Common Alerting Protocol (CAP) is the international standard that enables emergency warnings to leverage modern Information and Communications Technology.

That includes: the Internet, wireless and landline phones, satellite broadcast, smartphone apps, digital highway signs, digital television and radio, and just about any other digital communications and devices.

I will explain how that is.
Let's start by noting that online media is replacing mass media.
Much of today's public alerting infrastructure assumes that mass media, such as broadcast radio and television, is the best way to disseminate emergency alerts to a large percentage of people in harm's way.

Many television stations insert "crawl text" with the warning message, and radio stations insert a recording. This public-private collaborative effort required decades to implement and consumes huge, ongoing investments in specialized technology.

Unfortunately, this mass media approach does nothing to reach users of online media.
People are missing out on mass media emergency alerts as they increasingly substitute online media for broadcast radio and television.

Google has a solution--they leverage CAP to get emergency alerts to people online using Google tools. Here we see Google showing an official warning of a Storm Surge in St John's, Newfoundland.

Below it we see a tornado warning from the U.S. National Weather Service, overriding advertisements on Web pages for users in the alerting area. That overlay is performed by a non-profit consortium that simply buys the ad space through the usual online ad auctions.

Also, digital billboards carry CAP alerts in the United States. That is actually very smart from an advertising strategy perspective.

So, we see that digital media companies are using their own resources to help get warnings out. This is an amazing surge of innovation around emergency alerting--and it is happening because of the CAP standard.
### 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*

Before CAP, emergency messages were typically plain, unstructured text--a "Press Release" or "Police Bulletin".

CAP gave us a structured message, containing a mixture of data and text. The CAP message communicates key facts about any kind of emergency:

- **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.

CAP is designed for **any media**, to communicate information about **any kind of hazard** situation.

We can say that CAP is a "standard business form" for emergency alerting.
In paper, such a form could be carried on a clipboard. Everyone involved in the emergency should have this one additional form. The CAP alert doesn't have everything about the emergency--just a set of key facts that everyone needs.
### Presentation Outline

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Now let's look at the content of that form: an actual "CAP Message".
This is a CAP message, shown here with its "XML" tags.
This particular CAP message has the senderName: “National Weather Service, Sacramento, California”.
Here the **headline** is: “Severe Thunderstorm Warning”.
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".
Notice the alerting area. For human readers, the area is described in text. But, for automated processing, the area is also precisely given with the latitude/longitude points of a polygon.
This is the crucial feature of CAP messages. CAP is encoded with XML, so that textual information and data can be carried in the same message.

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

But, CAP messages also contain data: coded values that are essential for automated processing, routing, translation and much more.
### Relative Priority of this Message

- **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)*

*Common Practice - High Priority* (*"Red Alert"*)  
only if: people must act within 1 hour, situation is life-threatening, and probability > 50%.

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Three of the CAP “coded values” concern the relative priority of the alert:

- **Urgency:** Timeframe for responsive action
- **Severity:** Level of threat to life or property
- **Certainty:** Probability of occurrence

There is a common practice for high priority alerts (sometimes called "Red Alerts"). Typically, that's when urgency, severity, and certainty are all set at the top two levels. That means:

- people must act within one hour,
- the situation is life-threatening, and
- the certainty is above 50%.
With that background, let me highlight a few Benefits of CAP.
Alerting authorities that have not yet implemented CAP still struggle with many separate methods for sending out alerts.

Typically, this includes making phone calls, sending Faxes, sending e-mails, posting to a Web page, and posting to Facebook and Twitter, among others.

Those activities consume valuable time, distracting from the mission of composing accurate and actionable alerts.

With CAP, a single message disseminates quickly over multiple alerting methods.
Emergency managers must assimilate information of many types and from many different sources, at scales ranging from local to provincial, national, and global. Alerts are a big part of that, of course.

Without CAP, this variety of alerts are difficult to get, use, and share, because they are communicated in so many media and formats.

Information gathering and analysis is much easier with CAP alerts.
Here we see CAP alerts displayed on a map interface. This supports the Emergency Management function called "Shared Situational Awareness", or maintaining a "Common Operating Picture".
Trust in an alerting system is eroded when people get alerts not intended for them. This happens often with mass media and systems based on plain text.

With CAP, the alerting area can be precisely defined with polygons or circles in addition to the textual area description.
Many people in harm's way are underserved with current public alerting because they are blind, deaf, cognitively impaired, or they do not understand the language used in the alert.

These issues can be addressed by exploiting the data features of CAP, and with automated translation.
Some types of hazard occur so suddenly that seconds can mean the difference between timely, life-saving alerts and alerts that arrive too late. Examples are: earthquakes, tornadoes, tsunami, flash floods, volcanoes, landslides, avalanches, and terrorism, among others.

CAP alerts can be posted immediately through an online facility that immediately disseminates by many media, sometimes within seconds.

Also, CAP messages are digital. That enables immediate action not only by people but by devices such as sirens, highway signs, train controls, and other automated mechanisms that help save lives.
**A CAP alert is a kind of news story, and you might be thinking of the controversy surrounding "fake news".**
What is an Alerting Authority?

Any organization nationally authorized to perform the function of alerting

U.S. example alerting authorities:

- EPA, Air Quality Alerts
- FEMA, Integrated Public Alert and Warning System
- NOAA, National Weather Service
- NOAA, National Tsunami Warning Center
- USGS, Earthquakes
- USGS, Volcano Hazards Program

CAP-enabled alerting at global scale takes advantage that all countries have official "alerting authorities". For example, the United States has a range of authorities issuing CAP alerts:

Different countries have different policies on being "nationally authorized". But, it is agreed that official sources should be known internationally.
The international Register of Alerting Authorities was set up like a referral service--people can trust a registered alerting authority to the degree they trust the service that registered that authority.

This is the home page of the Register.
Here, we selected a U.S. alerting authority: NOAA’s National Weather Service.

In this case, we see there is a CAP feed URL.
Following that URL, we see CAP alerts disseminated as Internet “news feeds”. There are more than 3,000 of these CAP feeds. There is also a CAP news feed that aggregates across all of those small-scale feeds.
Now I want to talk about the current uptake of CAP.
At global scale, CAP is urged by the World Meteorological Organization (WMO) and commercial firms such as AccuWeather, and The Weather Company.

The International Telecommunication Union (ITU) promotes CAP in its guidance for all "National Emergency Telecommunications Plans".

The International Federation of Red Cross and Red Crescent Societies (IFRC) strongly promotes CAP and it is key to their "Hazards App".

CAP underlies the Google Public Alerts service. This provides alerts to anyone in harm's way using Google search, Google Maps, and so on. The Google Crisis Response Team strongly promotes CAP as well.
Today, 50% of the world’s people live in nations that have at least one official CAP news feed. 25% are in nations actively implementing CAP (India, for example).
Some countries have very many CAP alert sources. For example, the United States Federal CAP system aggregates over 1300 CAP alert feeds. These range across all 50 states, and include many counties and cities.

I do not know how many CAP-enabled systems exist at smaller scales.

Microsoft sells to cities a CAP-enabled product known as "CityNext". IBM also sells to cities a CAP-enabled product, called "Intelligent Operations Center for Emergency Management".
CAP uptake across Least Developed Countries is only 22%--half the uptake percentage across all countries. This is a gross injustice, given that developing countries are the least resilient to severe emergencies.

All of us must do all we can to assure that all LDCs know about CAP. That knowledge is key because CAP can be implemented very easily.
Let me show just how easy CAP implementation can be.
Here we have a cloud-based tool for creating and publishing CAP alerts. Any alerting authority could implement CAP with just this free tool, and some already have.

There is nothing to install--the tool requires nothing more than a Web browser. Anybody can use this as a "Guest" to one of the alerting authorities. Of course, a Guest is not authorized to save draft alerts or to publish alerts.

To use this tool for real, an alerting authority needs to designate which persons are officially authorized to create draft alerts and to publish alerts.
The National Disaster Management Authority of Afghanistan uses this tool to create CAP alerts and publish them to their own CAP alert feed.

Whenever they put out a new alert, that alert is disseminated by all subscribers. That can include all manner of local, national, regional, and global subscribers—sister agencies, news media, mobile networks, Red Cross/Red Crescent, Accuweather, Google, and so on.

You can see right now this tool is initialized for 140 alerting authorities across 111 countries, with an average of two languages per country.

Let me know if your alerting authority, your country, or your preferred language is missing. I would be glad to add it.
One of the subscribers to CAP alert feeds is this global-scale Alert Hub. The "Filtered Alert Hub" is also free, and it is all open source freeware. Here is a screen shot of its web site. The page includes links to current CAP alerts, filtered output subscription feeds, the input CAP alert feeds, and a wiki page about the project.
These were the key points of this presentation.
At this link you will find much more about CAP.
Here is my e-mail address--please feel free to contact me.