

The Common Alerting Protocol (CAP) Standard: Worldwide Applications

Presented 19 May 2011 in Venice, Italy by
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for the 2nd International Conference on Interoperability

**The Citizen at the centre ...
Integration of Rescue Services**

Today's Public Warning Patchwork

Every government has various public warning systems:

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

New Strategy for Public Warning

- Governments are realizing it makes no sense to build separate public warning systems for each particular type of emergency and for each particular communications medium
- Instead, efficiency and effectiveness argue for addressing public warning requirements with all-media coverage across all-hazards through interoperability standards

Interoperability

Definition:

*differences among systems
are not a barrier to a task
that spans those systems*



"What few things
must be the same
so that everything
else can be different"

What is CAP?

Common Alerting Protocol (CAP), ITU-T Recommendation X.1303, 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, Disease Outbreaks, Air Quality Warnings, Transportation Problems, Power Outages ...*)
- ✧ **to anyone:** the public at large; designated groups (civic authority, responders, etc.); specific people

Presentation Outline

- Example tool for creating alerts in CAP format
- Key features of CAP message
- Notes on CAP Implementations
- Register of Alerting Authorities

Editing Tool for Alerts in CAP Format

Draft Only **20070815185348.xml** Flash flood Warning for South Central San Bernardino, Western Riverside, and North Central San Diego Counties in Southwest California

Draft Only **20110125045333.xml** Geomagnetic Storm Alert

Draft Only **20110125050647.xml** Mount St Helens Volcano Advisory (aviation color code ORANGE)

Draft Only **20110205030309.xml** Magnitude 7.8 Rat Islands, Aleutian Islands, Alaska

As Posted **20110202083709.xml** Geomagnetic Storm Alert

As Posted **20110202100830.xml** Flash flood Warning for South Central San Bernardino, Western Riverside, and North Central San Diego Counties in Southwest California

As Posted **20110205025759.xml** Mount St Helens Volcano Advisory (aviation color code ORANGE)

Description: Current status is Volcano Advisory (Alert Level 2); aviation color code ORANGE: Growth of the new lava dome inside the crater of Mount St. Helens continues, accompanied by low rates of seismicity, low emissions of steam and volcanic gases, and minor production of ash. During such eruptions, changes in the level of activity can occur over days to months. The eruption could intensify suddenly or with little warning and produce explosions that cause hazardous conditions within several miles of the crater and farther downwind. Small lahars could suddenly descend the Toutle River if triggered by heavy rain or by interaction of hot rocks with snow and ice. These lahars pose a negligible hazard below the Sediment Retention Structure (SRS) but could pose a hazard along the river channel upstream.

Instruction: Wind forecasts from the National Oceanic and Atmospheric Administration (NOAA), coupled with eruption models, show that any ash clouds that rise above the crater rim today would drift principally eastward. Under current eruptive conditions, small, short-lived explosions may produce ash clouds that exceed 30,000 feet in altitude. Ash from such events can travel 100 miles or more downwind.

As Posted **20110205030309.xml** Magnitude 7.8 Rat Islands, Aleutian Islands, Alaska

Editing Tool for Alerts in CAP Format

Start Over at login screen

identifier

sender

sent

status msgType scope

language: category:

event:

urgency severity certainty

senderName:

headline

description

Current status is Volcano Advisory (Alert Level 2); aviation color code ORANGE: Growth of the new lava dome inside the crater of Mount St. Helens continues, accompanied by low rates of seismicity, low emissions of steam and volcanic gases, and minor production of ash. During such eruptions, changes in the level of activity can occur over days to months. The eruption could intensify suddenly or with little warning and produce explosions that

instruction

Wind forecasts from the National Oceanic and Atmospheric Administration (NOAA), coupled with eruption models, show that any ash clouds that rise above the crater rim today would drift principally eastward. Under current eruptive conditions, small, short-lived explosions may produce ash clouds that exceed 30,000 feet in altitude. Ash from such events can travel 100 miles or more downwind.

web

image

contact

areaDesc

Skamania County, Washington, in the Pacific Northwest region of the United States (96 miles south of Seattle, Washington and 53 miles northeast of Portland, Oregon)

circle

Circle format: latitude,longitude<space>radius

[Make circle using map](#)

polygon

Polygon format: (First and last point must be the same!)

lat-1,long-1 lat-2,long-2 lat-3,long-3 lat-4,long-4 lat-1,long-1

[Make rectangle using map](#)

geocode

Geocode format: 'type' = 'value'

Save this CAP Alert in drafts directory and send a copy to me by Email

```
<?xml version="1.0" encoding="UTF-8"?>
<cap:alert xmlns:cap="urn:oasis:names:tc:emergency:cap:1.1">
  <cap:identifier>urn:oid:2.49.0.3.1.2011.3.14.9.26.21</cap:identifier>
  <cap:sender>echristian@wmo.int</cap:sender>
  <cap:sent>2011-03-14T09:26:21-00:00</cap:sent>
  <cap:status>Test</cap:status>
  <cap:msgType>Alert</cap:msgType>
  <cap:scope>Public</cap:scope>
  <cap:info>
    <cap:language>en-US</cap:language>
    <cap:category>Met</cap:category>
    <cap:event>Message from USGS Volcanoes Program</cap:event>
    <cap:urgency>Expected</cap:urgency>
    <cap:severity>Minor</cap:severity>
    <cap:certainty>Possible</cap:certainty>
    <cap:senderName>USGS Volcanoes Program, Craig Weaver</cap:senderName>
    <cap:headline>Mount St Helens Volcano Advisory (aviation color code ORANGE)
  </cap:headline>
    <cap:description>Current status is Volcano Advisory (Alert Level 2); aviation
    color code ORANGE: Growth of the new lava dome inside the crater of Mount St.
    Helens continues, accompanied by low rates of seismicity, low emissions of steam
    and volcanic gases, and minor production of ash. During such eruptions, changes
    in the level of activity can occur over days to months. The eruption could
    intensify suddenly or with little warning and produce explosions that cause
    hazardous conditions within several miles of the crater and farther downwind.
    Small lahars could suddenly descend the Toutle River if triggered by heavy rain
    or by interaction of hot rocks with snow and ice. These lahars pose a negligible
    hazard below the Sediment Retention Structure (SRS) but could pose a hazard along
    the river channel upstream.</cap:description>
    <cap:instruction>Wind forecasts from the National Oceanic and Atmospheric
    Administration (NOAA), coupled with eruption models, show that any ash clouds
    that rise above the crater rim today would drift principally eastward. Under
    current eruptive conditions, small, short-lived explosions may produce ash clouds
    that exceed 30,000 feet in altitude. Ash from such events can travel 100 miles or
    more downwind.</cap:instruction>
    <cap:web>http://vulcan.wr.usgs.gov/Volcanoes/MSH/Eruption04/</cap:web>
    <cap:contact>Craig Weaver 1-206-553-0627</cap:contact>
    <cap:resource>
      <cap:resourceDesc>Image file</cap:resourceDesc>
      <cap:uri>http://www.fs.fed.us/gpnm/volcanocams/msh/</cap:uri>
    </cap:resource>
    <cap:area>
      <cap:areaDesc>Skamania County, Washington, in the Pacific Northwest region
      of the United States (96 miles south of Seattle, Washington and 53 miles
      northeast of Portland, Oregon</cap:areaDesc>
      <cap:circle>46.2,-122.2 0</cap:circle>
    </cap:area>
  </cap:info>
</cap:alert>
```

Make circle using map

circle

46.225,-120.921 99.55

Circle format: latitude,longitude<space>radius

[Make circle using map](#)

geocode

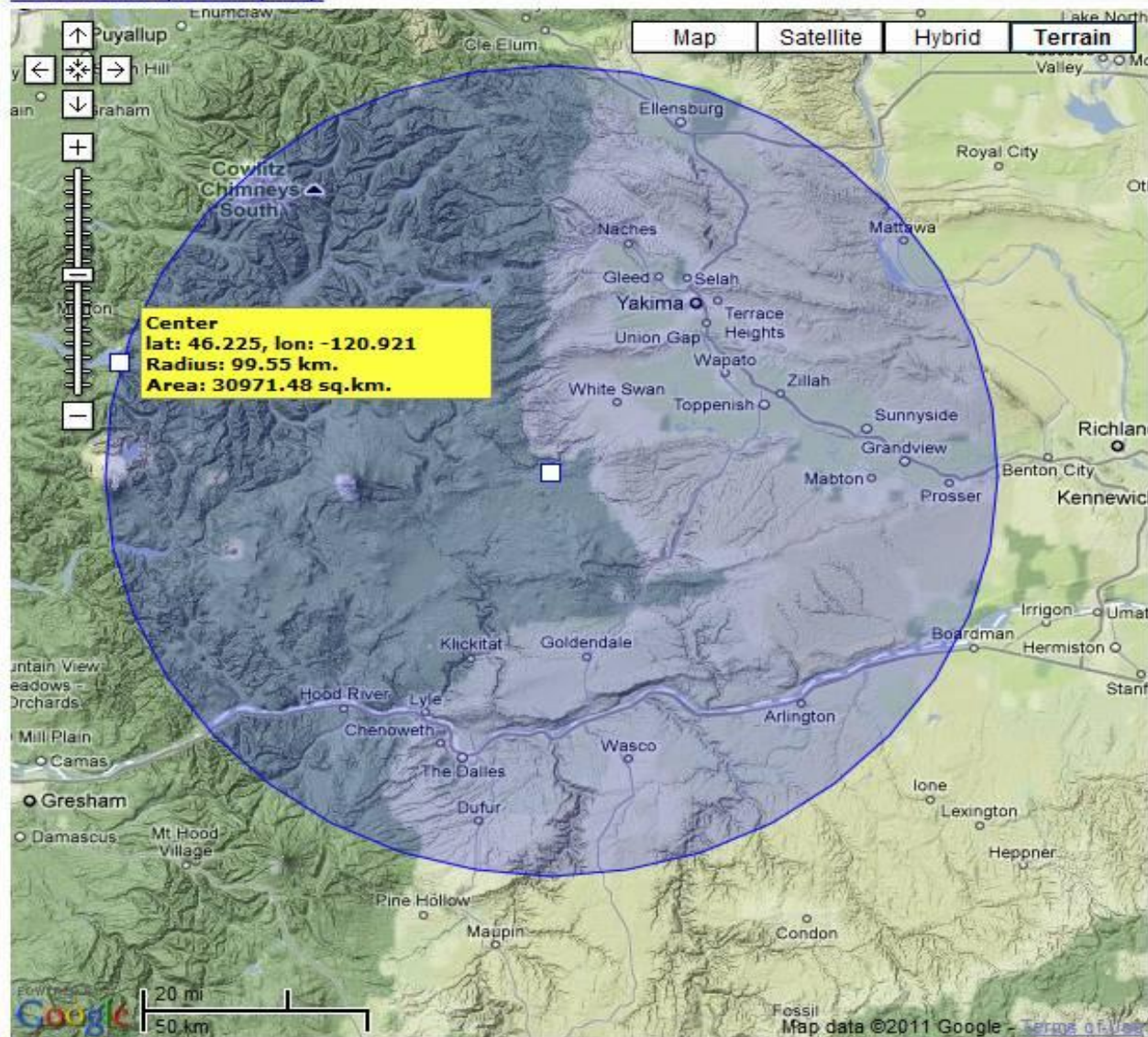
Geocode format: 'type' = 'value'

polygon

Polygon format: (First and last point must be the same!)

lat-1,long-1 lat-2,long-2 lat-3,long-3 lat-4,long-4 lat-1,long-1

[Make rectangle using map](#)



Editing Tool for Alerts in CAP Format

Save this CAP Alert in drafts directory and send a copy to me by Email

```
<?xml version="1.0" encoding="UTF-8"?>
<cap:alert xmlns:cap="urn:oasis:names:tc:emergency:cap:1.1">
  <cap:identifier>urn:oid:2.49.0.3.1.2011.3.14.9.26.21</cap:identifier>
  <cap:sender>echristian@wmo.int</cap:sender>
  <cap:sent>2011-03-14T09:26:21-00:00</cap:sent>
  <cap:status>Test</cap:status>
```

Start Over at login screen

CAP message sent by e-mail to **echristian@wmo.int**

Publish this alert message to the RSS news feed?

Start Over at login screen

CAP alert saved to alerts directory as: **20110314092621.xml**

RSS news feed for alerts has also been updated.

Return to alert message editing

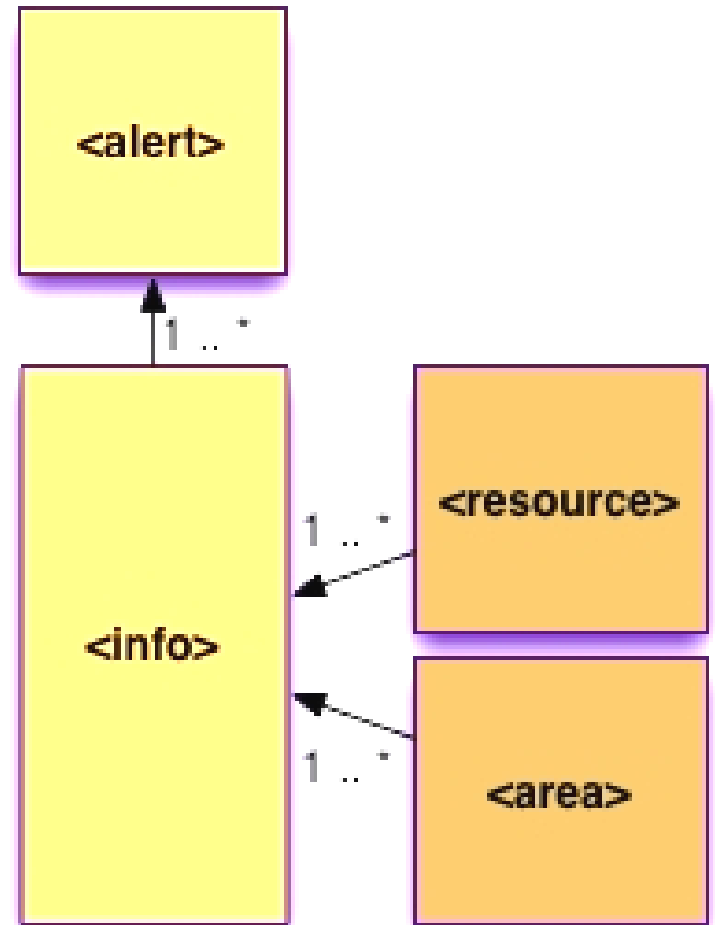
Presentation Outline

- Example tool for creating alerts in CAP format
- ➡ Key features of CAP message
- Notes on CAP Implementations
- Register of Alerting Authorities

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

- **Date/Time**
- **Geographic Area**
(polygon, circle, geographic codes)
- **Status**
(Actual, Exercise, System, Test)
- **Scope**
(Public, Restricted, Private)
- **Type**
(Alert, Update, Cancel, Ack, Error)

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, Unknown)

- **Severity:** Level of threat to life or property
(Extreme, Severe, Moderate, Minor, Unknown)

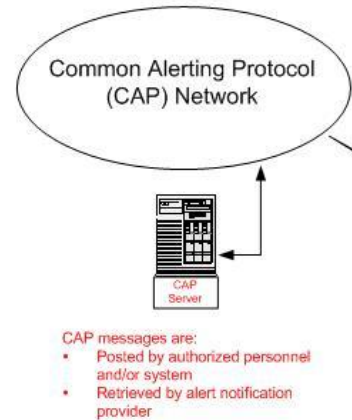
- **Certainty:** Probability of occurrence
(Very Likely, Likely, Possible, Unlikely, Unknown)

Presentation Outline

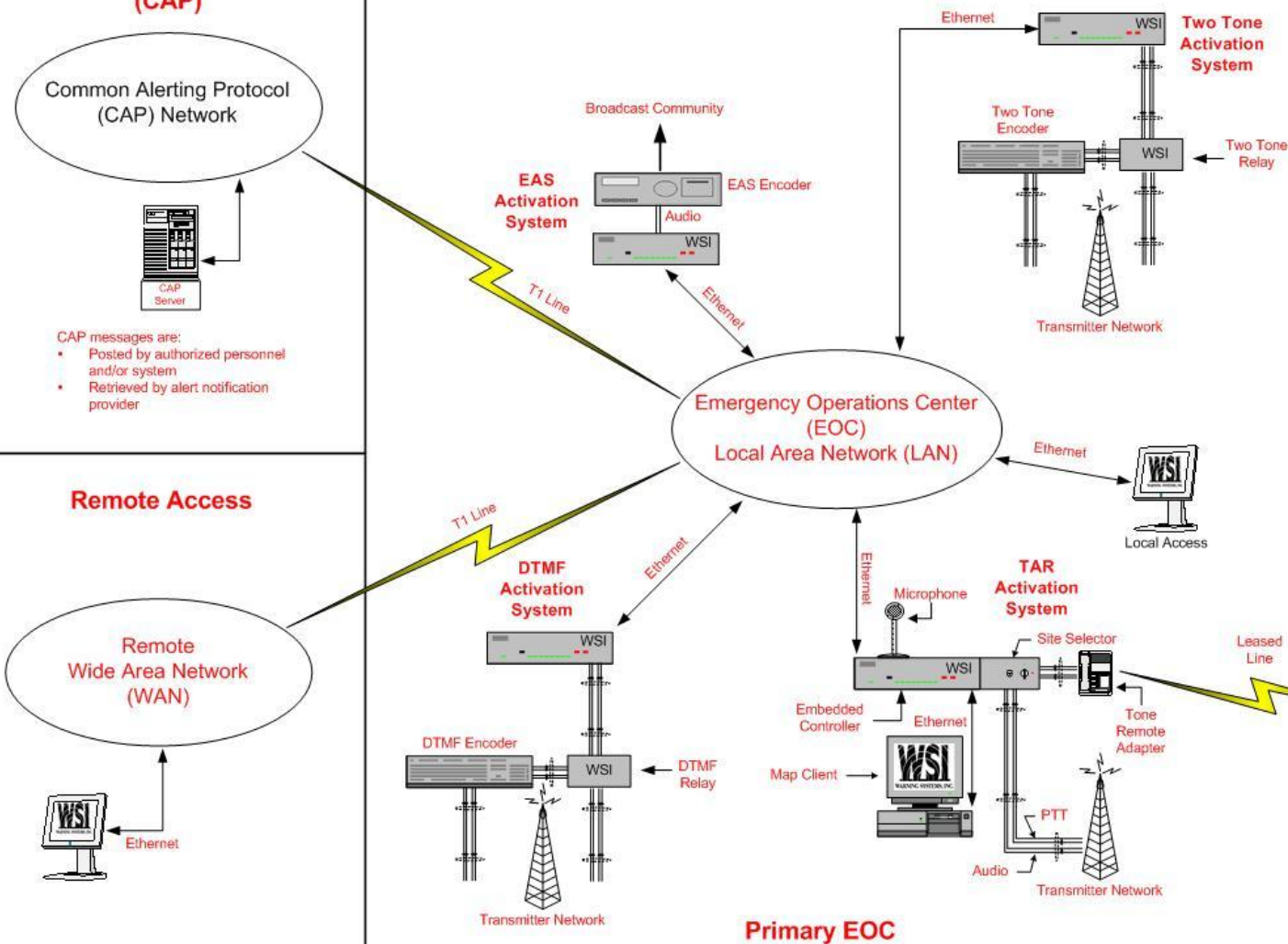
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Typical CAP-based Alerting System

Common Alerting Protocol (CAP)



Web Based OnAlert® Multi-System Activation Options



Notes on CAP Implementations 2011

Based on the recent CAP
Implementation Workshop

- **CAP and Google Crisis Response**
- **CAP Support in ESRI's Open Source GeoPortal Server**
- **CAP in the United States**



Local forecast by
"City, St"

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

Climate

Past Weather

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.

CAP Overview

CAP is an XML-based information standard used to facilitate emergency information sharing and data exchange across local, state, tribal, national and non-governmental organizations of different professions that provide emergency response and management services. NWS CAP messages are produced in the [CAP v1.1 format defined by the Organization for the Advancement of Structured Information Standards \(OASIS\)](#).

Developers and re-packagers of NWS CAP messages should review the [Technical Notes](#) about the NWS CAP 1.1 Messages.

ATOM Overview

ATOM is an XML based document format for syndicating news and other timely news-like information. The NWS ATOM feeds act as an index for active CAP messages by state, county, and NWS forecast zones to aid the automated dissemination of this information.

ATOM provides headlines, URLs to the source document and brief description information in an easy to understand and use format. Software libraries exist to read the ATOM format and present ATOM headlines on webpages, personal computer workstations, and mobile devices. For consumers of these feeds as indexes to the CAP messages, the ATOM feeds contain several CAP data fields to assist in the tracking of available CAP messages with the goal of reducing the need to query the complete CAP message at every refresh.

Global Disaster Alert and Coordination System

GDACS is a Joint Initiative of the United Nations and the European Commission. GDACS is collecting data and information from scientific and media sources in participation with European Commission Joint Research Centre, UNOSAT and OCHA ReliefWeb. Financially supported for 2008-2009 by EC MIC

The screenshot displays the GDACS website interface. At the top, the browser address bar shows 'http://www.gdacs.org/'. The page header includes the GDACS logo and a description: 'The Global Disaster Alert and Coordination System provides near real-time alerts about natural disasters around the world and tools to facilitate response coordination, including media monitoring, map catalogues and Virtual On-Site Operations Coordination Centre.'

The main content area is divided into several sections:

- Alerts:** Includes links for 'Current events', 'Archive', 'My alert account', and 'About alerts'.
- Current Disaster Events:** A list of recent events with icons and dates:
 - Earthquake Papua New Guinea 15 hours ago
 - Earthquake 21 hours ago
 - Earthquake Afghanistan 14 May 2011
 - Earthquake Japan 13 May 2011
 - Earthquake Costa Rica 13 May 2011
 - Cyclone AERE-11 11 May 2011
 - Flood Philippines 8 May 2011
 - Flood Brazil 8 May 2011
 - Flood USA 1 May 2011
 - Flood USA 1 Apr 2010
- Highlighted disasters:** A section for 'AUTOMATIC IMPACT REPORT (JRC)' showing:
 - Spain (M 5.1, depth 2km, 1 million people)
 - EMSC—Wednesday, May 11, 2011 4:47:00 PM UTC
 - EQ-2011-000050-ESP
- Documents from other organisations:** A section for 'AUTOMATIC IMPACT REPORT (JRC)' showing:
 - Japan (M 9.0, depth 32km, 318000 people)
 - NEIC—Friday, March 11, 2011 5:46:00 AM UTC

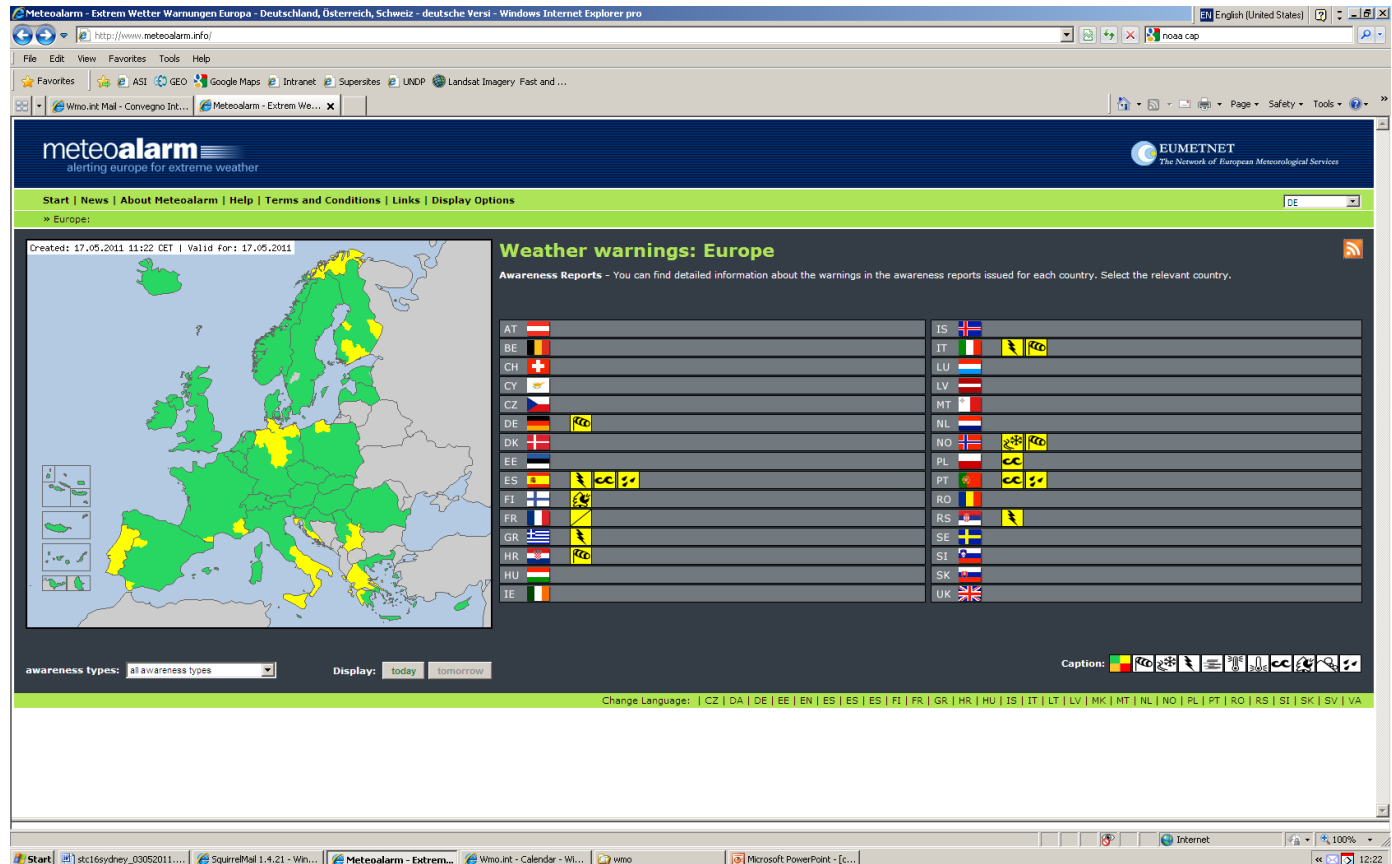
The bottom of the page shows a taskbar with various open applications, including 'stc16sydney_03052011...', 'SquirrelMail 1.4.21 - Win...', 'Global Disaster Alert...', 'Wmo.int - Calendar - Wi...', 'wmo', and 'Microsoft PowerPoint - [C...'.

Notes on CAP Implementations 2011

- **Satellite Alert Channel**
- **CAP worldwide over GTS**
- **CAP across Europe: MeteoAlarm**
- **CAP in Germany**
- **CAP in Sri Lanka and India**

Meteoalarm.eu

Integrates all important severe weather information originating from the official National Public Weather Services across a large number of European countries.



Notes on CAP Implementations 2011

- **CAP in South Africa**
- **CAP in Canada**
- **CAP Pilot System in China**
- **CAP for Disasters in Japan**
- **CAP in Australia**

Notes on CAP Implementations 2011

- **Caribbean CAP network**
- **CAP in New Zealand**
- **Severe Weather Forecasting Demonstration Project**
- **Others**

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- Example tool for creating alerts in CAP format
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- ➡ Register of Alerting Authorities

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 WMO Register of Alerting Authorities is a reference to address that lack


Register of Alerting Authorities


- Developed for WMO Public Weather Services
- WMO Members can identify their officially recognized alerting authorities
- Each Register entry asserts that a particular source of alert messages is regarded by a WMO Member as authoritative for particular categories of hazards over a particular area
- Register includes URL's for forecasts and CAP messages
- Aggregators of alert messages and others can subscribe to a news feed to stay current with any changes to the register

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

Review of Key Points

1. Rationale for standards-based, all-hazards, all-media alerting
2. Key worldwide standard is ITU-T Recommendation X.1303, Common Alerting Protocol (CAP)
3. Importance of structure and coded values in contrast to free-text
4. Typical roles of WMO Members in all-hazards alerting
5. WMO register of Alerting Authorities

Questions?

Contact: Eliot Christian <echristian@wmo.int>

World Meteorological Organization

- WMO Congress (2007) requested the Secretary-General to improve the exchange of high priority data and products in support of a virtual all hazards network
- WMO Executive Council (2008) requested Commission for Basic Systems to follow up on CAP implementation as a matter of urgency
- WMO Executive Council (2009) asked the Secretariat, and invited all Members and Regional Associations, to spare no efforts in ensuring that the implementation of CAP benefits all user communities

ITU Resolution 136

"The Plenipotentiary Conference [...] resolves [...] to promote implementation by appropriate alerting authorities of the international content standard for all-media public warning, in concert with ongoing development of guidelines by all ITU Sectors for application to all disaster and emergency situations"

U.S. Federal Communications Commission

"Washington, D.C. - The Federal Communications Commission today adopted [an Order that] requires [Emergency Alert System (EAS)] participants to accept messages using Common Alerting Protocol (CAP) [...]
The use of CAP will help to ensure the efficient and rapid transmission of EAS alerts [...] in a variety of formats (including text, audio and video) and via different means (broadcast, cable, satellite, and other networks) [...]
In addition, the Order expands the EAS system by requiring participation by wireline video providers."