



Common Alerting Protocol (CAP)

Presented by
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Breaking News: A Flood is Coming



Lives are at stake. People need to be warned.



The Key Facts

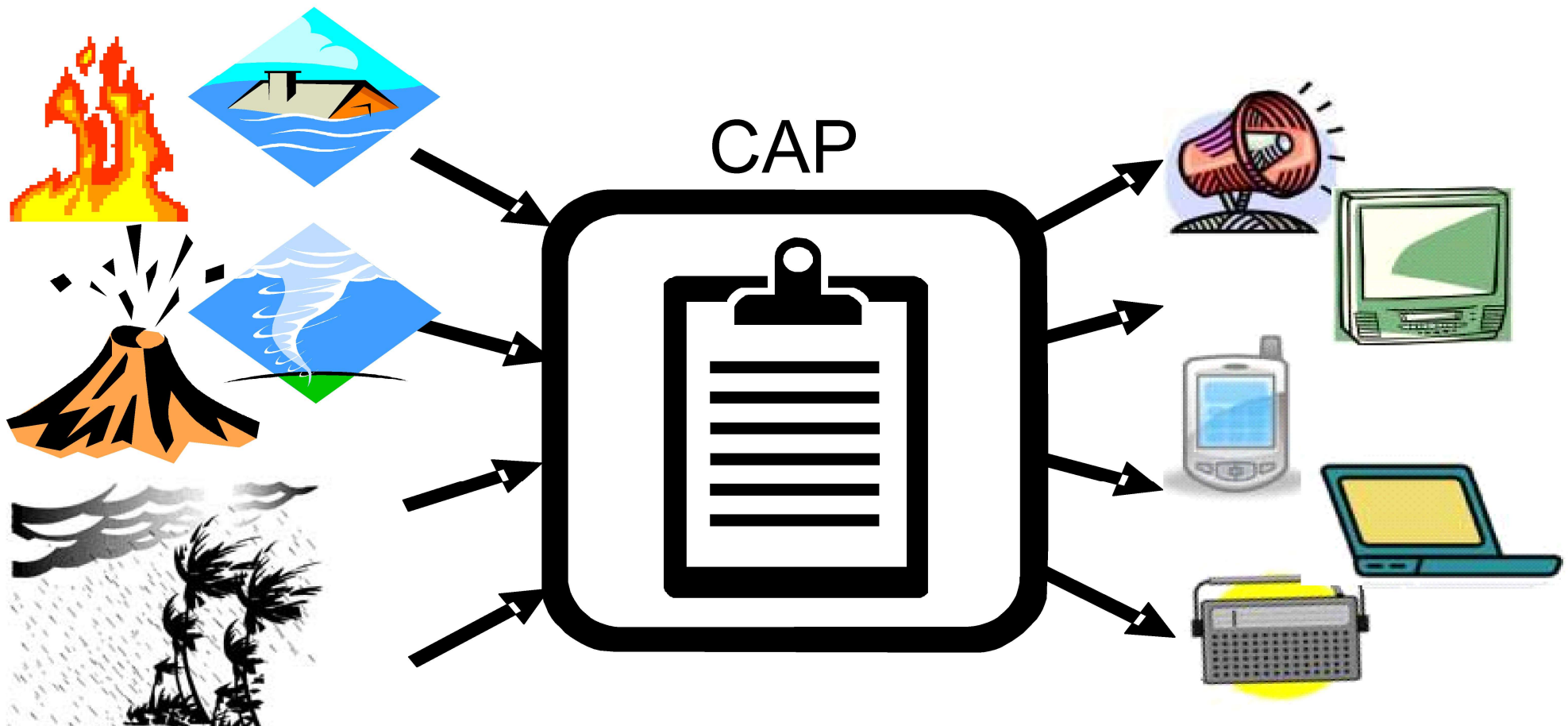
- **What** is the emergency?
- **Where** is the affected area?
- **How soon** do we need to act?
- **How bad** will it be?
- **How certain** are the experts?
- **What** should we do?



CAP Carries Key Facts

All-Hazards

All-Media





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



From Mass Media to Online Media

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

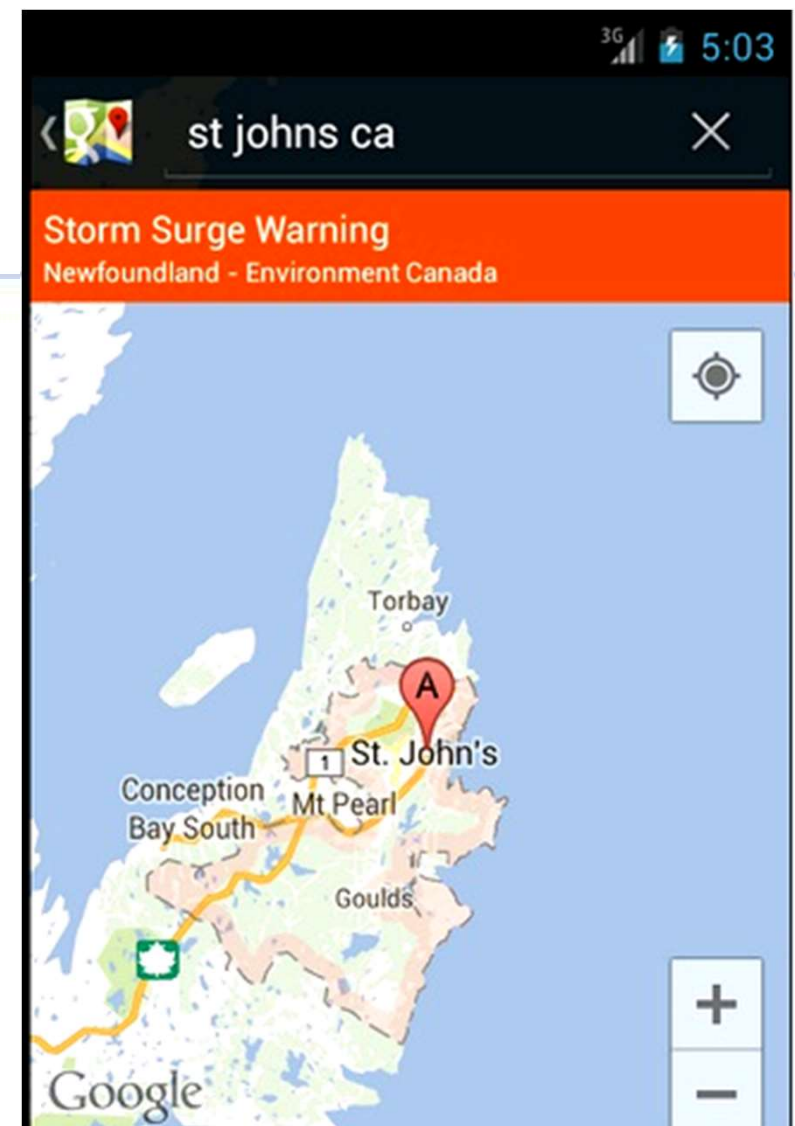
What about
online media
users?





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 National Weather Service has issued a
TORNADO WARNING
TAKE SHELTER IMMEDIATELY

KENT, MCCOMB, HARRIS, OTTOWA COUNTIES...

UNTIL WED, 5:18 PM EST

READ MORE »

THIS IS AN EXTREMELY DANGEROUS AND LIFE THREATENING SITUATION. IF YOU ARE IN THE PATH OF THIS LARGE AND... DESTRUCTIVE TORNADO TAKE COVER IMMEDIATELY.





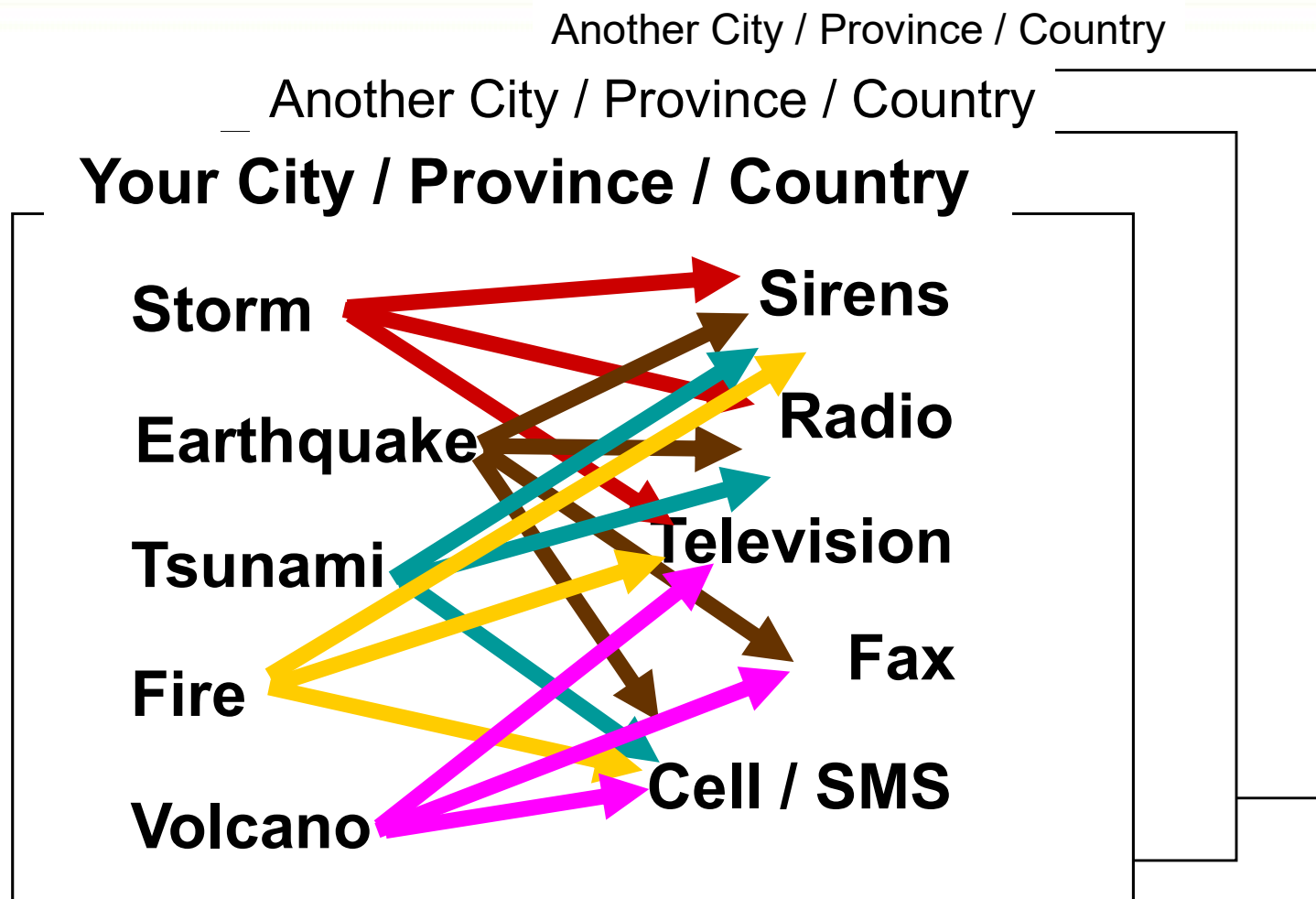
The Challenge of Alerting

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?

CAP is a standard message format designed for All-Hazard, All-Media, communications:

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



Distinct Voices, One Song Sheet

In a complex, extensive, or evolving emergency, multiple trusted authorities often have separate responsibilities

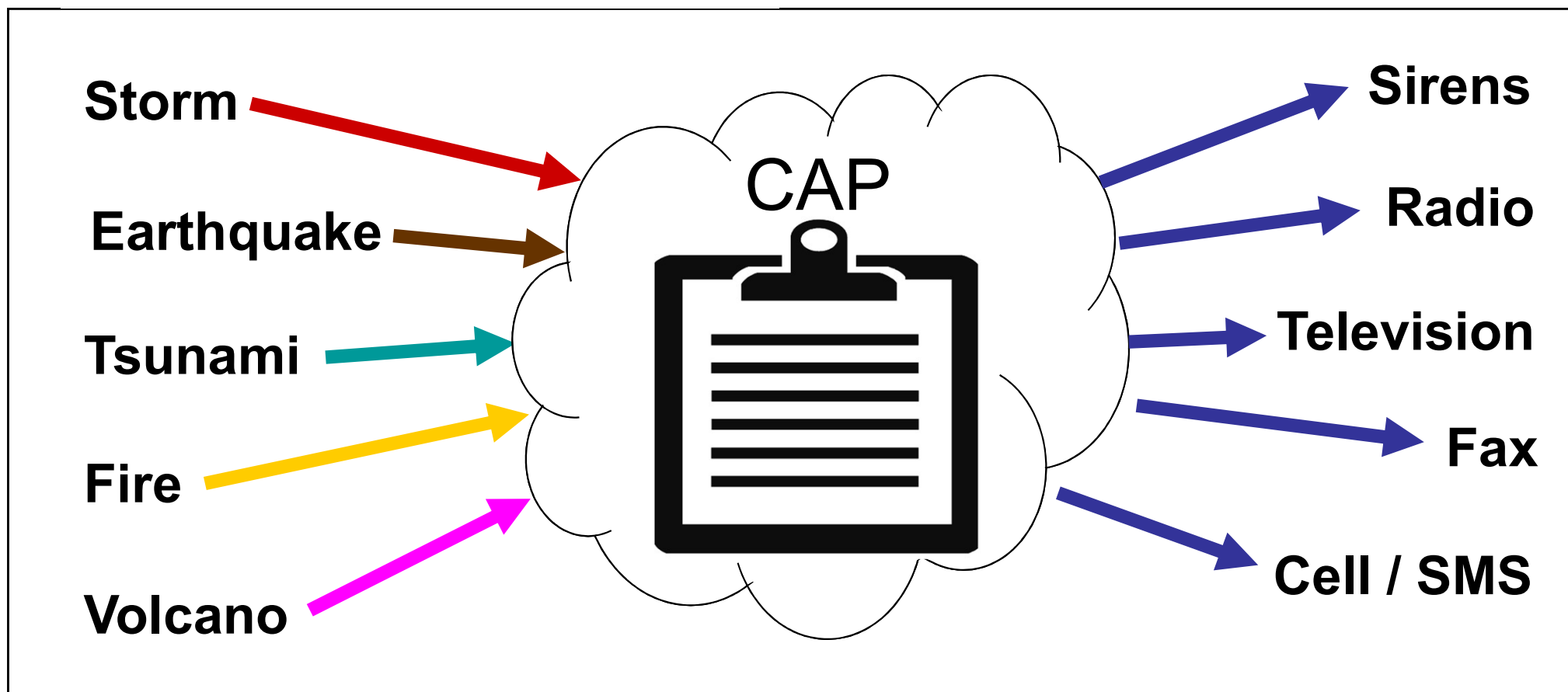
- Scientific and Technical agencies
- Civic Authorities
- Overlapping Jurisdictions

CAP helps ensure all trusted authorities communicate the Key Facts coherently



All-Hazards, All-Media Message Format

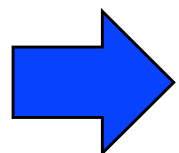
Any City / Province / Country





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



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

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>

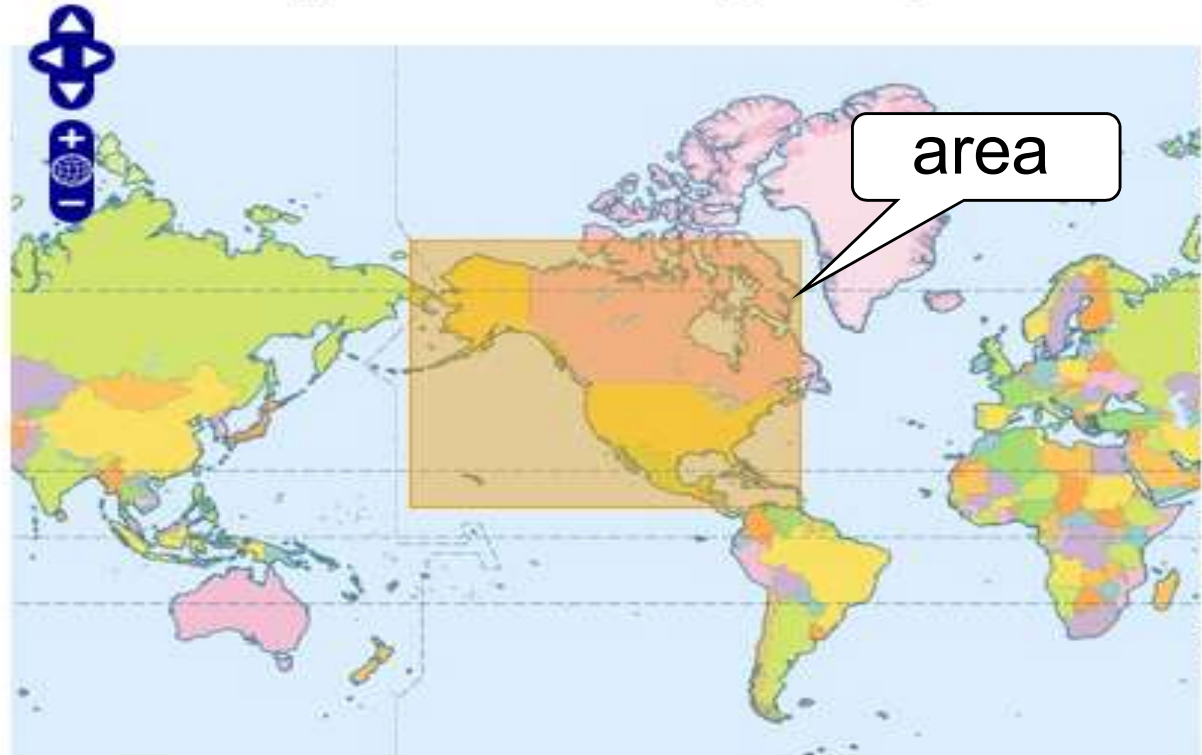
Forecasts URL: <http://www.worldweather.org/093/m093.htm>

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

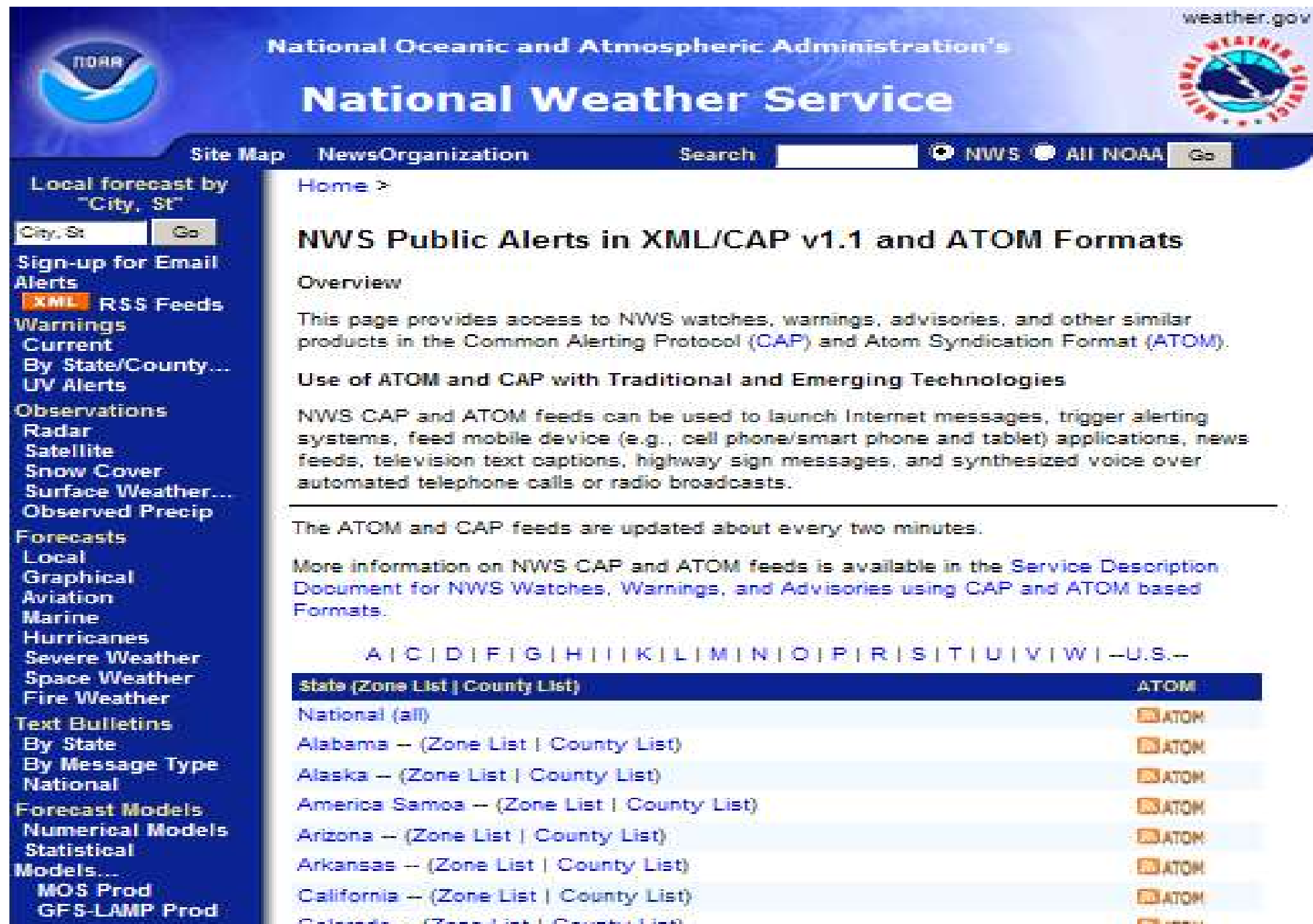
hazards

CAP feed URL

Map view of the typical area for this alerting authority.



- 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











The screenshot shows the National Weather Service website. The header includes the NOAA logo, the text "National Oceanic and Atmospheric Administration's National Weather Service", and a "weather.gov" link. Navigation links include "Site Map", "NewsOrganization", "Search", and buttons for "NWS" and "All NOAA".

On the left sidebar, there are links for "Local forecast by 'City, St'", "Sign-up for Email Alerts", "XML RSS Feeds", "Warnings", "Observations", "Forecasts", "Text Bulletins", and "Forecast Models".

The main content area is titled "NWS Public Alerts in XML/CAP v1.1 and ATOM Formats". It includes an "Overview" section explaining that the page provides access to NWS watches, warnings, advisories, and other products in CAP and ATOM formats. It also mentions the use of ATOM and CAP with various technologies.

Below the overview, there is a table listing the available feeds for each state and territory. The table has two columns: "State (Zone List | County List)" and "ATOM". Each row shows a state/territory name followed by a link to its ATOM feed.

State (Zone List County List)	ATOM
National (all)	 ATOM
Alabama -- (Zone List County List)	 ATOM
Alaska -- (Zone List County List)	 ATOM
American 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?

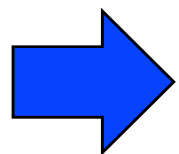
- Register of Alerting Authorities established by WMO and ITU
- WMO Member countries register alerting authorities they recognize
- WMO Permanent Representative designates editor to maintain entries



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101.2 Alerting Authorities



101.3 Benefits of CAP

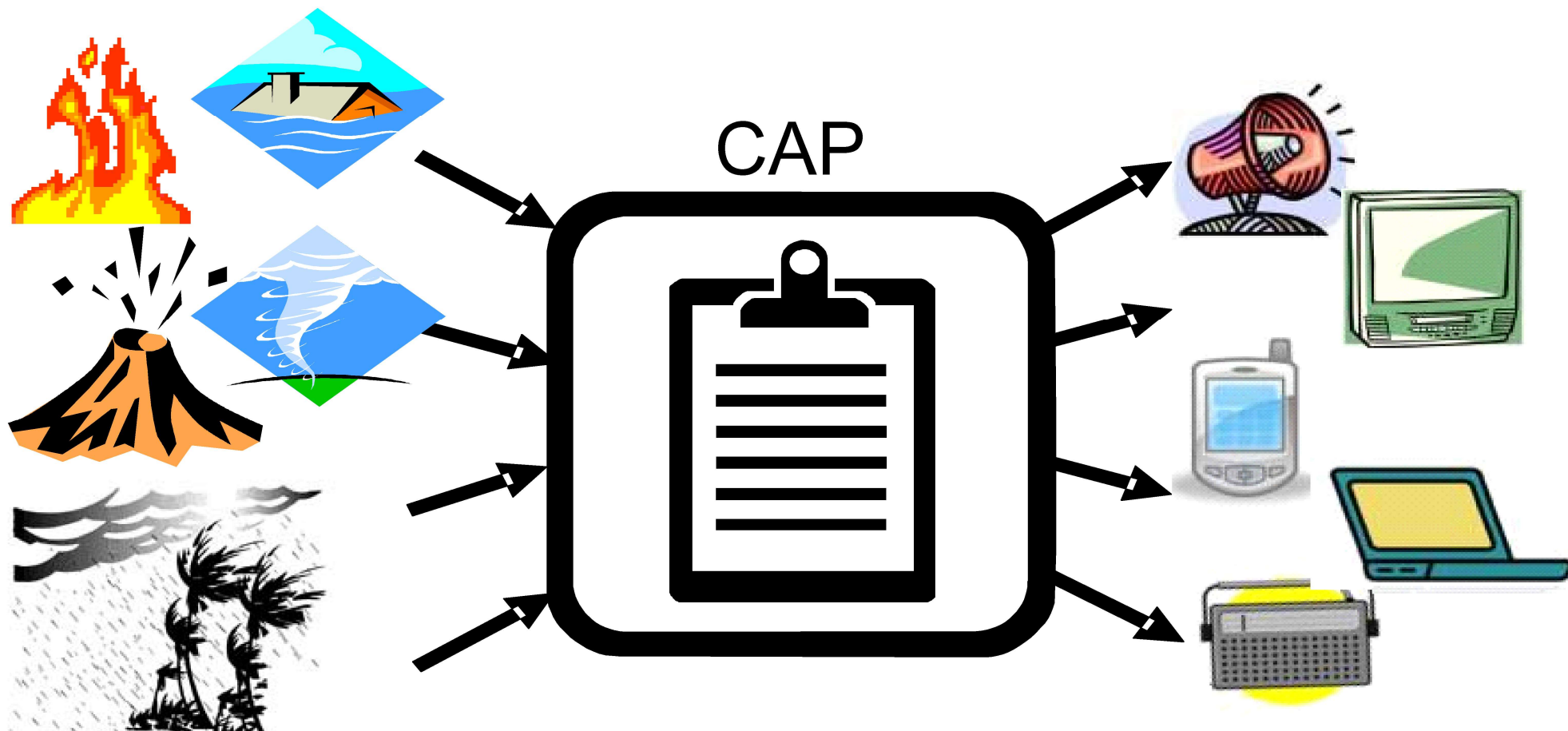
101.4 Features of a CAP Message

101.5 CAP-enabled Alerting Systems

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



A "universal adaptor" for alerts





Quicker and Easier to Issue Alerts

Without CAP:

making phone calls, sending Faxes, sending e-mails, posting to a Web page, posting to Facebook and Twitter, ...

With CAP:

posting a single message can trigger most alerting methods



Shared Situational Awareness

In a complex emergency, many types of information has to be assimilated, from many sources, at a broad range of scales, and a lot of that information involves alerting

Without CAP:

alerts are difficult to ingest, use, and share

With CAP:

sharing of alert information is much easier



Common Operating Picture





Alerting Areas are more Precise

People should not miss out on alerts; they should only get alerts intended for them

Without CAP:

text-based alerting not precise enough

With CAP:

precise alerting area with polygons or circles in addition to text description



People with Special Needs or a Language Barrier

Without CAP:

public alerting may neglect people who are blind, deaf, or cognitively impaired, and people who do not understand the local language

With CAP:

CAP data features enable custom messaging, automated translation



Alerting Sudden-onset Events

Seconds are critical for sudden-onset events, e.g., earthquakes, tornadoes, tsunami, flash floods, volcanoes, landslides, avalanches, terrorism

Without CAP:

life-saving messages might arrive too late

With CAP:

an alert can be disseminated in seconds

Because a CAP alert is digital, receivers can include devices -- sirens, highway signs, train controls, and other automated mechanisms that help save lives



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

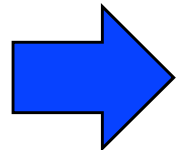


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Sample CAP Message



SEVERE THUNDERSTORM WARNING



Identifier: KSTO1055887203
Sender: KSTO@NWS.NOAA.GOV
Sent: 2003-06-17T14:57:00-07:00
Status: Actual
Message Type: Alert
Scope: Public

Category: Met
Event: SEVERE THUNDERSTORM
Urgency: Immediate
Severity: Severe
Certainty: Likely
Expires: 2003-06-17T16:00:00-07:00
Sender Name: NATIONAL WEATHER SERVICE SACRAMENTO CA
Headline: SEVERE THUNDERSTORM WARNING
Description: AT 254 PM PDT... NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM OVER SOUTH CENTRAL ALPINE COUNTY... OR ABOUT 18 MILES SOUTHEAST OF KIRKWOOD... MOVING SOUTHWEST AT 5 MPH. HAIL... INTENSE RAIN AND STRONG DAMAGING WINDS ARE LIKELY WITH THIS STORM.

Instruction: TAKE COVER IN A SUBSTANTIAL SHELTER UNTIL THE STORM PASSES.
Contact: BARUFFALDI/JUSKIE
Area:

Description: EXTREME NORTH CENTRAL TUOLUMNE COUNTY IN CALIFORNIA, EXTREME NORTHEASTERN CALAVERAS COUNTY IN CALIFORNIA, SOUTHWESTERN ALPINE COUNTY IN CALIFORNIA
Polygon: 38.47,-120.14 38.34,-119.95 38.52,-119.74 38.62,-119.89

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
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      COUNTY...MOVING SOUTHWEST AT 5 MPH. HAIL...INTENSE RAIN AND STRONG
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    <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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<?xml version="1.0" encoding="UTF-8"?>
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  <scope>Public</scope>
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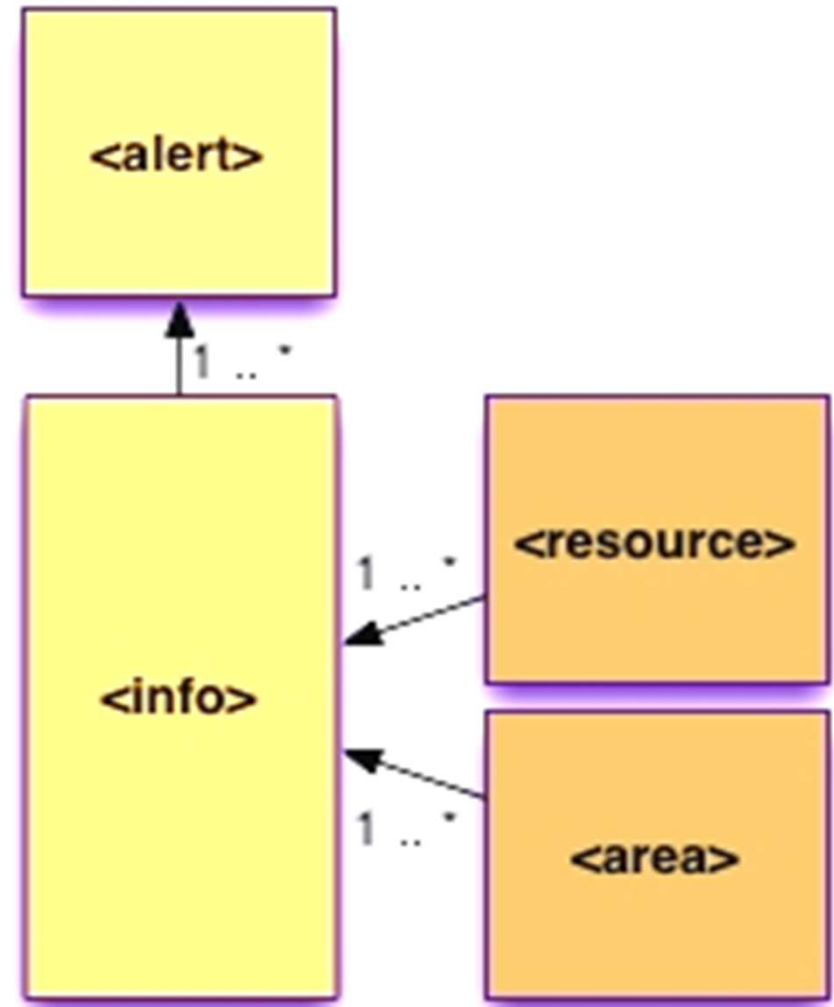
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      120.14</polygon>
    </area>
  </info>
</alert>
```




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

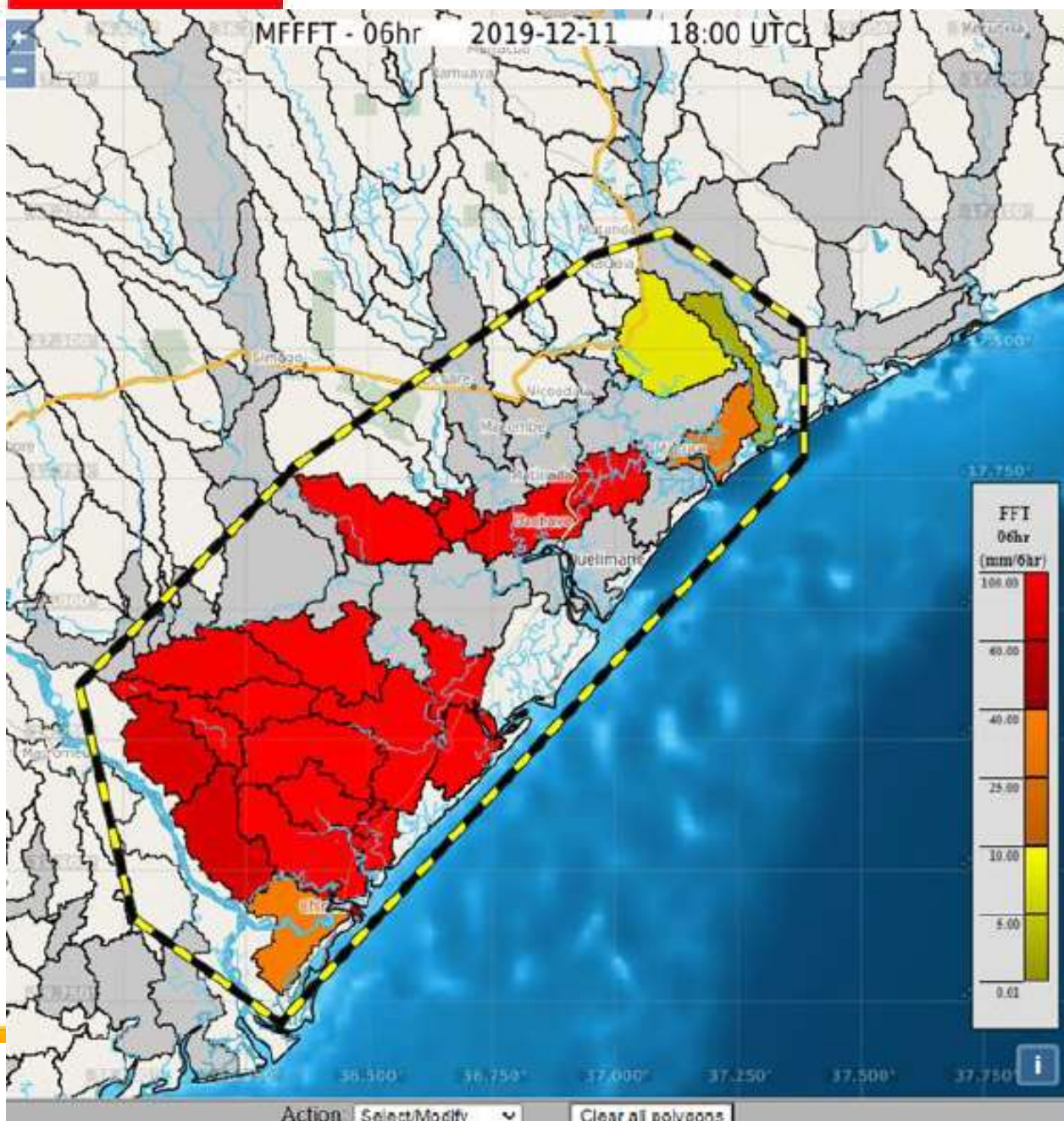
Alert methods supported: EAS (U.S. Emergency Alert System), broadcast radio station, broadcast television, cable TV, sirens, strobe lights, e-mail, SMS, voice telephone, intercom/digital telephony, computer pop-up's, Web sites, social media (Twitter, Facebook, WhatsApp...), Emergency Call Boxes, reverse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

Diagram by Alerting Solutions Inc. (ASI)





Flash Flood Guidance System



Alert Info

Message ID: kfpvp3c
Sender: cap_sample@hrcwater.org
Time Sent: 2019-12-12T01:06:38-00:00
Message Type: Alert
Status: Actual
Scope: Public

Event Info

Event Type (Required)

High Risk of Flooding

Category: Select option(s)
Response Type: Select option(s)
Urgency: Expected
Severity: Severe
Certainty: Likely

Resource Info

Resource Description (Required)

Attached image shows Flash Flood threat as depicted in the SARFFG web interface

Resource URI

https://www.hrcwater.org/images/cap_mess

☒ Image PNG has been placed at above location

Cancel Image Attachment

Event Description (Optional)

On Wednesday, December 11, 2019 <Agency> issued a flash flood warning for the south-eastern region of the Zambezi province. This warning includes, but is not limited to, the region from the city of Quelimane down to the region of the city of Chinde.

This warning is in effect from 8:00pm on December 11th, 2019 CAT until 2:00am on December 12th, 2019 CAT.

Heavy rains will likely lead to flooding, with likely extensive damage to houses and property in the area, as well as the potential for loss of life.

Instruction (Optional)

If you are in the warning area, avoid low-lying areas or move to higher ground immediately. Residents living along streams and creeks should take immediate precautions to protect life and property. Do not attempt to cross swiftly flowing waters or waters of unknown depth.



United States of America

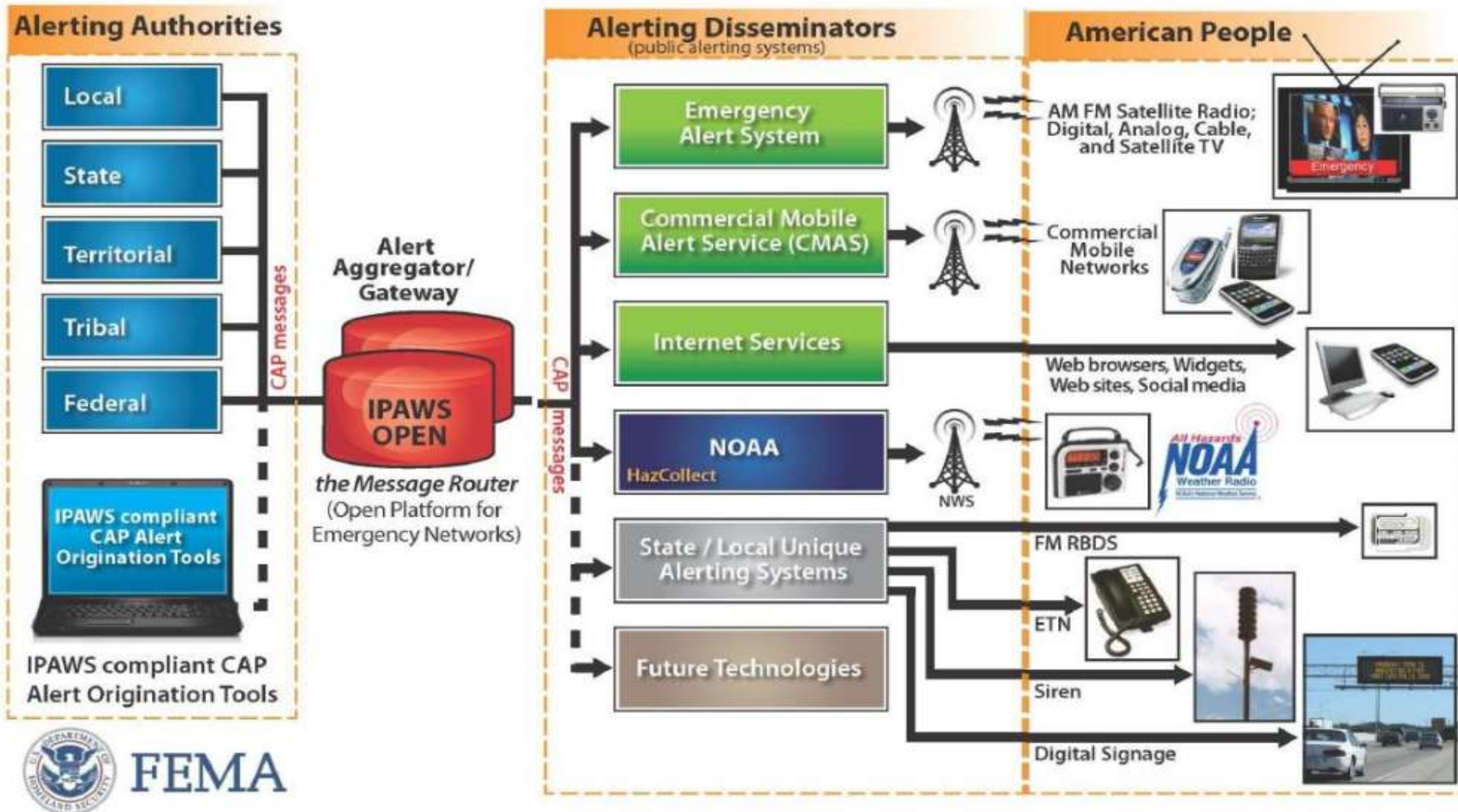
- National Oceanic and Atmospheric Administration (NOAA), National Weather Service
- NOAA National Tsunami Warning Center
- USGS Volcano Hazard Program
- Environmental Protection Agency, Air Quality Alerts
- Federal Emergency Management Agency, Integrated Public Alert and Warning System (IPAWS)



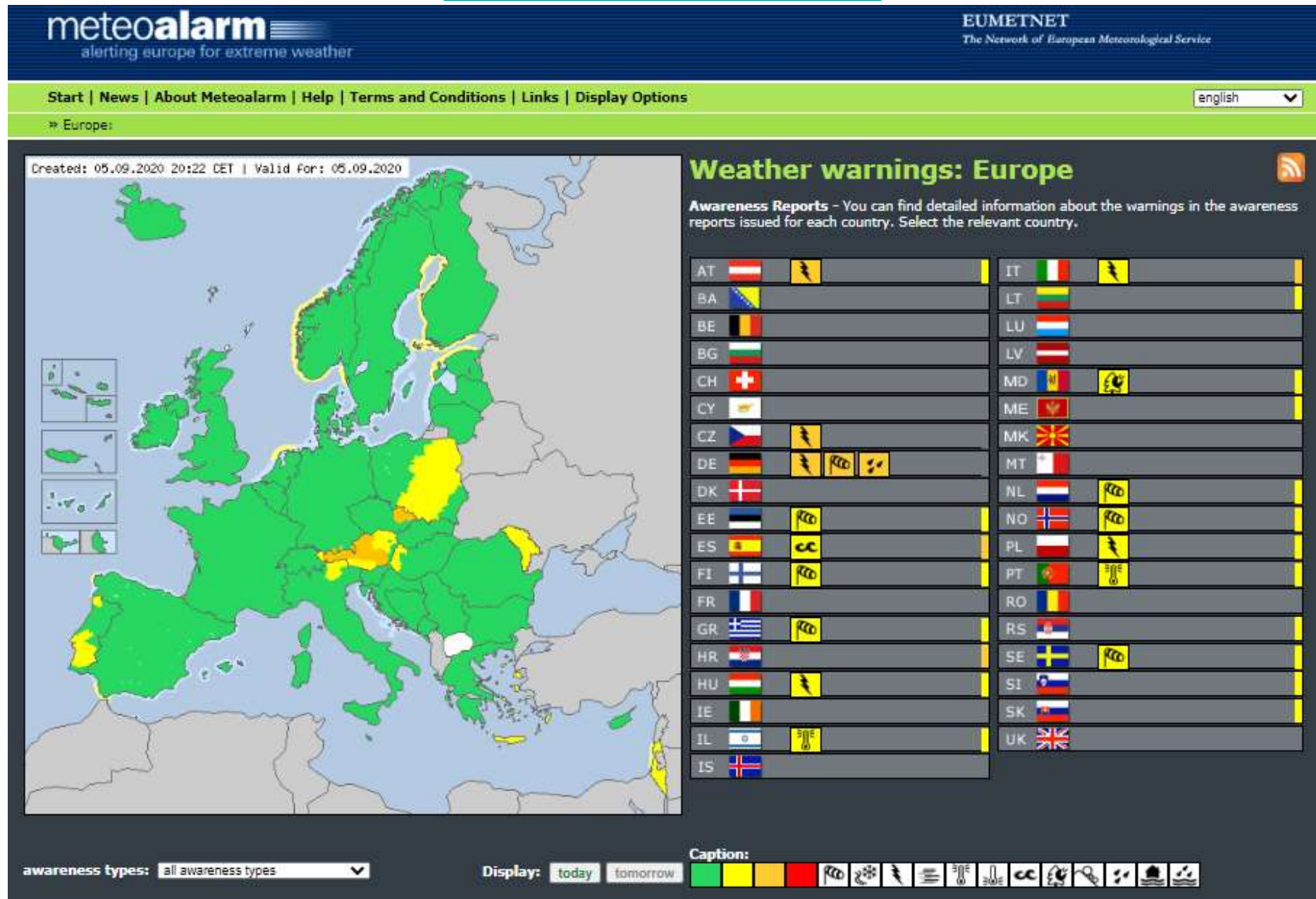
U.S. Integrated Public Alert and Warning System (IPAWS)

IPAWS Architecture

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

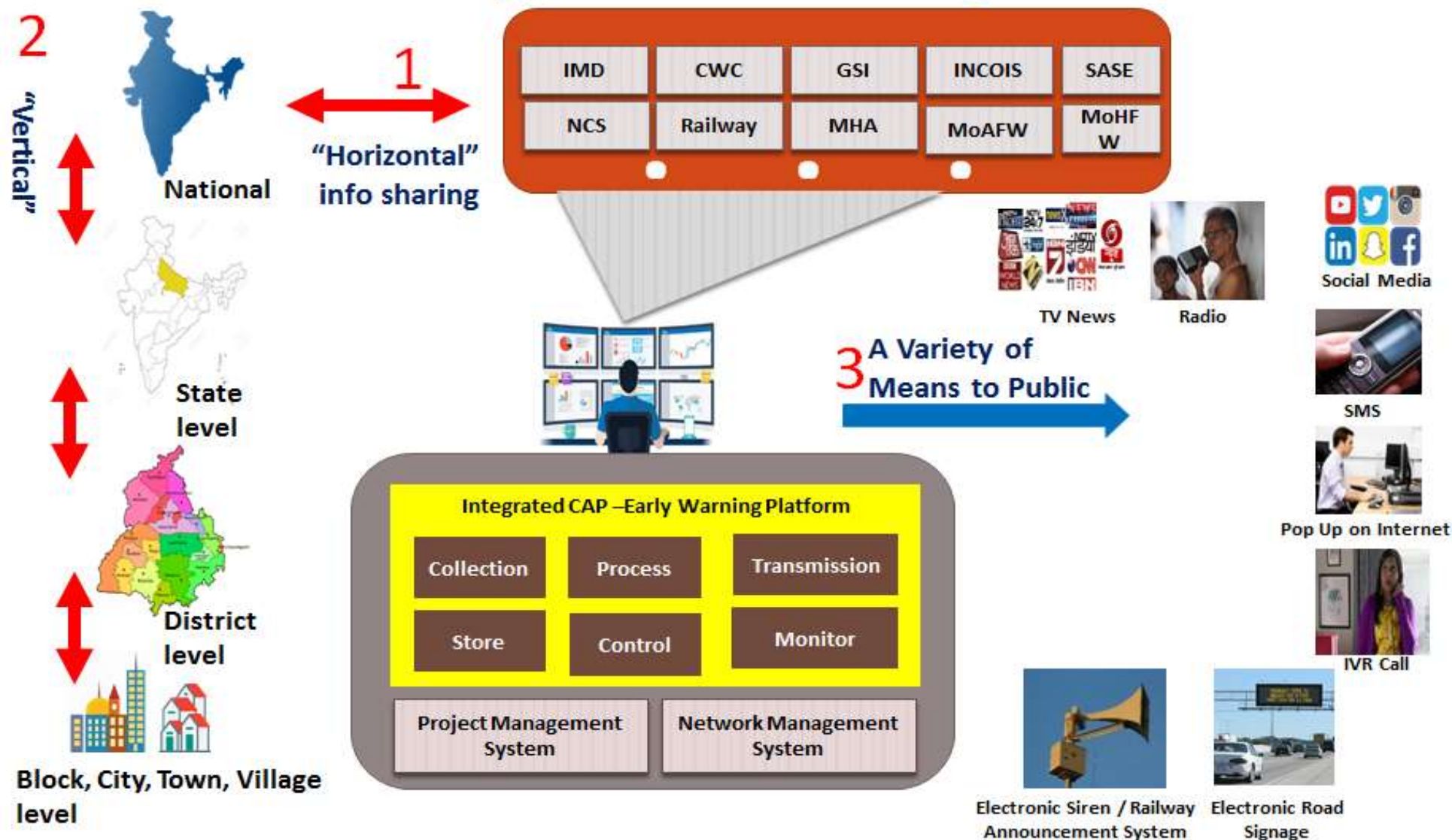


MeteoAlarm



CAP in India

Typical Vertical Horizontal Integration





CAP in China

1 national center

31 provincial centers

343 municipal centers

2015 county centers

10126 specialty staff







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

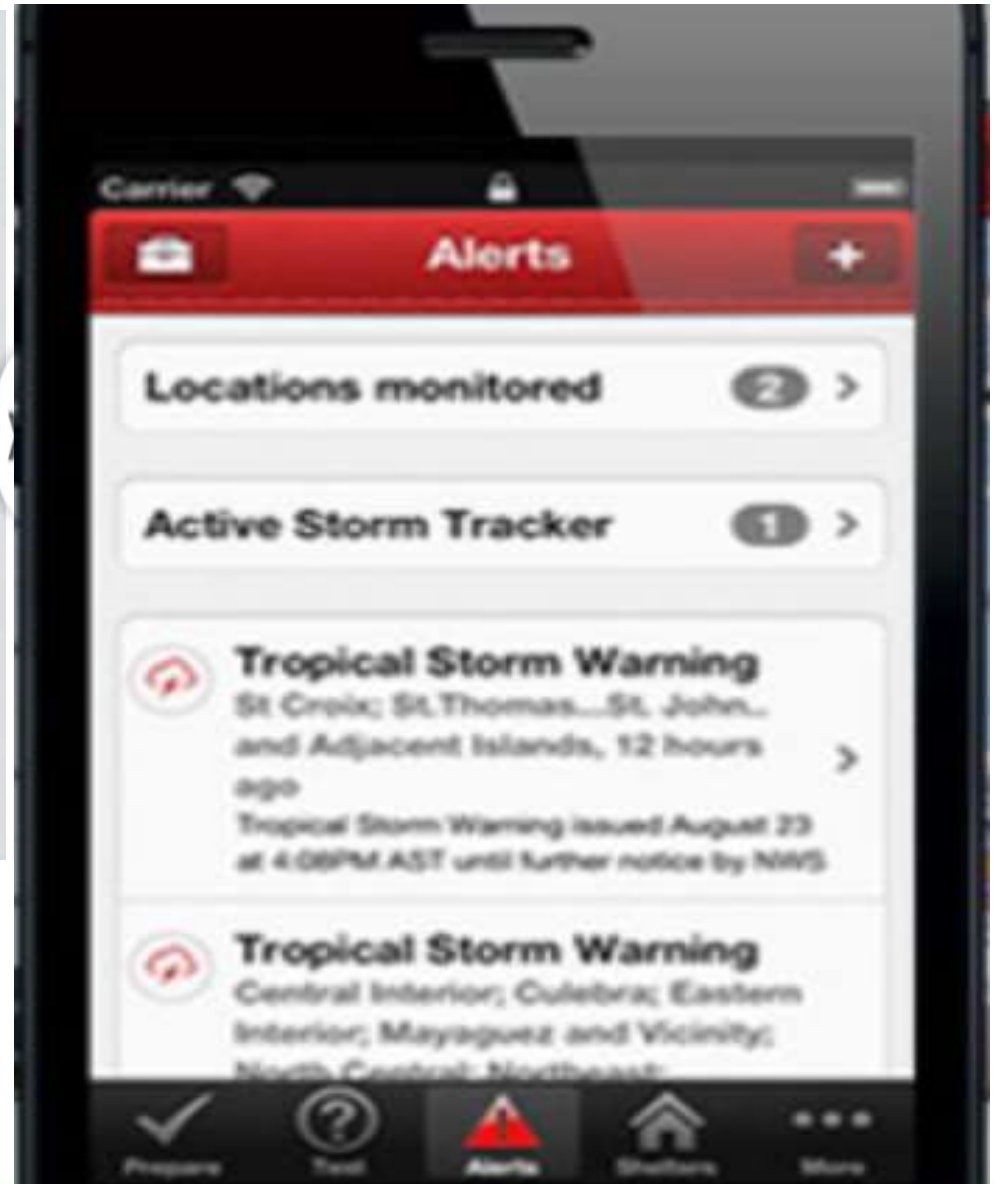
circle
lat,long<space>radius

polygon
SW SE NE NW SW (lat,lon points)





IFRC Universal App Program



American Red Cross Mobile Apps (example)

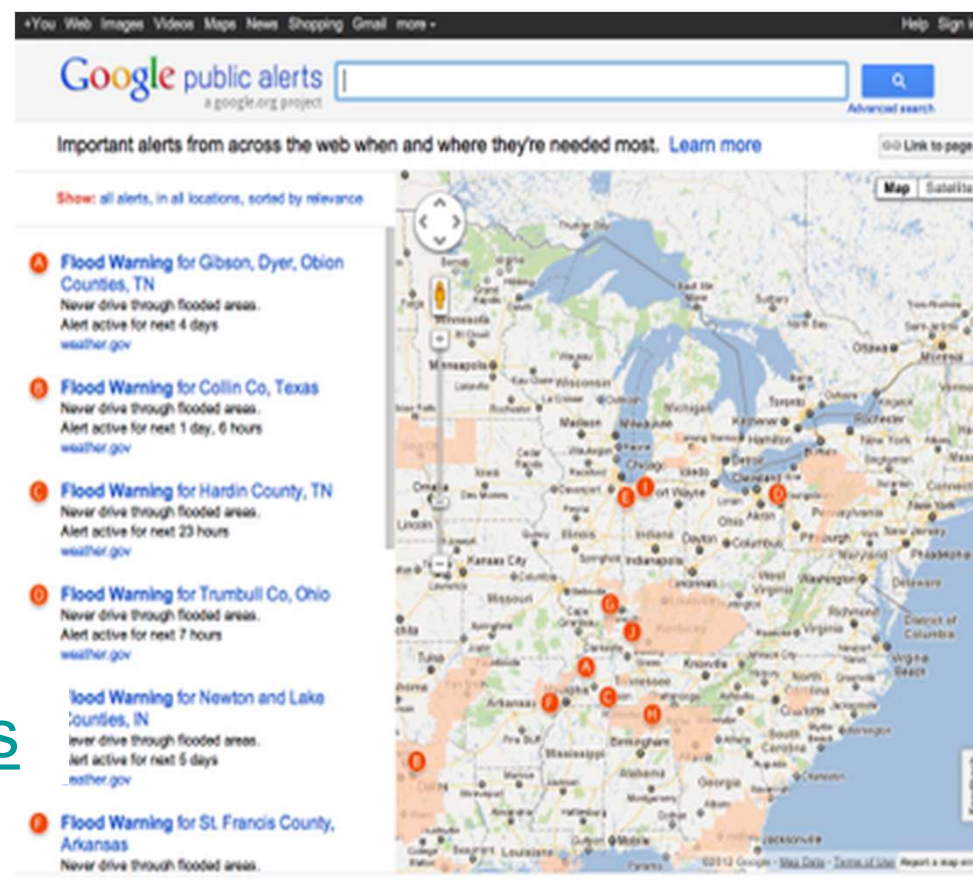
Google Public Alerts

Platform designed to bring users relevant emergency alerts when and where they are using Google tools

Whether a user sees an alert depends on which alerts are active and their importance

To see all active alerts, go to

<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
- The Weather Company

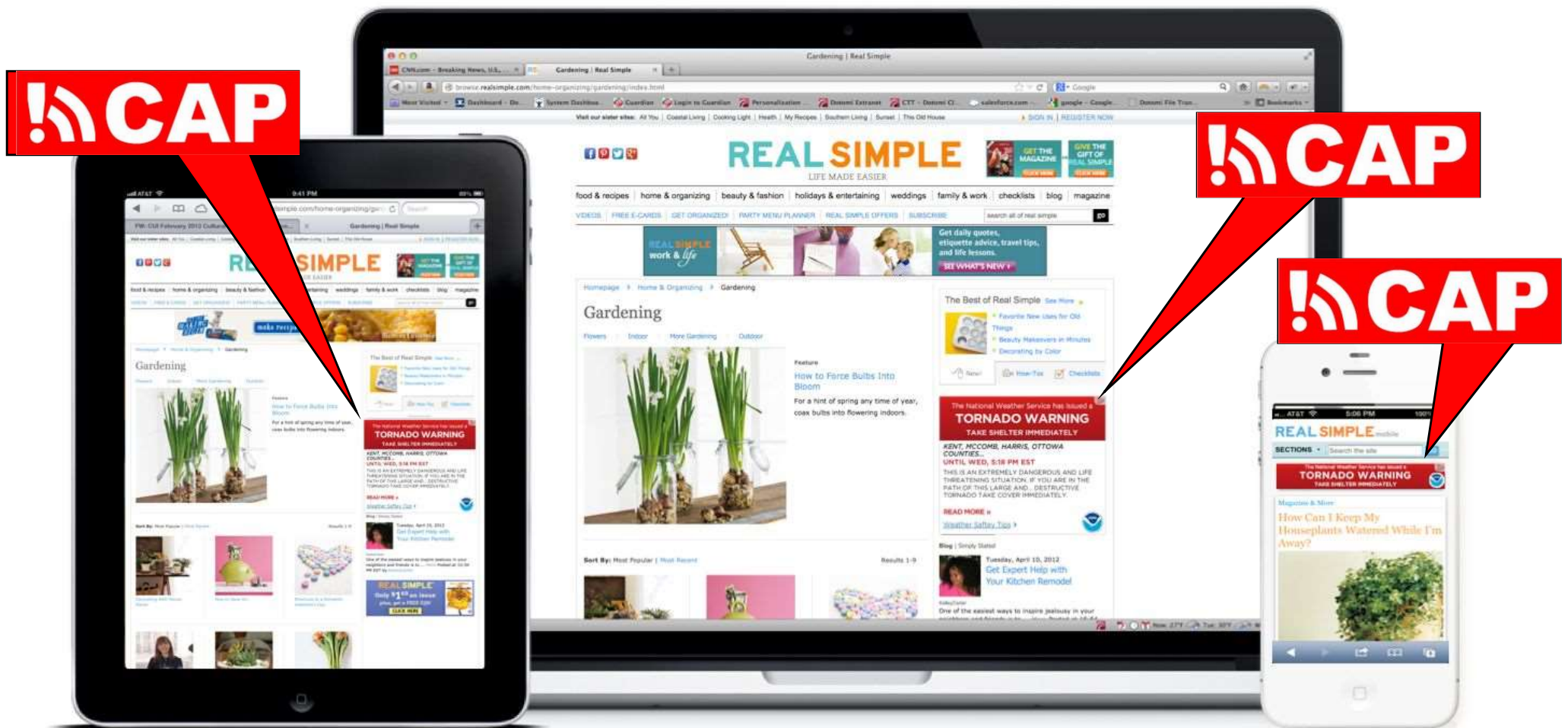


Sensors that Emit CAP Alerts

- 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.



Current Emergencies



Presentation Outline

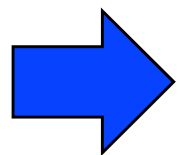
101.1 Opportunity and Challenge

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
- A typical CAP Alert Hub has alerts from official sources listed in the Register of Alerting Authorities
- Benefits :
 - Speed
 - Scale (performance, reliability, availability)
 - Redundancy
 - Security and Authenticity
 - Analytics



Filtered Alert Hub (freeware)



- Aggregate more than 100 CAP news feeds worldwide
- Filter aggregated alerts by location, language, and any other criteria (e.g., "official and high priority")
- Cloud-based: Highly Available, Reliable, Secure
- When seconds matter, sources can push CAP alerts to the Hub and the Hub can push them to subscribers



Available Alert Hub News Feeds

CAP News Feeds are available now at global scale, national scale, and each of 1800+ cities

Each is an RSS feed - anyone can simply subscribe

A subscriber might select, for instance:

- Valid CAP alerts received, [unfiltered](#)
- Recent public alerts from official sources [official-public](#)
- Recent high-priority, public alerts from official sources [official-high-priority-public](#)

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 more than 100 sources, and more are expected in the coming months. Click [here](#) for current alert sources.

Welcome to the global site for the Filtered Alert Hub initiative.

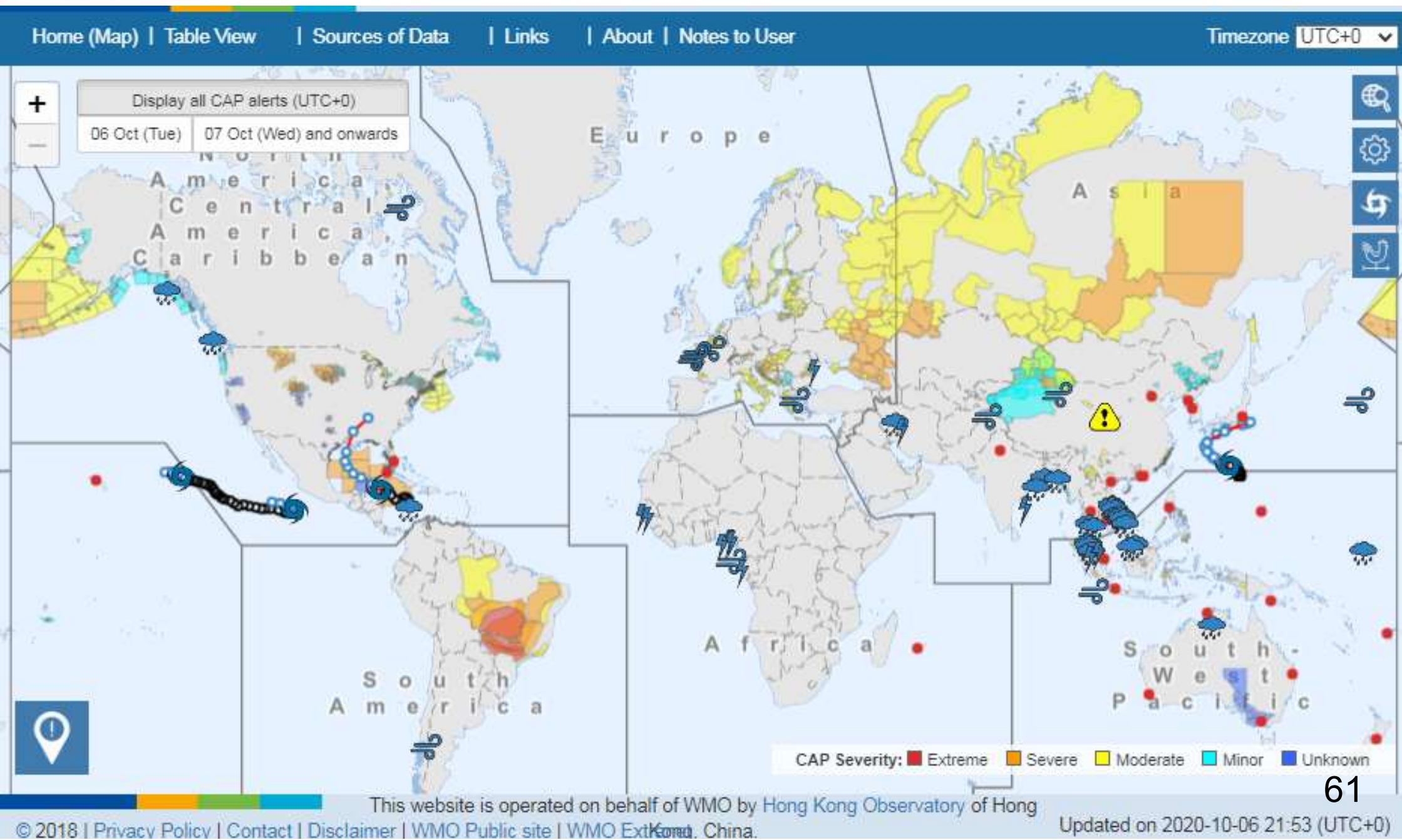
Many countries worldwide are now using the Common Alerting Protocol (CAP) standard for emergency warning. There are already dozens of national CAP alert news feeds and thousands of other CAP alert sources, together having just a few hundred events per second. Out of this rich flow of emergency warning, the Filtered Alert Hub technology allows selection of just those emergency alerts needed for a particular purpose. For example, the Filtered Alert Hub prototype already allows official, public, high-priority alerts in a specific language for each country in each of 1870 world cities. With this technology, much more can be done and properly prioritized emergency warning is available worldwide beginning this process, more available, more reliable, completely secure, and better as it can be.

- Filtered Alert Hub Design Document
- Filtered Alert Hub OpenSource (part of the NOAA Big Data Project)
- Filtered Alert Hub Prototype (part of the NOAA Big Data Project)
- Filtered Alert Hub Technology and OpenSource Implementation

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



Severe Weather Information Center (SWIC)





IFRC Alert Hub

- ✓ Free online source for published emergency alerts from local, national, and regional sources
- ✓ Multi-hazard alerting focus, leveraging CAP for all manner of emergency preparedness and response activities: city -> country -> global
- ✓ Consumers of IFRC Alert Hub: Red Cross and Red Crescent National Societies, **news organizations**, telecommunications providers, international and national emergency managers, disaster relief organizations, among many others



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
2020	ITU	Geneva, Switzerland	IAEM, IFRC, ITU, OASIS, WMO
2019	Mexico City Civil Protection	Mexico City, Mexico	IAEM, IFRC, ITU, OASIS, WMO
2018	Hong Kong Observatory	Hong Kong, China	IAEM, IFRC, ITU, OASIS, WMO
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



Reference Links

- [CAP Information Resources](#)
- [CAP Implementations by Country](#)
- [CAP Introduction \(video, 15 minutes\)](#)
- CAP Training Courses - contact me
Eliot Christian eliot.j.christian@gmail.com

Questions, Discussion



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