



# **MALDIVES METEOROLOGICAL SERVICE (MMS)**

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Male' Republic of Maldives

## **REQUEST FOR PROPOSAL**

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### **Design and Development of Maldives Meteorological Service Mobile Application and Alert system”**

[May 2018]

**Maldives Meteorological Service Hulhule'**

## 1) Introduction

Maldives Meteorological Services (MMS) has received assistance from Italian Ministry of Environment, Land and Sea towards strengthening Maldives' efforts to address the impacts of climate change and reduce climate vulnerabilities and associated impacts and risks. And MMS intends to apply part of the proceeds to strengthen the capacity of MMS by implementing the project "Design and Development of Maldives Meteorological Service Mobile Application and Alert system"

## 2) Objective

The key outcomes of the project are;

- a) Design and Development of MMS mobile application for iOS and Android
- b) Design and Development of alert system (weather, earthquake and tsunami)

The mobile application aims towards extending MMS services, to the mobile user community to allow them easy access to weather information of the country. MMS aims to provide the general weather situation of the country and the forecast.

Weather alerts, are to be issued by a dedicated web portal which is compliant to the Common Alerting Protocol (CAP) standard, and enables push notifications to the mobile user community while also disseminating alerts through other means such as social media, email and SMS.

## 3) Scope and Methodology

Based on the above explanations and objectives of the project, MMS seeks to engage competent consultant to;

- a) Design and Develop a mobile app to be used by the general public on both Android and iOS to enable access to weather information provided by MMS
- b) Design and Develop a web based CAP system as per follow OASIS Common Alerting Protocol Version 1.2 specification and Google Public Alerts CAP v1.0 specification
- c) Work with MMS for a period of 2 year to make improvements and bug fixes to the app after the initial release.
- d) Provide end user training for the use of mobile application and alert system.

## 4) Essential skills and qualifications

- a) The proponent must have minimum of 3 years work experience in mobile apps design and development (Android, iOS).

- b) Ability to design the structure of the database, write appropriate interfaces for data entry, and ensure data quality and security.
- c) The consultant must show proven experiences of successfully executing similar assignments.
- d) Maturity and professional ability to handle sensitive information and ability to respect the confidentiality of such information while working with MMS and even after the contract ends.
- e) Fluency in English

## 5) Mandatory Documents and Requirements

- a) Financial Proposal
  - Form 1 – Proposal Submission Form
  - Form 2 – Financial Break down
- b) Form 3 – Work Schedule
- c) CD containing the soft copy in PDF format of the proposal
- d) GST Registration Certificate (If applicable)
- e) Company Registration Certificate (If a proponent is a company or a firm)

## 6) Evaluation Criteria

### 6.1. Pre Evaluation

Pre Evaluation is a preliminary evaluation done based on the documentation requirement before moving on to the Technical Evaluation. Pre Evaluation determines if bidder is substantially responsive to the terms of this ToR as specified below;

- Bidder conforms to all requirements identified under Section 5. Mandatory Documents and requirements.

Substantially non-responsive bids at this pre evaluation stage will be rejected from further stages of evaluation.

Substantially responsive bids at this pre evaluation stage shall be qualified for further evaluation (Technical Evaluation).

## 6.2. Technical Evaluation

The offer proposal should outline a comprehensive, technical overview, including the extent to which it provides effective solutions for the services required. Technical proposal must include the following clear, complete and comprehensive components:

- Implementation methodology for developing the mobile app;
- Design samples for the mobile app (Only some of the visual attributes of the proposed application (such as shapes of elements, basic visual hierarchy, UI elements etc.)
- Approach for app maintenance, quality assurance, as well as bugs and risk mitigation; and
- Approach for sustainability and technical support.
- Bidder's capability to implement this project by comparing to the proponent's profile, experience in the relevant field and background of key personals allocated for the project and proposed methodology.

Note: Experience would only be considered for the reference letters submitted for the projects completed within the last 05 years and the letter should be indicated with the following

- Date and duration of project completion
- Scope or description of the work
- Name of the client

## 6.3. Financial Evaluation

Financial evaluation will be done with parallel to the technical evaluation and proponents with the lowest price scores the highest point in this category.

## 6.4. Point system for the evaluation is:

#	Detail	Point
1	Pricing	60%
2	Capabilities, Expertise, Experience & Qualification of the company and personals	10%
3	<ul style="list-style-type: none"><li>• Proposed features and functionalities of the mobile app and alert platform.</li><li>• Implementation methodology for developing the mobile application</li></ul>	20%
4	Design samples for the mobile app (Only some of the visual attributes of the proposed application (such as shapes of elements, basic visual hierarchy, UI elements etc.)	05%
5	Approach for app maintenance, quality assurance, as well as bugs and risk mitigation	05%

## 6.5. Final Evaluation

Proponents who doesn't score **minimum 80%** from total evaluation will be disqualified

## 7) Deliverables

The deliverables shall include the following:

- a) Submit Mobile App designs as per the requirements listing under technical requirements. Conduct an audience analysis with MMS technical team to inform the design of the app, database and the CAP.
- b) Published mobile application available for both Android and IOS platforms.
- c) Web based CAP system developed as per OASIS Common Alerting Protocol Version 1.2.
- d) All software codes for the app and CAP system in a softcopy format.
- e) Ongoing maintenance for the mobile app and CAP system.

## 8) Timeframe

- a) The consultant shall deliver the Mobile Application and CAP system according the requirements in these TOR within **120 days** from the commencement.
- b) Excluding the duration mentioned above in part (a), the consultant will initiate test phase and debugging for **30 days** effective from the date of delivery.

## 9) Payment Schedule

### **Payment**

The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:

**(a) Advance Payment:** Fifteen (15) percent of the Contract Price (Excluding the value for maintenance) shall be paid on the request of the contractor and subject to the Approval of the Ministry of Finance and Treasury of the Republic of Maldives.

The Payments succeeding the Advance Payment shall be paid after the deduction of the 15% against the Advance Payment and up to the total

amount of the Advance Payment according to the to the Public Procurement Regulation (February 2017) of the Republic of Maldives.

#	Payment Description and Requirements	Allocation
1	Approvals of application designing	20%
2	Development of application and CAP system	60%
3	Bug Fixing	20%
4	Maintenance	Proposed value for Maintenance

Note: Allocations from # 1 to 3 is the total percentage distribution of total proposed figure except for the maintenance

Proposed value for the maintenance will be payable separately once the development phase and debugging phase is completed and MMS gives approvals to the products.

## 10) License and Copyright

MMS shall hold all copyrights and license(s) of the app, database and CAP systems.

## 11) Maintenance:

The contractor shall provide maintenance for a period of 2 years.

## 12) Technical Requirements:

### 12.1 Weather Mobile Application:

#### 12.1.1 Platform and Devices:

Support for the latest firmware and devices (Smartphone) of iOS and Android.

#### 12.1.2 Language:

Support for both Dhivehi (primary language for app access within Maldives) and English language.

#### 12.1.3 Visual Design:

The UI of the application should be presentable, so that the end user will have a better experience as opposed to those where it is less intuitive. The UI should be elegant yet minimal, allowing tasks to be completed with much ease. Designing should be considered with the following features;

- Style: Use minimalistic design, icon set, and colors (concise, direct, clear information at a glance)
- Presentation: We are looking to present the information on application using less text, but with simple graphical elements, only the information which is needed.

#### 12.1.4 Backend:

Backend of the mobile app shall have the following features:

- Change the labels of the app in both languages.
- Change the directories of the data sources like change the FTP settings for Radar Images.
- View different analytics of the app like hits and usage count of different sections of the app.
- Administrate different settings of the app.
- Update daily weather bulletin

#### 12.1.5 Data Sources:

The data needed for the app is retrieved from the data sources provided by MMS.

- Real-time Weather: Data required to display weather information are collected from the Automatic Weather Stations installed. Data from these stations are stored in an SQL database in MMS.
- Weather Forecast: Forecast data are retrieved from the forecasting models of MMS. Model data are generated every day in grib2 format and stored in an FTP server.

- Weather Images: Weather images include satellite image which is collected every 30 min, radar images which is usually real-time or near real-time.

#### 12.1.6 Key Features for the application:

##### a) Real-time Weather

Real-time weather information based on location. This section displays weather icon and additional parameters when required. Tide graph for the day and sun/moon times are also displayed when in the detailed area of the page. MMS will provide access to the data sources required.

##### b) Area Management:

The app shall allow MMS staff to create locations (polygons or circles) and save them. Only these locations are available on the app for area selection. If a user's location is detected inside these areas, this area name is displayed on the app.

##### c) Real-time on a Map:

Near real-time map view of all the available automatic stations showing current weather condition (Weather Icon). Moreover, additional parameters are displayed if the user clicks on the station for more details. Data for these are collected from the data sources provided by MMS.

##### d) Weather Forecasts:

In this section there are two types of forecasts. Hourly weather forecast for the next 24 hours and daily weather forecast for the next 5 days. On hourly forecast, only general parameters and average weather condition (Weather Icon) for every hour is displayed.

5 Day forecast section shall display average weather condition (Weather Icon preferred) for that particular day. However, when the user selects a day, more information like Sun/Moon times for the day, tide graphs showing the lows and highs for the day shall be displayed.

##### e) Daily Weather Bulletin:

MMS issues daily bulletin which is an overview of the weather forecast for the day. The app shall display this weather bulletin in both the languages and provide interface to update it.

##### f) Display Weather Images:

Display radar, satellite and NWP image animations with time (+/- 3 hours) slider.

##### g) Recent Earthquake Events:

MMS provides information about specific earthquake events to the public. These events needed to be displayed on the map (About most recent 5 events).



h) Push Notification:

All alerts are generated and disseminated from the CAP Alert System of MMS. Once an alert is issued, the app shall send push notification to all the users. Moreover, push notifications are also sent when:

- Critical weather updates.
- Announcements from MMS.
- For Specific Earthquake events.

i) CAP on MAP:

Display CAP alerts on a map with alert issued area highlighted on the map.

12.1.7 Maintenance:

- Monthly Maintenance of application on iOS and Android, and their backend.
- Update the application to be compatible with new version of the OS of android and iOS.
- Update the application and backend to be compatible with newer versions of third party libraries and services.
- Regular Data backup and restore.
- Troubleshooting if any bug is reported by the client.
- Figure out issues with code and report to the customer, and scope out efforts to fix the same.
- Upload newer versions of the apps to relevant store.

12.1.8 Hosting

- The contractor shall host and publish the android and iOS app to the respective platform (play store, app store) for a period of 3 years.
- The backend of mobile application and web application shall be hosted on Google Firebase for a period of 3 years.
- The backend of mobile application and web application shall be hosted on Google Firebase for a period of 3 years
- For any reason, if the requested hosting configuration is not sufficient the contractor may propose and quote alternative hosting arrangements with justification as to why this alternative is better.
- MMS requires the hosting service to be reliable, robust, scalable and on cloud infrastructure.

**Note: We will provide google android iOS developer account. Contractor shall publish the application to the app store and the play store under the MMS provided account.**

**Contractor shall not include publishing or hosting platform charges to the apple and android store, as MMS already provides this (Contractor is free to quote for the service to publish the application to the app and play store.**

## 12.2 CAP System:

### 12.1.9 General

CAP System shall be a web application. The system shall follow OASIS Common Alerting Protocol Version 1.2 specification and Google Public Alerts CAP v1.0 specification for CAP implementation in the system.

### 12.1.10 Alert Management:

All alerts generated/updated through the system shall conform to the specifications mentioned.

### 12.1.11 Alert Templates:

The system shall enable template management for the CAP alerts. The users can create predefined templates and save them in the system. These templates are then used to generate CAP alerts instantly. Users can also create and save areas (polygons or circles) and select them when creating a CAP alert.

### 12.1.12 User Authentication:

Users shall be authenticated before accessing the system. System shall be a role based system where users are allowed to access the different components of the system based on the roles assigned to them. Some of the roles may include Alert Management, Alert Approval, User and Roles Management etc.

### 12.1.13 Contact Management:

The system shall support contact and group management. These contacts are used to disseminate alerts through SMS or Email.

### 12.1.14 Alert Dissemination:

The system shall support dissemination of alerts via SMS (closed user group), Email (closed user group). Also alerts generated through the system is sent to the mobile application via push notification. All alerts are disseminated only when an authorized user approves it. MMS will provide SMS API and SMTP details.

# **ANNEX 1: STANDARD FORMS**

# 1) FORM -1: PROPOSAL SUBMISSION FORM

To: .....

Dear Sirs:

We, the undersigned, offer to “Development of Mobile App and Common Alerting Protocol (CAP)” in accordance with your Term of Reference dated ..... and our Proposal. We are hereby submitting our Proposal; our financial offer is for the sum of ..... which is inclusive of the local taxes.

We hereby declare that all the information and statements made in this Proposal are true and accept that any misinterpretation contained in it may lead to our disqualification.

If negotiations are held during the period of validity of the Proposal, we undertake to negotiate on the basis of the proposed staff. Our Proposal is binding upon us and subject to the modifications resulting from Contract negotiations.

We undertake, if our Proposal is accepted, to initiate the services and fulfill the requirements of the terms of reference.

We understand you are not bound to accept any Proposal you receive.

We remain,

Yours sincerely,

Authorized Signature: .....

Name and Title of Signatory: .....

Name of Firm: .....

Address: .....

## 2) FORM-2: FINANCIAL BREAKDOWN

#	Description	MVR
1	Designing MMS Mobile Application and CAP system	
2	Developing MMS Mobile Application and CAP system	
3	Hosting for 3 Years	
4	Debugging	
5	Ongoing Maintenance for 2 Years	
<b>Sub Total</b>		
<b>GST 6%</b>		
<b>Total with GST 6%</b>		

Indicate the total cost with detail cost to be paid in Maldivian Rufiyaa.

Note: The total contract price should be quoted inclusive of Goods and Services Tax (GST) as per the GST Legislation and Circulars





# Common Alerting Protocol Version 1.2

## OASIS Standard

01 July 2010

### Specification URIs:

#### This Version:

<http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html>  
<http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.pdf>  
<http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.doc> (Authoritative)

#### Previous Version:

<http://docs.oasis-open.org/emergency/cap/v1.2/cs01/CAP-v1.2-cs01.html>  
<http://docs.oasis-open.org/emergency/cap/v1.2/cs01/CAP-v1.2-cs01.pdf>  
<http://docs.oasis-open.org/emergency/cap/v1.2/cs01/CAP-v1.2-cs01.doc> (Authoritative)

#### Latest Version:

<http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.html>  
<http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.pdf>  
<http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.doc> (Authoritative)

### Technical Committee:

OASIS Emergency Management TC

### Chair:

Elysa Jones, Warning Systems, Inc.

### Editor:

Jacob Westfall, Individual

### Related work:

This specification is related to:

- OASIS Standard CAP-V1.1, October 2005 [http://www.oasis-open.org/committees/download.php/15135/emergency-CAPv1.1-Corrected\\_DOM.pdf](http://www.oasis-open.org/committees/download.php/15135/emergency-CAPv1.1-Corrected_DOM.pdf)
- OASIS Standard CAP-V1.1, Approved Errata October 2007 <http://docs.oasis-open.org/emergency/cap/v1.1/errata/CAP-v1.1-errata.pdf>

### Declared XML Namespace:

urn:oasis:names:tc:emergency:cap:1.2

### Abstract:

The Common Alerting Protocol (CAP) is a simple but general format for exchanging all-hazard emergency alerts and public warnings over all kinds of networks. CAP allows a consistent warning message to be disseminated simultaneously over many different warning systems, thus increasing warning effectiveness while simplifying the warning task. CAP also facilitates the detection of emerging patterns in local warnings of various kinds, such as might indicate an undetected hazard or hostile act. And CAP provides a template for effective warning messages based on best practices identified in academic research and real-world experience.

### Status:

This document was last revised or approved by the Emergency Management TC on the above date. The level of approval is also listed above. Check the "Latest Version" or "Latest Approved Version" location noted above for possible later revisions of this document.

Technical Committee members should send comments on this specification to the Technical Committee's email list. Others should send comments to the Technical Committee by using the "Send A Comment" button on the Technical Committee's web page at <http://www.oasis-open.org/committees/emergency/>.

For information on whether any patents have been disclosed that may be essential to implementing this specification, and any offers of patent licensing terms, please refer to the Intellectual Property Rights section of the Technical Committee web page (<http://www.oasis-open.org/committees/emergency/ipr.php>).

The non-normative errata page for this specification is located at <http://www.oasis-open.org/committees/emergency/>.



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# 1 Introduction

## 1.1 Purpose

The Common Alerting Protocol (CAP) provides an open, non-proprietary digital message format for all types of alerts and notifications. It does not address any particular application or telecommunications method. The CAP format is compatible with emerging techniques, such as Web services, as well as existing formats including the Specific Area Message Encoding (SAME) used for the United States' National Oceanic and Atmospheric Administration (NOAA) Weather Radio and the Emergency Alert System (EAS), while offering enhanced capabilities that include:

- Flexible geographic targeting using latitude/longitude shapes and other geospatial representations in three dimensions;
- Multilingual and multi-audience messaging;
- Phased and delayed effective times and expirations;
- Enhanced message update and cancellation features;
- Template support for framing complete and effective warning messages;
- Compatible with digital signature capability; and,
- Facility for digital images and audio.

Key benefits of CAP will include reduction of costs and operational complexity by eliminating the need for multiple custom software interfaces to the many warning sources and dissemination systems involved in all-hazard warning. The CAP message format can be converted to and from the “native” formats of all kinds of sensor and alerting technologies, forming a basis for a technology-independent national and international “warning internet.”

## 1.2 History

The National Science and Technology Council report on “Effective Disaster Warnings” released in November, 2000 recommended that “a standard method should be developed to collect and relay instantaneously and automatically all types of hazard warnings and reports locally, regionally and nationally for input into a wide variety of dissemination systems.”

An international working group of more than 130 emergency managers and information technology and telecommunications experts convened in 2001 and adopted the specific recommendations of the NSTC report as a point of departure for the design of a Common Alerting Protocol (CAP). Their draft went through several revisions and was tested in demonstrations and field trials in Virginia (supported by the ComCARE Alliance) and in California (in cooperation with the California Office of Emergency Services) during 2002 and 2003.

In 2002 the CAP initiative was endorsed by the national non-profit Partnership for Public Warning, which sponsored its contribution in 2003 to the OASIS standards process. In 2004, CAP version 1.0 was adopted as an OASIS Standard. In 2005, changes based on user feedback were incorporated into CAP and version 1.1 was released. As part of the International Telecommunication Union (ITU-T) adoption of CAP, a CAP 1.1 Errata was released in 2007 to support ASN.1 encoding. Version 1.2 is a minor release to resolve issues identified by the EM-TC CAP Call for Comments initiated in April 2008 and also incorporates feedback from CAP profile development efforts.

## 42 **1.3 Structure of the CAP Alert Message**

43 Each CAP Alert Message consists of an <alert> segment, which may contain one or more <info>  
44 segments, each of which may include one or more <area> and/or <resource> segments. Under most  
45 circumstances CAP messages with a <msgType> value of “Alert” SHOULD include at least one <info>  
46 element. (See the document object model diagram in section 3.1, below.)

### 47 **1.3.1 <alert>**

48 The <alert> segment provides basic information about the current message: its purpose, its source and  
49 its status, as well as a unique identifier for the current message and links to any other, related messages.  
50 An <alert> segment may be used alone for message acknowledgements, cancellations or other system  
51 functions, but most <alert> segments will include at least one <info> segment.

### 52 **1.3.2 <info>**

53 The <info> segment describes an anticipated or actual event in terms of its urgency (time available to  
54 prepare), severity (intensity of impact) and certainty (confidence in the observation or prediction), as well  
55 as providing both categorical and textual descriptions of the subject event. It may also provide  
56 instructions for appropriate response by message recipients and various other details (hazard duration,  
57 technical parameters, contact information, links to additional information sources, etc.) Multiple <info>  
58 segments may be used to describe differing parameters (e.g., for different probability or intensity “bands”)  
59 or to provide the information in multiple languages.

### 60 **1.3.3 <resource>**

61 The <resource> segment provides an optional reference to additional information related to the <info>  
62 segment within which it appears in the form of a digital asset such as an image or audio file.

### 63 **1.3.4 <area>**

64 The <area> segment describes a geographic area to which the <info> segment in which it appears  
65 applies. Textual and coded descriptions (such as postal codes) are supported, but the preferred  
66 representations use geospatial shapes (polygons and circles) and an altitude or altitude range, expressed  
67 in standard latitude / longitude / altitude terms in accordance with a specified geospatial datum.

## 68 **1.4 Applications of the CAP Alert Message**

69 The primary use of the CAP Alert Message is to provide a single input to activate all kinds of alerting and  
70 public warning systems. This reduces the workload associated with using multiple warning systems while  
71 enhancing technical reliability and target-audience effectiveness. It also helps ensure consistency in the  
72 information transmitted over multiple delivery systems, another key to warning effectiveness.

73 A secondary application of CAP is to normalize warnings from various sources so they can be aggregated  
74 and compared in tabular or graphic form as an aid to situational awareness and pattern detection.

75 Although primarily designed as an interoperability standard for use among warning systems and other  
76 emergency information systems, the CAP Alert Message can be delivered directly to alert recipients over  
77 various networks, including data broadcasts. Location-aware receiving devices could use the information  
78 in a CAP Alert Message to determine, based on their current location, whether that particular message  
79 was relevant to their users.

80 The CAP Alert Message can also be used by sensor systems as a format for reporting significant events  
81 to collection and analysis systems and centers.

82

## 83 1.5 Terminology

84 The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD  
85 NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described  
86 in [RFC2119].

87 The words *warning*, *alert* and *notification* are used interchangeably throughout this document.

88 The term “coordinate pair” is used in this document to refer to a comma-delimited pair of decimal values  
89 describing a geospatial location in degrees, unprojected, in the form “[latitude],[longitude]”. Latitudes in  
90 the Southern Hemisphere and longitudes in the Western Hemisphere are signed negative by means of a  
91 leading dash.

## 92 1.6 Normative References

- 93 [RFC2119] S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*,  
94 <http://www.ietf.org/rfc/rfc2119.txt>, IETF RFC 2119, March 1997.
- 95 [dateTime] N. Freed, XML Schema Part 2: Datatypes Second Edition,  
96 <http://www.w3.org/TR/xmlschema-2/#dateTime>, W3C REC-xmlschema-2,  
97 October 2004.
- 98 [FIPS 180-2] National Institute for Standards and Technology, Secure Hash Standard,  
99 <http://csrc.nist.gov/publications/fips/fips180-2/fips180-2withchangenotice.pdf>,  
100 August 2002.
- 101 [namespaces] T. Bray, Namespaces in XML, <http://www.w3.org/TR/REC-xml-names/>, W3C  
102 REC-xml-names-19990114, January 1999.
- 103 [RFC2046] N. Freed, Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types,  
104 <http://www.ietf.org/rfc/rfc2046.txt>, IETF RFC 2046, November 1996.
- 105 [RFC3066] H. Alvestrand, Tags for the Identification of Languages,  
106 <http://www.ietf.org/rfc/rfc3066.txt>, IETF RFC 3066, January 2001.
- 107 [WGS 84] National Geospatial Intelligence Agency, Department of Defense World Geodetic  
108 System 1984, [http://earth-info.nga.mil/GandG/tr8350\\_2.html](http://earth-info.nga.mil/GandG/tr8350_2.html), NGA Technical  
109 Report TR8350.2, January 2000.
- 110 [XML 1.0] T. Bray, Extensible Markup Language (XML) 1.0 (Third Edition),  
111 <http://www.w3.org/TR/REC-xml/>, W3C REC-XML-20040204, February 2004.
- 112 [XMLSIG] Eastlake, D., Reagle, J. and Solo, D. (editors), *XML-Signature Syntax and*  
113 *Processing*, <http://www.w3.org/TR/2002/REC-xmlsig-core-20020212/>, W3C  
114 Recommendation, February 2002.
- 115 [ITU-T X.680] ITU-T Recommendation X.680, *Information technology – Abstract Syntax*  
116 *Notation One (ASN.1): Specification of basic notation*.
- 117 [ITU-T X.691] ITU-T Recommendation X.691, *Information technology – ASN.1 encoding rules:*  
118 *Specification of Packed Encoding Rules (PER)*.
- 119 [ITU-T X.693] ITU-T Recommendation X.693, *Information technology – ASN.1 encoding rules:*  
120 *Specification of XML Encoding Rules (XER)*.
- 121 [ITU-T X.694] ITU-T Recommendation X.694, *Information technology – ASN.1 encoding rules:*  
122 *Mapping W3C XML schema definitions into ASN.1*.
- 123

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## 124 2 Design Principles and Concepts (non-normative)

### 125 2.1 Design Philosophy

126 Among the principles which guided the design of the CAP Alert Message were:

- 127 • **Interoperability** – First and foremost, the CAP Alert Message should provide a means for  
128 interoperable exchange of alerts and notifications among all kinds of emergency information  
129 systems.
- 130 • **Completeness** – The CAP Alert Message format should provide for all the elements of an  
131 effective public warning message.
- 132 • **Simple implementation** – The design should not place undue burdens of complexity on  
133 technical implementers.
- 134 • **Simple XML and portable structure** – Although the primary anticipated use of the CAP Alert  
135 Message is as an XML document, the format should remain sufficiently abstract to be adaptable  
136 to other coding schemes.
- 137 • **Multi-use format** – One message schema supports multiple message types (e.g., alert / update /  
138 cancellations / acknowledgements / error messages) in various applications (actual / exercise /  
139 test / system message).
- 140 • **Familiarity** – The data elements and code values should be meaningful to warning originators  
141 and non-expert recipients alike.
- 142 • **Interdisciplinary and international utility** – The design should allow a broad range of  
143 applications in public safety and emergency management and allied applications and should be  
144 applicable worldwide.

### 145 2.2 Requirements for Design

146 Note: The following requirements were used as a basis for design and review of the CAP  
147 Alert Message format. This list is non-normative and not intended to be exhaustive.

148 The Common Alerting Protocol SHOULD:

- 149 • Provide a specification for a simple, extensible format for digital representation of warning  
150 messages and notifications;
- 151 • Enable integration of diverse sensor and dissemination systems;
- 152 • Be usable over multiple transmission systems, including both TCP/IP-based networks and one-  
153 way "broadcast" channels;
- 154 • Support credible end-to-end authentication and validation of all messages;
- 155 • Provide a unique identifier (e.g., an ID number) for each warning message and for each message  
156 originator;
- 157 • Provide for multiple message types, such as:
  - 158 – Warnings
  - 159 – Acknowledgements
  - 160 – Expirations and cancellations
  - 161 – Updates and amendments
  - 162 – Reports of results from dissemination systems
  - 163 – Administrative and system messages
- 164 • Provide for multiple message types, such as:

- 165 – Geographic targeting
- 166 – Level of urgency
- 167 – Level of certainty
- 168 – Level of threat severity
- 169 • Provide a mechanism for referencing supplemental information (e.g., digital audio or image files,  
170 additional text);
- 171 • Use an established open-standard data representation;
- 172 • Be based on a program of real-world cross-platform testing and evaluation;
- 173 • Provide a clear basis for certification and further protocol evaluation and improvement; and,
- 174 • Provide a clear logical structure that is relevant and clearly applicable to the needs of emergency  
175 response and public safety users and warning system operators.

## 176 **2.3 Examples of Use Scenarios**

177 Note: The following examples of use scenarios were used as a basis for design and  
178 review of the CAP Alert Message format. These scenarios are non-normative and not  
179 intended to be exhaustive or to reflect actual practices.

### 180 **2.3.1 Manual Origination**

181 The Incident Commander at an industrial fire with potential of a major explosion decides to issue a public  
182 alert with three components: a) An evacuation of the area within half a mile of the fire; b) a shelter-in-  
183 place instruction for people in a polygon roughly describing a downwind dispersion 'plume' extending  
184 several miles downwind and half a mile upwind from the fire; and c) a request for all media and civilian  
185 aircraft to remain above 2500 feet above ground level when within a half mile radius of the fire.

186 Using a portable computer and a web page (and a pop-up drawing tool to enter the polygon) the Incident  
187 Commander issues the alert as a CAP message to a local alerting network.

### 188 **2.3.2 Automated Origination by Autonomous Sensor System**

189 A set of automatic tsunami warning sirens has been installed along a popular Northwest beach. A  
190 wireless network of sensor devices collocated with the sirens controls their activation. When triggered,  
191 each sensor generates a CAP message containing its location and the sensed data at that location that is  
192 needed for the tsunami determination. Each siren activates when the combination of its own readings and  
193 those reported at by other devices on the network indicate an immediate tsunami threat. In addition, a  
194 network component assembles a summary CAP message describing the event and feeds it to regional  
195 and national alerting networks.

### 196 **2.3.3 Aggregation and Correlation on Real-time Map**

197 At the State Operations Center a computerized map of the state depicts, in real time, all current and  
198 recent warning activity throughout the state. All major warning systems in the state – the Emergency  
199 Alert System, siren systems, telephone alerting and other systems – have been equipped to report the  
200 details of their activation in the form of a CAP message. (Since many of them are now activated by way  
201 of CAP messages, this is frequently just a matter of forwarding the activation message to the state  
202 center.)

203 Using this visualization tool, state officials can monitor for emerging patterns of local warning activity and  
204 correlate it with other real time data (e.g., telephone central office traffic loads, 9-1-1 traffic volume,  
205 seismic data, automatic vehicular crash notifications, etc.).

206



#### 207 **2.3.4 Integrated Public Alerting**

208 As part of an integrated warning system funded by local industry, all warning systems in a community can  
209 be activated simultaneously by the issuance, from an authorized authority, of a single CAP message.

210 Each system converts the CAP message data into the form suitable for its technology (text captioning on  
211 TV, synthesized voice on radio and telephone, activation of the appropriate signal on sirens, etc.).

212 Systems that can target their messages to particular geographic areas implement the targeting specified  
213 in the CAP message with as little 'spillover' as their technology permits.

214 In this way, not only is the reliability and reach of the overall warning system maximized, but citizens also  
215 get corroboration of the alert through multiple channels, which increases the chance of the warning being  
216 acted upon.

#### 217 **2.3.5 Repudiating a False Alarm**

218 Inadvertently the integrated alerting network has been activated with an inaccurate warning message.

219 This activation comes to officials' attention immediately through their own monitoring facilities (e.g., 2.3.3

220 above). Having determined that the alert is, in fact, inappropriate, the officials issue a cancellation

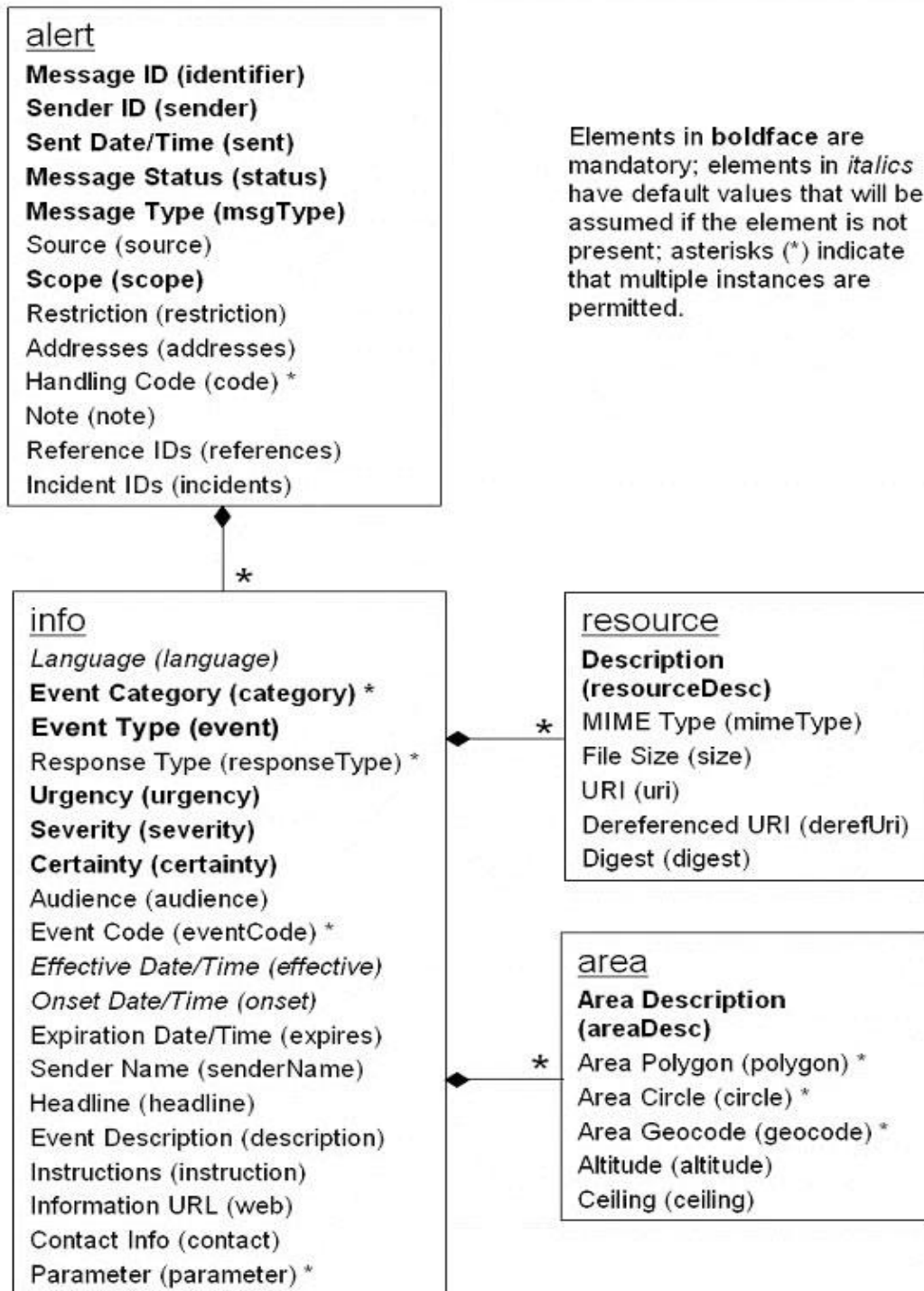
221 message that refers directly to the erroneous prior alert. Alerting systems that are still in the process of

222 delivering the alert (e.g., telephone dialing systems) stop doing so. Broadcast systems deliver the

223 cancellation message. Other systems (e.g., highway signs) simply reset to their normal state.

## 3 Alert Message Structure (normative)

### 3.1 Document Object Model



229 **3.2 Data Dictionary**

230 Note: Unless explicitly constrained within this Data Dictionary or the XML Schema  
 231 (Section 3.4), CAP elements MAY have null values. Implementers MUST check for this  
 232 condition wherever it might affect application performance.

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
<b>3.2.1 "alert" Element and Sub-elements</b>			
<b>alert</b>	<b>cap. alert. group</b>	<b>The container for all component parts of the alert message (REQUIRED)</b>	<p>(1) Surrounds CAP alert message sub-elements.</p> <p>(2) MUST include the xmlns attribute referencing the CAP URN as the namespace, e.g.:</p> <pre>&lt;cap:alert xmlns:cap="urn:oasis:names:tc:emergency:cap:1.2"&gt;   [sub-elements] &lt;/cap:alert&gt;</pre> <p>(3) In addition to the specified sub-elements, MAY contain one or more &lt;info&gt; blocks.</p>
<b>identifier</b>	<b>cap. alert. identifier. identifier</b>	<b>The identifier of the alert message (REQUIRED)</b>	<p>(1) A number or string uniquely identifying this message, assigned by the sender.</p> <p>(2) MUST NOT include spaces, commas or restricted characters (&lt; and &amp;).</p>
<b>sender</b>	<b>cap. alert. sender. identifier</b>	<b>The identifier of the sender of the alert message (REQUIRED)</b>	<p>(1) Identifies the originator of this alert. Guaranteed by assigner to be unique globally; e.g., may be based on an Internet domain name.</p> <p>(2) MUST NOT include spaces, commas or restricted characters (&lt; and &amp;).</p>
<b>sent</b>	<b>cap. alert. sent. time</b>	<b>The time and date of the origination of the alert message (REQUIRED)</b>	<p>(1) The date and time SHALL be represented in the DateTime Data Type (See Implementation Notes) format (e.g., "2002-05-24T16:49:00-07:00" for 24 May 2002 at 16:49 PDT).</p> <p>(2) Alphabetic timezone designators such as "Z" MUST NOT be used. The timezone for UTC MUST be represented as "-00:00".</p>

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
<b>status</b>	<b>cap. alert. status. code</b>	<b>The code denoting the appropriate handling of the alert message (REQUIRED)</b>	Code Values: "Actual" - Actionable by all targeted recipients "Exercise" - Actionable only by designated exercise participants; exercise identifier SHOULD appear in <note> "System" - For messages that support alert network internal functions "Test" - Technical testing only, all recipients disregard "Draft" – A preliminary template or draft, not actionable in its current form
<b>msgType</b>	<b>cap. alert. msgType. code</b>	<b>The code denoting the nature of the alert message (REQUIRED)</b>	Code Values: "Alert" - Initial information requiring attention by targeted recipients "Update" - Updates and supercedes the earlier message(s) identified in <references> "Cancel" - Cancels the earlier message(s) identified in <references> "Ack" - Acknowledges receipt and acceptance of the message(s) identified in <references> "Error" - Indicates rejection of the message(s) identified in <references>; explanation SHOULD appear in <note>
source	cap. alert. source. identifier	The text identifying the source of the alert message (OPTIONAL)	The particular source of this alert; e.g., an operator or a specific device.
<b>scope</b>	<b>cap. alert. scope. code</b>	<b>The code denoting the intended distribution of the alert message (REQUIRED)</b>	Code Values: "Public" - For general dissemination to unrestricted audiences "Restricted" - For dissemination only to users with a known operational requirement (see <restriction>, below) "Private" - For dissemination only to specified addresses (see <addresses>, below)

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
restriction	cap. alert. restriction. text	The text describing the rule for limiting distribution of the restricted alert message (CONDITIONAL)	Used when <scope> value is "Restricted".
addresses	cap. alert. addresses. group	The group listing of intended recipients of the alert message (CONDITIONAL)	<ul style="list-style-type: none"> <li>(1) Required when &lt;scope&gt; is "Private", optional when &lt;scope&gt; is "Public" or "Restricted".</li> <li>(2) Each recipient SHALL be identified by an identifier or an address.</li> <li>(3) Multiple space-delimited addresses MAY be included. Addresses including whitespace MUST be enclosed in double-quotes.</li> </ul>
code	cap. alert. code. code	The code denoting the special handling of the alert message (OPTIONAL)	<ul style="list-style-type: none"> <li>(1) Any user-defined flag or special code used to flag the alert message for special handling.</li> <li>(2) Multiple instances MAY occur.</li> </ul>
note	cap. alert. note. text	The text describing the purpose or significance of the alert message (OPTIONAL)	The message note is primarily intended for use with <status> "Exercise" and <msgType> "Error".
references	cap. alert. references. group	The group listing identifying earlier message(s) referenced by the alert message (OPTIONAL)	<ul style="list-style-type: none"> <li>(1) The extended message identifier(s) (in the form <i>sender,identifier,sent</i>) of an earlier CAP message or messages referenced by this one.</li> <li>(2) If multiple messages are referenced, they SHALL be separated by whitespace.</li> </ul>

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
incidents	cap. alert. incidents. group	The group listing naming the referent incident(s) of the alert message (OPTIONAL)	<p>(1) Used to collate multiple messages referring to different aspects of the same incident.</p> <p>(2) If multiple incident identifiers are referenced, they SHALL be separated by whitespace. Incident names including whitespace SHALL be surrounded by double-quotes.</p>
<b>3.2.2 "info" Element and Sub-elements</b>			
info	cap. alertInfo. info. group	The container for all component parts of the info sub-element of the alert message (OPTIONAL)	<p>(1) Multiple occurrences are permitted within a single &lt;alert&gt;. If targeting of multiple &lt;info&gt; blocks in the same language overlaps, information in later blocks may expand but may not override the corresponding values in earlier ones. Each set of &lt;info&gt; blocks containing the same language identifier SHALL be treated as a separate sequence.</p> <p>(2) In addition to the specified sub-elements, MAY contain one or more &lt;resource&gt; blocks and/or one or more &lt;area&gt; blocks.</p>
language	cap. alertInfo. language. code	The code denoting the language of the info sub-element of the alert message (OPTIONAL)	<p>(1) Code Values: Natural language identifier per <b>[RFC 3066]</b>.</p> <p>(2) If not present, an implicit default value of "en-US" SHALL be assumed.</p> <p>(3) A null value in this element SHALL be considered equivalent to "en-US."</p>

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
<b>category</b>	<b>cap. alertInfo. category. code</b>	<b>The code denoting the category of the subject event of the alert message (REQUIRED)</b>	<p>(1) Code Values:</p> <p>“Geo” - Geophysical (inc. landslide)</p> <p>“Met” - Meteorological (inc. flood)</p> <p>“Safety” - General emergency and public safety</p> <p>“Security” - Law enforcement, military, homeland and local/private security</p> <p>“Rescue” - Rescue and recovery</p> <p>“Fire” - Fire suppression and rescue</p> <p>“Health” - Medical and public health</p> <p>“Env” - Pollution and other environmental</p> <p>“Transport” - Public and private transportation</p> <p>“Infra” - Utility, telecommunication, other non-transport infrastructure</p> <p>“CBRNE” – Chemical, Biological, Radiological, Nuclear or High-Yield Explosive threat or attack</p> <p>“Other” - Other events</p> <p>(2) Multiple instances MAY occur within an &lt;info&gt; block.</p>
<b>event</b>	<b>cap. alertInfo. event. text</b>	<b>The text denoting the type of the subject event of the alert message (REQUIRED)</b>	

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
responseType	cap. alertInfo. responseType. code	The code denoting the type of action recommended for the target audience (OPTIONAL)	<p>(1) Code Values:</p> <p>“Shelter” – Take shelter in place or per &lt;instruction&gt;</p> <p>“Evacuate” – Relocate as instructed in the &lt;instruction&gt;</p> <p>“Prepare” – Make preparations per the &lt;instruction&gt;</p> <p>“Execute” – Execute a pre-planned activity identified in &lt;instruction&gt;</p> <p>“Avoid” – Avoid the subject event as per the &lt;instruction&gt;</p> <p>“Monitor” – Attend to information sources as described in &lt;instruction&gt;</p> <p>“Assess” – Evaluate the information in this message. (This value SHOULD NOT be used in public warning applications.)</p> <p>“AllClear” – The subject event no longer poses a threat or concern and any follow on action is described in &lt;instruction&gt;</p> <p>“None” – No action recommended</p> <p>(2) Multiple instances MAY occur within an &lt;info&gt; block.</p>
<b>urgency</b>	<b>cap. alertInfo. urgency. code</b>	<b>The code denoting the urgency of the subject event of the alert message (REQUIRED)</b>	<p>(1) The &lt;urgency&gt;, &lt;severity&gt;, and &lt;certainty&gt; elements collectively distinguish less emphatic from more emphatic messages.</p> <p>(2) Code Values:</p> <p>“Immediate” - Responsive action SHOULD be taken immediately</p> <p>“Expected” - Responsive action SHOULD be taken soon (within next hour)</p> <p>“Future” - Responsive action SHOULD be taken in the near future</p> <p>“Past” - Responsive action is no longer required</p> <p>“Unknown” - Urgency not known</p>



Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
severity	cap. alertInfo. severity. code	<b>The code denoting the severity of the subject event of the alert message (REQUIRED)</b>	<p>(1) The &lt;urgency&gt;, &lt;severity&gt;, and &lt;certainty&gt; elements collectively distinguish less emphatic from more emphatic messages.</p> <p>(2) Code Values:</p> <p>“Extreme” - Extraordinary threat to life or property</p> <p>“Severe” - Significant threat to life or property</p> <p>“Moderate” - Possible threat to life or property</p> <p>“Minor” – Minimal to no known threat to life or property</p> <p>“Unknown” - Severity unknown</p>
certainty	cap. alertInfo. certainty. code	<b>The code denoting the certainty of the subject event of the alert message (REQUIRED)</b>	<p>(1) The &lt;urgency&gt;, &lt;severity&gt;, and &lt;certainty&gt; elements collectively distinguish less emphatic from more emphatic messages.</p> <p>(2) Code Values:</p> <p>“Observed” – Determined to have occurred or to be ongoing</p> <p>“Likely” - Likely (p &gt; ~50%)</p> <p>“Possible” - Possible but not likely (p &lt;= ~50%)</p> <p>“Unlikely” - Not expected to occur (p ~ 0)</p> <p>“Unknown” - Certainty unknown</p> <p>(3) For backward compatibility with CAP 1.0, the deprecated value of “Very Likely” SHOULD be treated as equivalent to “Likely”.</p>
audience	cap. alertInfo. audience. text	The text describing the intended audience of the alert message (OPTIONAL)	

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
eventCode	cap. alertInfo. eventCode. code	A system-specific code identifying the event type of the alert message (OPTIONAL)	<p>(1) Any system-specific code for event typing, in the form:</p> <pre data-bbox="898 426 1386 562">&lt;eventCode&gt;   &lt;valueName&gt;valueName&lt;/valueName&gt;   &lt;value&gt;value&lt;/value&gt; &lt;/eventCode&gt;</pre> <p>where the content of "valueName" is a user-assigned string designating the domain of the code, and the content of "value" is a string (which may represent a number) denoting the value itself (e.g., valueName = "SAME" and value="CEM").</p> <p>(2) Values of "valueName" that are acronyms SHOULD be represented in all capital letters without periods (e.g., SAME, FIPS, ZIP).</p> <p>(3) Multiple instances MAY occur within an &lt;info&gt; block.</p>
effective	cap. alertInfo. effective. time	The effective time of the information of the alert message (OPTIONAL)	<p>(1) The date and time SHALL be represented in the DateTime Data Type (See Implementation Notes) format (e.g., "2002-05-24T16:49:00-07:00" for 24 May 2002 at 16: 49 PDT).</p> <p>(2) Alphabetic timezone designators such as "Z" MUST NOT be used. The timezone for UTC MUST be represented as "-00:00".</p> <p>(3) If this item is not included, the effective time SHALL be assumed to be the same as in &lt;sent&gt;.</p>
onset	cap. alertInfo. onset. time	The expected time of the beginning of the subject event of the alert message (OPTIONAL)	<p>(1) The date and time SHALL be represented in the DateTime Data Type (See Implementation Notes) format (e.g., "2002-05-24T16:49:00-07:00" for 24 May 2002 at 16: 49 PDT).</p> <p>(2) Alphabetic timezone designators such as "Z" MUST NOT be used. The timezone for UTC MUST be represented as "-00:00".</p>

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
expires	cap. alertInfo. expires. time	The expiry time of the information of the alert message (OPTIONAL)	<p>(1) The date and time SHALL be represented in the DateTime Data Type (See Implementation Notes) format (e.g., "2002-05-24T16:49:00-07:00" for 24 May 2002 at 16:49 PDT).</p> <p>(2) Alphabetic timezone designators such as "Z" MUST NOT be used. The timezone for UTC MUST be represented as "-00:00".</p> <p>(3) If this item is not provided, each recipient is free to set its own policy as to when the message is no longer in effect.</p>
senderName	cap. alertInfo. senderName. text	The text naming the originator of the alert message (OPTIONAL)	The human-readable name of the agency or authority issuing this alert.
headline	cap. alertInfo. headline. text	The text headline of the alert message (OPTIONAL)	A brief human-readable headline. Note that some displays (for example, short messaging service devices) may only present this headline; it SHOULD be made as direct and actionable as possible while remaining short. 160 characters MAY be a useful target limit for headline length.
description	cap. alertInfo. description. text	The text describing the subject event of the alert message (OPTIONAL)	An extended human readable description of the hazard or event that occasioned this message.
instruction	cap. alertInfo. instruction. text	The text describing the recommended action to be taken by recipients of the alert message (OPTIONAL)	An extended human readable instruction to targeted recipients. If different instructions are intended for different recipients, they should be represented by use of multiple <info> blocks.

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
web	cap alertInfo. web. identifier	The identifier of the hyperlink associating additional information with the alert message (OPTIONAL)	A full, absolute URI for an HTML page or other text resource with additional or reference information regarding this alert.
contact	cap. alertInfo. contact. text	The text describing the contact for follow-up and confirmation of the alert message (OPTIONAL)	
parameter	cap. alertInfo. parameter. code	A system-specific additional parameter associated with the alert message (OPTIONAL)	<p>(1) Any system-specific datum, in the form:</p> <pre data-bbox="899 974 1386 1108">&lt;parameter&gt;   &lt;valueName&gt;valueName&lt;/valueName&gt;   &lt;value&gt;value&lt;/value&gt; &lt;/parameter&gt;</pre> <p>where the content of "valueName" is a user-assigned string designating the domain of the code, and the content of "value" is a string (which may represent a number) denoting the value itself (e.g., valueName = "SAME" and value="CIV").</p> <p>(2) Values of "valueName" that are acronyms SHOULD be represented in all capital letters without periods (e.g., SAME, FIPS, ZIP).</p> <p>(3) Multiple instances MAY occur within an &lt;info&gt; block.</p>

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
<b>3.2.3 "resource" Element and Sub-elements</b>			
resource	cap alertInfoResource. resource. group	The container for all component parts of the resource sub-element of the info sub-element of the alert element (OPTIONAL)	(1) Refers to an additional file with supplemental information related to this <info> element; e.g., an image or audio file. (2) Multiple instances MAY occur within an <info> block.
resourceDesc	cap. alertInfoResource. resourceDesc. text	<b>The text describing the type and content of the resource file (REQUIRED)</b>	The human-readable text describing the type and content, such as "map" or "photo", of the resource file.
mimeType	cap. alertInfoResource. mimeType. identifier	<b>The identifier of the MIME content type and sub-type describing the resource file (REQUIRED)</b>	MIME content type and sub-type as described in <b>[RFC 2046]</b> . (As of this document, the current IANA registered MIME types are listed at <a href="http://www.iana.org/assignments/media-types/">http://www.iana.org/assignments/media-types/</a> )
size	cap. alertInfoResource. size. integer	The integer indicating the size of the resource file (OPTIONAL)	(1) Approximate size of the resource file in bytes. (2) For <uri> based resources, <size> SHOULD be included if available.
uri	cap. alertInfoResource. uri. identifier	The identifier of the hyperlink for the resource file (OPTIONAL)	A full absolute URI, typically a Uniform Resource Locator that can be used to retrieve the resource over the Internet  OR  a relative URI to name the content of a <derefUri> element if one is present in this resource block.

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
derefUri	cap alertInfoResource. derefUri. data	The base-64 encoded data content of the resource file (CONDITIONAL)	<p>(1) MAY be used either with or instead of the &lt;uri&gt; element in messages transmitted over one-way (e.g., broadcast) data links where retrieval of a resource via a URI is not feasible.</p> <p>(2) Clients intended for use with one-way data links MUST support this element.</p> <p>(3) This element MUST NOT be used unless the sender is certain that all direct clients are capable of processing it.</p> <p>(4) If messages including this element are forwarded onto a two-way network, the forwarder MUST strip the &lt;derefUri&gt; element and SHOULD extract the file contents and provide a &lt;uri&gt; link to a retrievable version of the file.</p> <p>(5) Providers of one-way data links MAY enforce additional restrictions on the use of this element, including message-size limits and restrictions regarding file types.</p>
digest	cap. alertInfoResource. digest. code	The code representing the digital digest ("hash") computed from the resource file (OPTIONAL)	Calculated using the Secure Hash Algorithm (SHA-1) per <b>[FIPS 180-2]</b> .
<b>3.2.4 "area" Element and Sub-elements</b>			
area	cap. alertInfoArea. area. group	The container for all component parts of the area sub-element of the info sub-element of the alert message (OPTIONAL)	<p>(1) Multiple occurrences permitted, in which case the target area for the &lt;info&gt; block is the union of all the included &lt;area&gt; blocks.</p> <p>(2) MAY contain one or multiple instances of &lt;polygon&gt;, &lt;circle&gt; or &lt;geocode&gt;. If multiple &lt;polygon&gt;, &lt;circle&gt; or &lt;geocode&gt; elements are included, the area described by this &lt;area&gt; block is represented by the union of all the included elements.</p>

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
areaDesc	cap. alertInfoArea. areaDesc. text	<b>The text describing the affected area of the alert message (REQUIRED)</b>	A text description of the affected area.
polygon	cap. alertInfoArea. polygon. group	The paired values of points defining a polygon that delineates the affected area of the alert message (OPTIONAL)	<p>(1) Code Values: The geographic polygon is represented by a whitespace-delimited list of <b>[WGS 84]</b> coordinate pairs. (See WGS 84 Note at end of this section)</p> <p>(2) A minimum of 4 coordinate pairs <b>MUST</b> be present and the first and last pairs of coordinates <b>MUST</b> be the same.</p> <p>(3) Multiple instances <b>MAY</b> occur within an &lt;area&gt; block.</p>
circle	cap. alertInfoArea. circle. group	The paired values of a point and radius delineating the affected area of the alert message (OPTIONAL)	<p>(1) Code Values: The circular area is represented by a central point given as a <b>[WGS 84]</b> coordinate pair followed by a space character and a radius value in kilometers. (See WGS 84 Note at end of this section)</p> <p>(2) Multiple instances <b>MAY</b> occur within an &lt;area&gt; block.</p>

Element Name	Context. Class. Attribute. Representation	Definition and (Optionality)	Notes or Value Domain
geocode	cap. alertInfoArea. geocode. code	The geographic code delineating the affected area of the alert message (OPTIONAL)	<p>(1) Any geographically-based code to describe a message target area, in the form:</p> <pre>&lt;geocode&gt;   &lt;valueName&gt;valueName&lt;/valueName&gt;   &lt;value&gt;value&lt;/value&gt; &lt;/geocode&gt;</pre> <p>where the content of "valueName" is a user-assigned string designating the domain of the code, and the content of "value" is a string (which may represent a number) denoting the value itself (e.g., valueName = "SAME" and value="006113").</p> <p>(2) Values of "valueName" that are acronyms SHOULD be represented in all capital letters without periods (e.g., SAME, FIPS, ZIP).</p> <p>(3) Multiple instances MAY occur within an &lt;area&gt; block.</p> <p>(4) This element is primarily for compatibility with other systems. Use of this element presumes knowledge of the coding system on the part of recipients; therefore, for interoperability, it SHOULD be used in concert with an equivalent description in the more universally understood &lt;polygon&gt; and &lt;circle&gt; forms whenever possible.</p>
altitude	cap. alertInfoArea. altitude. quantity	The specific or minimum altitude of the affected area of the alert message (OPTIONAL)	<p>(1) If used with the &lt;ceiling&gt; element this value is the lower limit of a range. Otherwise, this value specifies a specific altitude.</p> <p>(2) The altitude measure is in feet above mean sea level per the <b>[WGS 84]</b> datum.</p>
ceiling	cap. alertInfoArea. ceiling. quantity	The maximum altitude of the affected area of the alert message (CONDITIONAL)	<p>(1) MUST NOT be used except in combination with the &lt;altitude&gt; element.</p> <p>(2) The ceiling measure is in feet above mean sea level per the <b>[WGS 84]</b> datum.</p>



## 234 **3.3 Implementation Notes**

### 235 **3.3.1 WGS 84 Note**

236 Geographic locations in CAP are defined using **[WGS 84]** (World Geodetic System 1984), equivalent to  
237 EPSG (European Petroleum Survey Group) code 4326 (2 dimensions). CAP does not assign  
238 responsibilities for coordinate transformations from and to other Spatial Reference Systems. See section  
239 1.5 Terminology for the format of coordinate pairs within CAP elements.

### 240 **3.3.2 DateTime Data Type**

241 All **[dateTime]** elements (<sent>, <effective>, <onset>, and <expires>) SHALL be specified in the form  
242 "YYYY-MM-DDThh:mm:ssXzh:zm" where:

- 243 • YYYY indicates the year
- 244 • MM indicates the month
- 245 • DD indicates the day
- 246 • T indicates the symbol "T" marking the start of the required time section
- 247 • hh indicates the hour
- 248 • mm indicates the minute
- 249 • ss indicates the second
- 250 • X indicates either the symbol "+" if the preceding date and time are in a time zone ahead of UTC,  
251 or the symbol "-" if the preceding date and time are in a time zone behind UTC. If the time is in  
252 UTC, the symbol "-" will be used.
- 253 • zh indicates the hours of offset from the preceding date and time to UTC, or "00" if the preceding  
254 time is in UTC
- 255 • zm indicates the minutes of offset from the preceding date and time to UTC, or "00" if the  
256 preceding time is in UTC

257 For example, a value of "2002-05-30T09:30:10-05:00" would indicate May 30, 2002 at 9:30:10 AM  
258 Eastern Standard Time, which would be 2:30:10PM Universal Coordinated Time (UTC). That same  
259 time might be indicated by "2002-05-30T14:30:10-00:00".

### 260 **3.3.3 Character Entity References**

261 The use of character entity references, such as HTML entities (e.g. &nbsp;); is discouraged.

### 262 **3.3.4 Security Note**

263 Because CAP is an XML-based format, existing XML security mechanisms can be used to secure and  
264 authenticate its content. While these mechanisms are available to secure CAP Alert Messages, they  
265 should not be used indiscriminately.

#### 266 **3.3.4.1 Digital Signatures**

267 The <alert> element of a CAP Alert Message MAY have an Enveloped Signature, as described by XML-  
268 Signature and Syntax Processing **[XMLSIG]**. Other XML signature mechanisms MUST NOT be used in  
269 CAP Alert Messages.

270 Processors MUST NOT reject a CAP Alert Message containing such a signature simply because they are  
271 not capable of verifying it; they MUST continue processing and SHOULD inform the user of their failure to  
272 validate the signature.

273 In other words, the presence of an element with the namespace URI [XMLSIG] and a local name of  
274 <Signature> as a child of the <alert> element must not cause a processor to fail merely because of its  
275 presence.

### 276 3.4 XML Schema

```
277 <?xml version = "1.0" encoding = "UTF-8"?>
278 <!-- Copyright OASIS Open 2010 All Rights Reserved -->
279 <schema xmlns = "http://www.w3.org/2001/XMLSchema"
280   targetNamespace = "urn:oasis:names:tc:emergency:cap:1.2"
281   xmlns:cap = "urn:oasis:names:tc:emergency:cap:1.2"
282   xmlns:xs = "http://www.w3.org/2001/XMLSchema"
283   elementFormDefault = "qualified"
284   attributeFormDefault = "unqualified"
285   version = "1.2">
286   <element name = "alert">
287     <annotation>
288       <documentation>CAP Alert Message (version 1.2)</documentation>
289     </annotation>
290     <complexType>
291       <sequence>
292         <element name = "identifier" type = "xs:string"/>
293         <element name = "sender" type = "xs:string"/>
294         <element name = "sent">
295           <simpleType>
296             <restriction base = "xs:dateTime">
297               <pattern value = "\d\d\d\d-\d\d-\d\dT\d\d:\d\d:\d\d[-,+] \d\d:\d\d"/>
298             </restriction>
299           </simpleType>
300         </element>
301         <element name = "status">
302           <simpleType>
303             <restriction base = "xs:string">
304               <enumeration value = "Actual"/>
305               <enumeration value = "Exercise"/>
306               <enumeration value = "System"/>
307               <enumeration value = "Test"/>
308               <enumeration value = "Draft"/>
309             </restriction>
310           </simpleType>
311         </element>
312         <element name = "msgType">
313           <simpleType>
314             <restriction base = "xs:string">
315               <enumeration value = "Alert"/>
316               <enumeration value = "Update"/>
317               <enumeration value = "Cancel"/>
318               <enumeration value = "Ack"/>
319               <enumeration value = "Error"/>
320             </restriction>
321           </simpleType>
322         </element>
323         <element name = "source" type = "xs:string" minOccurs = "0"/>
324         <element name = "scope">
325           <simpleType>
326             <restriction base = "xs:string">
327               <enumeration value = "Public"/>
328               <enumeration value = "Restricted"/>
329               <enumeration value = "Private"/>
330             </restriction>
331           </simpleType>
332         </element>
333         <element name = "restriction" type = "xs:string" minOccurs = "0"/>
334         <element name = "addresses" type = "xs:string" minOccurs = "0"/>
335         <element name = "code" type = "xs:string" minOccurs = "0" maxOccurs = "unbounded"/>
336         <element name = "note" type = "xs:string" minOccurs = "0"/>
337         <element name = "references" type = "xs:string" minOccurs = "0"/>
338         <element name = "incidents" type = "xs:string" minOccurs = "0"/>
339         <element name = "info" minOccurs = "0" maxOccurs = "unbounded">
340           <complexType>
```

```

342 <sequence>
343   <element name = "language" type = "xs:language" default = "en-US" minOccurs = "0"/>
344   <element name = "category" maxOccurs = "unbounded">
345     <simpleType>
346       <restriction base = "xs:string">
347         <enumeration value = "Geo"/>
348         <enumeration value = "Met"/>
349         <enumeration value = "Safety"/>
350         <enumeration value = "Security"/>
351         <enumeration value = "Rescue"/>
352         <enumeration value = "Fire"/>
353         <enumeration value = "Health"/>
354         <enumeration value = "Env"/>
355         <enumeration value = "Transport"/>
356         <enumeration value = "Infra"/>
357         <enumeration value = "CBRNE"/>
358         <enumeration value = "Other"/>
359       </restriction>
360     </simpleType>
361   </element>
362   <element name = "event" type = "xs:string"/>
363   <element name = "responseType" minOccurs = "0" maxOccurs = "unbounded">
364     <simpleType>
365       <restriction base = "xs:string">
366         <enumeration value = "Shelter"/>
367         <enumeration value = "Evacuate"/>
368         <enumeration value = "Prepare"/>
369         <enumeration value = "Execute"/>
370         <enumeration value = "Avoid"/>
371         <enumeration value = "Monitor"/>
372         <enumeration value = "Assess"/>
373         <enumeration value = "AllClear"/>
374         <enumeration value = "None"/>
375       </restriction>
376     </simpleType>
377   </element>
378   <element name = "urgency">
379     <simpleType>
380       <restriction base = "xs:string">
381         <enumeration value = "Immediate"/>
382         <enumeration value = "Expected"/>
383         <enumeration value = "Future"/>
384         <enumeration value = "Past"/>
385         <enumeration value = "Unknown"/>
386       </restriction>
387     </simpleType>
388   </element>
389   <element name = "severity">
390     <simpleType>
391       <restriction base = "xs:string">
392         <enumeration value = "Extreme"/>
393         <enumeration value = "Severe"/>
394         <enumeration value = "Moderate"/>
395         <enumeration value = "Minor"/>
396         <enumeration value = "Unknown"/>
397       </restriction>
398     </simpleType>
399   </element>
400   <element name = "certainty">
401     <simpleType>
402       <restriction base = "xs:string">
403         <enumeration value = "Observed"/>
404         <enumeration value = "Likely"/>
405         <enumeration value = "Possible"/>
406         <enumeration value = "Unlikely"/>
407         <enumeration value = "Unknown"/>
408       </restriction>
409     </simpleType>
410   </element>
411   <element name = "audience" type = "xs:string" minOccurs = "0"/>
412   <element name = "eventCode" minOccurs = "0" maxOccurs = "unbounded">
413     <complexType>

```

```

414         <sequence>
415             <element ref = "cap:valueName"/>
416             <element ref = "cap:value"/>
417         </sequence>
418     </complexType>
419 </element>
420 <element name = "effective" minOccurs = "0">
421     <simpleType>
422         <restriction base = "xs:dateTime">
423             <pattern value = "\d\d\d\d-\d\d-\d\dT\d:\d:\d\d[-,+] \d\d:\d\d"/>
424         </restriction>
425     </simpleType>
426 </element>
427 <element name = "onset" minOccurs = "0">
428     <simpleType>
429         <restriction base = "xs:dateTime">
430             <pattern value = "\d\d\d\d-\d\d-\d\dT\d:\d:\d\d[-,+] \d\d:\d\d"/>
431         </restriction>
432     </simpleType>
433 </element>
434 <element name = "expires" minOccurs = "0">
435     <simpleType>
436         <restriction base = "xs:dateTime">
437             <pattern value = "\d\d\d\d-\d\d-\d\dT\d:\d:\d\d[-,+] \d\d:\d\d"/>
438         </restriction>
439     </simpleType>
440 </element>
441 <element name = "senderName" type = "xs:string" minOccurs = "0"/>
442 <element name = "headline" type = "xs:string" minOccurs = "0"/>
443 <element name = "description" type = "xs:string" minOccurs = "0"/>
444 <element name = "instruction" type = "xs:string" minOccurs = "0"/>
445 <element name = "web" type = "xs:anyURI" minOccurs = "0"/>
446 <element name = "contact" type = "xs:string" minOccurs = "0"/>
447 <element name = "parameter" minOccurs = "0" maxOccurs = "unbounded">
448     <complexType>
449         <sequence>
450             <element ref = "cap:valueName"/>
451             <element ref = "cap:value"/>
452         </sequence>
453     </complexType>
454 </element>
455 <element name = "resource" minOccurs = "0" maxOccurs = "unbounded">
456     <complexType>
457         <sequence>
458             <element name = "resourceDesc" type = "xs:string"/>
459             <element name = "mimeType" type = "xs:string"/>
460             <element name = "size" type = "xs:integer" minOccurs = "0"/>
461             <element name = "uri" type = "xs:anyURI" minOccurs = "0"/>
462             <element name = "derefUri" type = "xs:string" minOccurs = "0"/>
463             <element name = "digest" type = "xs:string" minOccurs = "0"/>
464         </sequence>
465     </complexType>
466 </element>
467 <element name = "area" minOccurs = "0" maxOccurs = "unbounded">
468     <complexType>
469         <sequence>
470             <element name = "areaDesc" type = "xs:string"/>
471             <element name = "polygon" type = "xs:string" minOccurs = "0" maxOccurs =
472 "unbounded"/>
473             <element name = "circle" type = "xs:string" minOccurs = "0" maxOccurs =
474 "unbounded"/>
475             <element name = "geocode" minOccurs = "0" maxOccurs = "unbounded">
476                 <complexType>
477                     <sequence>
478                         <element ref = "cap:valueName"/>
479                         <element ref = "cap:value"/>
480                     </sequence>
481                 </complexType>
482             </element>
483             <element name = "altitude" type = "xs:decimal" minOccurs = "0"/>
484             <element name = "ceiling" type = "xs:decimal" minOccurs = "0"/>
485         </sequence>

```

```
486         </complexType>
487     </element>
488 </sequence>
489 </complexType>
490 </element>
491 <any minOccurs = "0" maxOccurs = "unbounded" namespace = "http://www.w3.org/2000/09/xmldsig#"
492 processContents = "lax"/>
493
494 </sequence>
495 </complexType>
496 </element>
497 <element name = "valueName" type = "xs:string"/>
498 <element name = "value" type = "xs:string"/>
499 </schema>
500
```

501  
502

## 503 3.5 Use of ASN.1 to Specify and Encode the CAP Alert Message

### 504 3.5.1 General

505 The ASN.1 (see ITU-T Rec X.680) schema in 3.5.3 provides an alternative formulation of the XML  
506 schema defined in 3.4. If the ASN.1 Extended XML Encoding Rules (see ITU-T Rec X.693) are applied  
507 to this ASN.1 schema, the permitted XML is identical to that supported by the XML schema in 3.4. If the  
508 ASN.1 Unaligned Packed Encoding Rules (see ITU-T Rec X.691) are applied to it, the resulting binary  
509 encodings are more compact than the corresponding XML encodings.

### 510 3.5.2 Formal Mappings and Specification

511 The normative specification of the compact binary encoding is in 3.5.3 with the application of the ASN.1  
512 Unaligned Packed Encoding Rules (see ITU-T Rec. X.691).

513 The semantics of the fields in the ASN.1 specification are identical to those of the XSD specification, and  
514 the mapping of the fields from the XSD specification to the ASN.1 specification is formally defined in ITU-  
515 T Rec. X.694.

516 Implementations can produce and process the CAP alert XML messages using either ASN.1-based or  
517 XSD-based tools (or other ad hoc software).

518 Implementations can produce and process the CAP alert compact binary messages using ASN.1-based  
519 tools (or by other ad hoc software).

520 Any XML encoded CAP alert messages can be converted to compact binary messages by decoding with  
521 an ASN.1 tool configured for the Extended XML Encoding Rules and re-encoding the resulting abstract  
522 values with an ASN.1 tool configured for Unaligned Packed Encoding Rules.

523 Any compact binary CAP alert messages can be converted to XML encoded messages by decoding with  
524 an ASN.1 tool configured for Unaligned Packed Encoding Rules and re-encoding the resulting abstract  
525 values with an ASN.1 tool configured for Extended XML Encoding Rules.

### 526 3.5.3 ASN.1 Schema

```
527 CAP-1-2 {itu-t recommendation x cap(1303) version1-2(2)}  
528 DEFINITIONS XER INSTRUCTIONS AUTOMATIC TAGS ::=   
529 -- CAP Alert Message (version 1.2)  
530 BEGIN  
531  
532 Alert ::= SEQUENCE {  
533     identifier IdentifierString,  
534     -- Unambiguous identification of the message  
535     -- from all messages from  
536     -- this sender, in a format defined by the sender and  
537     -- identified in the "sender" field below.  
538     sender String,  
539     -- The globally unambiguous identification of the sender.  
540     -- This specification does not define the root of  
541     -- a global identification tree (there is no international  
542     -- agreement on such a root), so it relies  
543     -- on human-readable text to define globally and  
544     -- unambiguously the sender.  
545     -- An internet domain name or use of "iri:/ITU-T/..."  
546     -- are possible, but  
547     -- the choice needs to be clearly stated in human-readable form.  
548     sent DateTime (CONSTRAINED BY {/* XML representation of the XSD  
549     pattern "\d\d\d\d-\d\d-\d\d\dT\d\d:\d\d:\d\d[-,+] \d\d:\d\d" */}),  
550     status AlertStatus,  
551     msgType AlertMessageType,  
552     source String OPTIONAL,  
553     -- Not standardised human-readable identification
```

```

554     -- of the source of the alert.
555     scope      AlertScope,
556     restriction String OPTIONAL,
557         -- Not standardised human-readable restrictions
558         -- on the distribution of the alert message
559     addresses  String OPTIONAL,
560         -- A space separated list of addressees for private messages
561         -- (see 3.2.1)
562     code-list  SEQUENCE SIZE((0..MAX)) OF code String,
563         -- A sequence codes for special handling
564         -- (see 3.2.1)
565         -- The format and semantics of the codes are not defined in this
566         -- specification.
567     note      String OPTIONAL,
568         -- Not standardised human-readable clarifying text for the alert
569         -- (see 3.2.1)
570     references String OPTIONAL,
571         -- Space-separated references to earlier messages
572         -- (see 3.2.1)
573     incidents  String OPTIONAL,
574         -- Space-separated references to related incidents
575         -- (see 3.2.1)
576     info-list  SEQUENCE SIZE((0..MAX)) OF info AlertInformation }
577
578 AlertStatus ::= ENUMERATED {
579     actual,
580     draft,
581     exercise,
582     system,
583     test }
584
585 AlertMessageType ::= ENUMERATED {
586     ack,
587     alert,
588     cancel,
589     error,
590     update }
591
592 AlertScope ::= ENUMERATED {
593     private,
594     public,
595     restricted }
596
597 AlertInformation ::= SEQUENCE {
598     language      Language -- DEFAULT "en-US" -- ,
599         -- The language used in this value of the Info type
600         -- (see 3.2.2)
601     category-list SEQUENCE (SIZE(1..MAX)) OF
602         category InformationCategory,
603     event         String,
604         -- Not standardised human-readable text describing the
605         -- type of the event (see 3.2.2)
606     responseType-list SEQUENCE SIZE((0..MAX)) OF
607         responseType InformationResponseType,
608     urgency       HowUrgent,
609     severity      HowSevere,
610     certainty     HowCertain,
611     audience     String OPTIONAL,
612         -- Not standardised human-readable text describing the
613         -- intended audience for the message (see 3.2.2)
614     eventCode-list SEQUENCE SIZE((0..MAX)) OF eventCode SEQUENCE {
615         valueName ValueName,
616         value      Value },

```

```

617     effective           DateTime (CONSTRAINED BY {/* XML representation of the
618 XSD pattern "\d\d\d\d-\d\d-\d\dT\d\d:\d\d:\d\d[-,+] \d\d:\d\d" */}) OPTIONAL,
619     onset               DateTime (CONSTRAINED BY {/* XML representation of the
620 XSD pattern "\d\d\d\d-\d\d-\d\dT\d\d:\d\d:\d\d[-,+] \d\d:\d\d" */}) OPTIONAL,
621     expires             DateTime (CONSTRAINED BY {/* XML representation of the
622 XSD pattern "\d\d\d\d-\d\d-\d\dT\d\d:\d\d:\d\d[-,+] \d\d:\d\d" */}) OPTIONAL,
623     senderName         String OPTIONAL,
624         -- Not standardised human-readable name of the authority
625         -- issuing the message (see 3.2.2)
626     headline           String (SIZE (1..160,...)) OPTIONAL,
627         -- Not standardised human-readable short statement (headline)
628         -- of the alert (see 3.2.2)
629     description        String OPTIONAL,
630         -- Not standardised human-readable extended description of
631         -- the event (see 3.2.2)
632     instruction        String OPTIONAL,
633         -- Not standardised human-readable recommended action
634         -- (see 3.2.2)
635     web                AnyURI OPTIONAL,
636     contact            String OPTIONAL,
637         -- Not standardised human-readable contact details for
638         -- follow-up (see 3.2.2)
639     parameter-list     SEQUENCE SIZE((0..MAX)) OF parameter SEQUENCE {
640         -- System-specific parameters (see 3.2.2)
641         valueName ValueName,
642         value      Value },
643     resource-list      SEQUENCE SIZE((0..MAX)) OF resource ResourceFile,
644     area-list          SEQUENCE SIZE((0..MAX)) OF Area }
645
646 InformationCategory ::= ENUMERATED {
647     cBRNE,
648     env,
649     fire,
650     geo,
651     health,
652     infra,
653     met,
654     other,
655     rescue,
656     safety,
657     security,
658     transport }
659
660 InformationResponseType ::= ENUMERATED {
661     allClear,
662     assess,
663     avoid,
664     evacuate,
665     execute,
666     monitor,
667     none,
668     prepare,
669     shelter }
670
671 HowUrgent ::= ENUMERATED {
672     expected,
673     future,
674     immediate,
675     past,
676     unknown }
677
678 HowSevere ::= ENUMERATED {
679     extreme,
680     minor,

```



```

681         moderate,
682         severe,
683         unknown }
684
685 HowCertain ::= ENUMERATED {
686     likely,
687     observed,
688     possible,
689     unknown,
690     unlikely }
691
692 ResourceFile ::= SEQUENCE {
693     -- Information about an associated resource file
694     -- (see 3.2.3)
695     resourceDesc String,
696     -- Not standardised human-readable description of the type
697     -- and content of
698     -- an associated resource file (for example a map or
699     -- photograph) (see 3.2.3)
700     mimeType      String,
701     size          INTEGER OPTIONAL, -- In bytes
702     uri           AnyURI OPTIONAL,
703     derefUri     String OPTIONAL,
704     -- An alternative to the URI giving the Base64-encoded
705     -- content of the resource file (see 3.2.3)
706     digest       String OPTIONAL
707     -- SHA-1 hash of the resource file for error detection
708     -- (see 3.2.3) -- }
709
710 Area ::= SEQUENCE {
711     -- Identification of an affected area
712     areaDesc      String,
713     -- Not standardised human-readable description of the area
714     polygon-list SEQUENCE OF polygon String,
715     -- Each element is a space-separated list of coordinate pairs
716     -- The complete list starts and ends with the same point and
717     -- defines the polygon that defines the area
718     -- (see 3.2.4).
719     circle-list SEQUENCE OF circle String,
720     -- A space-separated list of coordinates for a point and a radius
721     geocode-list SEQUENCE SIZE((0..MAX)) OF geocode SEQUENCE {
722     -- A geographic code designating the alert target area
723     -- (see 3.2.4)
724         valueName ValueName,
725         value      Value },
726     altitude     REAL OPTIONAL,
727     -- Specific or minimum altitude of the affected area
728     ceiling      REAL OPTIONAL
729     -- Maximum altitude of the affected area -- }
730
731 ValueName ::= String -- A not standardised name for
732     -- an information event code, a parameter or a geocode
733
734 Value ::= String -- The value of the information event code,
735     -- parameter or geocode
736
737 String ::= UTF8String (FROM (
738     {0,0,0,9} -- TAB
739     | {0,0,0,10} -- CR
740     | {0,0,0,13} -- LF
741     | {0,0,0,32}..{0,0,215,255} -- Space to the start of the S-zone
742     | {0,0,224,0}..{0,0,255,253} -- Rest of BMP after S-zone
743     | {0,1,0,0}..{0,16,255,253} -- Other planes -- ) )
744

```

```

745 StringChar ::= String (SIZE(1))
746
747 SpaceAndComma ::= UTF8String (FROM (
748     {0,0,0,32} -- SPACE
749     | {0,0,0,44} -- COMMA -- ) )
750
751 IdentifierString ::= String (FROM (StringChar EXCEPT SpaceAndComma))
752
753 Language ::= VisibleString(FROM ("a".."z" | "A".."Z" | "-" | "0".."9"))
754     (PATTERN "[a-zA-Z]#(1,8) (-[a-zA-Z0-9]#(1,8))*")
755     -- The semantics of Language is specified in IETF RFC 3066
756
757 DateTime ::= TIME (SETTINGS "Basic=Date-Time Date=YMD
758     Year=Basic Time=HMS Local-or-UTC=LD")
759     -- This is the ISO 8601 format using local time and a
760     -- time difference
761
762 stringWithNoCRLFHT ::= UTF8String (FROM (
763     {0,0,0,32}..{0,0,215,255}
764     |{0,0,224,0}..{0,0,255,253}
765     |{0,1,0,0}..{0,16,255,255}))
766
767 AnyURI ::= stringWithNoCRLFHT (CONSTRAINED BY {
768     /* Shall be a valid URI as defined in IETF RFC 2396 */)
769
770 ENCODING-CONTROL XER
771     GLOBAL-DEFAULTS MODIFIED-ENCODINGS
772     GLOBAL-DEFAULTS CONTROL-NAMESPACE
773     "http://www.w3.org/2001/XMLSchema-instance" PREFIX "xsi"
774     NAMESPACE ALL, ALL IN ALL AS "urn:oasis:names:tc:emergency:cap:1.2"
775     PREFIX "cap"
776     NAME Alert, Area AS UNCAPITALIZED
777     UNTAGGED SEQUENCE OF
778     DEFAULT-FOR-EMPTY AlertInformation.language AS "en-US"
779     TEXT AlertStatus:ALL,
780     AlertMessageType:ALL,
781     AlertScope:ALL,
782     InformationCategory:ALL,
783     InformationResponseType:ALL,
784     HowUrgent:ALL,
785     HowSevere:ALL,
786     HowCertain:ALL AS CAPITALIZED
787     WHITESPACE Language, AnyURI COLLAPSE
788 END

```

789

---

## 790 4 Conformance

791 An implementation conforms to this specification if it satisfies all of the MUST or REQUIRED level  
792 requirements defined within this specification.

793 This specification references a number of other specifications. In order to comply with this specification,  
794 an implementation MUST implement the portions of referenced specifications necessary to comply with  
795 the required provisions of this specification. Additionally, the implementation of the portions of the  
796 referenced specifications that are specifically cited in this specification MUST comply with the rules for  
797 those portions as established in the referenced specification.

798

### 799 4.1 Conformance Targets

800 The following conformance targets are defined in order to support the specification of conformance to this  
801 standard:

- 802 a) CAP V1.2 Message
- 803 b) CAP V1.2 Message Producer
- 804 c) CAP V1.2 Message Consumer

805

### 806 4.2 Conformance as a CAP V1.2 Message

807 An XML 1.0 document is a conforming CAP V1.2 Message if and only if:

- 808 a) it is valid according to the schema located at [http://docs.oasis-](http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.xsd)  
809 [open.org/emergency/cap/v1.2/CAP-v1.2.xsd](http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2.xsd) and
- 810 b) the content of its elements and the values of its attributes meet all the additional mandatory  
811 requirements specified in Section 3.

812

### 813 4.3 Conformance as a CAP V1.2 Message Producer

814 A software entity is a conforming CAP V1.2 Message Producer if and only if:

- 815 a) it is constructed in such a way that any XML document produced by it and present in a place in  
816 which a conforming CAP V1.2 Message is expected (based on contextual information) is indeed a  
817 conforming CAP V1.2 Message according to this standard.

818 The condition in (a) above can be satisfied in many different ways. Here are some examples of possible  
819 scenarios:

- 820 – a distribution element(for example, EDXL-DE) transfers messages carrying CAP V1.2 Messages;  
821 a client has sent a request for a CAP V1.2 Message to a server which claims to be a conforming  
822 CAP V1.2 Message Producer, and has received a response which is therefore expected to carry  
823 a conforming CAP V1.2 Message;
- 824 – a local test environment has been set up, and the application under test (which claims to be a  
825 conforming CAP V1.2 Message Producer) has the ability to produce a CAP V1.2 Message and  
826 write it to a file in a directory in response to a request coming from the testing tool; the testing tool  
827 has sent many requests to the application under test and is now verifying all the files present in  
828 the directory, which is expected to contain only conforming CAP V1.2 Messages;

829

#### 830 **4.4 Conformance as a CAP V1.2 Message Consumer**

831 A software entity is a conforming CAP V1.2 Message Consumer if and only if:

832 a) it is constructed in such a way that it is able to successfully validate and ingest a conforming CAP  
833 V1.2 Message according to this standard.

834 The condition in (a) above can be satisfied in many different ways. Here is one example of a possible  
835 scenario:

836 – a client receives and processes a CAP V1.2 Message from a server which claims to be a  
837 conforming CAP V1.2 Message Producer

838

839

---

## 840 Appendix A. CAP Alert Message Example

841 XML examples are included below and are also available as separate files, along with ASN.1 binary  
842 encoded examples, in the CAP 1.2 document repository <http://docs.oasis-open.org/emergency/cap/v1.2/>

### 843 A.1. Homeland Security Advisory System Alert

844 The following is a speculative example in the form of a CAP XML message.

```
845 <?xml version = "1.0" encoding = "UTF-8"?>
846 <alert xmlns = "urn:oasis:names:tc:emergency:cap:1.2">
847   <identifier>43b080713727</identifier>
848   <sender>hsas@dhs.gov</sender>
849   <sent>2003-04-02T14:39:01-05:00</sent>
850   <status>Actual</status>
851   <msgType>Alert</msgType>
852   <scope>Public</scope>
853   <info>
854     <category>Security</category>
855     <event>Homeland Security Advisory System Update</event>
856     <urgency>Immediate</urgency>
857     <severity>Severe</severity>
858     <certainty>Likely</certainty>
859     <senderName>U.S. Government, Department of Homeland Security</senderName>
860     <headline>Homeland Security Sets Code ORANGE</headline>
861     <description>The Department of Homeland Security has elevated the Homeland Security Advisory
862 System threat level to ORANGE / High in response to intelligence which may indicate a heightened
863 threat of terrorism.</description>
864     <instruction> A High Condition is declared when there is a high risk of terrorist attacks. In
865 addition to the Protective Measures taken in the previous Threat Conditions, Federal departments
866 and agencies should consider agency-specific Protective Measures in accordance with their
867 existing plans.</instruction>
868     <web>http://www.dhs.gov/dhspublic/display?theme=29</web>
869     <parameter>
870       <valueName>HSAS</valueName>
871       <value>ORANGE</value>
872     </parameter>
873     <resource>
874       <resourceDesc>Image file (GIF)</resourceDesc>
875       <mimeType>image/gif</mimeType>
876       <uri>http://www.dhs.gov/dhspublic/getAdvisoryImage</uri>
877     </resource>
878     <area>
879       <areaDesc>U.S. nationwide and interests worldwide</areaDesc>
880     </area>
881   </info>
882 </alert>
```

883

884 **A.2. Severe Thunderstorm Warning**

885 The following is a speculative example in the form of a CAP XML message.

```
886 <?xml version = "1.0" encoding = "UTF-8"?>
887 <alert xmlns = "urn:oasis:names:tc:emergency:cap:1.2">
888   <identifier>KSTO1055887203</identifier>
889   <sender>KSTO@NWS.NOAA.GOV</sender>
890   <sent>2003-06-17T14:57:00-07:00</sent>
891   <status>Actual</status>
892   <msgType>Alert</msgType>
893   <scope>Public</scope>
894   <info>
895     <category>Met</category>
896     <event>SEVERE THUNDERSTORM</event>
897     <responseType>Shelter</responseType>
898     <urgency>Immediate</urgency>
899     <severity>Severe</severity>
900     <certainty>Observed</certainty>
901     <eventCode>
902       <valueName>SAME</valueName>
903       <value>SVR</value>
904     </eventCode>
905     <expires>2003-06-17T16:00:00-07:00</expires>
906     <senderName>NATIONAL WEATHER SERVICE SACRAMENTO CA</senderName>
907     <headline>SEVERE THUNDERSTORM WARNING</headline>
908     <description> AT 254 PM PDT...NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE
909 THUNDERSTORM OVER SOUTH CENTRAL ALPINE COUNTY...OR ABOUT 18 MILES SOUTHEAST OF KIRKWOOD...MOVING
910 SOUTHWEST AT 5 MPH. HAIL...INTENSE RAIN AND STRONG DAMAGING WINDS ARE LIKELY WITH THIS
911 STORM.</description>
912     <instruction>TAKE COVER IN A SUBSTANTIAL SHELTER UNTIL THE STORM PASSES.</instruction>
913     <contact>BARUFFALDI/JUSKIE</contact>
914     <area>
915       <areaDesc>EXTREME NORTH CENTRAL TUOLUMNE COUNTY IN CALIFORNIA, EXTREME NORTHEASTERN
916 CALAVERAS COUNTY IN CALIFORNIA, SOUTHWESTERN ALPINE COUNTY IN CALIFORNIA</areaDesc>
917       <polygon>38.47,-120.14 38.34,-119.95 38.52,-119.74 38.62,-119.89 38.47,-120.14</polygon>
918       <geocode>
919         <valueName>SAME</valueName>
920         <value>006109</value>
921       </geocode>
922       <geocode>
923         <valueName>SAME</valueName>
924         <value>006009</value>
925       </geocode>
926       <geocode>
927         <valueName>SAME</valueName>
928         <value>006003</value>
929       </geocode>
930     </area>
931   </info>
932 </alert>
```

933

### 934 **A.3. Earthquake Report (Update Message)**

935 The following is a speculative example in the form of a CAP XML message.

```
936 <?xml version = "1.0" encoding = "UTF-8"?>
937 <alert xmlns = "urn:oasis:names:tc:emergency:cap:1.2">
938   <identifier>TRI13970876.2</identifier>
939   <sender>trinet@caltech.edu</sender>
940   <sent>2003-06-11T20:56:00-07:00</sent>
941   <status>Actual</status>
942   <msgType>Update</msgType>
943   <scope>Public</scope>
944   <references>trinet@caltech.edu,TRI13970876.1,2003-06-11T20:30:00-07:00</references>
945   <info>
946     <category>Geo</category>
947     <event>Earthquake</event>
948     <urgency>Past</urgency>
949     <severity>Minor</severity>
950     <certainty>Observed</certainty>
951     <senderName>Southern California Seismic Network (TriNet) operated by Caltech and
952     USGS</senderName>
953     <headline>EQ 3.4 Imperial County CA</headline>
954     <description>A minor earthquake measuring 3.4 on the Richter scale occurred near Brawley,
955     California at 8:30 PM Pacific Daylight Time on Wednesday, June 11, 2003. (This event has now been
956     reviewed by a seismologist)</description>
957     <web>http://www.trinet.org/scsn/scsn.html</web>
958     <parameter>
959       <valueName>EventID</valueName>
960       <value>13970876</value>
961     </parameter>
962     <parameter>
963       <valueName>Version</valueName>
964       <value>1</value>
965     </parameter>
966     <parameter>
967       <valueName>Magnitude</valueName>
968       <value>3.4 Ml</value>
969     </parameter>
970     <parameter>
971       <valueName>Depth</valueName>
972       <value>11.8 mi.</value>
973     </parameter>
974     <parameter>
975       <valueName>Quality</valueName>
976       <value>Excellent</value>
977     </parameter>
978     <area>
979       <areaDesc>1 mi. WSW of Brawley, CA; 11 mi. N of El Centro, CA; 30 mi. E of OCOTILLO
980       (quarry); 1 mi. N of the Imperial Fault</areaDesc>
981       <circle>32.9525,-115.5527 0</circle>
982     </area>
983   </info>
984 </alert>
```

985

## 986 A.4. AMBER Alert (Multilingual Message)

987 The following is a speculative example in the form of a CAP XML message.

```
988 <?xml version = "1.0" encoding = "UTF-8"?>
989 <alert xmlns = "urn:oasis:names:tc:emergency:cap:1.2">
990   <identifier>KAR0-0306112239-SW</identifier>
991   <sender>KARO@CLETS.DDJ.CA.GOV</sender>
992   <sent>2003-06-11T22:39:00-07:00</sent>
993   <status>Actual</status>
994   <msgType>Alert</msgType>
995   <source>SW</source>
996   <scope>Public</scope>
997   <info>
998     <language>en-US</language>
999     <category>Rescue</category>
1000     <event>Child Abduction</event>
1001     <urgency>Immediate</urgency>
1002     <severity>Severe</severity>
1003     <certainty>Likely</certainty>
1004     <eventCode>
1005       <valueName>SAME</valueName>
1006       <value>CAE</value>
1007     </eventCode>
1008     <senderName>Los Angeles Police Dept - LAPD</senderName>
1009     <headline>Amber Alert in Los Angeles County</headline>
1010     <description>DATE/TIME: 06/11/03, 1915 HRS. VICTIM(S): KHAYRI DOE JR. M/B BLK/BRO 3'0", 40
1011     LBS. LIGHT COMPLEXION. DOB 06/24/01. WEARING RED SHORTS, WHITE T-SHIRT, W/BUE COLLAR.
1012     LOCATION: 5721 DOE ST., LOS ANGELES, CA. SUSPECT(S): KHAYRI DOE SR. DOB 04/18/71 M/B, BLK HAIR,
1013     BRO EYE. VEHICLE: 81' BUICK 2-DR, BLUE (4XXX000).</description>
1014     <contact>DET. SMITH, 77TH DIV, LOS ANGELES POLICE DEPT-LAPD AT 213 485-2389</contact>
1015     <area>
1016       <areaDesc>Los Angeles County</areaDesc>
1017       <geocode>
1018         <valueName>SAME</valueName>
1019         <value>006037</value>
1020       </geocode>
1021     </area>
1022   </info>
1023   <info>
1024     <language>es-US</language>
1025     <category>Rescue</category>
1026     <event>Abducción de Niño</event>
1027     <urgency>Immediate</urgency>
1028     <severity>Severe</severity>
1029     <certainty>Likely</certainty>
1030     <eventCode>
1031       <valueName>SAME</valueName>
1032       <value>CAE</value>
1033     </eventCode>
1034     <senderName>Departamento de Policía de Los Ángeles - LAPD</senderName>
1035     <headline>Alerta Amber en el condado de Los Ángeles</headline>
1036     <description>DATE/TIME: 06/11/03, 1915 HORAS. VÍCTIMAS: KHAYRI DOE JR. M/B BLK/BRO 3'0", 40
1037     LIBRAS. TEZ LIGERA. DOB 06/24/01. CORTOCIRCUITOS ROJOS QUE USAN, CAMISETA BLANCA, COLLAR DE
1038     W/BUE. LOCALIZACIÓN: 5721 DOE ST., LOS ANGELES. SOSPECHOSO: KHAYRI DOE ST. DOB 04/18/71 M/B,
1039     PELO DEL NEGRO, OJO DE BRO. VEHÍCULO: 81' BUICK 2-DR, AZUL (4XXX000)</description>
1040     <contact>DET. SMITH, 77TH DIV, LOS ANGELES POLICE DEPT-LAPD AT 213 485-2389</contact>
1041     <area>
1042       <areaDesc>condado de Los Ángeles</areaDesc>
1043       <geocode>
1044         <valueName>SAME</valueName>
1045         <value>006037</value>
1046       </geocode>
1047     </area>
1048   </info>
1049 </alert>
```



---

## 1050 **Appendix B. Acknowledgments**

### 1051 **OASIS Emergency Management Technical Committee**

1052 Doug Allport, Canadian Association for Public Alerting and Notification (CAPAN)  
1053 Patti Aymond, IEM  
1054 Himadri Banerjee, Previstar Inc.  
1055 Frank Bell, Individual  
1056 Art Botterell, Contra Costa County Community Warning System  
1057 John Bradley, Individual  
1058 Rex Brooks, Individual  
1059 Robert Bunge, NOAA's National Weather Service  
1060 Toby Considine, University of North Carolina at Chapel Hill  
1061 William Cox, Cox Software Architects LLC  
1062 Olivier Dubuisson, France Telecom  
1063 Sukumar Dwarkanath, SRA International  
1064 David Ellis, Sandia National Laboratories  
1065 Thomas Ferrentino, Individual  
1066 Jack Fox, US Department of Homeland Security  
1067 Patrick Gannon, Warning Systems, Inc.  
1068 Timothy Gilmore, US Department of Homeland Security  
1069 James Goodson, US Department of Homeland Security  
1070 Tim Grapes, Evolution Technologies Inc.  
1071 Gary Ham, Individual  
1072 Harry Haury, NuParadigm Government Systems, Inc.  
1073 Werner Joerg, IEM  
1074 Elysa Jones, Warning Systems, Inc.  
1075 Jeff Jortner, Sandia National Laboratories  
1076 William Kalin, US Department of Homeland Security  
1077 Ram Kumar, Individual  
1078 Jeff Kyser, Warning Systems, Inc.  
1079 Ron Lake, Galdos Systems Inc.  
1080 David Lamendsdorf, Emergency Interoperability Consortium  
1081 Mike McDougall, Individual  
1082 Donald McGarry, Mitre Corporation  
1083 Tom Merkle, Lockheed Martin  
1084 Enoch Moses, ManTech Enterprise Integration Center (e-IC)  
1085 Brian Nelson, Sandia National Laboratories  
1086 Camille Osterloh, US Department of Homeland Security  
1087 John Pitale, Edmond Scientific Company  
1088 Mark Pleimann, Mitre Corporation  
1089 Donald Ponikvar, US Department of Homeland Security  
1090 Jacqueline Postell, US Department of Homeland Security  
1091 Carl Reed, Open Geospatial Consortium, Inc. (OGC)  
1092 Dean Reese, ESI Acquisition, Inc.  
1093 Kirby Rice, Eye Street Solutions  
1094 Howard Ryan, Desktop Alert Inc.  
1095 Tracy Ryan, Emergency Interoperability Consortium  
1096 Josh Shows, ESI Acquisition, Inc.  
1097 Aviv Siegel, AtHoc, Inc.  
1098 Andrew Sonner, Evolution Technologies Inc.  
1099 Christopher Springer, US Department of Homeland Security  
1100 Steve Streetman, US Department of Homeland Security  
1101 Lee Tincher, Evolution Technologies Inc.

1102 James Trawick, viaRadio Corporation  
1103 Alessandro Triglia, OSS Nokalva  
1104 Richard Vandame, US Department of Homeland Security  
1105 Matt Walton, Individual  
1106 Jeff Waters, US Department of Defense (DoD)  
1107 David Webber, Individual  
1108 Jacob Westfall, Individual  
1109 David Yarbrough, Northrop Grumman  
1110  
1111

## Appendix C. Revision History

Rev	Date	By Whom	What
1.2	2010-03-02	Jacob Westfall	Technical Committee approved changes that removed XML Digital Encryption within CAP messages.
1.2	2009-12-22	Jacob Westfall	Technical Committee approved the v. 1.2 draft submitted by the Messaging Subcommittee with a duplicate Normative Reference entry removed.
1.2	2009-09-29	Jacob Westfall	Technical Committee approved the v. 1.2 draft submitted by the Messaging Subcommittee with a change made to responseType in the ASN.1 schema.
1.2	2009-09-17	Jacob Westfall	<p>Messaging Subcommittee approved changes based on initial public comment period:</p> <ul style="list-style-type: none"> <li>Expanded the scope of the &lt;addresses&gt; element</li> <li>Changed &lt;mimeType&gt; to be a required element and added note for &lt;size&gt;</li> <li>Qualified the base schema types in the schema</li> <li>Changed the schema typing for &lt;altitude&gt; and &lt;ceiling&gt; to be a decimal instead of a string</li> <li>ASN.1 examples were added</li> </ul> <p>Various editorial corrections</p>
1.2	2009-04-28	Jacob Westfall	<p>Technical Committee approved the v. 1.2 draft with the following additional changes:</p> <ul style="list-style-type: none"> <li>DateTime Data Type moved to Implementation Notes</li> <li>Changes to &lt;status&gt; and &lt;note&gt; descriptions</li> <li>Wording change to &lt;severity&gt; "Minor"</li> <li>Schema changed to allow only one &lt;EncryptedData&gt; element and changed Security Note section to allow multiple &lt;Signature&gt; elements</li> </ul> <p>Various editorial corrections and clarifications</p>
1.2	2009-04-14	Jacob Westfall	<p>Messaging Subcommittee approved v. 1.2 draft for submission to full Technical Committee:</p> <ul style="list-style-type: none"> <li>Multiple XML signature/encryption elements</li> <li>Editorial changes to History and Character Entity References sections</li> <li>DateTime Data Type examples</li> <li>Fixed DOM display</li> </ul>

1.2	2009-03-31	Jacob Westfall	<p>Applied changes per recommendations identified by CAP comments process and profile development:</p> <ul style="list-style-type: none"> <li>• Includes CAP 1.1 Errata and ASN.1 Schema</li> <li>• DateTime Data Type to further define the acceptable date and time values</li> <li>• New &lt;responseType&gt; values of Avoid and AllClear</li> <li>• Clarification on acceptable &lt;polygon&gt; values and the use of character entity references</li> <li>• Schemas were updated to reflect changes and to validate when XML signature/encryption elements are present</li> <li>• Conformance section added</li> <li>• Updated CAP Alert Message Examples</li> </ul> <p>Various editorial corrections and clarifications</p>
1.1 Errata	2007-10-02		CAP 1.1 Errata approved (see CAP 1.1 Errata document for prior change history)
1.1	2005-09-30		CAP 1.1 adopted as OASIS Standard (see CAP 1.1 specification document for prior change history)
1.1	2005-07-27	Art Botterell	<p>Edits to conform object model, data dictionary and schema:</p> <ul style="list-style-type: none"> <li>• Reordered items in object diagram and data dictionary to match sequence required by schema.</li> <li>• Edited schema to make &lt;scope&gt; mandatory and to permit multiple instances of &lt;responseType&gt; and &lt;eventCode&gt;, in accordance with the data dictionary.</li> </ul>
1.1	2005-07-23	Art Botterell	<p>Applied changes per recommendations of Messaging Subcommittee based on initial public comment period:</p> <ul style="list-style-type: none"> <li>• Modified XML syntax of &lt;eventCode&gt; , &lt;parameter&gt; and &lt;geocode&gt;</li> <li>• Added "Draft" value for &lt;status&gt;</li> <li>• Changed CAP namespace to URN form</li> <li>• Tightened usage of dateTime formats in &lt;sent&gt;, &lt;effective&gt;, &lt;onset&gt; and &lt;expiration&gt;</li> <li>• Corrected schema to correct value of "CBRNE" in &lt;event&gt;</li> <li>• Conformed examples in Appendix A to new namespace.</li> </ul>
1.1	2005-04-28	Elysa Jones	<p>Technical Committee approved the v. 1.1 draft with the following additional changes:</p> <ul style="list-style-type: none"> <li>• Normative language added to specify uniqueness of &lt;identifier&gt;</li> <li>• Change [dateTime] format for &lt;sent&gt;, &lt;effective&gt;, &lt;onset&gt; and &lt;expires&gt; elements</li> <li>• Change &lt;language&gt; element RFC from 1166 to 3066 and added null</li> <li>• Changed the &lt;mineType&gt; element RFC 1521 to 2046</li> <li>• Added &lt;derefURI&gt; element</li> <li>• Security Note updated and added Digital Signature and Encryption note paragraphs</li> </ul>

1.1	2005-01-04	Art Botterell	<p>Messaging Subcommittee approved v. 1.1 draft for submission to full Technical Committee:</p> <ul style="list-style-type: none"> <li>• Added &lt;responseType&gt; element</li> <li>• Made &lt;category&gt; element mandatory</li> <li>• Amended enumerated values for the &lt;certainty&gt; element</li> <li>• Deleted the &lt;password&gt; element</li> <li>• Various editorial corrections and clarifications</li> </ul>
1.0	2004-04-01	Art Botterell	<p>CAP 1.0 adopted as OASIS Standard (see CAP 1.0 specification document for prior change history.)</p>

1113

# Google Public Alerts CAP v1.0

This section describes Google-specific differences with the CAP 1.2 XML format. The [Google CAP schema](https://github.com/google/cap-library/tree/master/schema) (<https://github.com/google/cap-library/tree/master/schema>) is available for download from GitHub.

## Overview

Alert message data must be provided in [CAP 1.2](http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html) (http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html) XML format. (CAP 1.1 XML format also is accepted.)

Google Public Alerts requires some elements that are optional in the OASIS spec, such as `<expires>`, `<description>`, and `<area>`. These elements allow Google to process and display your alerts effectively. For example, specifying `<area>` helps us target your alert to the users most likely to find it relevant based on their location.

The tables below list the standard CAP 1.2 message elements as modified by the additional Google Public Alert requirements. These elements, including the Google modifications, comprise the data dictionary for CAP-Google. They have been implemented in the [Google CAP validator](http://cap-validator.appspot.com/) (http://cap-validator.appspot.com/) as Google Public Alerts CAP v1.0.

## Terminology

1. The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](https://www.ietf.org/rfc/rfc2119.txt) (https://www.ietf.org/rfc/rfc2119.txt).
2. Where an element's optionality has changed from the OASIS CAP 1.2 specification, the new value is bold and highlighted in **RED**.

## About the requirements tables

The "Optionality" columns in the tables below classify each element as one of the following:

1. **REQUIRED**: Your feed is considered invalid if it doesn't include a properly-formatted value for this tag
2. **CONDITIONAL**: Optional, but conditioned on the value of another tag
3. **OPTIONAL**: These tags are supported to allow you to tailor results based on your application

Google CAP also specifies additional requirements about the format and content of field values. The "notes and requirements" columns provide details and reasons for these.

## <alert> element and sub-elements

### Element Name Optionality CAP-Google notes and requirements

Element Name	Optionality	CAP-Google notes and requirements
<code>&lt;alert&gt;</code>	REQUIRED	
<code>&lt;identifier&gt;</code>	REQUIRED	
<code>&lt;sender&gt;</code>	REQUIRED	
<code>&lt;sent&gt;</code>	REQUIRED	If the location cited in the <code>&lt;area&gt;</code> block falls within a single timezone, <code>&lt;effective&gt;</code> SHOULD specify time in that zone, including allowance for Daylight Savings when applicable. When the content of a message applies across multiple timezones, the message producer SHOULD use UTC times in preference to local times.
<code>&lt;status&gt;</code>	REQUIRED	Require the use of "test" as <code>&lt;status&gt;</code> for all test messages. Sending test messages "actual" is considered extremely bad form and will lead Google to suspend a publisher.
<code>&lt;msgType&gt;</code>	REQUIRED	<code>&lt;msgType&gt;</code> UPDATE or CANCEL must include at least one <code>&lt;references&gt;</code> element. As specified in the CAP standard, any alert message that is updating a previous alert should use <code>&lt;msgType&gt;Update&lt;/msgType&gt;</code> and set <code>&lt;references&gt;</code> to all previous messages that haven't reached their <code>&lt;expires&gt;</code> date. The UPDATE or CANCEL must apply to a non-expired alert, and hence all related messages and unexpired alerts must be referenced when an UPDATE or CANCEL is issued.

<source>	OPTIONAL	
<scope>	REQUIRED	
<restriction>	CONDITIONAL	
<addresses>	CONDITIONAL	
<code>	OPTIONAL	
<note>	OPTIONAL	
<references>	OPTIONAL	Required if <msgType> is "Update" or "Cancel". Where your system republishes CAP content from another publisher, you should include alert CAP in full, but if it's been edited use the <references> tag to link to the original source.
<incidents>	OPTIONAL	

## <info> element and sub-elements

### Element Name    Optionality    CAP-Google notes and requirements

<info>	<b>REQUIRED</b>	At least one <info> must be present all <info> blocks must have the same <category> and <eventCode> values.
<language>	OPTIONAL	All <info> blocks with the same <language> must have the same values for <event>
<category>	REQUIRED	
<event>	REQUIRED	length: < 35 characters Google Public Alerts requires CAP that supports a finite and pre-defined set of <event> types. Alerts with <event> not drawn from this set for the appropriate profile or as provided to Google will not be published. This is a common pattern for many national CAP profiles (for example, CAP-CP and CAP-AU).  The set of event types should be defined in a CSV or Google Spreadsheet document ( <a href="https://docs.google.com/spreadsheets/d/1NKp1V21XD4tCieb7BFZuL9tVJxqssSZZZ7GJyv7JSFM/edit#gid=0">sample here</a> ) (https://docs.google.com/spreadsheets/d/1NKp1V21XD4tCieb7BFZuL9tVJxqssSZZZ7GJyv7JSFM/edit#gid=0). We want these to be short (< 35 char) and descriptive enough for the public to understand; we use the event string (or sometimes the <headline>) in the title of our alert. If your <event> names aren't like this, then we need a clear mapping to an "ordinary user" understandable string of < 35 char that we can use in it's place.  This should go either in the <headline> element (as the first 35 characters of the < 140 char string) or be listed as a separate string for each event type. Canada and Australia have CAP profiles that define this list for all alert providers in the country. Where such a profile exists we are happy to use it.
<responseType>	OPTIONAL	<responseType> is strongly recommended, when applicable, along with a corresponding <instruction> value.
<urgency>	REQUIRED	Do not use "unknown" as this makes indexing alerts and relative rankings difficult. It's important for Google to know how this field is set and by whom, though this is outside the scope of the formal profile. While preferably this value is set by the publisher on a case-by-case basis following clear triggering guidelines, they might be fixed by <event>, though this reduces the flexibility of alert authors. As an example, NOAA in the USA sets urgency statically based on event type.
<severity>	REQUIRED	Do not use "unknown" as this makes indexing alerts and relative rankings difficult. It's important for Google to know how this field is set and by whom, though this is outside the scope of the formal profile. While preferably this value is set by the publisher on a case-by-case basis following clear triggering guidelines, they might be fixed by <event>, though this reduces the flexibility of alert authors. As an example, NOAA in the USA sets urgency statically based on event type.
<certainty>	REQUIRED	Do not use "unknown" as this makes indexing alerts and relative rankings difficult. It's important for Google to know how this field is set and by whom, though this is outside the scope of the formal profile. While preferably this value is set by the publisher on a case-by-case basis following clear triggering guidelines, they might be fixed by <event>, though this reduces the flexibility of alert authors. As an example, NOAA in the USA sets urgency statically based on event type.
<audience>	OPTIONAL	
<eventCode>	OPTIONAL	
<effective>	OPTIONAL	Time zone fields must be included in all date/time values. If the location cited in the <area> block falls within a single timezone, <effective> SHOULD specify time in that zone, including allowance for Daylight Savings when applicable. When the content of a message applies across multiple timezones, the message producer SHOULD use UTC times in preference to local times.
<onset>	OPTIONAL	Time zone fields must be included in all date/time values. If the location cited in the <area> block falls within a single timezone, <effective> SHOULD specify time in that zone, including allowance for Daylight Savings when applicable. When the content of a

message applies across multiple timezones, the message producer SHOULD use UTC times in preference to local times.

<code>&lt;expires&gt;</code>	<b>REQUIRED</b>	<code>&lt;expires&gt;</code> must come after <code>&lt;effective&gt;</code> in time order. Time zone fields must be included in all date/time values. If the location cited in the <code>&lt;area&gt;</code> block falls within a single timezone, <code>&lt;effective&gt;</code> SHOULD specify time in that zone, including allowance for Daylight Savings when applicable. When the content of a message applies across multiple timezones, the message producer SHOULD use UTC times in preference to local times.
<code>&lt;senderName&gt;</code>	OPTIONAL	This is strongly recommended. Having the human readable name for the sender enables the <code>&lt;web&gt;</code> link to be shown in a user-friendly way as per the publisher/sender's preferences. In addition, this allows alert aggregators to act to publish from multiple authorities.
<code>&lt;headline&gt;</code>	OPTIONAL	length: < 140 characters The headline string can be free text, but should be < 140 characters. (CAP 1.2 suggests < 160 for text messages). The start of this string should be a few descriptive words that explain the core of the alert (for example, "Pontoon bridge closure..."). The <code>&lt;headline&gt;</code> and <code>&lt;description&gt;</code> should not be the same, as the <code>&lt;description&gt;</code> should provide more detail than the headline.
<code>&lt;description&gt;</code>	<b>REQUIRED</b>	The value of this element must not be the same as the <code>&lt;instruction&gt;</code> element. Google uses <code>&lt;description&gt;</code> to populate the "Message" section of our page and <code>&lt;instruction&gt;</code> to populate the "Recommended actions" section. Thus, even though some publishers make them identical, they serve different purposes in CAP and on the Google alerts pages.
<code>&lt;instruction&gt;</code>	OPTIONAL	Optional though strongly recommended. Google Public Alerts uses this field in alert details pages as the "recommended action". The <code>&lt;instruction&gt;</code> and <code>&lt;description&gt;</code> fields should be different, as they serve different purposes. Though some publishers simply copy one to the other, this makes for a poor user experience
<code>&lt;web&gt;</code>	<b>REQUIRED</b>	This should link to a copy of the original alert accessible on your web server. Note: Google validates against this.
<code>&lt;contact&gt;</code>	OPTIONAL	This contact field is optional but we strongly recommend it be present as it provides a way for users to provide feedback and respond to the alert. For example, "For emergencies call 911".
<code>&lt;parameter&gt;</code>	OPTIONAL	

## `<resource>` element and sub-elements

### Element Name    Optionality    CAP-Google notes and requirements

<code>&lt;resource&gt;</code>	OPTIONAL	Let us know when discussing your content with Google what kinds of resources may be linked to the message. For example, related web sites, .wav files, or images.
<code>&lt;resourceDesc&gt;</code>	REQUIRED	
<code>&lt;mimeType&gt;</code>	REQUIRED	
<code>&lt;size&gt;</code>	OPTIONAL	
<code>&lt;uri&gt;</code>	OPTIONAL	
<code>&lt;derefUri&gt;</code>	CONDITIONAL	
<code>&lt;digest&gt;</code>	OPTIONAL	

## `<area>` element and sub-elements

**Important:** If there are non-contiguous areas under the same alert level and type, create separate `<alert>` messages rather than a single `<alert>` with disjointed areas.

### Element Name    Optionality    CAP-Google notes and requirements

<code>&lt;area&gt;</code>	<b>REQUIRED</b>	<code>&lt;area&gt;</code> blocks must have at least one <code>&lt;circle&gt;</code> , <code>&lt;polygon&gt;</code> , or <code>&lt;geocode&gt;</code> . Google strongly prefers <code>&lt;circle&gt;</code> or <code>&lt;polygon&gt;</code> .
<code>&lt;areaDesc&gt;</code>	REQUIRED	<code>&lt;areaDesc&gt;</code> element may be used by Google to generate the location text string used in the alert title/headline.
<code>&lt;polygon&gt;</code>	OPTIONAL	Polygons must meet the following requirements:



- They must be closed.
- They can't overlap.
- Holes (for example, a donut-shaped polygon) and intersections aren't supported.
- A minimum of four coordinate pairs are required. The first and last pairs of coordinates must be the same.

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**<circle>** OPTIONAL

**<geocode>** OPTIONAL Values for **<geocode>** should be associated with a free and open dataset of polygons. As an example, in the USA, this includes the following:

- FIPS6
- UGC code
- SAME
- US Zipcode

This may also be provided as a fixed list provided as a http accessible CSV or Google Spreadsheet of valid **<area>** **<geocodes>** elements. Notices of updates to this list should be posted via a separate channel, preferably as RSS or email alerts.

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**<altitude>** OPTIONAL

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**<ceiling>** CONDITIONAL

## Additional field requirements

### Date/time fields

Date/Time fields MUST include the time zone. This applies to **<sent>**, **<effective>**, **<onset>**, and **<expires>**:

1. If the location cited in the **<area>** block falls within a single timezone, **<effective>** SHOULD specify time in that zone, including allowance for Daylight Savings when applicable.
2. When the content of a message applies across multiple timezones, the message producer SHOULD use UTC times in preference to local times.

### Event changes or expiration

Event changes or expiration SHOULD be handled in the following way:

- **<msgType>** UPDATE or CANCEL must include at least one **<references>** element.
- There are three ways to CANCEL events, in order of preference:
  1. Set an **<expires>** datetime for each event, with the message description setting the expectation that this alert will end on its own.
  2. Issue a new **<alert>** with **<msgType>** UPDATE, **<responseType>** "All Clear", and **<expires>** a short time in the future.
  3. Issue a new **<alert>** with **<msgType>** CANCEL.

Refer to [Sample Updates and Cancellations](https://developers.google.com/public-alerts/samples/alert-updates) (https://developers.google.com/public-alerts/samples/alert-updates) for examples.

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