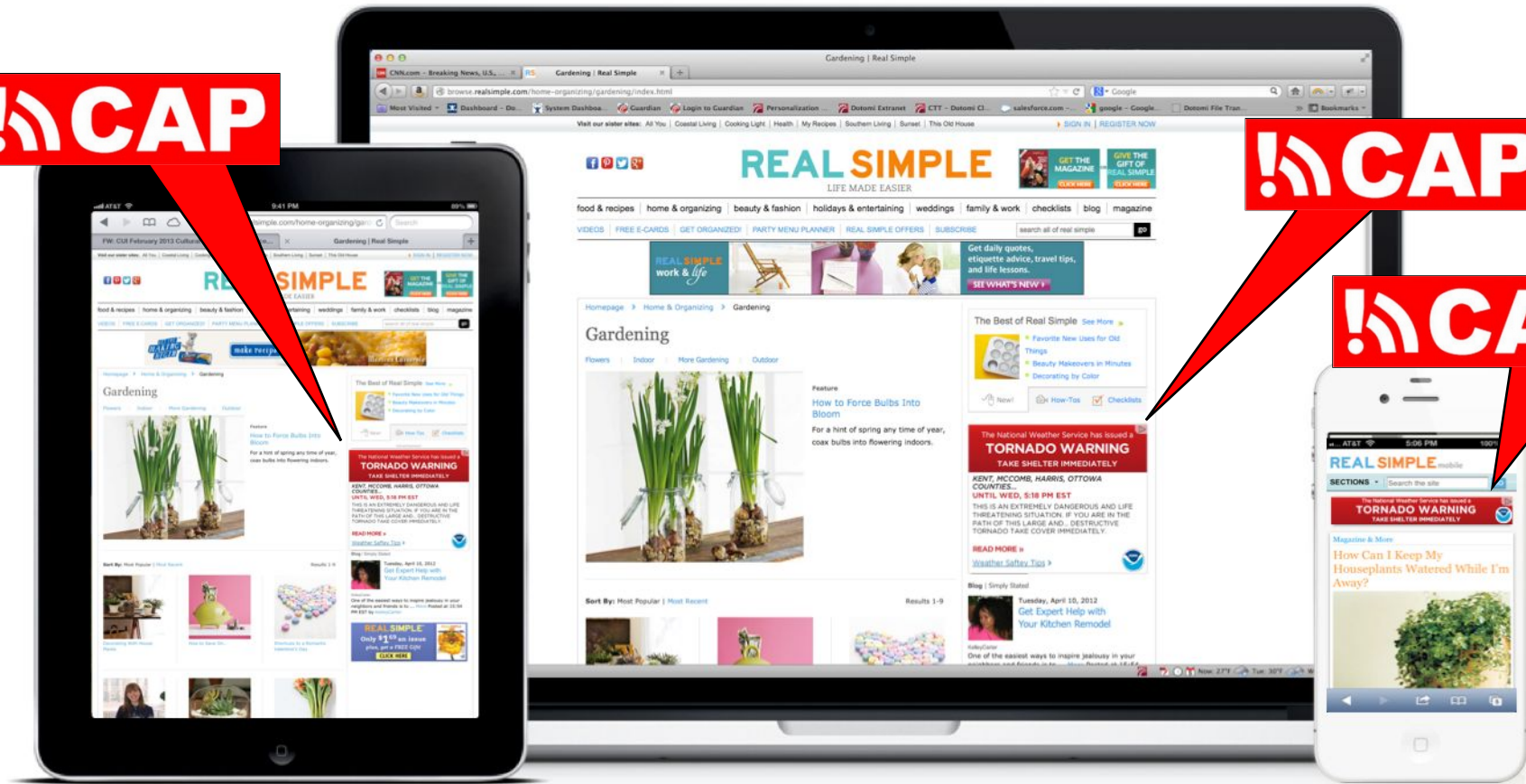


Sensors that Emit CAP Alerts

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



Federation for Internet Alerts



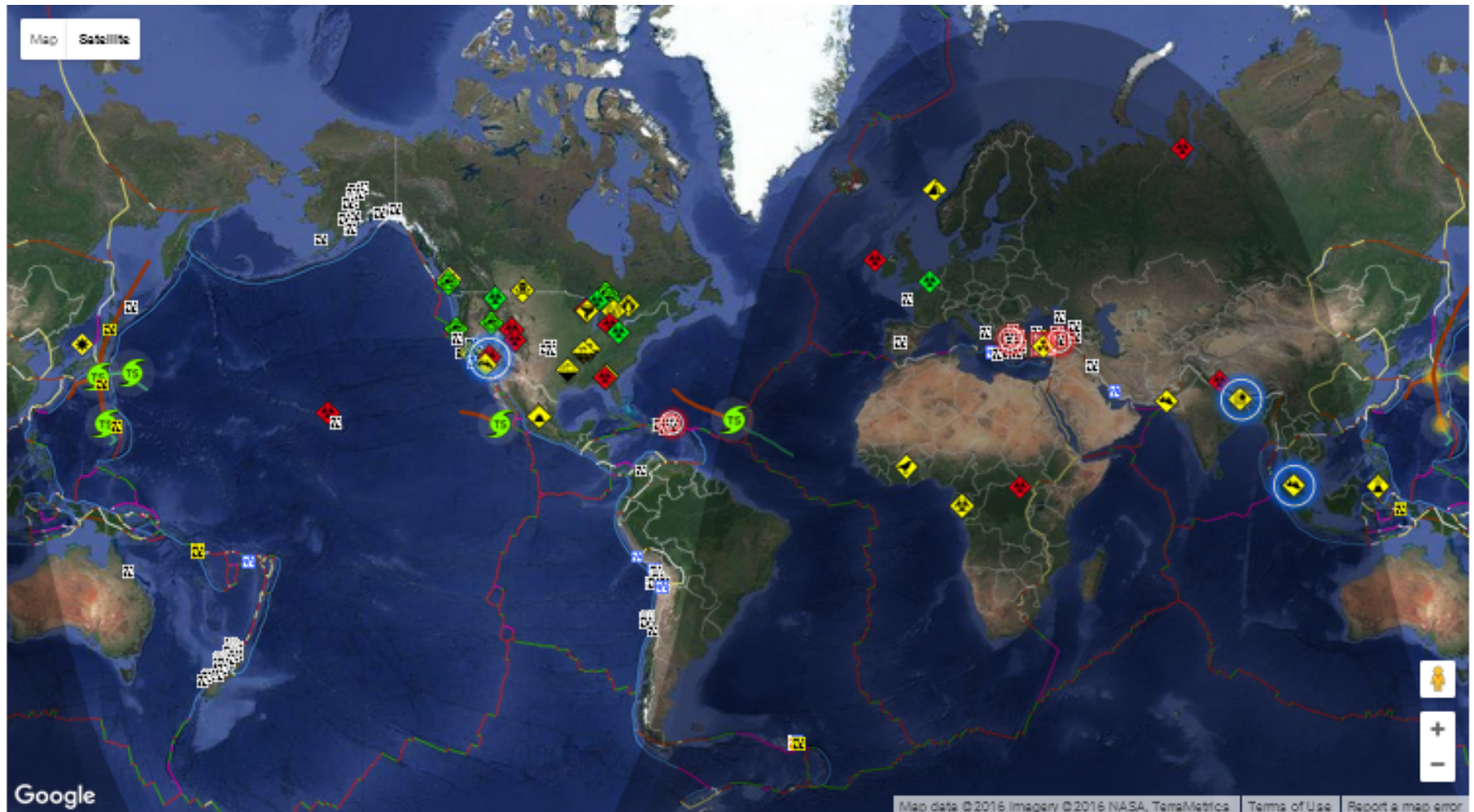
Advertising companies overlay online ads to show high-priority warnings from official alerting authorities



Other CAP-based Systems

- IBM Intelligent Operations Center for Emergency Management [video](#) [Users Guide](#)
- [Microsoft CityNext](#)
- Hate Group Monitoring
- Neighborhood Watch
- [RSOE Emergency and Disaster Information Service](#)

RSOE EDIS Alert Map



The information is updated every 5 minutes. There is no need to reload the page.

Emergencies 1

Short event 12

Long time event 33

Earthquakes 161

Tsunami 0

Volcano Activity 14

Tropical Storms 5

Supervolcano Monitoring System 18

Earth Approaching Objects 26

Current Emergencies



Presentation Outline

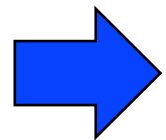
101.1 Opportunity and Challenge

101.2 Alerting Authorities

101.3 Benefits of CAP

101.4 Features of a CAP Message

101.5 CAP-enabled Alerting Systems



101.6 CAP Alert Hubs--
Free, Fast, Reliable, Secure



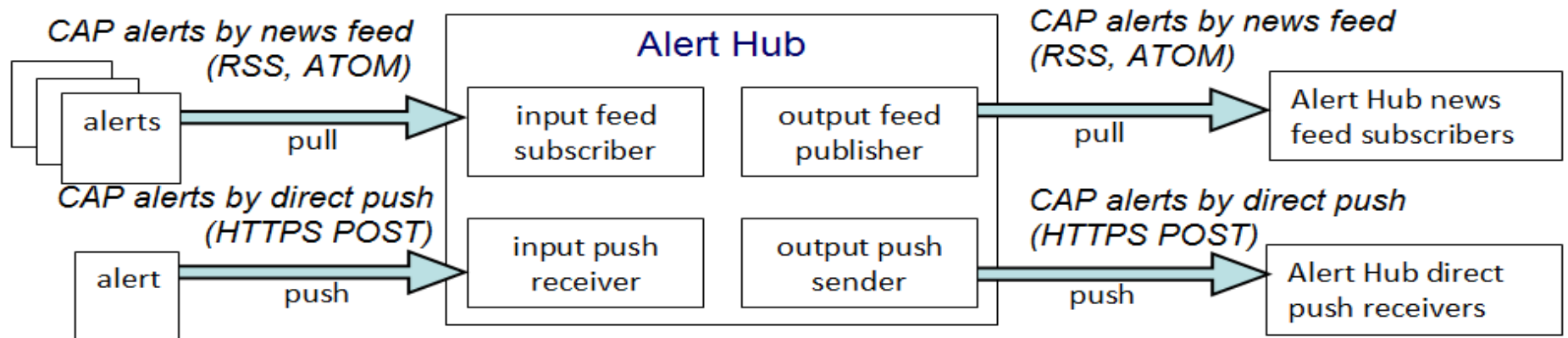
CAP Alert Hubs

- Free service aggregating alerts and other emergency information, can push updates to all subscribers
- The WMO Alert Hub will have alerts from official sources as listed in the Register of Alerting Authorities
- Benefits :
 - Speed
 - Scale (performance, reliability, availability)
 - Redundancy
 - Security and Authenticity
 - Analytics



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





Free Tool for CAP Alert Creation and Publishing

<https://cap.alert-hub.org>

identifier

sender

msgType **scope** **language**

status **category** **responseType**

event

urgency **severity** **certainty**

sent **expires**

[Text templates for headline, description, instruction.](#)

headline


description

instruction

areaDesc

circle
polygon

lat,lon<space>radius SW SE NE NW SW (lat,lon points)



Filtered Alert Hub <http://alert-hub.org>



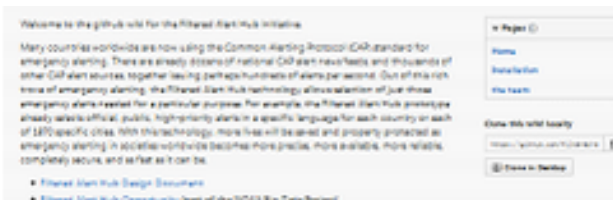
The cloud-based Filtered Alert Hub aggregates emergency alerts worldwide. Click [here](#) for recent alerts.



This Hub allows for filtering aggregated alerts to fit a particular purpose. For example, the prototype now makes a separate news feeds containing official, public, high-priority alerts in a specific language for each country and each of 1870 cities. Click [here](#) for these feeds.



At present, the prototype gathers alerts from 20+ sources, and more are expected in the coming months. Click [here](#) for current alert sources.



Development of the Filtered Alert Hub is part of the NOAA Big Data Project. Click [here](#) for the project Wiki, and to access the free, open source software.



Part of NOAA's Big Data Project



- Collaborative project with working prototype now
- Team includes: AccuWeather, Amazon Web Services, IBM and The Weather Company, Hong Kong Observatory, MeteoAlarm, Open Commons Consortium, USAID/OFDA ; others are welcome
- Core components are *Free Open Source Software*
- [Contact Project Lead \(Eliot Christian\)](#)

WMO Alert Hub Prototype



- WMO Alert Hub prototype aggregates alerts across feeds published by sources in the International Register of Alerting Authorities
- WMO Alert Hub prototype is based on the Filtered Alert Hub freeware



Review of Key Points

- Opportunity and Challenge
- Alerting Authorities
- Benefits of CAP
- Features of a CAP Message
- CAP-enabled Alerting Systems
- CAP Alert Hubs--
Free, Fast, Reliable, Secure



CAP Implementation Workshops

Link	Host	City	Co-sponsors
2017	Italian National Fire Corps	Rome. Italy	IAEM, IFRC, ITU, OASIS, WMO
2016	Asian Institute of Technology	Bangkok, Thailand	IFRC, ITU, OASIS, WMO
2015	Italian National Fire Corps	Rome. Italy	IFRC, ITU, OASIS, WMO
2014	LIRNEasia	Negombo, Sri Lanka	ITU, OASIS, WMO
2013	WMO	Geneva, Switzerland	ITU, OASIS, WMO
2012	Environment Canada	Montreal, Canada	ITU, OASIS, WMO
2011	WMO	Geneva, Switzerland	ITU, OASIS, WMO
2009	WMO	Geneva, Switzerland	ITU, OASIS, WMO
2008	WMO	Geneva, Switzerland	ITU, OASIS, WMO
2006	ITU	Geneva, Switzerland	ITU, OASIS



CAP Information Resources

- [CAP Implementations by Country](#)
- [CAP References \(PrepareCenter.Org\)](#)
- [CAP Video \(10 minutes, made by IFRC\)](#)
- [Guidelines for Implementation of CAP-Enabled
Emergency Alerting \(PWS-27\) free to download
in English Arabic French Russian Spanish](#)
- CAP Training Courses - contact me
Eliot Christian eliot.j.christian@gmail.com